UURAF

University Undergraduate
Research & Arts Forum

2021

ACKNOWLEDGEMENTS

The 23rd University Undergraduate Research and Arts Forum (UURAF) at Michigan State University will be hosted virtually on Symposium by ForagerOne from April 15 – 19, 2021. This program book recognizes the outstanding research and creative endeavors by over 650 undergraduate students. These students represent 15 different colleges and were mentored by more than 470 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 faculty. Many thanks to…

- Our undergraduate and graduate staff: Paul Billock, Maddie Cantrell, Jessica Diaz, Amanda Flores, Nadir Fouani, Kyleigh Meyers-Vandouser, and Victoria Rubio
- Casie Chunko, Administrative Assistant
- Mordecai Harvey, Professional Aide for Undergraduate Research
- Heather Dover, Coordinator for Undergraduate Research and lead UURAF organizer
- Korine Wawrzynski, Assistant Dean, Academic Initiatives & Director, Undergraduate Research

We appreciate the work of numerous MSU assistant and associate deans for identifying faculty and graduate students to evaluate student presentations.

Finally, we thank 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 Wyatt Stonhouse ‘20, 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 2020-21 Undergraduate Research Ambassadors include:

Anna Akariza
Marissa Cortright
Alyssa Fritz
Aalayna Green
Wisdom Henry
Jasmine Jordan
Srikar Kessamneni
Benjamin Kessler
Erin Kramer
Meghan Kwederis
Jalon Martin
Evan Morton
Kathleen Williams

TABLE OF CONTENTS

Undergraduate Research
MICHIGAN STATE UNIVERSITY

Abstracts

Presentations are organized by category and then by section, followed by presentation number. Oral presentations are listed first, followed by poster and showcase presentations. Abstracts truncated at 300 word maximum.

AGRICULTURE & ANIMAL SCIENCE

PURPORTED INSULIN MODULATORS DO NOT ALTER GLYCEMIC AND INSULINEMIC RESPONSE WHEN CORN IS FED TO MATURE HORSES

Renee Harbowy
Agriculture and Animal Science, Oral Presentation
Section: 1
Presentation Number: 1
Mentor(s): Brian Nielsen

Understanding insulinemic and glycemic responses to equine feeds and efficacy of purported insulin modulators (IM) is valuable in designing diets. Using a repeated 5x5 Latin square design, dehydrated alfalfa (DA), beet pulp (BP), oats (O), corn (C), and corn with an IM consisting of aloe vera and grape seed extract (CIM) were tested for glycemic and insulinemic response in ten horses. Feeds were fed at the rate of 1.5 g/kg of body weight (BW). Aloe vera and grape seed extract were fed at the rates of 150 mg/kg and 20 mg/kg of BW respectively. Horses were fed only forage except when subjected to a glycemic response test. A 12-h fasted blood sample was taken before providing treatments. Additional samples were taken every 30 minutes for 3 hours. Glycemic and insulinemic responses were evaluated by maximum concentrations and time to peak response. Results are presented as lsmeans + SEM. DA and BP had lower peak glucose and insulin concentrations ($P<0.05$) than O, C, and CIM. Adding IM to corn did not alter peak glucose [C: 128+5 mg/dL, CIM: 133+5 mg/dL, $P=0.39$], peak insulin [C: 54.5+15.6 μIU/mL, CIM: 58.6+15.6 μIU/mL; $P=0.78$], time to peak glucose concentrations [C: 93+9 min, CIM: 108+9 min, $P=0.23$], or time to peak insulin concentrations [C: 81+13 min, CIM: 87+13 min, $P=0.73$]. Results support that feeds with greater starch concentrations produce higher maximal blood glucose and insulin concentrations, but the addition of IM to corn did not show a detectable change in the horses' insulinemic and glycemic response.

WHAT DO WE LOSE WHEN UNFETTERED CAPITALISM MEETS UNDER-UTILIZED SPECIES?

Rachel Drobnak
Agriculture and Animal Science, Oral Presentation
Section: 1
Presentation Number: 2
Mentor(s): Krista Isaacs

The rise of under-utilized species, specifically quinoa, opens an opportunity for cultures to benefit from ancestral knowledge and their stewardship of crops over generations; however, history has shown that these groups rarely benefit and are often exploited. While beneficial in the short-term, the rapid rise and fall of quinoa prices (approx. 2008-2015) was harmful to those involved in its production, to the environment, and to the economies of quinoa-producing communities. It is possible to learn from problems associated with the quinoa boom and bust to prevent similar levels of harm to future rising crops.

INFERRING INFECTION RISK OF WEST NILE VIRUS FROM WILDLIFE: CONNECTING HABITAT SELECTION AND SEROPREVALENCE IN FREE-RANGING WHITE-TAILED DEER (ODOCOILEUS VIRGINIANUS)

Avery Tilley
Agriculture and Animal Science, Oral Presentation
Section: 1
Presentation Number: 3
Mentor(s): Sonja Christensen

West Nile virus (WNV) is a mosquito-transmitted pathogen of humans, livestock, and wildlife that has extended rapidly across the United States since its initial 1999 introduction in New York City. WNV is maintained primarily in an enzootic cycle between ornithophilic mosquitoes and avian amplifying hosts, with mammals, including humans, serving as dead-end hosts. A mammalian host of particular interest is the white-tailed deer (WTD), given their role in the maintenance and distribution of WNV as identified through serosurveillance. The WTD serves as the primary mammalian blood meal for Culex species associated with WNV transmission, and WTD have a widespread distribution across varying habitats promoting a variety of interactions between WTD and mosquito vectors. For these reasons, it is critical to better understand the spatial ecology of WTD and how their use of habitat at a landscape level may be important for mitigating or monitoring WNV. This study seeks to evaluate WTD habitat use with respect to Culex habitat and whether WTD could serve as sentinel species for WNV monitoring due to advantages such as opportunistic serum collection from hunter-harvested deer. This study utilized WTD serum obtained from live, radiocollared deer and tested for antibodies to WNV using a virus neutrilaztion assay. Serum results were compared to habitat use of deer and that of known Culex habitat. Our findings suggest the distribution of deer may inform when and where WNV may present a risk on the landscape.

MANAGEMENT OF CERCOSPORA LEAF SPOT IN SUGAR BEETS USING LEAF DEGRADATION TREATMENTS TO REDUCE INOCULUM

Jaime Davidson
Agriculture and Animal Science, Oral Presentation
Section: 1
Presentation Number: 4
Mentor(s): Alex Hernandez, Jaime Willbur

Michigan is the fourth largest producer of sugar beets in the nation, however the industry loses as much as 19% of its annual yields to the foliar disease Cercospora leaf spot (CLS) caused by the fungus Cercospora beticola. CLS causes energy to be diverted from storage in the root to foliar regeneration, reducing sugar content and quality. The pathogen is capable of overwintering in leaf residue and has developed resistance to several commercial fungicide classes, which presents a unique challenge to growers in high pressure areas. In Minnesota and North Dakota, crop rotation and tillage have been used effectively to manage CLS with Michigan and Ontario following in their footsteps. Preliminary observations (data not shown) suggest certain field treatments with a focus on leaf degradation can reduce CLS pressure in the following season by depleting host tissue. In field studies, three treatments were evaluated (heat, desiccant, and tillage) to reduce inoculum survival. Leaves were collected at harvest and every 45 days and area measured using ImageJ. Pre-harvest heat treatment of foliage decreased the viability of CLS sporulation and reduced total leaf area over time ($P < 0.05$). Greenhouse trials were designed to test whether beet pulp and compost soil amendments could also impact leaf degradation and C. beticola viability. A reliable method for leaf residue management could reduce CLS pressure in the sugar beet growing region of Michigan.

EVALUATION OF GROWTH PERFORMANCE AND PLASMA METABOLITE EVALUATION OF LAMBS REARED ON COVER CROP GRAZING SYSTEMS

Danny Schaub
Agriculture and Animal Science, Oral Presentation
Section: 1
Presentation Number: 5
Mentor(s): Barbara Makela, Cat Macaluso, Erin Recktenwald, Jeannine Schweihofer, Kimberly Cassida, Richard Ehrhardt

The integration of sheep into cropping systems provides sheep producers a source of high-quality forage potentially suitable for lamb finishing needs. To evaluate the potential of this forage source for lamb finishing, we examined growth performance and plasma metabolite concentrations of lambs in four types of rearing systems: 6 weeks of grain diet (GR), 8 weeks grazing either brassica cover crop (CCB) or a diverse cover crop mixture (CCM), and 4 weeks background grazing CCB followed by 4 weeks of (BK-GR). Dorset x Polypay lambs (N= 60; 3 pens or pastures, 5 lambs each) were weighed and had blood samples taken weekly during the treatment period. Plasma concentrations of non-esterified fatty acids (NEFA), glucose and plasma urea nitrogen (PUN) were measured to gain insight into aspects of energy and protein metabolism. Grain-fed lambs (GR and BK-GR, 366 g/d) grew faster than grazing lambs (CCB and CCM, 194 g/d) over the study period ($P<0.01$). Glucose concentration did not vary according to treatment or over the study period. Grain-fed lambs displayed lower NEFA concentration than grazing lambs ($P<0.05$). PUN concentration in lambs grazing brassica forage (CCB) was consistently lower than that of other treatments over the study period ($P<0.01$). These results are indicative of greater energy availability to support a higher rate of growth in grain-fed lambs. These results also suggest a perturbation of protein metabolism unique to lambs grazing brassica forage. Further evaluation is underway to reveal whether this is due alteration of anabolic or catabolic processes.

VERIFICATION OF RFID TRACKING POULTRY IN MULTI-TIERED AVIARY SYSTEMS

Torey Fischer
Agriculture and Animal Science, Oral Presentation
Section: 1
Presentation Number: 6
Mentor(s): Cara Robison

Radio frequency identification (RFID) is used extensively for inventory tracking and for general traceability in other segments of animal agriculture. However, RFID has had limited success in tracking the movement of birds around a cage in a multi-tiered aviary system. The purpose of this project was to validate an RFID system to ensure accuracy for data collection and for future application to more extensive projects. There were four separate rooms; each containing forty RFID tagged birds out 144 birds total. In each room, one RFID antenna was installed on each tier of a three-tiered aviary housing system. Digital video cameras were installed in each of room to record the marked birds to confirm the bird location with the RFID data. Video was recorded for four consecutive days in each room. This data will be analyzed and correlated to the RFID data to determine if the antennas are accurately registering the bird's location within the aviary. Times when birds appeared near antennas on the video were marked and then cross-referenced with times when birds came up on the RFID scanner. In the future, this type of technology could be utilized to give producers critical information about how birds are using these types of systems. Additionally, this could impact genetic companies by identifying traits or hens that could improve well-being and improve production through the reduction of mislaid eggs.

NUTRIENT BAG COMPOSITION'S EFFECT ON MOREL MUSHROOM CULTIVATION

Katie Joles
Agriculture and Animal Science, Oral Presentation
Section: 2
Presentation Number: 8
Mentor(s): Laurie Thorp

Morel production has potential to be an important revenue stream for farmers in the Midwest, however currently the majority of morels in the marketplace are wild foraged. Therefore, there is a significant opportunity to utilize this gap to help Midwest farmers improve their economic sustainability. My research aims to find the ideal nutrient bag composition for the morels. Another objective is to study MSU consumer interest in price point and desirability of locally, or in this case campus produced morels. In order to accomplish these objectives, one bed in Bailey Greenhouse, a 30′ by 72′ passive solar greenhouse, will be dedicated for the production of morels. Three different nutrient formulations (leaf litter, brewer's grain, and a control) will be applied in each quadrant of the bed and compared for yield differences from December 1, 2020 to May 1, 2021. During this time ambient air temperature, soil temperature, emergence of spawn, and growth in various treatment will be monitored daily via an automated monitoring system. Harvest weights produced with the different treatments will be compared in May 2021, thus this is preliminary research. Also, a survey to better understand the desirability and price point for the sale of morels to campus dining will be developed and administered during SS21. Anticipated outcomes include preliminary data to scale up further studies of morel production in hoop houses of the Midwest, data on desirable nutrient bags for hoop house production, and data on potential markets for morel sales to MSU campus venues.

A RAY OF HOPE: INVESTIGATING THE EFFECT OF LIGHT COMPOSITION ON SHELTER CAT WELFARE

Kathryn Hurt
Agriculture and Animal Science, Oral Presentation
Section: 2
Presentation Number: 9
Mentor(s): Hanne Hoffmann, Jacquelyn Jacobs

Cats that are adopted quickly tend to cope well in the shelter environment, showing affiliative, engaging behaviors at the front of the kennel toward potential adopters. Cats that do not cope well may hide in the back of the kennel or if provided, in a hide box, and tend to have longer stays in the shelter. Cats are naturally nocturnal and are approximately 7 times more sensitive to light than the human eye. Furthermore, color vision is primarily limited to green and blue colors; in all, cats may not cope well with shelter conditions because the ambient lighting is too intense for comfort. The ultimate aim of this project is to identify a preferred light condition that decreases stress and ultimately, improves adoptability. Three light conditions will be compared: 200-400 lux white light (control; typical shelter light condition), 50-100 lux white light, and 200-400 lux red light. Each cat enrolled in the study will be assessed individually in their respective kennels during the three changes of lighting conditions for signs of discomfort; behavioral stress scores, urinary cortisol and activity via accelerometers will be collected. We hypothesize cats will respond favorably to dim and red-light conditions through increased activity and decreased behavioral and physiological signs of stress in comparison to the 200-400 lux white light condition. Data collection is ongoing through the spring 2021 semester.

PESTICIDE EFFECTS ON NATURAL ENEMIES OF SPOTTED-WINGED DROSOPHILA IN HIGHBUSH BLUEBERRIES

Andrew Jones
Agriculture and Animal Science, Oral Presentation
Section: 2
Presentation Number: 10
Mentor(s): Jacquelyn Perkins

Growers of highbush blueberry must combat a wide variety of pests to produce marketable yields. Insecticides are a primary control method for insect pests, but can be highly toxic to non-target insects such as beneficial natural enemies (predators/parasitoids that suppress pest populations). Spotted-Winged Drosophila is the most damaging insect pest in blueberry production. Their specialized ovipositor allows females to lay eggs within a berry where larvae feed on the fruit. They also have rapid generations, allowing populations to quickly build up. Due to the potential for widespread fruit damage, growers have turned to frequent applications of broad-spectrum insecticides. While natural enemies of SWD are known to be in this region, it's unknown if they can exist within chemically treated fields and aid in controlling pest populations. Therefore, we surveyed six blueberry farms in southwest Michigan for natural enemies when SWD cause the most damage (June-August). Three of the farms used broad-spectrum insecticides and the other three used no chemical control. We used yellow-sticky cards to catch flying insects and changed the cards out every two weeks. Natural enemies were identified to 16 groups (e.g. green lacewings, lady beetles), and we compared the abundance and diversity of these groups between farms and locations within the field. We hypothesized that natural enemies would be more abundant and diverse at farms without chemical pest control.

PRELIMINARY INVESTIGATION OF GLYCINE MAX (SOYBEAN) RESISTANCE TO TWO PHYTOTOXINS ASSOCIATED WITH FUSARIUM VIRGULIFORME: CITRININ AND RADICICOL

Josh Deradoorian
Agriculture and Animal Science, Oral Presentation
Section: 2
Presentation Number: 11
Mentor(s): Dechun Wang

Sudden death of soybean (SDS) is a major disease of Glycine max (soybeans) in the United States. Foliar symptoms have been largely associated with a variety of phytotoxins produced by the fungus Fusarium virguliforme. Genetic resistance is generally believed to be the most effective form of management. This study was an initial investigation into genetic resistance of G. max to various phytotoxins produced by F. virguliforme. Assays were designed using two commercially available phytotoxins associated with foliar symptoms of sudden death. First foliar symptoms of SDS were replicated using cell free F. virguliforme filtrate. An attempt to replicate symptoms seen in previous studies was made using three toxins associated with SDS: citrinin, fusaric acid and radicicol. Three parents of previously genotyped populations were assayed using citrinin and fusaric acid. Two parents exhibited symptoms compared to the control in the citrinin assays and one for fusaric acid assays. Offspring descending from these resistant and susceptible parents may be eligible for further genetic studies regarding citrinin and fusaric acid resistance. If a trait can be associated with both resistance to the fungus and a phytotoxin produced by the fungus it may mean the trait is partially responsible for disease resistance by neutralizing the toxin. If this association can be found, further studies could investigate the mechanism of resistance. If a mechanism were discovered, it may have implications on disease management for sudden death or other fungi that produce the same or similar toxins.

TOTAL AND ANTIGEN-SPECIFIC IGM AND IGA FOLLOWING VACCINE BOOSTER USE IN BOVINE LEUKEMIA VIRUS INFECTED COWS

Cait Ancel
Agriculture and Animal Science, Oral Presentation
Section: 2
Presentation Number: 12
Mentor(s): Paul Coussens

Bovine Leukemia Virus (BLV) is a growing concern within the dairy industry. Approximately 89% of US dairy herds contain infected animals, leading to substantial economic losses. B cells, the main target of BLV, are also the main antibody producers in the host. In 30% of infected cows, B cells proliferate causing persistent lymphocytosis (PL). In 5%-10% of infected cows, BLV can cause lymphoma. The goals of this study were to determine: 1) If the amount of BLV present or proviral load (PVL) is altered by vaccination and 2) If serum IgA and IgM levels were affected by BLV. To do this, blood and saliva samples were collected from 6 BLV+ and 6 BLV- (n=12) cows prior to and at various times post-vaccination (d3, d7, d11, d21, d28). Serum from whole blood collected was analyzed by enzyme-linked immunosorbent assay (ELISA) for IgM and IgA against BHV1, L. Hardjo, and L. Pomona, components of the vaccine. Data was analyzed by Student's T test and ANOVA. PVL in BLV+ cows exhibited a temporary spike at day 14 post vaccination. BLV+ cows were separated into two groups: high PVL (HPL) and low PVL (LPL). Generally, HPL cows had lower IgM and IgA levels against BHV1 than LPL cows. Although these relationships fluctuated throughout the study period. For example, IgA increased at d7, but decreased on d14 and d21, and increased again at d28. The observed trends show BLV alters IgM and IgA responses to vaccines and vaccination may cause a transient increase in PVL.

THE EFFECT OF SHIFTWORK ON BEHAVIOR AND CIRCADIAN RHYTHMS IN REPRODUCTIVE TISSUES.

Autumn McLane-Svoboda
Agriculture and Animal Science, Oral Presentation
Section: 2
Presentation Number: 13
Mentor(s): Alexandra Yaw, Hanne Hoffmann

Many careers, including health and protective services, depend on nightshifts, which disrupt the body's timekeeping through mistimed light information as compared to the natural day-night cycle. Coordinated timekeeping in the hypothalamic-pituitary-gonadal (HPG) axis is necessary for reproduction. Light input from the eyes signal through the hypothalamus to the entire body to align behavior and physiological functions to the time of day. Our goal is to use a mouse shiftwork model, referred to as light-shift, to determine how mistimed lighting impacts running-wheel behavior and the HPG axis. We hypothesize that light-shift negatively impacts wheel-running behavior and reproductive function. The capacity to behaviorally adapt to light-shifts of male and female mice was assessed using running wheels with two light-based light-shift paradigms (advancing or rotating). Succeeding the light-shift paradigms, estrous cycling was done in female mice, while sperm counts were done in male mice. Locomotor analyses were performed by analyzing patterns in the time of wheel-running activity through actograms. We found that adaptation to light-shifts was dependent on direction of shift, with the transition to advances being more disruptive in both the rotating and advance-only paradigms. Behavioral adaptation to rotating light-shifts in females was less precise during advances. HPG axis functional analysis was done through measuring reproductive endpoints in both sexes following light-shift. Our preliminary data indicate that female HPG axis function is more sensitive to light-shifts than male HPG axis function. Together, this work provides insight to how shiftwork influences circadian rhythms in reproductive tissues.

HAIR UNDER THE MICROSCOPE

Michael Quintieri

Agriculture and Animal Science, Poster Presentation
Section: 3
Presentation Number: 16
Mentor(s): Carl Boehlert, Per Askeland

All mammals have hair. However, different species have very different hair. Differences include the thickness of individual hairs, the occurrence of double coats in some animals, and the texture of the coats. What are the differences between different animals' hair at the microscopic level, and how can those differences be related to the macroscopic differences? Samples of hair or fur have been acquired from various animals, and will be examined via Scanning Electron Microscopy and Electron Dispersive Spectroscopy in an attempt to correlate microscopic structure with macroscopic behavior. The results will be considered in light of any previous findings on the subject, and consideration will be given to possible evolutionary reasons for the macroscopic behaviors.

DETECTION OF PHYTOPHTHORA FROM MICHIGAN RIVERS

Crystal Nelson

Agriculture and Animal Science, Poster Presentation
Section: 3
Presentation Number: 17
Mentor(s): Monique Sakalidis

Phytophthora are an economically important genus of plant pathogens that affect a broad range of plant species. The majority of Phytophthora research has focused on agriculture, and there is less understanding of the impact of Phytophthora in wilderness areas. There are no studies on Phytophthora species present in Michigan rivers. Our goal was to identify the species of Phytophthora present in seven different rivers in Michigan's Lower Peninsula. Twelve water samples were collected from each river once in the Fall of 2019 and once in the Spring of 2020. The samples were processed using three methods, the first was the "gold-standard" culture based detection method known as "Bottle of Bait" (BOB), the second using quantitative PCR and Sanger-sequencing and the third method using a technology called CANARY® Phytophthora biosensor. We found that qPCR followed by BOB then the CANARY® Phytophthora biosensor detected the most to least species. It is clear that riverways harbor multiple species of Phytophthora and future research will focus on the composition of Phytophthora species on the areas of land adjacent to the riverways and continue to assess detection technology.

GENOME-WIDE ASSOCIATIONS FOR COAT COLOR TRAITS IN A CROSS OF DOMESTIC PIG BREEDS

Roshan Patel

Agriculture and Animal Science, Poster Presentation
Section: 3
Presentation Number: 18
Mentor(s): Juan Steibel

Exploitation of genetic variation through selection is important because it allows desirable alleles to be passed down to future generations, resulting in improved phenotypes. Thus, knowing how genetic variations affect phenotypic traits is beneficial for breeding because it enables artificial selection to be implemented more effectively to improve the performance of livestock populations. The goal of this study was to find genomic variants that affect coat color in pigs. The study used a dataset from a F2 cross of two pig breeds generated at Michigan State University. The dataset had a sample size of 496 pigs for coat color, size of spots, underbelly color, and hair density traits phenotypes and 705 pigs for face color

phenotype. The pigs were genotyped at 44911 SNP markers. The statistical analysis used linear mixed models including effects of DNA markers as well as random effects of animals to account for relationships between pigs. Biological interpretation of statistically significantly QTL regions was done by querying Ensembl BioMart (http://useast.ensembl.org/biomart/martview/) and animal QTL databases (https://www.animalgenome.org/cgi-bin/QTLdb/SS/search). A total of 10 significant QTLs were found for 5 color traits. Putative QTLs were located in chromosomes 1, 2, 6, 8, 15, and 16. Some of these QTL regions spanned known genes for affecting coat color such as MC1R, KIT, and TYRP1. Moreover, two likely novel QTLs were found. All in all, we mapped genetic variants that affect the coat color of pigs that can be used for selection schemes in the purebred and crossbred pig industry.

MODELING SORGHUM CANOPY ARCHITECTURE TRAITS AND THEIR EFFECT ON BIOMASS

Carolina Pratas Glycerio Defreitas
Agriculture and Animal Science, Poster Presentation
Section: 3
Presentation Number: 19
Mentor(s): Addie Thompson

In a world with growing population and several issues related to scarcity of natural resources, efficiency is vital. Sorghum, a grass native from East Africa, has potential to meet this modern world requirement. With significant acreage in US and Africa, Sorghum is a plant well adapted to high temperatures and dry conditions, it is largely use as feed for cattle, both as silage and grain, in some parts of the world it is used as food grain for humans and more recently, as a source of biodiesel. In order to maximize production of feed and energy per unit of land, it is important to be able to genetic control biomass, that is the end goal of Dr. Thompson's and other faculty from other institutions project. This presentation comprises the first step to achieve this goal: to access which traits control biomass in sorghum. Data about several phenotypes was collected: plant height, leaf number, leaf angle, leaf size, panicle and tiller size, etc. Alternative methods of measurement such as Canopeo App by OSU, GreenSeeker, NDVI, drone imagery and light interception were also used to collect data. Them, R programming was used to analyze the data and access which canopy architecture traits had more effect on plant biomass.

A SURVEY ANALYZING WHETHER CONSUMER PERCEPTIONS ABOUT FOOD PRICES, FOOD SAFETY, AND FOOD AVAILABILITY HAVE CHANGED SINCE THE CORONAVIRUS OUTBREAK

Claire Bott, Maya Salamey, Sydney Puda, Torey Fischer
Agriculture and Animal Science, Poster Presentation
Section: 3
Presentation Number: 20
Mentor(s): Jason Knott

The COVID-19 pandemic has presented many challenges to public health and has impacted community perceptions about food. As new discoveries are made about the virus, new policies and guidelines are presented in order to keep the community safe and the debate about health and safety surrounding the pandemic has brought up some very polarized opinions. Another topic of debate that has a history of controversy regarding sanitation measures is the agriculture industry. In this study, we sought to identify how peoples' perceptions about food prices, safety, and availability have changed over the course of the COVID-19 pandemic as a result of the increased awareness of routes of disease transmission as well as fluctuating food prices. We will be using data obtained from an online Qualtrics survey that we have generated, which is to be distributed February 15 thru March 1, 2021. Results will be presented upon completion. We predict that COVID-19 has influenced

consumer perceptions most notably about food safety as there is currently a greater concern for public health during the pandemic. By conducting this research, we hope to understand how we can help the agriculture industry spread accurate information about food safety and find ways to manage food shortages and price changes if an event like the COVID-19 outbreak were to occur in the future.

IMPROVING IRRIGATION WATER USE EFFICIENCY USING SENSOR TECHNOLOGY

Brenden Kelley
Agriculture and Animal Science, Poster Presentation
Section: 4
Presentation Number: 23
Mentor(s): Younsuk Dong

Water is considered the most important natural resource to all life on earth. Proper use of water through irrigation can increase yields, diversify the types of crops that can be grown in certain areas, and provide stability in drought years. However, irrigation accounts for a large portion of fresh water usage, making the efficiency of each application important. Many high-value crops, such as vegetables, potatoes, seed crops, turf, and ornamentals, often require irrigation to be grown in the United States. The determination of the right amount and the best timing for irrigation is a challenge for many growers. The use of sensor monitoring systems that continuously measure the field conditions and the MSU Irrigation Scheduler program can improve irrigation water use efficiency, boost return on investment and maximize crop quality and yields. This project has explored many of the components that are involved in irrigation and crop monitoring, with a primary focus on maintaining soil moisture throughout the growing season. Additionally, leaf wetness and plant growth have been observed in order to understand the environmental conditions that potentially increase foliar disease risk. Sensor monitoring systems were installed in irrigated fields in Michigan to help growers determine optimal irrigation timing and amounts.

RECRUITMENT AND RETENTION IN MICHIGAN AGRICULTURAL EDUCATION PROGRAMS

Kylie Sperow
Agriculture and Animal Science, Poster Presentation
Section: 4
Presentation Number: 24
Mentor(s): Aaron McKim

Membership trends within agricultural education programs in the state of Michigan fluctuate annually. Some agricultural programs increase in the number of students, while others remain steady in their numbers or decline in membership. The main goal of this research project is to analyze why trends in agricultural education programs fluctuate and the reasoning behind the fluctuation. In the research conducted, six categories of student recruitment activities were evaluated on teacher usage and perceived effectiveness of each strategy. The six categories evaluated were program spotlight through immersion, program spotlight through presentation, programmatic features, programmatic culture, informal recruitment, and administration education. The main goal of the research is to determine which recruitment strategies are most successful in increasing the number of students engaged in the program. Once this is discovered, it can be shared with agricultural educators throughout the state to help recruitment efforts in their home programs.

SOYBEAN RESPONSE TO ROW SPACING AND SEEDING RATE UNDER VARIOUS PLANTING DATES

Madeline Yaek
Agriculture and Animal Science, Poster Presentation
Section: 4
Presentation Number: 25
Mentor(s): Maninderpal Singh

The goals of this study were to determine the impact of various management strategies (planting date, row spacing, and seeding rate) on soybean yields. Plots were planted on one of three dates—May 13, June 2, or June 22—within rows of either 15" or 30" spacing and populations of 40k, 70k, 100k, 130k, 160k, or 190k seeds per acre using a split-split-plot design. Multiple types of sampling took place during the season including soil sampling, Canopeo, final stand counts, and hand harvest to determine yield components. Through this sampling, it was determined that significant yield effects were recorded among planting date and row spacing. The latest planting date (June 22) showed yields that were 11 bushels/acre lower than that of the previous planting date (June 2). Early Planting and Mid-Planting (May 13 and June 2) showed similar yields, with a difference of only 2.9 bu/a between the early and mid dates. In addition, planting on 15" row spacing compared to 30" row spacing increased yields by 5.9 bu/a across all planting dates. Seeding rate did not produce significant results. Possible factors contributing to the data shown in regards to planting date includes an increase in the number of growing degree days. For row spacing, this data could be a result of decreased competition between soybean plants, while simultaneously achieving enough canopy cover to suppress weeds.

ASSESSMENT OF ASSOCIATIONS BETWEEN A CD8B POLYMORPHISM AND T CELL CO-RECEPTOR GENE EXPRESSION

Jenna Grabowski
Agriculture and Animal Science, Poster Presentation
Section: 4
Presentation Number: 26
Mentor(s): Catherine Ernst

Identifying genetic markers associated with immune and disease traits in pigs will facilitate breeding for improved resilience. In vertebrates, T cells are involved in the adaptive immune response and commit to one of the two cell fates during development: cytotoxic T cells expressing the CD8 co-receptor and helper T cells expressing the CD4 co-receptor. A previous study identified a single nucleotide polymorphism (SNP) associated with CD8+ T cell abundance in pig peripheral blood. Our lab has shown that this SNP lies within a putative regulatory region in the CD8B gene. However, the molecular mechanisms by which this CD8B genotype influences CD8+ T cell abundance are unknown. The objective of this study is to assess associations between CD8B genotype and transcript abundance of cytotoxic T cell marker genes CD8B and CD8A. We hypothesize that the CD8B genotype associated with higher CD8+ T cell percentage (C/C) will exhibit increased CD8B and CD8A expression. Relative transcript abundance of CD8A and CD8B will be estimated by quantitative polymerase chain reaction (qPCR) in leukocytes from adult pigs carrying one of three CD8B genotypes (C/C, C/T, or T/T). We have shown that this SNP is segregating in a pig resource population and have selected 12 animals per genotype for qPCR analysis. Preliminary results also indicate that selected qPCR primers are effective in measuring CD8B and CD8A abundances in pig leukocytes. Progress on this project has been delayed due to the ongoing COVID-19 pandemic but qPCR is underway and work is expected to be completed soon.

ESTABLISHMENT OF PHOSPHOROUS APPLICATION GUIDELINES TO MODERATE THE EFFECTS OF PHOSPHOROUS LEACHING IN MICHIGAN CORN CROP SOILS

Greg Rouland, Rachel Shapin
Agriculture and Animal Science, Poster Presentation
Section: 4
Presentation Number: 27
Mentor(s): Steven Safferman

Runoff from agricultural fields into the Great Lakes is one of the central causes of algal growth, also known as eutrophication. The phosphorus present in this runoff is a key contributor to the growth of harmful algal blooms (HABs), which produce toxins detrimental to both aquatic ecosystems and humans. Phosphorus runoff also contaminates drinking water, forcing communities to dedicate valuable resources toward its purification. The goal of this research project, which was funded by the Great Lakes Water Authority and Michigan Corn, is to develop an empirical model that aids farmers in minimizing the amount of phosphorus runoff from their fields. Once developed, this model will reduce phosphorus runoff into the Great Lakes and help farmers conserve an expensive resource. To fulfill this objective, the two-dimensional modeling software HYDRUS is being employed to model phosphorus losses under several conditions. As a baseline model for extreme conditions, scenarios were run with both the phosphorus already in the soil and that which was applied by farmers. Weather data from 2019, a year of unusually high rainfall, was also included in this baseline. It was observed that fields containing large quantities of sand released more phosphorus than other types of soil. The next part of the project will involve adjusting several parameters to determine which fields are most and least sensitive to phosphorus application. Finally, a comprehensive set of guidelines for phosphorus application for farmers will be developed.

ORGANIC FARMING

Audrey Ratliff, Julianna Adams
Agriculture and Animal Science, Poster Presentation
Section: 4
Presentation Number: 28
Mentor(s): Georgia Peterson, Steve Marquie

This study was conducted to determine the most advantageous marketing practices and overall job satisfaction for organic produce farmers in Michigan. A survey was conducted and sent to organic produce farmers across Michigan to determine their selling methods, “economic success”, and their overall job satisfaction. The results of this research will compile the outcome of the survey along with already published data. Organic farming, by definition, is the practice of farming without synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives. Criteria to qualify as an organic farm is specific and government regulated. For a career to be stable, it needs to be economically viable. In recent years, the demand for organic produce has been increasing due to its known health benefits and its tendency to be more environmentally sustainable. The results of this study will demonstrate if there is a correlation with career contentment and current economic practices.

ANTHROPOLOGY & ARCHEOLOGY

THE MUSEUM OF BELIZE DIGITAL HERITAGE PROJECT

Mia Pardel
Anthropology and Archeology, Oral Presentation
Section: 1
Presentation Number: 31
Mentor(s): Gabriel Wrobel

Digital heritage helps take archaeology to the public. Recent advancements in 3D modeling and web-based applications have aided schools and museums around the world in creating tools for education and research. My project's objective is to use these technologies and applications to create a website in conjunction with the Museum of Belize for educational purposes. I began by creating 3D photogrammetry models of artifacts from the museum's collections using photographs taken previously by students from the MSU Bioarchaeology Laboratory. This collection includes different kinds of artifacts, such as lithic points, pottery, and stone carvings. I uploaded the completed 3D models to Sketchfab, an online resource for storing and sharing 3D models, where I can set viewing parameters and change the lighting to optimize their appearance. I am currently working with the Cultural Heritage Informatics Initiative at MSU to create a permanent online repository for these 3D models, and with the Museum of Belize to incorporate contextual data about each of the artifacts. These will be incorporated into an informational website focusing on Belize's history, which will be hosted by MSU and managed by the Museum of Belize.

AUTISM IN INDIGENOUS COMMUNITIES

Isabella Green
Anthropology and Archeology, Oral Presentation
Section: 1
Presentation Number: 32
Mentor(s): Heather Howard

Indigenous communities around the world face well-documented health disparities when compared to non-Indigenous groups within their same countries. This presentation will summarize existing research on Autism Spectrum Disorder (ASD) in Indigenous communities focusing on disparities in access to care and perspectives on ASD. Research was based on a literature review carried out over the course of 4 months. The majority of existing research papers came from Australia, the United States, and Canada. Information was then divided into the categories of diagnosis rates, perspectives on ASD, and intervention options. The findings from this research show that Indigenous communities across the globe face barriers to a greater extent than non-indigenous communities when seeking ASD diagnoses and interventions.

THE IMPACT OF SEX AND ANCESTRY ON DENTAL DEVELOPMENT

Carolynn Sauter
Anthropology and Archeology, Oral Presentation
Section: 1
Presentation Number: 33
Mentor(s): Joseph Hefner, Kelly Kamnikar

The progression of human dental development can be used to estimate age in subadult skeletal remains. Because the timing and growth of human dentition is heavily regulated by genetics, with only minimal influence from environmental or cultural factors, age estimation from the dentition is generally accurate. Age estimates are generated from observations of individual teeth, which can be compared to development charts or collectively analyzed within a statistical framework. Recently, a large study analyzed the efficacy of the Moorrees,

Fanning, and Hunt dental development method using transition analysis. Using a modern forensic sample, that study better estimated age and contributed fewer underestimations. However, sample sizes were small for older aged children. To address this gap, and further refine the method, a large NIJ-funded research project is evaluating a large, globally diverse sample of subadult radiographs within the transition analysis framework. Using this large dataset, the undergraduate research project presented here investigates populational differences by sex in the timing of dental growth and development using different ancestry groups. Preliminary results show that females follow a more advanced dental development program than males for all groups tested. Furthermore, the mean maximum likelihood age estimates vary across groups indicating differences in the timing of dental development is variable, even at different ages. This exploratory analysis will have direct implications for data collection and interpretation to the larger project.

LINGUISTIC AND CULTURAL PRACTICES OF FINE DINING RESTAURANTS

Taryn Vielma
Anthropology and Archeology, Oral Presentation
Section: 1
Presentation Number: 34
Mentor(s): Steven Fraiberg

On the basis of understanding, the restaurant industry has one task; to satisfy our hunger. However, fine dining restaurants demonstrate many different aspects to form a more three-dimensional and hospitable experience for their visitors. Restaurant guests will not only leave with a full stomach, but also with a new appreciation for cuisine culture. This feeling is stimulated by a complex set of techniques, treatments, practices, and passions by the restaurant, usually invisible to the public eye, to formulate a delectable and intriguing dining experience. I am conducting a longitudinal ethnographic study to uncover the linguistic and cultural practices of fine-dining Italian restaurants in Michigan, one of which I am currently employed. My methods of participant observation, fieldnotes, examining cultural artifacts, and semi-structured interviews showcase a behind-the-scenes perspective of restaurant employees and business performance. Through this data, I will present patterns and aspects that classify a restaurant as fine dining, and the evidence that supports the long-lasting impact to have customers return for those fine dining and mouth watering experiences time and time again.

CRITICAL REFLECTION AS A TOOL FOR GIRL EMPOWERMENT

Kianna Delly
Anthropology and Archeology, Oral Presentation
Section: 1
Presentation Number: 35
Mentor(s): Kevin Brooks

This presentation focuses on using critical reflection in civic engagement. In summer of 2019, I worked with a girl's empowerment organization. I helped supervise a group of young women, ages 15-18, during a week-long summer camp. This camp focused on female empowerment and the importance of fostering a sisterhood. The journey to building this sisterhood was challenging and emotional for everyone involved, myself included. The relationships between the young women went through peaks and valleys. By the end of the camp, the girls developed the strong sisterhood that they came to the camp seeking. Watching the girls learn more about themselves and cultivating their skills in communications, respect, and understanding helped me to deepen my understanding of these skills. I have learned much more about uplifting women and showing kindness through my experience with the young women.

PORTRAIT OF A DANCER: A CULTURAL FRAME OF THE INDIAN CLASSICAL DANCE BHARATANATYAM

Siri Vangavolu

Anthropology and Archeology, Oral Presentation
Section: 1
Presentation Number: 36
Mentor(s): Steven Fraiberg

Classical dance in India is strongly rooted in the country's main religion, Hinduism, and its rich cultural history. With over eight different major styles, Indian classical dance is used as a form of musical theatre to retell epics and fables. It has long been a staple of culture in India, as well as an important connection to one's culture for Indians in the U.S. Despite this great degree of personal and cultural importance, Indian classical dances are a relatively unknown field to outsiders. To look more closely at these issues, this ethnographically informed research project will focus on the most popular of these dances, Bharatanatyam. To the untrained eye, this dance is merely the rhythmic expression of movement. This project will more closely observe how Bharatanatyam embodies the cultural and religious values of India, as well as discover how stories are told through the art. Drawing on ethnographically informed methods, research will be conducted by studying performances, classes, and photos of dance students posted in public forums such as YouTube, as well as through interviews of dancers themselves. In this project, I will present an account of the symbolism of Bharatanatyam, as well as its performance and practice culture and the social structure of its community. By describing the internal interactions of the communities of the dance and mapping out how stories are told and individualized through performance, we can form a cultural frame of Bharatanatyam.

ANALYZING THE IMPACT THE COVID-19 PANDEMIC HAS ON THE MATERIAL CULTURE AT MICHIGAN STATE UNIVERSITY

Ashley Maloney

Anthropology and Archeology, Poster Presentation
Section: 2
Presentation Number: 37
Mentor(s): Stacey Camp

With the rapid spread of the COVID-19 disease, early evidence illustrates a dramatic change in consumption and waste disposal throughout communities. As a consequence of the pandemic, there has been a 25% to 30% increase in waste generation in households according to Republic Services, a solid waste collection company. By analyzing the household waste and material culture that accumulates, archaeologists can develop behavioral research on the impact the COVID-19 pandemic has on mental health, the environmental changes (changes in the waste build-up on streets, levels of smog, and toxic pollutants), and the activities people participate in during the quarantine times. In this research, the campus of Michigan State University was the archaeological site used to conduct the effect the pandemic has on human behaviors through the collection of household waste, medical masks, and construction waste.

QUANTIFYING SEXUAL DIMORPHISM IN SCAPULAR MORPHOLOGY

Savannah Holcombe

Anthropology and Archeology, Poster Presentation
Section: 2
Presentation Number: 38
Mentor(s): Joseph Hefner

Sexual dimorphism is the consistent difference in size or shape between the sexes. The human skeleton exhibits lower levels of sexual dimorphism compared to other animals; however, are these differences related to size, shape, or a combination of the two? The

current literature focuses on the pelvis or cranium, but there are indications that scapular morphology may be an indicator of sex. This project explores scapular morphology through linear measurements (LM) and geometric morphometric (GM) methods. Traditional LMs assess size; GMs assess shape. I hypothesize that since pelvic girdle morphology relates to shape and size variations between males and females, the shoulder girdle will be similarly dimorphic. Three-dimensional data were obtained from the William M. Bass Collection (n=106); linear data were obtained from the Forensic Anthropological Databank (n=1,252). I modeled these data separately to quantify the levels of sexual dimorphism in size (LM) and shape (GM) variability. Overall, linear measurements correctly identified 93% of the sample; the GM method could only correctly identify ~70% of the sample. These results indicate size, and not shape, drives differences between female and male shoulder girdle morphology, a finding contrary to the morphological differences noted between female and male pelves. As a non-weight bearing element of the skeleton, free from the influences of modifications of childbirth, these results suggest other sexually dimorphic aspects of the human skeleton may represent differences in size and not shape between males and females.

AN ANALYSIS OF CHINESE FANDOM UNDER IDOL REALITY SHOWS

Jing Wang
Anthropology and Archeology, Poster Presentation
Section: 2
Presentation Number: 39
Mentor(s): Steven Fraiberg

Music idol reality shows have become widely popular in Chinese society. Adapted from the Korean idol show Produce 101, which introduced an interactive audience-centered voting process, it provided performers who are well trained on vocal and dance an opportunity to debut as a K-pop band group. Chinses agencies, seeing the economic benefits behind it, brought the shows into the Chinese market. The show became a phenomenon with hundreds and thousands of fans contributing a great amount of their time, money, and energy to the idol. Seeing these obsessive behaviors toward idols in Chinses fandom, a number of critics have attacked fan communities as irrational. My project aims to look at the underlying logic of fandom and challenge this assumption. This move is accomplished by an ethnographic research on fandom communities specifically focused on two idols that participated in Chinses idol reality shows. It addresses how do fans communicate, and related to this broad question, what specialized insider languages and signs do they use. In order to study these questions, I have gathered qualitative data through 5 months of participant-observation, interviews, and the study of online forums. Triangulating the data, the presentation shows how Chinese fan communities form their own well-structured communication system and what values they are pursuing.

SURFACING THE STRUCTURAL IN THE ART OF PROTEST

Isabel Hershey
Anthropology and Archeology, Poster Presentation
Section: 2
Presentation Number: 40
Mentor(s): Elizabeth Drexler

In 2020, COVID-19 spread through communities around the globe. With it came an increasing awareness of the structural violence embedded both nationally and abroad. Within this context, artists continue to engage audiences and expose systemic inequity through their creative and affective practices. Thus, creativity has an important role in making structural injustices visible through its affective and perceivable nature. This interdisciplinary research explores structural violence and its relation to artistic activism during a global pandemic. It is vital to understand the relationship between them; knowing how they connect provides

insight on how to increase awareness surrounding systemic violence to individuals and their communities. This research is especially important to conduct during a global pandemic?the COVID-19 response in 2020 revealed many structural injustices to communities unaware of them prior. This research is concerned with making structural inequity visible through powerful images and creative works. To investigate this, we utilized the photovoice technique. Through a week-long session, college students interested in human rights research took photos in response to prompts related to structural violence. We organized these photos into thematic categories as units of analysis, discussing the significance of each theme and their connections to the photographs. All research was done virtually, emphasizing the relevance of exploring structural injustice during a global pandemic. Preliminary findings include qualitative data about identities and their relation to structural inequity and participation during pandemic conditions. These preemptive findings potentially demonstrate relationships between affective imagery and discernable representation of previously undiscernible structural inequity.

BIOCHEMISTRY & MOLECULAR BIOLOGY

METHODS FOR TRACKING EPITHELIAL MESENCHYMAL TRANSITION (EMT) IN VIVO AS A MECHANISM OF CANCER METASTASIS

Rachel Dubuque
Biochemistry and Molecular Biology, Oral Presentation
Section: 1
Presentation Number: 45
Mentor(s): Zhen Qiu

Cancer metastasis is responsible for approximately 90% of cancer deaths, and understanding the mechanisms of metastasis is critical for the development of cancer therapeutics in order to improve patient prognosis. One mechanism by which cancer metastasizes is Epithelial Mesenchymal Transition (EMT) where cancer carcinoma of the epithelial cell phenotype transitions to the mesenchymal cell phenotype, allowing cancer cells to detach from the basement membrane and enter the bloodstream. This enhanced cell motility, allows the cell to invade and colonize distant sites throughout the body, ultimately giving rise to cancer metastasis. In order to observe the change in cellular phenotype in vivo, plasmids designed with a fluorescent construct on either side of a bidirectional promoter could indicate the cell phenotype associated with the genes upstream of each fluorescence reporter. This method would likely allow for EMT to be observed in real-time via the change in fluorescence, and could allow for a deeper understanding of this mechanism.

EXPLORING METABOLIC OUTCOMES OF PUTRESCINE IN ATROPA BELLADONNA

Jessica Litchfield
Biochemistry and Molecular Biology, Oral Presentation
Section: 1
Presentation Number: 46
Mentor(s): Cornelius Barry

Tropane alkaloids are compounds with an eight-membered, nitrogen containing ring. Several tropane alkaloids have medicinal properties, such as scopolamine for treating motion sickness, or cocaine, which is used as a stimulant. The medicinally important tropane alkaloids scopolamine and hyoscyamine are synthesized in plants of the Solanaceae family, including Atropa belladonna, Deadly Nightshade. Putrescine represents a key entry point into the tropane alkaloid pathway because it is methylated by putrescine methyltransferase (PMT) to form N-methylputrescine, which will eventually form the N-methypyrrolinium cation, the first ring of the tropane alkaloid core. Putrescine is involved in cell cycle regulation and is used in several different metabolic pathways like polyamine and hydroxycinnamic acid amide

(HCAA) synthesis. To gain a better understanding of the biosynthesis of tropane alkaloids, the PMT gene was silenced using virus-induced gene silencing, or VIGS, and non-targeted metabolomics analysis of PMT-silenced plants was utilized to uncover the fates of putrescine and downstream products. The purpose of this study is to determine how levels of various metabolites change when putrescine cannot be methylated, and to gain a better understanding of how putrescine's role in various metabolic pathways in A. belladonna. Following PMT silencing, phenyllactic acid accumulated along with non-tropane phenylacetyl-derived metabolites; there were no changes in known hydroxycinnamic acid amides (HCAAs). Future experiments will focus on identifying and characterizing the altered metabolites.

DEVELOPING A PROTOCOL FOR LIPID EXTRACTION AND QUANTIFICATION FOR BOMBUS IMPATIENS

Trevor Dalrymple
Biochemistry and Molecular Biology, Oral Presentation
Section: 1
Presentation Number: 47
Mentor(s): Darren Incorvaia, Zachary Huang

Lipids are crucial macromolecules that exist in all known organisms. In animals, they serve in membrane structure, energy storage, hormone signaling, and can have significant mechanistic effects on behavior. These effects have been observed in honeybees, specifically during a significant decline in lipid levels as they shift from nurses to foragers with age. This shift, and its subsequent effect on behavior and function of individual bees, leaves open the prospect that the lipid content of Bombus impatiens (the common eastern bumblebee) may lead to observable and mechanistic changes in its behavior. To answer these questions, it is vital to have an efficient and accurate method of quantifying lipid levels in bumblebees, relative to body mass. The protocol we developed employs a colorimetric sulpho-phospho-vanillin reaction combined with a spectrophotometric reading to allow calculation of concentration and mass. Here, we describe in more detail the process by which we developed and refined this lipid extraction and measurement protocol, and highlight its primary features. We successfully employ this method using bumblebees in different treatment groups that we suspect will have contrasting lipid levels, correlated with known differences in behavior, and analyze the subsequent data. From this data we can draw conclusions about the effect of these treatments on lipid levels in bumblebees, and begin to understand the role lipids play in shaping their behavior. These insects have profound ecological, evolutionary, and economical importance, and the development of repeatable and effective research methods such as this will greatly contribute to their study.

DEGLYCOSYLATION OF FLAVONOIDS AND ITS IMPACT IN ANTI-CANCER AND ANTI-INFLAMMATORY ACTIVITIES

Zach Heeringa
Biochemistry and Molecular Biology, Oral Presentation
Section: 1
Presentation Number: 48
Mentor(s): Andrea Doseff

Chronic inflammatory diseases accounted for 60% of deaths in 2002 and was expected to rise to 73% by 2020 according to a WHO study (World Health Report 2002). Chronic inflammation is often the result of a dysregulated immune system. Diet can have an important role in levels of inflammatory markers like TNF-α and C-reactive protein making dietary compounds, like flavones, an intriguing therapeutic target for these diseases. Dietary intake of flavones as a route of administration is hindered because flavones exist conjugated to a carbohydrate in most plants. Flavone glycosides are poorly absorbed compared to their aglycone counterpart. Flavone deglycosylation is a crucial stage in producing a flavone

treatment with a clinically significant oral bioavailability. The enzyme that catalyzes this crucial reaction is ß-glucosidase. Celery-based-apigenin-rich (CEBAR) food is a diet developed by our lab that converts apigenin glycosides into the bioavailable aglycone, but patient complaints of saltiness due to the addition of base to reach the ideal pH for ß-glucosidase has stunted clinical trials. This has introduced a desire to find the lowest pH that the reaction can run at and still deglycosylate the glucoside at an industrially practical rate. First, a trial was done using purified almond ß-glucosidase and apigenin-7-O-glucoside to find conditions for a second assay. The second was executed with almonds and celery in reflection of CEBAR. This data will be used to optimize CEBAR for patient satisfaction.

DEVELOPMENT OF A TRANSFORMATION-FREE METHOD TO PRODUCE THERAPEUTIC DNA MINICIRCLES

Nathaniel Pascual
Biochemistry and Molecular Biology, Oral Presentation
Section: 1
Presentation Number: 49
Mentor(s): Masako Harada, Shakhlo Aminova, Yuki Harada

While its mechanism has not been elucidated, the Seamless Ligation Cloning Extract (SLiCE) method is a simple, cost-effective method to clone vectors in a one-pot reaction. Using the lysates of standard laboratory Escherichia coli strains, a typical SLiCE reaction can catalyze recombination of several linear DNA fragments with flanking heterologous sequences. Our lab has been developing a method to apply SLiCE cloning to generate small (approximately 2 to 4 kilobase) therapeutic vectors devoid of bacterial sequences. Derived from the SLiCE-mediated intramolecular recombination of PCR-amplified minimum expression cassettes, these DNA minicircle vectors offer the potential to improve transfection efficiency compared to traditional gene vectors. Transfection efficiency will be compared by a bioluminescent reporter assay using Human Embryonic Kidney cell line, HEK-293T, transfected with Gaussia luciferase expression constructs. This presentation will focus on the key challenges encountered in the development of the method: distinguishing linear and circular DNA, optimizing SLiCE reaction conditions, and scaling-up production of DNA minicircles. Furthermore, future applications of these DNA minicircles, in particular the development of extracellular vesicle therapeutics, will be surveyed.

INVESTIGATING AND COMPARING THE EFFECTIVENESS OF PREDICTED THERAPY IN REDUCING THE SIZE OF MAMMARY TUMORS AND PREVENTING METASTASIS IN MICE WITH METASTATIC BREAST CANCER

Rachel Kubiak
Biochemistry and Molecular Biology, Poster Presentation
Section: 2
Presentation Number: 51
Mentor(s): Eran Andrechek

Recent breast cancer studies have predicted that 281,550 women in the United States will be diagnosed with invasive breast cancer in the year of 2021, and 43,600 of those cases will result in death. Therefore, it is crucial that we are proactive in developing treatment plans and medications that can increase survival rates and allow for improved prognoses of patients diagnosed. In this presentation, I will be discussing the results of the project that I conducted in the spring semester of 2020. I analyzed the effectiveness of two newly formulated drug treatments on cell lines in mice to decide if the drug can be further tested in clinical trials on human subjects. Essentially, I observed their role in the prevention of metastasis, and whether or not the drug successfully decreased the size of mammary tumors. I grew and injected cell lines into the mammary glands of 20 mice. Once the tumors reached 6mm, I performed the 21 days of drug treatment of drugs A, B, AB, and the control through oral gavage techniques. I

palpated and recorded measurements of the tumors daily to determine whether or not the growth of the tumors remained unchanged or decreased. After completion of the treatment, I necropsied them and sent the tumors, mammary glands, lungs, and any potential masses to histology. The necropsies were an indicator as to whether or not the drug treatment worked in preventing the spreading of cancer and decreasing the size of the tumor.

ENGINEERED BACILLUS SUBTILIS TO DELIVER PRODRUG CONVERTING ENZYMES TO CANCER

Olivia Garbacik
Biochemistry and Molecular Biology, Poster Presentation
Section: 2
Presentation Number: 52
Mentor(s): Christopher Contag, Victoria Toomajian

In 2018, nearly 1.7 million Americans were diagnosed with cancer. Among the existing treatments to combat cancer, bacteriotherapy offers the ability to amplify and deliver therapies at the tumor site. Bacteriotherapy refers to the treatment of an illness with bacteria that have been engineered to provide therapeutic products. The Gram-positive bacterium Bacillus subtilis (B. subtilis) was selected for this study because of its ease of manipulation, non-pathogenicity and ability to secrete proteins into its surroundings. The purpose of this project is to determine if B. subtilis can be engineered to secrete enzymes into the tumor microenvironment for the purpose of converting prodrugs into chemotherapeutic agents capable of eradicating cancer cells and subsequently destroying the tumor. A fusion gene comprised of thymidine kinase and nitroreductase (TK-NTR), with signal sequences for secretion, will be inserted into the genome of the B. subtilis and evaluated for activation of the prodrugs, ganciclovir and CB1954 (5-(aziridin-1-yl)-2,4-dinitrobenzamide). Verification of TK-NTR expression will be investigated through fluorescent microscopy, sequencing, and proteomics. To confirm functionality of the secreted TK-NTR and its use in bacteriotherapy, the engineered B. subtilis will be incubated with murine mammary carcinoma cells, 4T1-BGL, which stably expresses firefly luciferase (fLuc2) and green fluorescent protein (GFP). The effects of the engineered B. subtilis and secreted TK-NTR on the 4T1-BGL cell line will be assessed by measuring bioluminescence as a live/dead readout, as fLuc2 requires ATP for production of bioluminescence. A decrease in bioluminescence will indicate cell death, and comparison of 4T1-BGL cells treated with B. subtilis without TK-NTR will indicate activity. This investigation will be translated to a mouse model where the engineered B. subtilis will be delivered intravenously and intratumorally to mice with 4T1-BGL-derived breast cancer and the therapeutic effect will be indicated by a decrease in in vivobioluminescent signals and histology.

PRODUCTION AND CRYSTALLIZATION OF E-CADHERIN AGEC5

Evan Arnold
Biochemistry and Molecular Biology, Poster Presentation
Section: 2
Presentation Number: 53
Mentor(s): Jian Liu, Xiangshu Jin

Cadherins are important adhesion proteins in animal cells and have many roles in the development and embryogenesis of many organisms. E-cadherin proteins are key proteins of the cadherin family and are involved in calcium-dependent cell-cell adhesion. They form cell to cell adhesions through the formation of homodimers with other cells exhibiting E-cadherins. There are eight binding domains in this mosquito E-cadherin. However, the protein being studied in this research does not produce all eight. There are only four binding domains, (5,6,7 and 8), in this AgEC5 cadherin that is being crystallized. To accomplish this crystallization, AgEC5 plasmids with kanamycin resistance are used in Rosetta E. coli to

produce the fifth through eighth binding domains. The E. coli make a perfect test subject as they can express the eukaryotic protein given to them in the plasmid when given IPTG to force this protein expression. The proteins are produced in these E. coli specimens and harvested for crystallization which uses multiple screening solution kits and the mosquito LCP machine. During crystallization, it is important to avoid the formation of salt crystals from compounds used in the screening kits. The goal is to crystallize this AgEC5 protein and observe the structure of this protein. The three-dimensional structure of this crystallized E-cadherin is determined using X-ray crystallography. Using the structure, the function of E-cadherins can be better analyzed and understood which would provide a deeper knowledge and understanding of cell signaling during processes like apoptosis, necrosis, and many cancers.

STINK BUG'S STALE DEFENSE

Cam Stout
Biochemistry and Molecular Biology, Poster Presentation
Section: 2
Presentation Number: 54
Mentor(s): Carl Boehlert, Per Askeland

The stinkbug's smell that wards off predators will be discovered in this research. I will be searching for the glands and viewing them under an SEM machine virtually. This is their main use for the smell that they can create. I will be attempting to find as much information about this odd function that they are capable of. It ranges from attracting a stinkbug mate to warding off predators. They are one of the only organisms that create a foul smell that both attracts a mate and wards off predators from themselves for defense. Along with this, I will try to find if the reaction that is occurring with the two glands combining is exothermic or endothermic. If it is exothermic, how do they retain the heat?

THE EFFECT OF CALCIUM ON MITOCHONDRIAL ULTRASTRUCTURE AND FUNCTION

Benjamin West
Biochemistry and Molecular Biology, Poster Presentation
Section: 2
Presentation Number: 55
Mentor(s): Jasiel Strubbe, Jason Bazil

Myocardial ischemia/reperfusion (IR) injury is an injury preceded by loss of mitochondrial function caused by calcium overload. Despite the well-known effects of this phenomenon, it is unknown how calcium alters mitochondrial bioenergetics through changes in mitochondrial structure and cristae morphology. This is significant since the main cause of cardiac tissue and cell death after myocardial infarction is mediated by calcium overload. The objective of this project is to characterize how calcium modulates mitochondrial morphology using well-established cryo-electron microscopy (cryoEM) in the presence of the cardioprotective agent cyclosporin A and the calcium chelator EGTA during calcium overloaded conditions. The structural data reveal that increasing levels of calcium content disrupt cristae junctions with a lamellar rather than tubular appearance and it is associated with calcium phosphate deposits. In addition, the data also reveal the cardioprotective agent cyclosporin A preserves the cristae morphology. By correlating structural and functional data, we show that maintaining the cristae integrity prevents mitochondria from losing function. Overall, these findings establish a mechanism of calcium-induced mitochondrial dysfunction and reveal new, potential targets for cardioprotective therapies responsible for maintaining cristae structure and function.

PHAGE HUNTING AND SHIGELLA FLEXNERI PHAGE MOO19

Kendal Tinney
Biochemistry and Molecular Biology, Poster Presentation
Section: 3
Presentation Number: 59
Mentor(s): Kristin Parent, Sundharraman Subramanian

Bacteriophages—commonly known as phages—are viruses that infect bacteria. They are abundant in our environment and in our bodies. The Gram-negative pathogen Shigella flexneri has relatively few well-characterized phages. These exhibit limited diversity and have been understudied compared to phages of other enteric bacteria. In an effort to find and identify new Shigella flexneri phages we partnered with high school students from Lincoln, Nebraska and students from Michigan State University graduate and undergraduate courses for phage hunting. The process of phage hunting involves sample collection from various sources (e.g. river water, soil, etc) and identifying phages to better understand the diversity of phages present in our environment. A group of four high school students from Nebraska when phage hunting in a cow pasture found a unique Shigella flexneri phage we named Moo19. The distinct short tail of Moo19 characterizes it as a Podoviridae. Compared to long tailed phages Myoviridae and Siphoviridae short tailed phages are relatively uncommon. In addition, Moo19 displays a narrower host range compared to other isolated Shigella flexneri phages. Preliminary genomic analysis revealed similarity to Escherichia phage N4 and cryo-electron microscopy has revealed that Moo19 displays a unique capsid morphology with a T number of 9. It is important to continue to hunt for new and diverse phages in our environment to provide insight on phage-host interactions that are relatively understudied.

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

Zach Dhaem
Biochemistry and Molecular Biology, Poster Presentation
Section: 3
Presentation Number: 60
Mentor(s): 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) and the National Health and Nutrition Examination Survey (NHANES) suggest there is a relationship between the AHR and cholesterol levels. Using a panel of 14 strains of mice, it was shown that a locus within 0.5 Mb of HMGCR was associated with TCDD-induced weight change. This result was similar to observations in a human GWAS where polymorphisms around the AHR locus were correlated with elevated cholesterol levels. Importantly, this GWAS identified two coding single nucleotide polymorphisms (cSNPS) within the AHR (R554L and P275L) that are significantly correlated with changes in human cholesterol homeostasis. 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 will be introduced into an AHR expression plasmid and then inserted into AHR null cells. These cell strains will be exposed to TCDD and HMGCR expression will be assessed by quantitative real time polymerase chain reaction.

STRUCTURAL AND SEQUENCE CONSERVATION OF THE CTBP COREPRESSOR C-TERMINAL DOMAIN ACROSS VERTEBRATE SPECIES

Kalynn Bird, Maddy Niblock
Biochemistry and Molecular Biology, Poster Presentation
Section: 3
Presentation Number: 61
Mentor(s): Ana-Maria Raicu, David Arnosti

The C-terminal Binding Protein (CtBP) is a transcriptional corepressor that regulates gene expression and functions as a tumor suppressor. The CtBP catalytic core resembles an NAD(H)-dependent dehydrogenase, and binding to the NAD(H) cofactor enables formation of dimers and tetramers. The less conserved C-terminal domain (CTD) has not been structurally characterized and a functional role remains elusive. Some organisms, like Drosophila, have a single CtBP gene with multiple splice isoforms that encode variant “short” and “long” CTDs. Vertebrates encode two paralogous genes, CtBP1 and CtBP2. To uncover the relevance and conservation of the CTD, we performed an evolutionary comparison of protein sequences from vertebrates. We find that the CtBP1 primary structure is highly conserved, with only subtle differences observed in the CTD when comparing mammals to amphibians and fish. Conversely, the CtBP2 CTD is less conserved across the vertebrate phylogeny. Still, primary structure similarities can be identified between the CTD of CtBP1 and CtBP2. Secondary structure predictions using PSIpred software indicate that in both CtBP1 and CtBP2, most of the CTD is predicted to be disordered, but an alpha-helix may form. CtBP2 is predicted to have more variable disordered regions varying in location and length, depending on the organism analyzed. The high level of primary and secondary structure conservation of the CtBP CTD among vertebrates suggests that this poorly characterized domain is critical for function. Extending our evolutionary approach to other metazoans can reveal possible regulatory and functional significance of the CTD of this metazoan transcriptional corepressor.

IDENTIFICATION OF TRANSCRIPTION FACTORS REGULATING ACYLSUGAR BIOSYNTHESIS IN THE GLANDULAR TRICHOMES OF TOMATO

Liz Christensen
Biochemistry and Molecular Biology, Poster Presentation
Section: 3
Presentation Number: 62
Mentor(s): Rachel Kerwin, Robert Last, Yann Ru Lou

Every year 10-40% of crops are lost to pests. Conventional pesticides pollute soil and water, and intoxicate wildlife. Acylsugars, specialized metabolites made in the trichomes (leaf hairs) of Solanaceae species, can be utilized as novel, effective, and environmentally safe pesticides. Almost all enzymes that synthesize acylsugars in Solanum lycopersicum (cultivated tomato) have been characterized. However, no transcription factors regulating the biosynthesis of acylsugars have been identified, limiting agricultural application of these natural defense compounds. Transcription factors are DNA-binding proteins that regulate expression by interacting with specific sequences in target gene promoters. To find transcription factors regulating acylsugar biosynthesis, I performed differential gene expression analysis of trichomes and shaved stems from tomato. I prioritized candidates based on absolute expression differences, genes expressed above my threshold, the relative expression of candidates, and candidates in families known to be involved in specialized metabolism. Based on these qualifications, I identified 10 candidates where I then employed CRISPR/Cas9 gene editing to validate each acylsugar transcription factor candidate in tomato. I designed CRISPR constructs to generate mutants with transcription factor candidate knockouts. Using LC-MS, I compared acylsugar quantity and quality between mutant and wildtype plants in graphs. Reduced levels of acylsugar accumulation or changes in acylation patterns in mutant plants

identified transcription factors that are indeed involved in regulating ASAT genes. Understanding acylsugar pathway regulation in tomato can help to understand how constitutive herbivory defense metabolism is regulated in plants. This knowledge can be leveraged to genetically engineer crops with enhanced resistance to insect herbivory.

INVESTIGATION INTO CHARACTERISTICS OF HYDROGEL

Evie Fang
Biochemistry and Molecular Biology, Poster Presentation
Section: 3
Presentation Number: 63
Mentor(s): Carl Boehlert

Hydrogel is a material that can perform on-demand dissolution with tunable cell-adhesive properties. It can be used as a medium for new cell growth and has the ability to cover the cells. Here we investigate if hydrogel can maintain its characteristics and structure through extreme conditions in humans and try to determine if hydrogel's presence will cause unexpected changes in the body. Understanding hydrogel's characteristics would allow further studying into its possible functions in the field of medical devices.

DIRECTED SPATIAL STRUCTURE AND PATTERNING IN SYNTHETIC COMMUNITIES

Kimberly Watson
Biochemistry and Molecular Biology, Poster Presentation
Section: 3
Presentation Number: 64
Mentor(s): Daniel Ducat, Lisa Yun

Microbial communities play a foundational role in system regulation. Microbes define their environments, commonly noted in the human gut microbiome and hydrothermal vents. These communities have natural spatial structure and patterning (e.g., biofilms). Synthetic communities lack the robustness and organization of natural communities. These characteristics cannot be controlled in synthetic cultures yet since there is not a technique for specific spatial binding of cells. Through surface functionalization, a targeted approach to manipulate patterning can be engineered into synthetic cultures. This project focuses on harnessing proteins to direct the aggregation and spatial structuring of chosen cells. By using pairs of proteins, a modular and programmable toolbox can be created to mix and match which bacteria are desired for aggregation, using the same protein pair. In particular, the adhesin pair SpyTag and SpyCatcher can be utilized to include cyanobacterium Synechococcus elongatus PCC 7942 (S. elongatus PCC 7942) in the repertoire of options for cell-cell aggregation, with vast potential to expand into cyanobacterial industrial applications. Currently, in biotechnology, only one microbe is being utilized at a time for a given outcome; with controllable spatial structuring, the possibilities of synthetic cultures are expanded greatly. By using S. elongatus PCC 7942 and Escherichia coli (E. coli) to develop this method, advances in synthetic spatial structuring and patterning, as well as in biotechnology, can be achieved through this project.

TESTING CANDIDATE LIPID METABOLISM GENES IN CHLAMYDOMONAS REINHAARDTII USING INSERTIONAL MUTANTS

Peter Koroma
Biochemistry and Molecular Biology, Poster Presentation
Section: 4
Presentation Number: 67
Mentor(s): Danielle Young, Na Pang, Yair Shachar-Hill

Microalgae produce triacylglycerol (TAG oil), which can be used for biofuels, chemical feedstocks, and nutritional applications. In order to discover and analyze mechanisms that are

contributing to TAG accumulation, understanding of lipid metabolism is needed to help in the engineering of microalgae with increase TAG accumulation. This research focuses on identifying genes involved in lipid metabolism, that influences fatty acid composition and abundance during normal growth and after the accumulation of TAG. The organism used in this study is Chlamydomonas reinhardtii, which is an excellent model for the investigation of algal bioenergy capture and lipid metabolism for diverse reasons; its genome has been fully sequence, it has the ability to grow in multiple conditions (autotrophically, mixotrophically and heterotrophically), and it has the ability to accumulate TAG under a range of environmental stresses. Two strains of Chlamydomonas reinhaardtii mutated in candidate gene and their wild types were cultured in three different conditions: 1. Nitrogen replete 2. Nitrogen Starved and 3. Nitrogen recovery. Measured cell growth rate spectrophotometrically as optical density at wavelength of 750 nm. Total lipid contents and fatty acid composition was determined by total lipid extraction, transmethylation to form fatty acid methyl esters and quantification by gas chromatography with flame ionization detection. Different lipid classes separated on Thin Layer Chromatography plates, were quantified by staining and their fatty acid composition measured as for total lipids. The findings will be presented and their implications for gene function discussed.

UNDERSTANDING DIABETIC RETINOPATHY WITH MICROFLUIDIC RESPIROMETRY

Jeremiah Hutson
Biochemistry and Molecular Biology, Poster Presentation
Section: 4
Presentation Number: 68
Mentor(s): Denis Proshlyakov

Mitochondrial dysfunction is at the epicenter of many metabolic and neurological diseases such as diabetes, Alzheimer's and Parkinson's disease. Diabetic retinopathy is the leading cause of blindness in the United States and the most common diabetic eye disease affecting more than 4.1 million Americans over 40. Mitochondria are the main energy producing organelle in cells and generate energy molecules in the form of adenosine-triphosphate (ATP). A key component of ATP production comes from a series of proteins called the electron transport chain (ETC) in which the terminal step results in reduction of oxygen to water. As a result of its role, oxygen can be a reporter molecule to assess mitochondrial function. Studying mitochondrial damage resulting from such diseases can show contrasts with healthy mitochondria and provides a gateway for understanding diabetic retinopathy. Large sample demand as required by traditional techniques precludes experimentation with limited sample. This poster introduces an affordable microfluidic tool to reduce sample demand and automate studies on mitochondria. Utilizing retinal samples or isolated cells in a microfluidic setting additionally minimizes the sample needed for experimentation. Long term studies on these samples with this tool can be carried out by programmed solution flow sequences in the microfluidic chamber and varied as necessary. We have been able to attain reproducible flow rates from 20-100mL/min that can be varied with cost-effective air pressure supply, HPLC tubing and syringe sizes to create a compact automated respirometry tool.

INTERACTIONS OF LATE STAGE ENDOSPORULATION PROTEINS IN BACILLUS SUBTILIS

Maura Barrett
Biochemistry and Molecular Biology, Poster Presentation
Section: 4
Presentation Number: 69
Mentor(s): Lee Kroos, Sandra Olenic

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. Next, experimentation was directed towards BofA and SpoIVFA's interactions with SpoIVFB. We are constructing two plasmids to express SpoIVFB (one with cytTM), native BofA, and N-terminally truncated SpoIVFA in E. coli. Work from our lab shows that addition of cytTM to the N-terminal end of SpoIVFB may improve accumulation, and that truncated SpoIVFA is more stable and retains function when expressed in E. coli. Accumulation of these three proteins will be visualized by immunoblot analysis and interactions assessed through pull-down assays. Our work aims to improve knowledge of intramembrane metalloproteases and their regulation.

INVESTIGATING THE ROLE OF TCAB1 IN TELOMERASE ASSEMBLY

Kate Adams-Boone
Biochemistry and Molecular Biology, Poster Presentation
Section: 4
Presentation Number: 70
Mentor(s): Jens Schmidt

Telomerase is a ribonucleoprotein (RNP) found in most eukaryotic organisms that synthesizes repetitive DNA sequences in order to maintain telomere length. Telomerase is necessary to avert cell senescence due to short telomeres in proliferative cell types such as gametes and certain stem cells, and its function is frequently exploited by cancer cells. Over 85% of human cancer cell types exhibit upregulated telomerase expression. The telomerase complex consists of a telomerase reverse transcriptase (TERT) and the telomerase RNA (TR). Telomerase function is dependent on several auxiliary proteins, including telomerase cajal body-associated protein 1 (TCAB1), which traffics and localizes TR to telomeres. Previous studies have contradictory findings regarding the role of TCAB1 in assembling the telomerase RNP. We hypothesize that TCAB1 is necessary for telomerase assembly, which we demonstrate through phenotypic analysis of TR- and TCAB1-knockout cell lines. Through immunofluorescence microscopy, we found that TERT and TR localize to different subnuclear compartments in the absence of TCAB1, preventing assembly. Furthermore, live single molecule imaging reveals that 3xFLAG-Halo-TERT behaves similarly in TR- and TCAB1-knockout cell lines, suggesting a failure to assemble with TR in the absence of TCAB1. Finally, by immunopurification of 3xFLAG-Halo-TERT followed by RT-qPCR, we demonstrate that there is significantly less TR bound to immunopurified TERT in cells lacking TCAB1 compared to cells expressing TCAB1. We propose that TCAB1 is required in order to extract telomerase RNA from the nucleolus, allowing assembly of the telomerase complex.

THE EFFECT OF PH ON PLASMA MEMBRANE FLUIDITY

Alexandra Korabiewski
Biochemistry and Molecular Biology, Poster Presentation
Section: 4
Presentation Number: 71
Mentor(s): Gary Blanchard

A cell's ability to survive and function properly is dependent on several factors, one of which being cell membrane fluidity. Fluidity can be understood as the viscosity of the membrane arising from the constant interactions between its molecular constituents: lipids. The plasma membrane does not exist as a static structure, but rather an intricate and incredibly dynamic system tasked with controlling what types of molecules can enter and leave the cell. Unfortunately, this system is vulnerable to damage brought on by disease, the signifier of which being a change in fluidity. This project explores the effect of pH on the fluidity of plasma cell membranes by observing the interactions of molecules within different regions of the membrane using steady state fluorescence spectroscopy. The goal is that by understanding the chemistry of cell membranes we can better understand the progression of diseases that impact these systems. This work is part of a larger effort that explores plasma membrane fluidity as a diagnostic of disease state. Several experimental variables, including glucose concentration, pH, and ionic strength are the focus of this work and their effect on live cells and selected model systems is currently being explored.

BUSINESS

A STUDY ON FEMALE RUN MUTUAL FUND PERFORMANCE

Em Schnettler
Business, Poster Presentation
Section: 1
Presentation Number: 75
Mentor(s): Antoinette Tessmer, Kirt Butler

Finance is perceived by many as an industry that is dominated by men, with minimal involvement of women. Despite this belief, there are actually many successful female CEOs and leaders in the finance industry. This presentation examines the differences in performance of mutual funds run by both genders to assess if gender is a determinant in portfolio performance. Gender does play a psychological role in the way people think, and therefore how an individual will choose to invest. We hypothesize that female led mutual funds will outperformed the general stock market, over a six-month period, based on stock market performance. We invested an imaginary one million dollars into a stock market simulation called Stock Track. The money was invested into mutual funds that had a female CEO, or at least one woman on the board or in a position of power within the firm. Our analysis focuses on daily portfolio performance as compared to a market average. Our results may highlight significant differences in portfolio growth depending on the manager's gender. We will propose investment strategies, accordingly.

COMPARING GENDER-BASED PRODUCTS AND STOCK MARKET PERFORMANCES

Lydia Heyn
Business, Poster Presentation
Section: 1
Presentation Number: 76
Mentor(s): Antoinette Tessmer, Kirt Butler

Our research focuses on the stock market performance of companies that market male versus female-oriented products. Based on related content, other studies, and our own predictions, we hypothesize that there will be no significant difference in markets when one gender

orientation is compared to another. We use a simulated stock portfolio that invests in companies with distinct gender-oriented products. Through this research, we aim at expanding knowledge on how gender may affect the stock markets. Research in this area is important because it sheds light on whether differentiating genders play a role in important aspects of businesses such as their market performance.

INVESTMENT SPACE: MEN VS. WOMEN

Daisy Kelly, Konstantinos Sarinopoulos, Rachel Wu
Business, Poster Presentation
Section: 1
Presentation Number: 77
Mentor(s): Antoinette Tessmer

With gender bias studies growing in popularity, researchers have seen a noticeable difference in how men and women operate within the investment space and financial workplace. Our project analyzes assets under management (AUM) comparisons, return and risk, and type of investment by genders. Through organic survey results from students of the Eli Broad College of Business and investment analysis papers, this study shows how gender can affect the outcome of investments. Females tend to be risk-averse, i.e., as soon as they lose money, they are more likely to take action to limit their loss as compared to males. Knowing that males tend to take more risk and are more involved in the investment space, we set out to identify how this risk-taking tendency affects investments' return and companies' growth. Furthermore, by drawing attention to different sectors of investments, including mutual funds, hedge funds, private equity, and real estate, our research also shows how investment diversification can be beneficial and how gender can easily sway it to become either positive or negative. Our research reports the significant effects that gender behavior tendencies can have on an investment portfolio's return and within the workplace.

EQUALITY INITIATIVES AND STOCK PERFORMANCE: THE CASE OF FINANCIAL INSTITUTIONS

Akhila Cholasamudram
Business, Poster Presentation
Section: 1
Presentation Number: 78
Mentor(s): Antoinette Tessmer

This research explores how promoting gender equality in financial institutions can help improve the company's performance in the stock market when compared to the MSCI World ETF (ticker = URTH). In the past, women have been intimidated by the financial industry because it was male dominated. However, in more recent years, Wall Street's diversity has increased. This research highlights the benefits and importance of this change. It is high time that gender stereotypes are shattered and everyone is given equal opportunities. First, we researched financial institutions across different countries that promote gender diversity through diversity programs, company's mission statements, company's diversity policies, etc. Subsequently, we divided one million dollars among the selected companies and invested in stock from the corresponding financial institutions. We hypothesize that financial institutions that participate in gender equality initiatives perform better than average on the stock market. Our expected results are that the simulated stock portfolio's performance will support our hypothesis.

TOP COMPANIES TO WORK FOR AS A WOMAN VS. THE STOCK MARKET

Amanda Thompson
Business, Poster Presentation
Section: 1
Presentation Number: 79
Mentor(s): Antoinette Tessmer, Kirt Butler

To understand more about gender influences and inequalities in the stock market, we used Stock Trak, a global stock portfolio simulator, to invest one million dollars in stock of top companies to work for as a woman. We Compare our portfolio' market performance to other companies not ranked as highly by female employees. We invested in twenty-one different companies that were found to be ranked by Forbes as America's best employers for women. These companies ranged from Ulta Beauty to Mattel to JetBlue Airways to diversify among products and services. We predict that the portfolio return will be positive.The objective of this research is to examine trends in different stocks and relate these findings to the company's leading status with female employees. This is important research because gender diversity is essential to the workplace and in fact ensuring equal representation for women has a multitude of positive impacts in an organization.Therefore women could benefit from this research if companies take the time to look into such gender inequalities.

GIRL POWER - HOW FEMALE CEOS CAN CHANGE THE GAME

Rachel Wu
Business, Poster Presentation
Section: 1
Presentation Number: 80
Mentor(s): Antoinette Tessmer

As female empowerment and gender bias issues grow, the number of females in senior management positions has increased tremendously. With that, several differences between the management styles of males and females in C-suite positions have been identified, revealing the drastic effects it has on the company as a whole. Our research project seeks to find whether a female in a Chief Executive Officer (CEO) position affects a company's success in a positive or negative way compared to those with a male CEO. Our experiment synthesizes the results of a seven month long diversified StokTrak portfolio, an online brokerage platform that simulates the global stock market, that compared the performance of companies with female CEOs and those with male CEOs. We also research other aspects of those companies that we invested in. Because women are a new voice in management and can easily bring new perspectives, many companies with female CEOs have seen boosted returns on equity. Our poster will reveal our findings and conclusions that although few, female CEOs may stand as a positive influence for companies.

HE SAYS, SHE SAYS: DOES GENDER IMPACT THE WAYS IN WHICH INVESTORS VALUE RETURNS?

Em Schnettler, Holly Bashore, Lucas Lisowsky
Business, Poster Presentation
Section: 2
Presentation Number: 83
Mentor(s): Antoinette Tessmer, Kirt Butler

Does gender influence the ways in which individuals value returns on investments? The purpose of this presentation is to examine the differences in the ways men and women choose to invest their money, and the psychology behind the reasoning. The purpose of this research is to gain a greater understanding of the potential influence gender may have on investing in general, and the reasoning behind why this divide exists. Our research is important as it digs deeper into the thought processes that separate men and women.

Gender has proven to have a distinct effect on the endeavors that investors seek, due to a variety of factors including biological and social. We are obtaining our research from multiple sources such as a survey sent out to members of the business college, and observations made in previous studies and the media. We have found that there are indeed differences in the desired returns by gender, and differences in how they are seeked out. The study confirms the impact gender may have on investment styles and the factors that contribute to economic success.

COMPARING PERFORMANCE OF FEMALE AND MALE LED FIRMS

Devin Brust
Business, Poster Presentation
Section: 2
Presentation Number: 84
Mentor(s): Antoinette Tessmer, Kirt Butler

The goal of our research is to test the theory that male led companies outperform their female counterparts on the stock market. We hypothesize that companies led by a male CEO will outperform their equivalent female led companies. We created two StockTrak portfolios consisting of one million dollars each. Each portfolio is invested in eight companies currently led by a female or male CEO, respectively. The chosen companies all share a venture capital round of funding before their IPOs. Successful outcomes from male led companies were higher than female led ones when they received venture capital funding. The portfolios have a similar combination of companies in matching industries. We will report and analyze our portfolios' performances since the beginning of October 2020.

IS IT POSSIBLE FOR WOMEN TO OUTPERFORM MEN ON WALL STREET?

Bernardo Mascarenhas
Business, Poster Presentation
Section: 2
Presentation Number: 85
Mentor(s): Antoinette Tessmer, Kirt Butler

The low number of women working on Wal Street is notable. As much as this difference has narrowed over the years, our society must be aware that there is still much work to be done. Gender inequality in the financial sector is also found in asset management. It is a fact that the vast majority of mutual funds are managed by men. Ideally, the gender ratio in asset management would be equal, however, based on current data, we are a long way from this reality. It is important to recognize that historical differences and structural prejudices are a major factor for this difference. The purpose of this study is to analyze the performance of mutual funds and seek a potential relationship between the gender of those who manage the funds and the funds' performance on the stock market. Following the advice provided in a recent reputable business publication, we built a simulated portfolio that invest in companies that are most often picked by female asset managers. We analyze our portfolio performance over a period of seven months. Our data will indicate whether a typical female manager can maintain a performance that is superior to the Market average over a medium-term investment horizon. Our conclusions may help investors decide whether they should consider the managers' gender as a valid criterion for mutual fund selection.

LEARNING FROM GENDERS: THE MOST EFFICIENT STOCK INVESTMENT DECISIONS

Ky Chimrak, Spencer Thakady
Business, Poster Presentation
Section: 2
Presentation Number: 86
Mentor(s): Antoinette Tessmer, Kirt Butler

Decision making in the stock market depends on many factors such as age, gender, income level. Our research aims at identifying the differences in investment strategies between males and females. At the start of the research period, participants were given one million dollars to invest on a simulated stock market website called Stocktrak. We focus on two blind portfolios, one managed by a male participant and the other by a female participant. Both participants were instructed to invest all of their money, at first, in a given list of corporate stocks, as well as mutual funds. Participants were free to make changes to their portfolio over a period of seven months, if they wanted to. The two portfolio managers did not communicate with each other. Data to be compared includes the number of trades, the size of trades, the frequency of trades, and the different companies invested in. Our analysis will help discover whether genders play a role in investment decisions. We will find evidence of gender-related particular strategies, differentiate the outcome of those strategies among genders and suggest the most appropriate environments when each gender's strategies should be followed.

RISK PERCEPTION BY GENDER

Ashley Yearwood, Devin Brust, Lydia Heyn
Business, Poster Presentation
Section: 2
Presentation Number: 87
Mentor(s): Antoinette Tessmer, Kirt Butler

Our research focuses on the perception of risk and how it differentiates between male and female business students. Based on literature articles and conversation with professionals, we hypothesize that males are willing to take more risk compared to females. We surveyed Broad students on the amount of risk that an individual would be willing to take based on the amount of expected reward. Through our research, we hope to raise awareness on risk aversion between genders and how it may affect the financial industry.

SOCIALLY RESPONSIBLE INVESTING: BETTER OR WORSE THAN THE S&P500

Daisy Kelly
Business, Poster Presentation
Section: 2
Presentation Number: 88
Mentor(s): Antoinette Tessmer, Kirt Butler

This research focuses on determining if socially responsible investments perform better than the overall return on the S&P500. We put together a $1M portfolio on Stocktrak and invested in eighteen different socially responsible companies and tracked the returns from September 2020 until April 2021 and compared the results against the S&P500 over the same period of time. The goal of this research is to show that socially responsible companies continually perform better than the market, which is proven by the data from the portfolio. This information is valuable to investors because they know that their money is going to a good cause and it not being erroneously spent. It also aids the reputation of the investor because it demonstrates that they care about the society and world around them and are trying to help those causes through investing.

STOCK MARKET ANALYSIS SHOWS HOW WOMEN CEOS PERFORM COMPARED TO THE AVERAGE

Ashley Yearwood
Business, Poster Presentation
Section: 3
Presentation Number: 91
Mentor(s): Antoinette Tessmer, Kirt Butler

This research analyzes the stock market performance of women CEOs compared to the market average. One million dollars were invested in companies with female CEOs. Companies were chosen based on upward trends and the goal of creating a diverse portfolio. The stocks within the portfolio were held for seven months without making any changes. To simulate the one-million-dollar stock portfolio, the online "StockTrak" platform was used. A total of nineteen female-led companies were chosen and observed for the scope of this project. Female-led companies are predicted to outperform the stock market. This hypothesis is drawn primarily from the assumption that women tend to be more cautious, methodical, and sensitive when it comes to investing and running a business compared to men. We will report greater details regarding the performance of and inferences made about these companies over the last seven months.

STOCK PERFORMANCE AND CUSTOMERS' GENDER

Raphael Barbuda Amaral da Silveira
Business, Poster Presentation
Section: 3
Presentation Number: 92
Mentor(s): Antoinette Tessmer

There is ample research regarding the topic of gender on Wall Street, and whether managers make different decisions if they are male or female. This topic has become quite popular in the last decade as questions regarding gender inequality were brought up. Another interesting perspective from which the matter of gender can be analyzed is how companies that sell products to women or men perform in the stock market. As the stock market has been recognized as impartial in various instances, we propose this atypical point of view to analyze gender equality. Does the stock market discriminate companies based on the gender of their customers? If the stock market is in fact impartial, are there other parameters that make those companies perform better or worse than average? We propose to analyze the performance of a stock portfolio composed of companies that sell women's products, men's products, or unisex products. Although it would be ideal to identify companies that have 100% of their customers with one specific gender, this is not a fact in the current economy. We used popular knowledge to classify companies as "male" or "female" oriented. We report our portfolio results and interpret them in light of customers' gender.

THE EFFECT OF MEDIA ATTENTION ON THE STOCK MARKET PERFORMANCE OF COMPANIES THAT SELL PRODUCTS FOR WOMEN VS. PRODUCTS FOR MEN

Leland Macke
Business, Poster Presentation
Section: 3
Presentation Number: 93
Mentor(s): Antoinette Tessmer, Kirt Butler

Our research looks at twenty different companies, ten of which make and market products geared towards men. The other ten companies manufacture products that are made and marketed for women. By analyzing these companies both on their market performance and their media attention, we aim at identifying an obvious difference from or advantage to one group over the other. This is an important research topic because it has the potential to

discover advantageous or disadvantageous patterns that may occur in the market performance of these two groups. We analyze the daily market performance of these two groups while tracking relevant media news. Company performance is observed both individually and per group based on which gender the products are geared to. Media attention is categorized as having a potential positive effect on the stock price. We hypothesize that these companies will have similar performance, with media attention being the largest influencer of their performance.

THE EFFECTS OF GENDER ON INVESTMENT RISK AND RETURN

Ky Chimrak, Raphael Barbuda Amaral da Silveira, Tommy Hojnicki
Business, Poster Presentation
Section: 3
Presentation Number: 94
Mentor(s): Antoinette Tessmer

While gender plays a role in many other fields and parts of life, we set out to find if these differences extend into investing in the stock market. We believe that there is a noticeable difference between the stock investment methods and success of male and female investors. A main reason for this hypothesis comes from the expectation that males will employ active portfolio management practices to increase their chances to earn larger returns. However, this type of investing also increases the likelihood of significant losses. Proving our theory will demonstrate to investment firms that increasing the proportion of women in their work force can significantly benefit their portfolio. Our data will be collected from the portfolios of all 17 course participants: return, number of trades, sharpe ratio, changes in portfolio values, buy/sell transaction sizes, buy/sell transaction frequencies... We also surveyed participants to understand how they determined when and if it was time to sell/buy stocks. We expect to confirm our hypotheses and show results that suggest that females have a greater sense of balancing risk and reward.

THE VALUE OF A COMPANY BEING SOCIALLY RESPONSIBLE TO FEMALE VS. MALE INVESTORS

Lucas Lisowsky
Business, Poster Presentation
Section: 3
Presentation Number: 95
Mentor(s): Antoinette Tessmer, Kirt Butler

In today's environment it is ever more important for companies to play a crucial role in helping the environment and preventing future environmental disasters. With the financial help of large companies, there has been significant progress towards reversing the negative impacts of pollution, the use of fossil fuels, and much more. However, do companies choose to help out of the kindness in their heart or is there another reason behind their involvement in environmental programs? We track the performance of twenty socially responsible companies on the stock market, from September 2020 to March 2021. We compare our portfolio to a common socially responsible mutual fund. We also compare our portfolio to a major stock market index to discover any major differences in performance over the same time period. Through this research we hope to determine whether or not a socially responsible portfolio performs differently than average, specifically significantly better. Other studies have shown that females more often invest in socially responsible companies than males. We hypothesize that female investors are more likely to invest in socially responsible companies than male companies because of the appearance of a greater value in the company. We also hypothesize that male investors tend to minimize the role of corporate social responsibility when evaluating a stock.

GENDER REPRESENTATION ON WALL STREET

Akhila Cholasamudram, Bernardo Mascarenhas, Leland Macke
Business, Poster Presentation
Section: 3
Presentation Number: 96
Mentor(s): Antoinette Tessmer, Kirt Butler

Over the years, there has been an increase in gender equality in the U.S. financial sector, but even so, there is still a gap between men and women in certain positions and our mission is to alert society that we always need to improve and seek a more diverse environment. We are researching whether there is fair gender representation on Wall Street using past trends, interviews from professionals involved in finance, and relevant articles that focus on this topic. This is an important research subject because in order to form a more impartial society we need to better recognize the prejudices and biases tainting our population. Our goal is to expose the lack of gender diversity and use this information to help form a society with equal opportunities. Our method includes interviewing a diverse group of professionals and students who have had significant experience with the finance industry in the United States in order to get qualitative data. Interviewees include people who are at different levels in their career to make sure our study is unbiased as possible and to get a variety of viewpoints and values from different age groups in the field of finance. We expect to learn more about the initiatives various financial institutions have undertaken to increase gender diversity. However, we also expect to learn about the biases and failure to equally represent the population - specifically, the biases employers have during the hiring process and the biases employees have when entering the industry.

WHY IS THE MSU FINANCE MAJOR DISPROPORTIONATELY CHOSEN BY MALE STUDENTS?

Amanda Thompson, Spencer Thakady
Business, Poster Presentation
Section: 4
Presentation Number: 99
Mentor(s): Antoinette Tessmer

Our research examines why the finance major at MSU is particularly chosen by far more male students than female students. Principally, finance is one field that still carries the traditional thinking that it is a man's field. Our poster will focus on data collected from our conducted survey that was sent out to all MSU Broad business students and from Michigan State University enrollment numbers in the finance major to specifically show the imbalance of male finance majors to female finance majors. The objective of this poster is to provide insight into why men are more inclined to pursue finance than women and helps explain why this gender inequality still exists in this business field. In order to acquire these results, the survey we conducted consists of numerous questions about interests a student may have, choices they would make in certain situations, as well as their background and parents' background professionally. This will allow us to make an assessment and determine why the finance major is constructed so heavily of males at Michigan State University.

WOMEN WORKPLACE WONDERLAND

Tommy Hojnicki
Business, Poster Presentation
Section: 4
Presentation Number: 100
Mentor(s): Antoinette Tessmer, Kirt Butler

Half of the population has seen centuries of being excluded from working, especially in favorable conditions. Recently, more companies push themselves to create an environment

that is more inviting and inclusive to women. Many of the companies that have the honor to be ranked as a top workplace for women are industry leaders. Our research is designed to track the growth of these corporations' stock, a strong indicator of the current and future growth of the company as a whole. We also are investigating if the trends in stock are influenced by the institution placing a female in a leadership position or crucial innovations made by a female already in these roles. Finding evidence to support these theories will encourage all business leaders to initiate transformations that will propel a universally inclusive work environment. We look at how these top companies are experiencing success. We also compare how many women are in leadership positions relative to their less inclusive counterparts. Analyzing these pieces of evidence will reveal to us, the true impact that women have on companies around the world.

WONDER WOMEN CEOS

Konstantinos Sarinopoulos
Business, Poster Presentation
Section: 4
Presentation Number: 101
Mentor(s): Antoinette Tessmer, Kirt Butler

Recently, NASDAQ announced that it will require its listed companies to have at least two “diverse” board members or explain why they do not. This indicates that Nasdaq believes that diversity is both important and beneficial to companies. The CEOs of the illustrious Fortune 500 have never been an extremely diverse group. When it comes to gender, only 37 out of the Fortune 500 are women, i.e., a mere 7.4%. Our research focuses on the market performance of companies where women hold CEO positions. We hypothesize that ?women will outperform the market? because women executives already know how to succeed against the odds. This could be because diversity brings new ideas to the table or that women are held to higher standard than their counterparts. Studies show that the language used in newly appointed female executives' biographies more frequently possessed the attributes associated with success. We built a stock portfolio homogenously invested in female led companies. Our portfolio will be compared to a market index identified by the S&P 500. We selected a diverse set of securities to represent various sectors in the economy and to reduce unsystematic risk. We expect that our portfolio data supports the notion that women executives are stronger performers. Such results would suggest that women can achieve greater success as business executives. On the basis of this, in their attempt to bring new ideas and greater performance, firms should not count out a woman CEO.

AN ANALYSIS OF THE SOCIAL MEDIA ON CSR ACTIVITIES

Nikunj Agarwal
Business, Poster Presentation
Section: 4
Presentation Number: 102
Mentor(s): Satish Joshi

Over the last decade, social media platforms such as Facebook, Tumblr, and Twitter have enabled stakeholders and customers not only to communicate with each other but also to inform firms about their expectations, satisfaction or frustrations with firm products, performance and initiatives. Because of inherent strengths in timeliness, global reach, sheer volume, granularity, and specificity of feedback and the potential for viral social amplification, social media is evolving as a powerful watchdog of societal norms and expectations. While it makes logical sense that firms perceive and respond to aggregate societal pressures from a range of stakeholders expressed through social media posts (SMPs), very little is known about the mechanisms through which firms collect and process social media information; and if and how they respond to such perceived social pressures by changing their corporate

social responsibility efforts. The goal is to understand how corporations collect, assess, and respond to social media posts/information about their corporate social responsibility efforts.

TO BUY OR NOT TO BUY: HOW GENDERS MANAGE INVESTMENT RISK AND RETURN

Holly Bashore
Business, Poster Presentation
Section: 4
Presentation Number: 103
Mentor(s): Antoinette Tessmer, Kirt Butler

The purpose of our research is to identify tendencies in stock investing that are more efficient in terms of risk and return, depending on gender. This research is important as it can shed light on the investment practices of women versus men, and their effects on how investment risk and return is managed. We also expect to identify what investment tendencies are most efficient in minimizing risk and maximizing return. We collected data on a stock portfolio managed by a woman and on the stock portfolios of a group of male participants in a research seminar. All participants have similar investment knowledge, invested the same amount of simulated dollars, and managed their portfolio over the same period of time. We compare measures such as portfolios turnover, overall return, and average risk. Our analysis may provide insight as to how genders act differently in a stock investment environment and on how those actions affect a stock portfolio risk and return.

RESTART PHUKET: THE EFFICIENT WAY FOR THE HOTEL INDUSTRY IN PHUKET, THAILAND TO RECOVER FROM THE PANDEMIC

Ky Chimrak
Business, Poster Presentation
Section: 4
Presentation Number: 104
Mentor(s): Mi Ran Kim

With a population of 416,582 people, Phuket is essentially the second-highest per capita income in Thailand as it is one of the main landmarks in the country. Due to the total value of tourism's contribution to GDP was approximately 12 percent prior to the pandemic, Phuket was unfairly given the government's total budget based on their population and not their total capital income. This study aims to analyze a structural issue that has been affecting hotels in Phuket by comparing both before and after the pandemic and point out the critical issues. The research will also present how the customers respond to the effect of failure management and approximate total opportunity losses over the period. The goal is to suggest the solution of what the policies should Thai government be taken differently and how hotels in Phuket should handle the circumstances to recover from time of crisis to complete the mission of restart Phuket.

CELL BIOLOGY, GENETICS & GENOMICS

DEFENSE RESPONSE IN SCIURUS CAROLINENSIS AFTER PREDATOR PLAYBACK AND ITS LINK TO HUMAN DRD4 GENE

Hannah Rick
Cell Biology, Genetics and Genomics, Oral Presentation
Section: 1
Presentation Number: 107
Mentor(s): Douglas Luckie

Over the past semester, I led a research project that examined animal behaviors that may have relevant homologs in humans. The focus of the investigation approached behaviors quite similar to fight-or-flight responses to alarm or danger signals. For example, in one thrust

we examined a model organism's (squirrel) reaction to predator (hawk) playback vocalizations while the organism was eating, and whether the response(s) might be altered by same-species cues (squirrel chatter). We played different sequences of playbacks to 38 squirrels on Michigan State University's campus. The different sequences included silence-silence, silence-chatter, silence-hawk, and chatter-hawk where each part of the sequence was played from 3 to 5 meters away for 10 seconds each, while the squirrel was eating. The squirrels were then categorized as either "reaction" or "no reaction". A reaction squirrel either ran away or stopped eating. No reaction squirrels continued eating. While there were less reaction squirrels in the chatter-hawk sequence than the silence-hawk sequence, after chi-squared analysis, the differences in the n=38 dataset were not found to be statistically significant (p-value=0.07). Our data did not support one prediction that squirrels would increase risk-taking when foraging and surrounded by same-species audio cues. We plan to conduct more trials inspired by novel methods in recent publications. Our final results, including our homologous human trials and some early analysis of conserved DNA sequences, will be presented at UURAF in April 2021.

USING SINGLE MOLECULE LIVE CELL IMAGING TO INVESTIGATE THE ROLE OF RNF169 IN THE DNA DAMAGE RESPONSE

Aastha Bahl
Cell Biology, Genetics and Genomics, Oral Presentation
Section: 1
Presentation Number: 108
Mentor(s): Jens Schmidt, Joshua Heyza

Human ring finger protein 169 (RNF169) plays an important role in mediating the DNA damage response, specifically in the response to DNA double strand breaks (DSBs). DSBs in DNA elicit RNF168 to recruit the DNA repair protein 53BP1 as well as RNF169 through the deposition of a ubiquitin modification on histone H2A. The literature shows that RNF169 limits the accumulation of 53BP1, thereby attenuating 53BP1 activity. The purpose of this research is to investigate the way that RNF169 balances the DNA damage response. Through designing and utilizing CRISPR plasmids for endogenous genome editing of RNF169 in U2OS cells, I have generated HALO tagged RNF169 cell lines for live-cell single-molecule imaging studies. Using this genome-edited cell line, I can analyze the recruitment of RNF169 to DNA damage sites and define the molecular mechanism by which it counteracts 53BP1 recruitment.

BEHAVIORAL RESPONSES OF BOER GOATS

Anthony Tundo
Cell Biology, Genetics and Genomics, Oral Presentation
Section: 1
Presentation Number: 109
Mentor(s): Douglas Luckie

Both humans and boer goats (Capra aegagrus hircus) process physical cues using the neurons plasticised by the FMR1 gene. The purpose of this study was to document the behavior of goats and humans after receiving physical cues in order to make a decision that would result in a reward, indicating the use of FMR1 as a homologous gene in both species. Both female Boer goats from a small farm in Michigan and college-aged female humans were subjected to trials with randomized baited bowls that were referred to by the cues of looking at, touching, pointing, and a negative control of no cue at all. When the baited bowl was chosen, the food under the bowl was given to the subject. It was hypothesized that the physical cues of pointing and touching would be more successful in cueing the subjects when compared to the cues involving the head that are more ambiguous. The significance in the science of this study is that the documentation of the FMR1 gene's function helps to further the understanding of the learning disabilities and autism that affect many people around the

world. The predictions of this study would be two-fold: Cues involving hands will be more successful in leading the subject to choose the baited bowl; and that the human subjects would be more successful in choosing the baited bowl overall when compared to the performance of the goat subjects.

FUNCTIONAL ANALYSIS OF ENDOTHELIN LIGAND GENES IN THE DEVELOPMENT OF THE ZEBRAFISH NEURAL CREST CELL POPULATION

Cameron Bennett
Cell Biology, Genetics and Genomics, Oral Presentation
Section: 1
Presentation Number: 110
Mentor(s): Ingo Braasch

Neural crest cells (NCC) are an embryonic cell population that differentiates into many tissues including e.g. heart, pigment cells, neurons, and craniofacial skeleton. Unique to the vertebrates like fish and humans, the neural crest forms along the dorsal neural tube before migrating throughout the embryonic body. The endothelin (Edn) signaling system is a key molecular regulator in cell fate determination, migration, and differentiation into different NCC derivatives. Endothelin peptide ligands and their respective G-protein coupled receptors make up the bona fide endothelin system, which newly evolved in a vertebrate ancestor. Vertebrate whole-genome duplication events have then led to varying sets of Edn ligand and receptor genes among vertebrate lineages. Here, our objective is to better understand the developmental role of the five Edn ligands in the teleost fish zebrafish, Danio rerio following a teleost-specific whole-genome duplication. Currently, the functional spectrum of most Edn ligands remains unknown. We used CRISPR-Cas9 genome editing to successfully knock out edn2a, edn2b, edn3a, edn3b, and edn4 genes and combine them in a zebrafish endothelin quintuple mutant line. Interestingly, we have not yet detected any observable phenotypes in this mutant line beyond the known edn3a/end3b double mutant pigmentary defects, suggesting that the endothelin system acts in a highly redundant manner. The findings of this study enhance our understanding of the functions of the endothelin ligand gene family and provide insight into the evolutionary fates of paralogous genes following whole-genome duplication.

A BAYESIAN METHOD FOR ENHANCED GENOME-WIDE ASSOCIATION RESULTS

Lindsay Guare
Cell Biology, Genetics and Genomics, Oral Presentation
Section: 5
Presentation Number: 111
Mentor(s): David Arnosti, Mark Reimers

While genome-wide association studies (GWAS) have identified many dozens of relevant genetic loci for psychiatric disorders and behavioral traits, this number is much less than the estimated number of loci. Moreover, it is challenging to choose the causal variant out of a significant locus because, usually, many single-nucleotide polymorphisms (SNPs) are highly correlated in linkage disequilibrium. The goal of this project is to identify novel risk loci for a variety of brain-related traits, and to narrow the range of likely SNPs within each locus. We have developed a Bayesian statistical method based on priors defined by partitioned heritability estimates and likelihoods based on the joint distribution of Z Scores within the locus. We have developed a pipeline in Python and R that uses the multivariate distribution of linked SNPs to find the likelihoods and then incorporates information about each SNP's functional class to calculate the posteriors. Preliminary results have shown promise in uncovering many more significant SNPs than are currently in the literature.

BIOLOGICAL FEATURE SETS FOR ACCURATE COMPARISON OF EXPRESSION SAMPLES ACROSS SPECIES

Sneha Sundar
Cell Biology, Genetics and Genomics, Oral Presentation
Section: 5
Presentation Number: 112
Mentor(s): Arjun Krishnan

Researchers traditionally study certain genes in model species, such as mice or zebrafish, and obtain expression data to later apply to humans because ethically many of the experiments that further our understanding of the genetic mechanisms that cause disease can't be performed in humans; however, expression profiles consisting of thousands of genes are often generated in these experiments, but are not directly comparable to human gene expression. Usually researchers rely on sets of directly comparable genes (one-to-one orthologs) to translate these results in humans, but only a subset of genes in each species fall into this category. In this work, we utilize biological pathway information and groups of orthologous genes to cast all the samples in the same feature space. These methods allow for the use of a greater number of genes when applying what is learned from model organisms to humans. A critical step is to create a gold standard to evaluate the different feature spaces, utilizing expression data from humans, mice, zebrafish, worms, flies, and yeast, which was further divided into tissue types -- heart, brain, blood, liver, intestine, and lungs. From there, to determine whether using one-to-one orthologs, biological pathways, or orthologous groups as features are the best way to compare samples across species, we use them in multiple machine learning methods. Based on these comparisons, we have found that orthologous groups are better features than biological processes for accurately distinguishing samples from different tissues across species.

MOLEVOLVR: A WEB-APP FOR CHARACTERIZING PROTEINS USING MOLECULAR EVOLUTION AND PHYLOGENY

Samuel Chen
Cell Biology, Genetics and Genomics, Oral Presentation
Section: 5
Presentation Number: 113
Mentor(s): Janani Ravi

The interdisciplinary field of computational biology uses concepts and tools from computer science to drive discovery in biology. In our group, we focus on using molecular evolution and phylogeny to gain key insights into pathogenic proteins. We study how these proteins evolve across bacterial lineages, by identifying lineage-specific and pathogen-specific signatures and variants in their homologs. The goal of my project was to build a streamlined approach for the molecular evolution and phylogeny of target proteins, widely applicable across protein and pathogen families. To this end, we have created MolEvolvR, a webapp that enables biologists to run our entire molecular evolution and phylogeny approach on their data by simply uploading a list of their query proteins. The webapp provides an easy-to-use interface for a wide range of analyses, starting from homology searches and phylogeny to domain architectures. data. In addition to this analysis, users can use the app for data summarization and dynamic visualization. MolEvolvR will be a powerful, easy to use tool that accelerates the characterization of proteins. The webapp can be accessed here: https://jravilab.org/molevolvr. Soon, it will be available as an R-package for use by computational biologists.

FDA APPROVED DRUG BICALUTAMIDE RESCUES MALE MICE FROM KENNEDY'S DISEASE

Mackenzie Greene
Cell Biology, Genetics and Genomics, Oral Presentation
Section: 5
Presentation Number: 114
Mentor(s): Cynthia Jordan, Yu Ping Tang

Kennedy's Disease (KD) is a neurodegenerative disorder caused by a polyglutamine expansion, or CAG repeat, in the Androgen Receptor (AR) gene. This disease affects only males, usually emerges mid-life, and is characterized by marked deficits in muscle strength and coordination. Male mice with the KD allele develop muscle weakness around puberty as testosterone levels surge, suggesting that levels of testosterone may contribute to disease development in mice with mutated AR. Bicalutamide (Casodex Brand) is a drug currently being prescribed to slow progression of prostate cancer. By binding to androgen receptors to block androgens like testosterone, bicalutamide prevents the detection and effects of testosterone. We hypothesize that giving bicalutamide to male mice carrying the mutated AR allele will slow or prevent disease progression. We monitored the integrity of their motor function over time based on measures of hang time, grip strength, and ambulatory function in an open field. When one mouse in the trial reached a certain disease threshold indicated by weakness, all animals in the trial were sacrificed and muscle size and body weight were analyzed. Disease symptoms were significantly less for mice who received bicalutamide compared to the vehicle-treated mice, demonstrating a clear benefit of this drug in a mouse model of KD. Bicalutamide is currently approved for use as a treatment for prostate cancer, and our findings suggest that this drug may be an effective therapeutic for patients afflicted by KD.

GENETIC MODELS OF PANCREATIC CANCER UNCOVER TUMOR SUPPRESSIVE ROLE OF MICRORNA-21

Katie Powell
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 2
Presentation Number: 115
Mentor(s): Lorenzo Sempere

Pancreatic ductal adenocarcinoma (PDAC) is a recalcitrant and lethal disease with an overall 5-year survival rate of less than 8%. PDAC is characterized by its highly aggressive cancer cells and extensive stroma reaction. This reactive stroma contains distinct tumor-restraining and tumor-promoting fibroblast subpopulations. Re-education rather than indiscriminate elimination of these fibroblasts has emerged as a new strategy for combination therapy. We studied the effects of global loss of pro-fibrotic non-coding regulatory microRNA-21 (miR-21) in K-Ras-driven p53-deleted genetically engineered mouse models of PDAC. Strikingly, loss of miR-21 accelerated tumor initiation and progression to locally advanced invasive carcinoma from which animals precipitously succumbed at an early age. The absence of tumor-restraining myofibroblasts and a massive infiltrate of immune cells were salient phenotypic features of global miR-21 loss. Stromal miR-21 activity was required for induction of tumor-restraining myofibroblasts in in-vivo isograft transplantation experiments. Low miR-21 expression negatively correlated with a fibroblast gene expression signature and positively with an immune cell gene expression signature in TCGA PDAC data set (n = 156) mirroring findings in the mouse models. Our results exposed an overall tumor suppressive function of miR-21 in in-vivo PDAC models. These results have important clinical implications for anti-miR-21-based inhibitory therapeutic approaches under consideration for PDAC and other cancer types. Mechanistic dissection of the cell-intrinsic role of miR-21 in cancer-associated fibroblasts and other cell types will be needed to inform best strategies for pharmacological

modulation of miR-21 activity in PDAC in order to remodel the tumor microenvironment and enhance treatment response.

EFFECTS OF OXYBENZONE ON EPITHELIAL DUCTAL DEVELOPMENT IN MURINE MAMMARY GLANDS

Calista Busch
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 2
Presentation Number: 116
Mentor(s): Olena Morozova, Richard Schwartz

Oxybenzone (benzophenone-3; BP-3) is a putative endocrine disrupting chemical, and common ingredient in sunscreens and many personal care products. Endocrine disrupting chemicals can interfere with the normal action of reproductive hormones. BP-3 is found in the urine of as much as 98% of the U.S. population. Given the prevalence of BP-3 exposure, published evidence that BP-3 is an endocrine disrupting chemical, and the lab's previous studies showing that a high-fat diet can promote breast cancer, we investigated the effects of BP-3 and diet on the ductal development of mammary glands in mice. To that end, BALB/c mice were fed diets with or without BP-3. The diets also varied in dietary fat. Mice were fed a continuous low-fat diet (LFD; 10% kcal fat), continuous high-fat diet (HFD; 60% kcal fat), high-fat diet switched to low-fat diet (HFD-LFD) after puberty, or low-fat diet switched to high-fat diet (LFD-HFD) after puberty (10 weeks of age). To determine if BP-3 had a continued impact after exposure ended, two additional diet groups included withdrawal of BP-3 for 2 weeks and 4 weeks before termination of the experiment. At 26 weeks of age, mammary glands were collected from the mice. Images of whole mounted mammary glands were captured using a Nikon stereo microscope at 4x magnification. The frequency of branch points in each mammary gland was calculated as a representation of glandular development, and the differences in branch point frequency between diet groups were statistically compared. Results of these analyses will be presented.

EFFECTS OF MODULATING MUSCLE CONTRACTIONS ON EMBRYO MOVEMENT IN EARLY MOUSE PREGNANCY

Madeline Dawson
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 2
Presentation Number: 117
Mentor(s): Ripla Arora

Early-stage mammalian embryos rely on physical and biological interactions with the maternal environment (uterine niche) to arrive at their site of attachment. In the mouse during early pregnancy, embryos first move unidirectionally, as a cluster, away from the oviduct towards the center of the uterine horn. Next, the embryos spread out bidirectionally towards the oviduct and the cervix until they space equally and attach. We are currently investigating the role of uterine muscle contractions in the movement of embryos by asking: a) Do muscle relaxing drugs prevent contractions of the uterus?, b) Does modulating the contractions prevent embryo movement? and c) Which phase of embryo movement (unidirectional or bidirectional) is affected? To answer the questions, I will be using image analysis techniques to quantify uterine horn contractions. First, we record 2D videos of the muscle and graph the longitudinal movement on the x-axis and transverse movement on the y-axis. Using image analysis, I then determine the lines' slopes to calculate the intensity and magnitude of the contractions. “Contraction intensity” thus quantified, is then compared between a) uterine horns at different times during pregnancy, and b) with and without drug treatment. These quantitative data will allow me to start addressing questions regarding embryo movement and the effect of drugs on this movement. Understanding how muscle

relaxation affects pregnancy in the mouse model will inform the potential for these drugs to regulate contractions that lead to spontaneous abortions and miscarriage in pregnant women.

A LITERATURE REVIEW OF PERIDERM IN DEVELOPMENT AND DISEASE

Josie Kleve
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 2
Presentation Number: 118
Mentor(s): Brian Schutte

The periderm is a flat, squamous layer of epithelial cells found only on the surface of a fetus during development. To study its role in development and disease, I performed a literature search. I queried the Pubmed database using the following key search terms “periderm” and one of the following terms, “proliferation“ and “differentiation”. I found 160 publications. From reading these papers, I learned that the periderm originates from the fetal limbs and migrates to cover the entire surface of the fetus, including the oral cavity. Interestingly, the periderm is a transient tissue and is shed by 20-24 weeks gestation in humans. The shedding coincides with stratification and keratinization of underlying epithelial cells. 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, such as between 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 birth defects like orofacial clefting as seen in Van der Woude syndrome, popliteal pterygium syndrome, cocoon syndrome, and Bartsocas-Papas syndrome. Because of its critical functions in development and its transient location on the fetus, we hypothesize that the periderm is a good target for in utero gene therapy.

ANALYSIS OF TBX GENE EXPRESSION DURING EMBRYONIC FIN DEVELOPMENT IN SPOTTED GAR

Rachel Alcorn
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 2
Presentation Number: 119
Mentor(s): Ingo Braasch, Olivia Fitch

Ray-finned fishes make up more than 50% of living vertebrate species and are diverse in both species number and body plans. We are interested in identifying genetic mechanisms underlying diversity of fin configurations and shapes. These mechanisms include involvement of T-box (tbx) genes that encode transcription factors necessary for appendage identity and formation during embryonic development of vertebrates. Paired fins in fishes are thought to be regulated by expression of tbx5 and tbx4 in early development of pectoral (anterior) and pelvic (posterior) fins, respectively. Embryonic tail development in fishes is similarly thought to be regulated by tbx6, tbx16, and tbx18, where tbx18 is also considered to be involved in dorsal and anal fin positioning. Holostean fishes, gars and bowfin, are the closest living outgroup to teleost fishes. Here we use spotted gar (Lepisosteus oculatus), with an asymmetrical (heterocercal) caudal region and a small, posteriorly located dorsal fin, as a comparison to teleosts, with a symmetrical (homocercal) caudal, and to bowfin, with a large dorsal fin spanning most of its back. The objective of this study is to better understand the function of various T-box genes (tbx4, tbx5, tbx6, tbx16, and tbx18) in development and evolution of paired and unpaired fins in holostean fishes. By using RNA in-situ hybridization, spatial and temporal patterning of expression for the selected genes in spotted gar embryos can be analyzed. Findings of this study will enrich current functional understanding of the T-

box gene family and their involvement in embryonic fin positioning, development, evolution, and diversity.

DEVELOPMENT OF TETRASTR 12-PLEX TO LOCATE PRA-CAUSING MUTATIONS WITHIN VARIOUS PUREBRED DOG BREEDS

Maddy Eischer
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 2
Presentation Number: 120
Mentor(s): Patrick Venta

A multitude of canine disorders can be attributed to genetic mutations, and the ability to pinpoint these mutations is crucial to the ethical and financial success of dog breeders. Many of the mutations for one group of disorders in dogs known as progressive retinal atrophy (PRA), which causes declining vision leading to eventual complete vision loss, have already been located. However, with the vast nature of the canine genome and the genetic variation between different breeds, many of these PRA mutations still need to be unearthed. In order to combat this problem, our research has focused on designing a simple and cost-effective genetic test that could be used to localize these mutations across a variety of different dog breeds. Through the use of software including the USCS Genome Browser and Primer3, we have successfully designed effective primer sets targeting these mutations to be used in a future one-step multiplex. Our creation of a 12-plex of tetraSTRs should simplify the search for PRA genes in other breeds, leading to the understanding and discovery of other PRA-causing mutations. By using this multiplex, researchers will likely be able to develop tests to identify carriers of these mutations, allowing breeders to therefore prevent the production of PRA-affected dogs leading to the eventual elimination of specific mutations and disorders from these breeds. Future lab work will entail testing this multiplex on samples of purebred dog DNA to determine the efficacy of our primer sets.

IDENTIFYING MECHANISMS OF PHAGE DEFENSE IN VIBRIO CHOLERAE USING HIGH-THROUGHPUT BARCODE SEQUENCING

Drew Beckman
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 2
Presentation Number: 121
Mentor(s): Christopher Waters

Phage, viral parasites of bacteria, are primary drivers of bacterial evolution and ecology. My research centers on understanding how the bacterial pathogen Vibrio cholerae, the causative agent of the diarrheal disease cholera, defends itself against phage infection. Prior research revealed that the ability of lytic phage to infect V. cholerae was density-dependent such that phage infection did not occur at high cell densities. To characterize which genes are responsible for this shift in phage defense, I plan to employ a systems biology approach that utilizes transposon mutagenesis with random genetic barcodes (Bar-Seq). For this approach, hundreds of thousands of V. cholerae transposon mutants, each identified by 20 base pair unique barcode sequences, will be constructed, creating a system that tracks relative mutant abundance under selective conditions. The mutant library will then be challenged at high cell densities with ICP-1, ICP-2, and ICP-3, the three common lytic phage of V. cholerae. The fitness of each gene will be analyzed by comparing the number of hits for each barcode, representing unique transposon mutations, before and after phage infection. Mutants that exhibit decreased abundance post-infection demonstrate decreased fitness and possibly contribute to the ability of V. cholerae to resist phage infection at high cell densities. Once established, this barcode sequencing approach can be utilized to study phage infection of V. cholerae in dozens of different environments. Future research will more closely examine the

function of genes identified by Bar-Seq to further elucidate their role in high cell density resistance to ICP phage infection.

MUTATIONS IN DRUG RESISTANCE-ASSOCIATED GENES OF MYCOBACTERIUM TUBERCULOSIS IN BRAZILIAN INDIGENOUS POPULATION

Emily Lavey
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 3
Presentation Number: 123
Mentor(s): Evan Brenner

Following years of vaccination and drug therapy, Mycobacterium tuberculosis remains one of the most fatal infectious diseases in underdeveloped and low-income countries. M. tuberculosis around the world has evolved towards increasing drug resistance, with the specter of totally drug-resistant tuberculosis looming. This is especially true for the Guarani-Kaiowà people of Paraguay and the Brazilian state of Mato Grosso do Sul. Tuberculosis prevalence in the community is high, yet tuberculosis and associated drug resistance in the area remains largely unstudied, leading to unmanaged spread and suffering in addition to being a surveillance blind spot. M. tuberculosis isolates were collected from local clinics and were whole genome sequenced. Single nucleotide polymorphisms (SNPs) were identified throughout the gene and genes known to play roles in drug resistance were specifically analyzed. Multiple SNPs, some fixed in local strains, were found across resistance-associated genes. These results serve as a warning sign that understudied populations are being failed by public health infrastructure, and this failure may lead to the development of more dangerous strains of tuberculosis.

RECONCILING MULTIPLE CONNECTIVITY SCORES FOR DRUG REPURPOSING

Kewalin Samart
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 3
Presentation Number: 124
Mentor(s): Arjun Krishnan, Janani Ravi

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. This principle was defined and popularized by the influential 'connectivity map' study in 2006 regarding reversal relationships between disease- and drug-induced gene expression profiles, quantified by a disease-drug 'connectivity score.' Over the past 14 years, several studies have proposed variations in calculating connectivity scores towards improving accuracy and robustness in light of massive growth in reference drug profiles. However, these variations have been formulated inconsistently using varied notations and terminologies even though they are based on a common set of conceptual and statistical ideas. Therefore, we present a systematic reconciliation of multiple disease-drug connectivity scores by defining them using consistent notation and terminology. In addition to providing clarity and deeper insights, this coherent definition of connectivity scores and their relationships provides a unified scheme that newer methods can adopt, enabling the computational drug-development community to compare and benchmark different approaches easily. To facilitate the continuous and transparent integration of newer methods, this review will be available as a live document (at https://jravilab.github.io/connectivity_score_review/) coupled with a GitHub repository (at https://github.com/jravilab/connectivity_score_review) that any researcher can build on and push changes to.

SYSTEM MODELS IN UNDERGRADUATE BIOLOGY

Josh Marwede

Cell Biology, Genetics and Genomics, Poster Presentation
Section: 3
Presentation Number: 125
Mentor(s): Tammy Long

In biological science, instructors use system models to help students connect concepts and demonstrate their mastery of topics covered in class. When constructing system models, students place core concepts (components) in boxes and link them together with arrows to show relationships between components. System models can provide insight into students' thinking that is different from traditional assessments, such as multiple choice and essay questions. Prior research has shown that the amount and type of contextual information provided in prompts can influence the content, size and architecture of students' models. In this study, I analyzed how students' responses differed when they were asked to model decontextualized system components (e.g., gene, chromosome) vs., contextualized equivalents (e.g., CFTR gene, chromosome 7). Student responses (n=380) to a prompt about the genetic basis of cystic fibrosis were collected from two different semesters of undergraduate introductory biology for majors. I predict that students given decontextualized components will produce smaller-sized models and use generic terms when describing relationships between components. The results of this research will help inform instructors about key features of prompts likely to influence students' model-based responses.

THE ROLE OF SETD2 IN CANINE LYMPHOMA

Carter White

Cell Biology, Genetics and Genomics, Poster Presentation
Section: 3
Presentation Number: 126
Mentor(s): Ansley Rowland, Bonnie Harrington, Cory Howard, Kimberley Sebastian

Diffuse large B-cell lymphoma (DLBCL) is one type of common and aggressive cancer that can affect humans as well as canines. This cancer does not currently have non-toxic and/or effective treatment therapies. The epigenetic tumor suppressor gene SETD2, which is recurrently mutated in human DLBCL tumors, could play some role in the proliferation of DLBCL. The study of the SETD2 gene in canine DLBCL may reveal a path towards less toxic and more effective treatments in both canine and human lymphomas. To explore this possibility, we will generate three SETD2 knockout canine B-cell lymphoma cell lines. Methods: Two CRISPR-Cas9 constructs targeting portions of SETD2 spaced approximately 1kb apart will be introduced into the canine lymphoma cell lines CLBL1, 17-71, and GL-1 by electroporation. Selection with GFP sorting and puromycin follow, then single cell cloning. Successful truncation of SETD2 will be confirmed by Sanger sequencing. After SETD2(-) cells are produced and cloned, the effect of the gene's absence can be assessed. Assessment can be carried out by testing proliferative ability, resistance to chemotherapy, microsatellite instability, and alteration of DNA methylation/transcription/etc. The end goal of comparative studies between cells with and without SETD2 is to create and hypothesize a humane and effective treatment of DLBCL in canines, which may be later compared to human cancer.

UNCOVERING THE ROLE OF ER1 AND RAC1 SIGNALING IN UTERINE GLAND BRANCHING

May Shen

Cell Biology, Genetics and Genomics, Poster Presentation
Section: 3
Presentation Number: 127
Mentor(s): Ripla Arora

Uterine gland secretions are essential for the survival of the mammalian embryo and pregnancy success. Ovarian hormone estrogen through estrogen receptor 1 (ESR1) regulates early pregnancy events, but the role of ESR1 in uterine gland structure remains unknown. We observed that epithelial-specific deletion of ESR1 displays reduced uterine gland branching. RAC1, a protein essential for epithelial cell polarity, is essential for early pregnancy, regulates cell death, and regulates epithelial branching. ESR1 inhibits RAC1 signaling in both the mouse and the human uterus. Thus, we hypothesized that ESR1 inhibits RAC1 during uterine gland branching and found that uterine-specific deletion of RAC1 displayed excessive gland branching. I will use an image analysis pipeline to quantify these branching phenotypes in ESR1 and RAC1 mutants in comparison to controls. We will stain the uterine horns with epithelial markers and perform confocal imaging. Using IMARIS, a 3D reconstruction software, we will determine the length of the horn to segment it into three compartments - near the oviduct, middle of the horn, and near the cervix. 3D renderings of glands will be made in each section. Using ImageJ, MATLAB and the Filaments plugin of the IMARIS software we will perform centerline extraction and evaluate the number of branch points for each gland. Quantifying these branch points will confirm the qualitative gland branching phenotypes observed in the ESR1 and RAC1 mutants. Knowledge of the uterine gland structure, and proteins essential for shaping the glands, will add to our understanding of uterine gland function during early pregnancy.

ROBUST ROBUST MACHINE LEARNING DENOISING ALGORITHM FOR SINGLE CELL RNASEQ DATA

Jeremy Rebenstock, Reeta Bhanini
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 3
Presentation Number: 128
Mentor(s): Yuying Xie

One of the most promising cancer treatments is the Immunotherapy, which invokes a patient's immune system to eliminate cancer cells. A major Compelling evidence suggests that a favorable clinical response to immunotheropy relies on the tumor immune microenviroment in terms of immune cells landscape, which can be measured via Single Cell RNAseq (scRNAseq) technology. However, scRNAseq data is nonlinear and often contaminated with outliers, which makes the estimation of immune landscape non-trivial. Thus, it is imperative to develop a robust machine learning algorithm to denoise the data in a manifold. We develop nonlinear manifold denoising algorithm and show it outperform existing methods in both synthetic and real datasets.

CRISPR-CAS EDITING EFFICIENCY BETWEEN REGENERATION CYCLES IN TOBACCO PLANTS

John Ryner
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 4
Presentation Number: 131
Mentor(s): Guo-Qing Song

New genome editing technologies such as CRISPR-CAS systems allow for the precise knockout of specific DNA sequences. This technology has applications in not only academic research but also the agricultural industry as well. A key consideration in the use of CRISPR-CAS systems is on-target editing efficiency. One method to evaluate editing efficacy in plants is to knock out a gene of interest and measure the knockout frequency in the resulting progeny after a round of regeneration. For this experiment We hypothesize that allowing more time for Cas nuclease action via a second round of regeneration will yield a larger knockout frequency than a first-round measurement. For this experiment, four CRISPR-CAS

constructs (Cas9 or Cas12a driven by either promoter X or promoter Y) will be targeted to the gusA reporter gene in tobacco plants. Stain, PCR, and sequence analysis will then be used to evaluate knockout frequencies for each construct during a first and second round of regeneration.

IDENTIFYING DIAGNOSTIC SRNA TARGETS IN INFECTED HOSTS USING COMPUTATIONAL APPROACHES

Elliot Majlessi, Philip Calhoun
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 4
Presentation Number: 132
Mentor(s): Janani Ravi

Early diagnosis of many agriculturally relevant zoonotic diseases has always been problematic since the hosts often remain asymptomatic until it's too late. The second main problem has been with accurate and sensitive diagnosis often confounded by closely related and environmental bacteria. We, therefore, focus on developing a computational workflow to identify pathogen-specific diagnostic targets that can be detected in infected hosts. We will use small RNA (sRNA) as diagnostic target molecules due to the changes that occur in the host and pathogenic sRNA upon infection. We are interested in identifying bacterial sRNAs that are pathogen-specific, making them ideal candidates for diagnostic biomarkers. Although intra-and extracellular sRNAs have been used extensively in cancer detection (host miRNA), few studies have addressed sRNA as biomarkers for detecting pathogens within the host. Here, we propose computational approaches to detect pathogenic sRNA in infected host samples. The computational workflow will be used to identify pathogenic sRNA in sequenced sera from white-tailed deer (Odocoileus virginianus) infected with bovine tuberculosis (Mycobacterium tuberculosis variant bovis). We will use existing sRNA databases, host and pathogen reference genomes, measure differential expression, and benchmark against existing sRNA pipelines to help us discern uniquely bacterial sRNA that can be isolated and detected in infected host samples. Taken together, our approach will help us identify sRNA signatures unique to M. tuberculosis variant bovis in Odocoileus virginianus, and any combination of pathogen-infected hosts, and facilitate early diagnosis of bacteremia.

MAPPING BACTERIAL PHENOTYPES TO GENOTYPIC FEATURES USING MACHINE LEARNING

Karn Jongnarangsin
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 4
Presentation Number: 133
Mentor(s): Janani Ravi

Although bacterial phenotypes are heavily dependent on their genotypes, predicting phenotypes based on observed genotypes is no simple task. This is because the genotype codes for proteins, which in turn have complex functions and interactions that culminate in observed phenotypes. Simply put, a bacterial genotype stands as the baseline for which phenotype is to be realized. Given sufficient amounts of phenotypic information and associated genomes, patterns can be drawn between the presence/absence of certain ORFs, their constituent features, and phenotypic characteristics. Using machine learning models and training them using genomes and associated phenotypic traits, predictions can be made regarding the phenotypic traits associated with genomes outside of the training set. The initial tests for these machine learning models use genomes and phenotypes from Staphylococcus and were implemented using the scikit-learn library in Python. We start with Staphylococci since we have biologically relevant phenotypes such as antibiotic resistance

and host-resistance to test our ML model. Future goals for this project are to incorporate these predictive capabilities into a web-app for ease of use for any bacterial group of interest.

OXYBENZONE INCREASES PROLIFERATION IN TRP53-NULL MAMMARY TISSUES IN CONJUNCTION WITH HIGH FAT DIET

Mitchell Borin
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 4
Presentation Number: 134
Mentor(s): Richard Schwartz

Oxybenzone (benzophenone-3; BP3) is a common ingredient in many skincare products, including sunscreen. Previous research in the lab showed BP3 to increase cellular proliferation in normal mouse mammary glands. The previous study examined whether BP3 influences tumor proliferation in Trp53-null mammary glands, already prone to tumor development. In the current study, BP3-induced proliferation was examined in normal mammary tissue in younger mice (26-, 13-, and 8-week old mice), prior to the occurrence of tumors. BP3 impact was examined alongside that of diet, specifically content of saturated fat from red meat. Mice were either fed low fat diet (10% calories from fat; LFD) or high fat diet (60% calories from fat; HFD), and either maintained on LFD their entire life or switched from one diet to the other at puberty (10 weeks of age). These 3 diet groups were fed with or without BP3 compounded into their food (70 mg/kg of body weight). When mice reached target age, they were treated with the nucleotide analog BrdU, and then tissues were harvested for sectioning, stained with antibody to BrdU, and counterstained with DAPI. DAPI stains the DNA of all cells and BrdU specifically indicates cells actively synthesizing DNA. This allows analysis of the proportion of proliferating cells. Increased proliferation was found in all BP3 treated groups at 8 and 26 weeks, with little effect at 13 weeks. This temporal pattern will be discussed. BP3 may increase early mammary gland proliferation and products containing BP3 should be used with caution.

THE THERAPEUTIC POTENTIAL OF EXTRACELLULAR VESICLE MEDIATED IGF-1 GENE DELIVERY IN TYPE 1 DIABETES

Katherine Lauro
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 4
Presentation Number: 135
Mentor(s): Masako Harada

Type 1 diabetes (T1D) is an autoimmune disease in which the host's immune system attacks and destroys pancreatic β cells, resulting in the significant reduction of insulin secretion followed by impaired glucose metabolism. The current, most common treatment for T1D is insulin replacement therapy, which serves as a symptomatic rather than curative treatment. A permanent treatment for T1D requires regeneration of β cells from islet cell precursors and prevention of future autoimmune attack. This project aims to investigate the potential of the IGF-1 as curative treatment for T1D based on previous reports of its potential to stimulate β cell regeneration. However, gene delivery is difficult due to their size, stability in body fluids, inefficient cellular uptake, and negative charge. Extracellular vesicles (EVs) are natural molecular carriers used to overcome these obstacles due to their non-immunogenic properties, which is often an issue in other delivery methods. This project focused on cloning a mouse insulin promoter (MIP)-driven gene construct to be delivered by EVs using PCR and homologous recombination via one-piece Seamless Ligation Cloning Extract (SLiCE) technique. We have successfully cloned imaging molecules, mCherry and gaussian luciferase (gLuc) under MIP and tested their expression in the mouse β cell line (NIT-1).

HARVESTING BONE MARROW DERIVED MACROPHAGES
Michael Habeeb
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 4
Presentation Number: 136
Mentor(s): Chima Maduka

Macrophages are innate immune cells and constitute a critical part of the first line of defense against foreign agents. Primary bone-marrow derived macrophages (BMDMs) are directly isolated from bone tissue and are advantageous over cell lines because BMDMs capture the true variables of living tissue, including age and sex. Moreover, in our application to study immune response to biomaterials, they represent bona fide immune cells. The objective of this study was to isolate primary bone-marrow derived macrophages and characterize their normal microscopic appearance. Ultimately, isolated BMDMs will be used to study foreign body response to a variety of biomaterials, including polylactide. The long bones (femur and tibia) of euthanized (dead) mice were dissected out and their marrow were flushed using cold phosphate buffered saline (PBS). After centrifugation at 300 x g for 15 minutes (25 °C), cells were plated onto a 75mm petri dish in serum-containing DMEM-based cell medium. After 7days in the incubator, adherent cells were harvested and imaged using low and high magnification microscopy. We found out that BMDMs were spherical in shape and abundant, averaging 3 x 106 per mouse. This study will enable our Lab isolate critical immune cells which will be used to study functional metabolic changes following prolonged interaction with polylactide degradation products, opening a fundamentally novel area in cell-biomaterial interaction for tissue engineering applications.

CELL TYPE PREDICTION
Filip Jevtic
Cell Biology, Genetics and Genomics, Poster Presentation
Section: 4
Presentation Number: 137
Mentor(s): Arjun Krishnan, Christopher Mancuso

Gene technologies have enabled researchers to analyze large amounts of data in hopes of gaining a greater understanding of biological systems and relations. It is therefore essential that gene expression samples be labeled appropriately to the single cell, tissue, or disease they belong to. We present a method to annotate both seen and unseen gene expression samples. The method entails using graph based dimensionality reduction combined with deep learning to annotate cells, diseases, or tissues based on the hierarchical structure of the respective ontology. Our results demonstrate that the dimensionality reduction technique used is the most accurate at determining a gene expression sample's label, even if it wasn't present in the training data. The work we've done provides concrete evidence that graph based dimensionality reduction is critical in the development of cell type prediction methods.

COMMUNICATION ARTS & SCIENCES

CLEAR AND CREATIVE SCIENCE COMMUNICATION
Taylor Haelterman
Communication Arts and Sciences, Oral Presentation
Section: 1
Presentation Number: 139
Mentor(s): David Poulson

Scientific research is important. But research is not communicated to the public, it fails to reach its potential. Sharing science with non-scientists is a crucial aspect of creating change

and spreading new ideas. As an environmental journalist I use concise language and creative storytelling to translate scientific work to people outside the field. Attracting readers to a science-based story, making complicated concepts easy to digest and helping sources explain their work in ways anyone can understand are all things I practice while writing for the Great Lakes Echo, a news organization produced by the Knight Center for Environmental Journalism at Michigan State University. In my presentation I will tell you how to do the same.

RAP ON FLINT

Ben Goldman, Nolan Wall
Communication Arts and Sciences, Oral Presentation
Section: 1
Presentation Number: 140
Mentor(s): Geraldine Zeldes

This multimedia project—that includes a documentary film, a book, and a website—documents the history of rap music in Flint, Michigan beginning in the late 1980s to the present. The project is meant to ignite a conversation about the political and socioeconomic influences that gave birth to the hustle and flow- the rhythms and rhymes- of the lyrics of Flint rappers. Like some 30 years ago, the rap songs of today mirror tragic circumstances. Yet, despite the lead water crisis and a myriad of other disasters faced by Flint residents, artistry continues to grow, bringing hope to Flint's future.

CREATING A FILM IN A POST-PANDEMIC WORLD

Dylan Kissel, Julianna Lavey, Maddie Brent, Sara Seryani, Tevy Hambric
Communication Arts and Sciences, Oral Presentation
Section: 1
Presentation Number: 141
Mentor(s): Amol Pavangadkar

In the summer of 2020, we had the opportunity to create a fiction film while under the new rules of filmmaking during the pandemic. This film was led by a group of producers who had lost their ability to create their capstone film due to the pandemic shutting down the university in spring of 2020 and had oversight from mentors within the university. The entire film was able to be created safely. The Pre-Production was all done remotely with casting and table reads happening on zoom and the scouting and design was happening individually. The Production itself was the first time the actors were able to meet in person and the first time the crew was able to meet. In a four day time span, we were able to shoot the entire twenty minute film while staying socially distant and safe. Each person on set was required to take their temperature each time they arrived on set and the entire production team was able to stay healthy throughout the entire shoot and afterwards. Shooting a film while socially distant became difficult at times when fitting people into houses, however thanks to our designated safety officers we had on set we were able to avoid any issues.

A STUDY OF QANON PROPAGANDA ON TWITTER AS INFORMATION WARFARE

Faith Foster
Communication Arts and Sciences, Oral Presentation
Section: 1
Presentation Number: 142
Mentor(s): 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.

FOSTERING SOCIETAL TRANSFORMATIONS IN ATTITUDES TOWARD NEURODIVERSE POPULATIONS

Mariam Sayed

Communication Arts and Sciences, Oral Presentation
Section: 1
Presentation Number: 143
Mentor(s): 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.

CONTENT ANALYSIS OF OPINION PIECES AND HARD NEWS STORIES ON THE COVERAGE OF PROTESTS IN 2020

Elena Cousino
Communication Arts and Sciences, Poster Presentation
Section: 2
Presentation Number: 146
Mentor(s): Rachel Reis Mourao

Opinion pieces do not hold the same journalistic values and approaches as hard news stories. Hard news stories follow a code of ethics and journalists are taught to remove all forms of bias from their stories. On the other hand, opinion pieces allow the writer to state whatever they believe while using other sources if only to emphasize or prove a point. Opinion pieces are positive for the overall public to see differing views, but should not be taken as facts. By looking at the differences between opinion pieces and hard news stories, the public and fellow researchers would be able to see a pattern with how each type of journalism reports and how this could impact their audience. Sample data will be taken from a pool of data on protests in 2020 with an equal number of opinion pieces and hard news stories. Using a randomly constructed week and quantitatively analyzing the data, the research should show that opinion pieces have fewer numbers of sources than hard news. The research will also show that opinion pieces will have more drastic differences in how protestors are described in the story compared to hard news stories through the use of frames.

MEDIA MULTITASKING AND ADVERTISEMENTS REPRESENTING SOCIAL ISSUES

Diya Venkatesh
Communication Arts and Sciences, Poster Presentation
Section: 2
Presentation Number: 147
Mentor(s): Anastasia Kononova

This study will consist of two parts. In the first stage, we will pretest 16 commercials that touch upon several social issues. These commercials cover topics such as women empowerment, racial relations, civic action, same-sex marriages, LGBTQIA+ rights, police brutality, empowerment of people with disabilities, and bullying. We will measure ad familiarity, brand authenticity, the level of controversy, level of humor in the ad, creativity, ad valence, and ad arousal. After we gather data from the pretest, we will be selecting 3 controversial and another 3 non-controversial videos for the main study. The first two conditions will depict controversial and non-controversial videos. They will be manipulated as within-subjects conditions, where participants will view both types of videos, controversial and non-controversial. The other two conditions will be control and multitasking conditions. The multitasking group will be manipulated over Zoom by a research team member. The researcher will connect with a participant on Zoom and use the chat option to ask the participant questions. This will resemble an instant-messaging activity. The sample questions will be provided as supplemental materials. We will measure the effects on memory for the ads, ad content understanding, brand authenticity, levels of empowerment and inspiration to stand up for a social issue depicted in an ad, and brand loyalty. These outcomes will be measured for four conditions: 1) controversial ads in the multitasking condition, 2) controversial ads in the non-multitasking (control) condition, 3) non-controversial ads in the multitasking condition, 4) non-controversial ads in the non-multitasking (control) condition.

ABILITY TO IDENTIFY COVID-19 VACCINE MISINFORMATION ON TIKTOK

Anish Nimmagadda, Anvita Suneja

Communication Arts and Sciences, Poster Presentation
Section: 2
Presentation Number: 148
Mentor(s): Alina Dong, Saleem Alhabash

The COVID-19 pandemic took the world by storm, and various social media platforms have documented the entire timeline. While the quarantine period was filled with new content from the booming platform TikTok, misinformation spread like a wildfire just like viral videos. Social media platforms, along with health officials, have issued warnings and in some cases taken actions to minimize misinformation and disinformation related to the COVID-19 pandemic and the emerging vaccine. The current study investigates the effects of misinformation detection on the willingness to get the COVID-19 vaccine, when available for participants. The study will primarily recruit college-aged participants (N = 120), where they will be exposed to TikTok videos that include misinformation and authentic information about the vaccine. For each TikTok video, participants will identify whether or not they think the video includes incorrect information (misinformation) or correct information (authentic). Using Truth Default theory, we anticipate that the ability to detect misinformation will predict attitudes toward the vaccine, viral behavioral intentions toward the TikTok videos, and intentions to get vaccinated when presented with the opportunity. Data collection is pending.

THE EVOLUTION OF PROFESSIONAL EXPERIENCE COURSES IN JOURNALISM

Danielle James

Communication Arts and Sciences, Poster Presentation
Section: 2
Presentation Number: 149
Mentor(s): Eric Freedman

At many four-year universities, professional experience is either required or highly encouraged for journalism students. This experience, which is made up of internships, part-time jobs and campus media outlets, prepares students for the working world. However, it also provides varying levels of supervision and responsibility for young journalists. To provide an opportunity for students to gain real-world experience with comprehensive supervision, Michigan State University created its Capital Reporting Program (now Capital News Service) in the fall of 1981. The course focused on the coverage of state government and politics. The objectives at the time of the program's creation fell into three categories: "to develop further reporting and writing skills of the students...", "to familiarize students with some of the intricacies and complications of state government..." and "to provide the cooperating newspapers with live news and feature stories of direct interest...". The program began with a roster of 10 student reporters and 10 subscribing newspapers working in tandem. After 40 years, it has expanded to include about 30 Michigan print and online publications. Students today still cover Capitol news, but also report on beats like education and tourism. Increased technological advances and a changing approach to reporting has also affected professional experience programs, and Capital News Service is no exception. This article will explore further how the program has changed in the past four decades through the perspective of current students, past instructors and alumni.

VOICE USE AND LIFESTYLE OF ADULTS TAKING SINGING LESSONS VIRTUALLY OR IN-PERSON

Kate Vinkemulder, Nishtha Kakar
Communication Arts and Sciences, Poster Presentation
Section: 2
Presentation Number: 150
Mentor(s): Jeffrey Searl

Limitations on face-to-face interaction because of the COVID-19 pandemic have resulted in video chats as “the new normal”. Such interactions, however, may not be ideal for specific types of activities for various reasons including the possibility that video chatting negatively impacts aspects of voice and interpersonal communication. Taking singing lessons online is one such activity that may be challenging to do online. The goals of this study were to describe the voice and lifestyle behaviors of adults receiving singing lessons online, and to compare their behaviors to students receiving face-to-face singing lessons. Adults who are not singers were also included for comparative purposes. An additional goal was to develop an App to support large-scale data collection for this study. Study participation included completion of a detailed demographic, lifestyle and singing training survey done in Qualtrics and a brief daily log regarding voice, singing and lifestyle done for 21 straight days done via the newly created App. This poster explains the rationale for addressing the study aims, details the methodological approach, and describes the App development process. Through this research, we will gain an understanding of the differences and difficulties associated with singing lessons completed online compared to face-to-face environments.

“SHE JUST REMINDS ME SO MUCH OF ME! MAYBE I SHOULDN’T ADMIT THAT”: HOW CHILDREN’S GENDER IDENTITY INFLUENCES THE SELECTION OF THEIR FAVORITE MEDIA CHARACTERS AND PROGRAMS

Erica Austhof
Communication Arts and Sciences, Poster Presentation
Section: 2
Presentation Number: 151
Mentor(s): Fashina Alade, Melinda Aley

Children represent a large and important market segment of the entertainment industry. For example, the domestic box office market share in 2019 for PG-rated movies reached just over 28%. Today's children are exposed to a variety of media options, making them a heavily targeted group in the development of new television shows and movies. Researchers today understand that there are multiple reasons why children select their favorite television shows and movies, one of which falls into the study of gender and gender characteristics. Social identity gratifications theory states that viewers choose media that supports their social identities, but previous research has limited the examination of gender to a binary system, male or female only. This study is based on a survey study that explored the relationship between children's (N=219, Mage=9.77) gender identity, their identification with masculine and feminine traits, and their media selection. This specific part of the project analyzes children's open-ended responses about their favorite television shows and/or movies, and their favorite characters from those programs, in order to identify the traits and characteristics that children associate with male vs. female characters. These findings will assist in the future media development for children's programming to include a more inclusive media character environment.

APPLYING RUSBULT'S INVESTMENT MODEL TO THE CONTEXT OF FAMILY DISTANCING

Marissa Immel
Communication Arts and Sciences, Poster Presentation
Section: 3
Presentation Number: 154
Mentor(s): Elizabeth Dorrance Hall

This research project focuses on the replication and extension of Rusbult's Investment Model to understand family commitment in the context of family member marginalization. Family member marginalization is when families push one member to the margins of the family. These relationships can be marked by disapproval, difference and exclusion, and can contribute to relational distance along with toxic behaviors. Despite these feelings, society praises commitment and obligation to family, which can be stressful to those who feel marginalized. The Investment Model predicts that commitment is a function of relationship satisfaction and investment along with a person's potential voluntary kin. Voluntary Kin is a term used to explain a mutually selected relationship where one is perceived to be family but not related by blood or law. This study utilizes the model to understand commitment in marginalized family relationships. We found that marginalization is negatively associated with commitment, satisfaction, and investment, but positively associated with alternative/chosen kin. This indicates that the less a person feels committed, satisfied, and invested in a relationship, the more they will feel marginalized.

NONPROFIT ORGANIZATIONS USE OF SOCIAL MEDIA

Lydia Werth
Communication Arts and Sciences, Poster Presentation
Section: 3
Presentation Number: 155
Mentor(s): Ava Francesca Battocchio, Kjerstin Thorson

The purpose of this research project is to study how nonprofit organizations throughout the Midwest use social media. We will analyze social media data from non-profits in six local communities to understand what type of posts lead to engagement and how post engagement is related to content. The final outcome relies on the number of followers, size of area, and post engagements. We will collect data using digital tools such as GuideStar, Facebook, and Crowdtangle. The results will help nonprofit organizations learn how to use social media. These organizations will then begin to draw larger followings and engagements.

HOW QUOTING SOURCES IN NEWS STORIES AFFECTS EVALUATIONS OF BLACK LIVES MOVEMENT

Xinyi You
Communication Arts and Sciences, Poster Presentation
Section: 3
Presentation Number: 156
Mentor(s): Rachel Reis Mourao

Journalism has always been a non-neglectable force in engaging in social campaigns. During the black lives movement, news workers provide countless front-line stories that are essential for the public to understand the campaign. Journalism reporters have been adopting consistent and strict methods in writing news stories to achieve the ultimate goal of objectivity. Among these methods, quoting is an essential way of fact-based reporting. In the following work, this paper will specifically examine 11 news outlets in the U.S. from both national and local levels using quantitive content analysis to determine if unbalanced quoting sources affect the evaluations of the black lives movement and if the proportion of official sources delegitimize the protestors. Although absolute objectivity can be hard to reach for journalists, scientific methods of reporting are hopefully practical in presenting authentic and

unbiased truths. Understanding the effect of journalistic reporting on the black lives movement is significant for future news workers to be more considerate in adopting traditional reporting methods.

MI DIARIES: THE DEVELOPMENT OF A RESEARCH PROJECT AS A BRAND

Alexis Furkioti, Jack Rechsteiner
Communication Arts and Sciences, Poster Presentation
Section: 3
Presentation Number: 157
Mentor(s): Betsy Sneller, Suzanne Wagner

It is unusual for a research project to require brand management, but we quickly recognized that it could be essential to the attraction and retention of participants in a longitudinal study. The MI Diaries research project from the MSU Sociolinguistics Lab has adopted brand management practices to establish its credibility and generate awareness to Michiganders, to ultimately serve its goal of documenting life and language beyond the COVID-19 pandemic. Traditionally, in order to build trust and collect unselfconscious speech, a sociolinguistic researcher sits down with the participant and audio-records a casual conversation. However, social distancing has led the MI Diaries project to collect self-recorded audio diaries instead. Brand management has historically been utilized to progress an established company's value over a period of time; however, MI Diaries was a new research entity without any awareness or trustworthiness. The project needed to build a brand that would invoke a sense of safety and honesty, so that diarists would feel as comfortable sharing stories from their lives with a non-visible researcher as they would with a co-present one. To address this disconnect, we constructed a social media strategy, defined our mission, vision, and values, created a visual identity, managed our press and publicity and utilized promotional incentive programs. As a result of implementing these branding strategies, we are successfully recruiting, retaining and engaging participants and have finally established the MI Diaries brand identity.

NEWS MEDIA INTERPRETATION OF SOCIAL MOVEMENT PROTEST SIGNS

Justin Brust
Communication Arts and Sciences, Poster Presentation
Section: 3
Presentation Number: 158
Mentor(s): Rachel Reis Mourao

Protest Signs a Beacon of Legitimacy? The inclusion of protest signs in a newspaper story, should bring a more legitimizing light to protestors and a way for readers to check a journalist's attendance. We have hypothesized if a protest sign is included in a news story, then we predict the same news story would be more likely to give legitimacy to the protest movement. Previous literature on the protest paradigm has shown most protests are seen in a negative light by highlighting looting and violence than the actual cause of the protest. Content analysis will be used on newspapers, radio and television transcripts to find quotes from protestors who attended the protest and the use of protest signs. If a newspaper mentions protest signs, then a journalist was more likely at the event and can relay more insight on the subject.

AN EXAMINATION OF CRISIS JOURNALISM RESEARCH

Maddie Monroe
Communication Arts and Sciences, Poster Presentation
Section: 3
Presentation Number: 159
Mentor(s): Manuel Chavez

Looking back at the research I have done on how journalists report on crisis, this includes natural disasters, economic crises, the COVID-19 pandemic, the climate crisis and more. Also how the media has presented these topics and what the impact of that coverage is.

CONTENT ANALYSIS OF CIVIC JOURNALISM AT THE JACKSONVILLE TIMES-UNION

Subah Bhatia
Communication Arts and Sciences, Poster Presentation
Section: 3
Presentation Number: 160
Mentor(s): Esther Thorson

The Jacksonville Times-Union newspaper has been at the forefront of civic journalism for years. There is, however, no complete archive of all the investigative pieces, opinion pieces, and other content that form the body of this important form of journalism. After acquiring access to the Times-Union archives, we consolidated all the relevant articles and the content analyzed them.

EXPLORING THE IMPACT OF STORY-BASED TRAINING ON PHISHING SUSCEPTIBILITY

Faye Kollig
Communication Arts and Sciences, Poster Presentation
Section: 4
Presentation Number: 162
Mentor(s): Rick Wash

Phishing emails are messages from senders pretending to be someone they aren't to get some action from the recipient. Often, the scammer asks the recipient to click on a link and divulge sensitive personal or financial information that results in significant consequences for the individual and the organization. This research experiment explored the potential positive impact of stories about phishing on whether or not people click on links within phishing emails. Recruiting participants with MSU email addresses, we provided training that contained one of three different types of stories: stories in which someone fell for a phishing attack, stories in which someone successfully identified a phishing attack before falling for it, and control stories about problems with working remotely. We sent a set of fake phishing emails before and after this training to gauge whether these stories made a difference in participants' ability to not fall for phishing attacks. Previous literature has shown that secondhand experience is commonly a part of non-experts' computer security knowledge, which makes stories a potentially effective source of training. Improving the ability of people to identify phishing emails when automated filtering systems don't catch targeted attacks is a key part of preventing security breaches. In this presentation, I will discuss the preliminary findings of our experiment, including the impact of different story trainings on click rates and other patterns in clicking behavior, as well as implications for future research and phishing training in general.

POTENTIAL IMPACTS OF FACE COVERINGS ON CHILDHOOD COMMUNICATION DEVELOPMENT

Alyssa Fritz, Alyssa Spencer, Koryn Pennebaker, Madison Dunn
Communication Arts and Sciences, Poster Presentation
Section: 4
Presentation Number: 163
Mentor(s): Jeffrey Searl

The ongoing pandemic due to COVID-19 has necessitated mandates to wear a mask in order to help prevent the spread of the virus. While necessary as a public health measure, mask wearing has the potential to negatively impact communication, especially for those who have a communication disorder for whom nonverbal communication, specifically facial cues, are of benefit. With some schools returning to in-person learning, questions have been raised about how the wearing of masks in a school setting affects communication growth for students. The purpose of this study is to review the peer-reviewed literature regarding the potential impacts on communication and the development of children resulting from wearing of face coverings over the nose and mouth. Literature that includes data about the impact of face coverings for student's development is reviewed and evaluated. Current literature suggests that masks inhibit language development and social interaction to some degree. Even though masks are a necessary component in preventing the spread of COVID-19, wearing them may have unintentional consequences on children in their critical years for development of communication and language skills.

HOW ELECTRONIC TOYS IMPACT THE QUALITY OF PARENT LANGUAGE INPUT PROVIDED TO YOUNG CHILDREN WITH AND WITHOUT AUTISM

Ellen Brooks, Kaitlin Gaynor, Kaylee Commet, Libby Fernau
Communication Arts and Sciences, Poster Presentation
Section: 4
Presentation Number: 164
Mentor(s): Mackenzie Sturman, Courtney Venker

Electronic toys have become increasingly popular over the past decade, but they may decrease the quality of adult language input provided to young children. This is especially important in the case of children with autism, who often experience language delays. In this study, we asked how electronic toys affected the quality of parent language input, compared to traditional (non-electronic) toys. Participants were 14 children with autism (2 to 4 years old) and their parents, as well as 14 children with typical development (2 to 4 years old) and their parents. The children with typical development were included to help interpret our findings. Parent-child dyads completed two 10-minute play samples. They played with a traditional toy set on one day and an electronic toy set on the other (counterbalanced across participants). Toys sets included a barn with animals, a shape sorter, sensory balls, vehicles, a puzzle, and a toy dog. The electronic toys played music, flashed lights, and made sounds (speech and animal noises). Trained research assistants transcribed the samples using Systematic Analysis of Language Transcripts software. Preliminary findings suggest that the diversity of vocabulary used by parents may be higher during traditional toy play than electronic toy play. Ongoing analyses are investigating the amount of background noise present during electronic versus traditional toy play. Given the importance of providing high-quality language input to children with and without autism, as well as the increasing prevalence of electronic toys in our society, the potential impact of electronic toys is an important consideration.

STUDENT FILMMAKING AND SAFETY DURING CORONAVIRUS-19

Adam Menting, Alex Fitzgerald, Jillian Burger
Communication Arts and Sciences, Poster Presentation
Section: 4
Presentation Number: 165
Mentor(s): Amol Pavangadkar

For this presentation, we want to stress how coronavirus has affected not only the film industry as a whole, but the student film industry especially. Over the course of the past year, students had to take extra precautions regarding not only our safety, but the safety of our peers as the protocols given by our university and East Lansing rapidly changed to fit the needs of the evolving pandemic. Unlike professional film companies we do not have some type of insurance for when a crisis like this erupts. During production we mandated two masks because the CDC was ruling that wearing two masks was much safer than one as more viral strains began entering the US, and we used a digital thermometer to check people as they came in. For all actors and crew, we also deemed that each person not only have a negative COVID-19 test but also fill out a google form telling us about how they feel before each of our production days. Eating healthy and being very vigilant with weather conditions changes was also something we needed to do before each production day. As we lost locations, due to the regulations, we also cracked down more on sanitizing equipment. Besides wearing gloves and sanitizing all shared equipment, our team also brought sanitizer and sanitized all of our own equipment we would bring. Throughout filming we also did our best to do social distancing making it a bit more difficult to set up equipment in specific locations.

CONFRONTING STEREOTYPE AND STIGMA AROUND AUTISM USING PHENOMENOLOGICAL DATA FROM TWITTER

Carcia Young, Emma Bullock, Olivia Moore, Priya Patterson-Lee
Communication Arts and Sciences, Poster Presentation
Section: 4
Presentation Number: 166
Mentor(s): Laura Dilley

Neuropsychiatric disorder terms typically generate stereotyping and stigma toward labeled persons, although terms and concepts regarding mental disorder are socially constructed and must therefore be understood with respect to historical context. Recent scientific research and alternative frames suggested by the term “neurodiversity”, which has been adopted by many in the autism self-advocacy community, raise the possibility that multiple person-related category attributions may reflect social stereotypes, rather than accurate depictions. The present research therefore investigated social perceptions and stereotypes around the diagnostic category of autism, using naturalistic data from communications on the social media site Twitter. First, we contrasted viewpoints associated with phenomenological self-reports advanced by accounts that used the hashtag #ActuallyAutistic, with viewpoints identified with individuals not on the spectrum, such as advocates for the professional organization Autism Speaks. Second, we used Twitter data to characterize contrasting viewpoints about media depictions of autism as advanced by persons identifying as Autistic, compared with those not identifying as Autistic, including the recently-released film “Music” by singer-songwriter Sia. Preliminary data suggest that individuals identifying as Autistic on Twitter commonly identify prevailing narratives in media to convey inaccurate stereotypes about persons on the spectrum. Consideration of phenomenological report of Autistic individuals through naturalistic data on Twitter and other platforms further contributes to critical discourse analysis around social construction of group identity and hierarchy and may lead to identification of barriers which, when removed, lead to greater opportunity and equality for historically marginalized and/or disadvantaged persons.

BRINGING VOICE TO NON-SPEAKING INDIVIDUALS ON THE AUTISM SPECTRUM
Alyssa Hennessey, Angel Edwards, Anushree Ravi, Kat Zuniga
Communication Arts and Sciences, Poster Presentation
Section: 4
Presentation Number: 167
Mentor(s): Laura Dilley

Individuals who do not have reliable speech (“non-speaking individuals”) are often assigned lower social status, a fact that contributes to lack of input into their self-determination with respect to education and life goals. The present project aims to contribute to reduction of discrimination and stereotyping of non-speaking individuals toward greater opportunities with respect to education, health care, governmental regulation, and the workforce. This study aimed to analyze the self-narratives of non-speaking individuals in a corpus of blog posts relative to the societal issues discussed above. A coding system was developed to characterize and classify perspectives of non-speaking individuals who self-identified as being on the autism spectrum. It is expected that rigorous characterization of the perspectives of non-speaking individuals will contribute to promotion of greater opportunities for education, the workforce, and other areas of society.

CRIMINAL JUSTICE & LEGAL STUDIES

TURNING TOWARDS TERRORISM: USING LIFE-COURSE CRIMINOLOGY TO ANALYZE EXTREMISTS FROM THE PHILIPPINES
Allison Medley
Criminal Justice and Legal Studies, Oral Presentation
Section: 1
Presentation Number: 170
Mentor(s): Sheila Maxwell

Reasons for individual participation in terrorism have been a focus of research across several disciplines, including criminology. However, data used have often relied on third parties or open sources, which presents well-known limitations. This project uses theory derived from Life Course Criminology (LCC) to examine qualitative interviews with individuals from the Philippines who have been incarcerated for involvement in terrorism. Using transcribed interviews originally conducted by Dr. Sheila Maxwell, life-course narratives of individuals from three different terrorist organizations were analyzed to identify life conditions, events, and significant "turning points," which may have created conditions conducive to processes of radicalization. Turning points are defined as "a change in one's social institutions," such as that of family, work, or school, and are theorized to mark a shift in one's life-course trajectory. Analysis of these life narratives indicated the presence of several important turning points; most notably changes in individual family structure and educational experiences. These experiences were identified as creating circumstances that either created motivation or opportunity to participate in terrorist activities. Intragroup trends associated with involvement in the three terrorist organizations were also identified through qualitative coding and comparison of the interviews. Results from this study demonstrate how LCC can be an effective way to understand individual radicalization, and to identify radicalization patterns associated with specific terrorist groups. This can help researchers, community members, and governments better understand potential causes of radicalization, and assist in the development of appropriate responses for individuals at risk.

EXAMINING THE RELATIONSHIP BETWEEN NEIGHBORHOOD CONTEXT AND OPIOID-RELATED OVERDOSE INCIDENTS IN A MID-SIZED CITY

Mat Issa
Criminal Justice and Legal Studies, Oral Presentation
Section: 1
Presentation Number: 171
Mentor(s): Julie Krupa

In the United States, nearly 400,000 people died from an opioid-related overdose between 1999-2017. Law enforcement officials are often tasked with a multitude of responsibilities and often times the first to respond to medical emergencies, including drug-related incidents. The current research project seeks to provide a better understanding of opioid-related overdose incidents in Ingham County, including the frequency, nature (i.e., fatal or non-fatal), profile of user (e.g., age) and geographic distribution of incidents to census block groups. This project is guided by the Social Disorganization Theory. This theory posits that socioeconomically downtrodden communities are preoccupied with meeting their basic individual needs, and therefore, don't have the opportunity to form strong social networks within their respective communities. This preoccupation leads to a lack of overall community solidarity, which may result in increased high-risk behavior among that areas' constituents. Based on this framework, the project also examines the relationship between overdose incident(s) and neighborhood factors to better understand how neighborhood dynamics may be associated with fatal and non-fatal overdose incidents. This study utilizes overdose incident data in Ingham County (provided by Lansing Police Department) from January 2017 to December 2020. Data are analyzed using negative binomial regression models to examine the relationship between neighborhood characteristics and overdose incidents. Implications for policy, theory, and research are discussed.

EXPLORING DIFFERENCES IN FACULTY SCHOLARLY INFLUENCE BY RACE/ETHNICITY IN THE LEADING DOCTORAL PROGRAMS IN CRIMINOLOGY AND CRIMINAL JUSTICE

Alexandra Gormely
Criminal Justice and Legal Studies, Oral Presentation
Section: 1
Presentation Number: 172
Mentor(s): Jon Maskaly, Sanja Kutnjak Ivkovic

People of color are disproportionately affected by crime and the criminal justice response, yet most of the faculty studying these issues—and training the next generation of practitioners—are overwhelmingly white. This study explores the racial/ethnic differences in faculty at top 20 doctoral programs in criminology and criminal justice (CCJ). Using a unique dataset collected from the curriculum vitae of faculty from these programs, we seek to dig into the status of and potential effects of racial/ethnic differences in the faculty of top CCJ programs. Specifically, we examine the distribution of faculty by racial/ethnic identification in these top programs. Preliminary analyses suggest the overwhelming majority of tenure stream faculty at these programs are white. While the issue is marginally better for junior faculty, the issue is exacerbated as rank increases at these programs. This begs the question: are we slowly addressing these differences with recent hires or are there barriers that prevent the promotion of faculty of color? To delve into this, we consider the potential role of mentorship?and the idea that mentoring from similar others tends to be more effective. Specifically, we look to see if non-white faculty at top 20 CCJ programs are isolated from demographically similar colleagues. We then test the assertion that the racial/ethnic composition of a program may affect faculty research outputs. Finally, using Google Scholar citations as a metric, we examine the effects of race/ethnicity on scholarly influence.

TRAUMATIC BRAIN INJURY AND VIOLENT CRIME

Alex Dean
Criminal Justice and Legal Studies, Oral Presentation
Section: 1
Presentation Number: 173
Mentor(s): John Waller

The crossover between the neurological and forensic areas is a relatively new field that has emerged in the past decade due to new technological advances, so there is limited scholarly research regarding the strength of this connection between TBI and violent crime. The validity of this putative connection is extremely important to establish, as its presence leads to questions regarding the insanity defense within the American legal system. If someone can be judged to be lacking the mens rea, or intention to do wrong when committing a crime, due to a biological mental illness, could the same be said for someone who is lacking mens rea due to a legitimate brain injury? To answer this question and further expand on how the justice system treats criminals with TBI, it must first be clear that there is a significant link between TBI and violent crime. This meta-analysis attempts to establish that link and examines the disparity in the interactions between the justice system and defendants with a TBI, while also providing possible solutions to the later. Results from a large-scale literature review revealed a loose consensus on the positive relationship between TBI and violence or violent crime and an examination of cases and further studies highlighted the disparity among the treatment of those with a TBI in the justice system. Further research is needed on the most effective techniques for implementing scanning procedures for TBI within the justice system and what treatments are best practice for those incarcerated with a TBI.

BREAKING THE GLASS CEILING IN THE TOP CRIMINOLOGY AND CRIMINAL JUSTICE DOCTORAL PROGRAMS

Margaret Amshay
Criminal Justice and Legal Studies, Oral Presentation
Section: 1
Presentation Number: 174
Mentor(s): Jon Maskaly, Sanja Kutnjak Ivkovic

While about-two thirds of doctoral students in criminology and criminal justice are female, the majority of faculty at these same programs are men. As promotion through the ranks is dependent mostly upon the faculty performance in research, the focus of our study is on exploring gender differences in faculty research productivity. The general thrust of scholarship in criminology and criminal justice, especially in recent years, has been the production of journal articles, and, to a certain lesser degree, the production of academic books. Using a data set created from the curriculum vitae of faculty members at the top 20 PhD programs in criminology and criminal justice, we examine gender differences in the publishing patterns. While controlling for rank, we compare not only the overall number of journal articles published by men and women, but we also analyze the proportion of articles published in prestigious journals to assess the gender differences. Given gender stereotypes and gender roles in western culture, there are reasons to anticipate gender differences in the publishing practices of books. Specifically, given women's stereotypical role as nurturers and teachers, we expect women to produce proportionately more textbooks than their male colleagues. In contrast, we expect that men produce proportionately more research monographs grounded in original empirical work than their female counterparts. Finally, we analyze the potential gender differences in how impactful faculty research is perceived to be, as demonstrated by the number of citations for the research outputs.

ORIGINS OF #BLACKTRANSLIVESMATTER AND IMPLICATIONS FOR POLICY

Caitlin Ziesmer, Hailey Wood, Harnoor Kaur, Marissa Cortright
Criminal Justice and Legal Studies, Oral Presentation
Section: 1
Presentation Number: 175
Mentor(s): Christina DeJong

According to the Human Rights Campaign, the large majority of trans people murdered in the United States are people of color. It is unclear, however, whether the homicides of Black and Latinx trans victims differ from white victims based on offender relationship, motive, or other important variables. In this study, we examine the homicides of transgender people that occurred during 2020 to determine how race and gender identity intersect to explain differences in these crimes. We also investigate how the hashtag #BlackTransLivesMatter has been used to draw attention to this issue, and suggest policy recommendations based on our findings.

FASHION DESIGN PROTECTION UNDER INTELLECTUAL PROPERTY LAWS

Ally Iverson
Criminal Justice and Legal Studies, Poster Presentation
Section: 2
Presentation Number: 177
Mentor(s): Theresa Winge

Fashion designs are difficult to protect under intellectual property laws. This, however, is not a new issue for fashion designers and the associated industry. The debate about how to protect the intellectual property of fashion designers has been discussed for more than a hundred years. Since fashion designs fall into both the utility category and the arts category, finding a solution to the intellectual property issue for fashion is controversial and complex. While there are some circumstances that fashion designs can be protected by copyright, trademark, and patent laws, these situations are rare, as well as extremely costly, and time consuming. The lack of protection can be harmful to designers and fashion businesses alike. The 'knock-offs' (stolen designs reproduced without payment or permission) rapidly produced and marketed by large companies or competing brands devastate the livelihood of the actual fashion designer as well as contribute to environmental issues and safety hazards, not to mention the stress and money that goes into the ongoing legal cases. In this presentation, I share information about the current ways that fashion designers are attempting to protect their creative intellectual properties, as well as future efforts that could improve the fashion industry.

EXPLORING THE MENTAL HEALTH NEEDS OF COURT-INVOLVED YOUTH BY RACE AND TIME IN DETENTION, AND THE EFFECT ON RECIDIVISM

Zarria Broner
Criminal Justice and Legal Studies, Poster Presentation
Section: 2
Presentation Number: 178
Mentor(s): Caitlin Cavanagh

Minority youth are at higher risk of underserved mental health needs (Rawal, Romansky, & Jenuwine et al. 2004), and have greater representation in the juvenile justice system. Therefore, the juvenile court system is well positioned to identify and meet the needs of an underserved population. The present study explored the relation between mental health needs, time in a detention, and reoffending among a sample of court-involved youth. Differences between groups by race will be examined. This current study utilized data from a Midwestern Juvenile Court using the Massachusetts Youth Screening-2 (MAYSI-2), How-I-

Think Questionnaire (HIT), and Youth Level of Service (YLS).

AGING OUT OF CRIME & SOCIAL MEDIA

Elizabeth Thomas, Jeremy Contardi, Mae Odell
Criminal Justice and Legal Studies, Poster Presentation
Section: 2
Presentation Number: 179
Mentor(s): Jay Kennedy

Past research in the field of Criminal Justice has shown that there is a relationship between age and crime. Research has shown that the likelihood that an individual commits a crime increases during childhood and adolescence, only to begin to decrease around 25 years of age. However, due to the rise of the internet as a "safe place" for some types of crime to be committed, we believe this criminal behavior drop-off age will only increase over time, especially within Generation Z and younger Millennials. White-collar crimes such as product counterfeiting are becoming more popular amongst younger generations as a way to create revenue and serve as a source of income for their lifestyle. Rather than being something that these individuals do in secret, they are taking to social media platforms such as TikTok and Instagram to show off their products and business practices. In this digital realm, product counterfeiting is often accepted as a legitimate and respected business. In our research, we will examine the interactions between social media users and how they can drive or deter criminal activity within their niches. We will also use past and present research to discuss the likelihood that the criminal behavior drop-off age will rise and the extent to which it will. With the internet being such a powerful tool for individuals and businesses, we believe that the drop-off age may become more obsolete as individuals are able to operate an entire illegitimate business from their cell phone.

THE EFFECT OF PROTECTIVE FACTORS ON GANG INVOLVEMENT, SUBSTANCE ABUSE, AND RECIDIVISM AMONG COURT - INVOLVED YOUTH

Clare Chie
Criminal Justice and Legal Studies, Poster Presentation
Section: 2
Presentation Number: 180
Mentor(s): Caitlin Cavanagh

As youth protective factors (e.g. healthy family relations, commitment to school) increase, youth self-reported violence decreases (Viljoen, 2018). This research examined the relation between familial and educational protective factors with peer and substance abuse risk factors among a sample of court-involved youth administered the Youth Level of Service/Case Management Inventory (YLS/CMI). Data from a Midwestern Family Court answered the question, are protective factors related to gang involvement, substance abuse, and recidivism rates? The hypothesis is that as protective factors providing structure increase, youths' risk of delinquent peers, substance use and reoffending will decrease.

ARE THE CHARACTERISTICS AND DEMOGRAPHICS OF FLORIDA COUNTIES ASSOCIATED WITH THE RATE OF RISK PROTECTION ORDERS PETITIONED FOR AND GRANTED?

Ryan Mann
Criminal Justice and Legal Studies, Poster Presentation
Section: 2
Presentation Number: 181
Mentor(s): April Zeoli

In 2018, Florida passed a law that made it legal for law enforcement officers to ask the court for a temporary ban on purchasing and possessing firearms and ammunition for those who

pose a significant threat to themselves or others?termed a Risk Protection Order. In this analysis, I investigate whether counties' demographic characteristics, such as median household income and percent of people 25 years and older that have a bachelor's degree or higher (gathered from the United States Census), are associated with the number of petitions for and Risk Protection Orders granted. Florida's Office of State Court Administrators provided access to the counts of petitions and Risk Protection Orders granted that county clerk offices reported from 2018 through June 2020. The counts were converted to rates, which revealed a wide range of rates among the counties for Risk Protection Order petitions, with a few counties not having any petitions filed. Descriptive statistics on county characteristics and results of the regression model will be presented. To my knowledge, this is the first analysis to examine whether demographic factors are associated with the utilization of Risk Protection Orders. The findings could reveal important patterns in Risk Protection Order utilization and associated demographic characteristics across counties. This information may help provide direction for communicating with counties about Risk Protection Orders and their appropriate use.

INVESTIGATING RISK SCORE AND MENTAL HEALTH NEEDS BETWEEN DEVIANT AND SEXUALLY-DEVIANT YOUTH

Kaylie Williams
Criminal Justice and Legal Studies, Poster Presentation
Section: 2
Presentation Number: 182
Mentor(s): Caitlin Cavanagh

Research has found that, in general, court-involved youth tend to have higher mental health needs than youth not involved with the court (Goldstein et al., 2005). Within the population of court involved youth, the mental health needs of juvenile sex offenders are likely different than those without a sex offense and deserves increased scrutiny. The present study intends to examine the relation between risk scores and mental health needs among a sample of youth brought to the courts attention due to a sex offense. This relation will be assessed using data extracted from the Youth Level of Service (YLS) and the Massachusetts Youth Screening Instrument (MAYSI) from a Midwestern juvenile court. The present study expects to find juvenile sex offenders have lower risk scores generally and higher mental health needs compared to youth without a sex offense. This study may help courts provide better mental health treatment for juvenile sex offenders therefore leading to less recidivism.

PERSPECTIVES ON THE HIRING PROCESS FROM BOTH EMPLOYERS AND APPLICANTS WITH A CRIMINAL RECORD

Alia Sloan
Criminal Justice and Legal Studies, Poster Presentation
Section: 2
Presentation Number: 183
Mentor(s): Stacy Hickox

People with a criminal record face challenges in finding and retaining employment, in large part because of the gap between employer preferences and the perceived qualifications of applicants with a criminal record. Original surveys of employers and interviews with people with a criminal record help us understand what is creating such discrimination against applicants with a criminal record and ways to combat that discrimination. The paper analyzes responses from employers surveyed on their perspective and attitudes about the hiring of people with a criminal record and the responses of people with a criminal record regarding their experience and perspective in applying for jobs. These responses also will be analyzed in light of legal research regarding disparate impact of employers' consideration of applicants' criminal records. Survey responses will be analyzed in light of the requirement that screening

based on criminal record be job-related and a business necessity, where that screen disproportionately impacts applicants of color or with disabilities. By informing both employers and people with a criminal record about the perspectives from the other side of hiring, we can help increase the job opportunities for those who have been in contact with the criminal justice system. With our research and past research, we will be able to understand what is creating such discrimination on people with a criminal record and ways to combat that discrimination.

DIGITAL HUMANITIES

POST-MODERN RELIGION IN THE DIGITAL AGE

Alana Davis

Digital Humanities, Oral Presentation
Section: 1
Presentation Number: 185
Mentor(s): Jon Keune, Morgan Shipley

The post-modern and digital age has ushered in countless changes for religious communities. Traditional expressions of religiosity are flourishing online but so are a new category of believers who identify themselves as “spiritual but not religious”; in dissecting spirituality from religiosity and challenging traditional modes of authority they have changed the religious landscape and ushered in a post-modern religiosity. The vastness of religious expression online has also pushed the limits of religious experience online. "Digital Surrogate Religious Experiences" offer us instances of meaning, a sense of awe or purpose which used to be filled by religiosity. In this presentation I will document and talk about my experiences building a digital humanities project in the form of a website attempting to tackle the questions posed by post-modern religiosity and digital surrogate religious experience.

AESTHETIC DIVERGENCE: GRAPHING THE DISTINCT DIFFERENCES IN (DIS)PLEASING HIGHLIGHTING DATA

Allison Simpson, Carly Wholihan, Jacob Okulewicz, Jacob Phillips, Milena Sinistaj, Nikita Nambiar

Digital Humanities, Oral Presentation
Section: 1
Presentation Number: 186
Mentor(s): Mitch Carr, Natalie Phillips, Soohyun Cho

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 highlighting 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 continue to analyze the data, we noticed distinct moments of diverged data around certain words or phrases that create visible spikes in the graphs. Our group sought to determine whether there were more moments of distinct difference in the positive or negative highlighting. We hypothesized that the displeasing data would show more drastic moments when the two data sets differed in highlighting. The DHLC believes that

understanding these moments of difference is important because it can provide valuable insight into why people respond to texts in certain ways.

A PLATFORM FOR POETRY: ENABLING VIRTUAL ENGAGEMENT WITH THE ARTS

Kaylee McCarthy
Digital Humanities, Oral Presentation
Section: 1
Presentation Number: 187
Mentor(s): Lauren Russell

During the COVID-19 pandemic, the RCAH Center for Poetry has developed virtual programming to allow the community to stay safely engaged in poetry and with each other. The Center's website has become an important platform for sharing news and event information, but it lacks some key content and multimedia and does not reflect the dynamism of the Center's work. Even after in-person events are possible, however, the need for a usable and engaging virtual space will not go away. The website will serve as a tool for outreach for the Center, a community resource, and a means of reaching readers and writers of poetry outside the East Lansing area. My work this semester involves researching effective strategies of websites in the arts and reimagining the Center for Poetry website. In engaging with other university poetry centers' websites, I have gauged the effectiveness of various visual strategies, navigation styles, archival formats, and more. My work on the website includes incorporating archival materials from various platforms, making resources and necessary information more streamlined, and developing graphics and other content to enhance the website's visual interest. In this presentation, I will share key components of the revolutionized website, including visual design work, interactive content, and incorporated resources. I will also discuss the process of developing the website, the usability of the website, and best practices. The redesigned website will enable the Center to communicate more efficiently with a wider audience and share the transformative power of poetry with the university, community, and world.

HAYTI ALUMNI: DIGITAL COMMUNITY SPACE

Allyssa Harris, Neha Singh, Todjanae Jones
Digital Humanities, Oral Presentation
Section: 1
Presentation Number: 188
Mentor(s): Rebecca Tegtmeyer

The Hayti Central School-Parent Chapter Alumni Association (HCHS) is the impetus for this project and serves as the community through which a team of students are working together to design a digital learning space for the community. The mission of HCHS is to preserve their historical roots, share their story, and withhold the legacy of their membership. The active alumni group currently provides networking, scholarship, and mentorship opportunities to current students in the greater Hayti school district and maintains communications and events for their membership. In this experiential learning project, the collaborative team is utilizing user-experience and graphic design methods to create a digital learning environment that informs and inspires the HCHS community. The team has analyzed how individuals experience the community through defining the five experiential elements of a digital community, a framework introduced by design anthropologist, Dori Tunstall. Research methods used are landscape analysis, audience diagrams, interviews, and site diagramming. Specific objectives for the community environment include to be accessible to the general public and members, a historical timeline, offer membership features such as a directory and event information, and build on ecommerce features such as donations, event registration, membership fees, and a community store. The collaborative team includes students from the College of Arts and Letters, specifically Graphic Design and Experience Architecture and the

Broad College of Business. Additionally, the students are collaborating with a practicing UX designer working in industry.

HOW DO SOCIAL MEDIA GIVEAWAYS HELP SMALL BUSINESSES WIN ON EXPOSURE?

Erin Sawyer

Digital Humanities, Oral Presentation
Section: 2
Presentation Number: 191
Mentor(s): Zachary Neal

In the age of social networking, small businesses have to get creative to reach consumers and convince them to shop small. Giveaways that require sharing the targeted content have become a popular strategy, but they leave the user asking: "Is this as exciting for the business owner as it is for me? How does that work?" This experiment aims to find out, employing an agent-based model to examine simulated giveaway success along the parameters of initial follower count and users' willingness to enter the contest. The model and accompanying analysis is specifically tailored to inform small businesses' social media strategy, as many of the relevant articles on the topic are geared towards large corporations. Yet, it takes into account many of the concepts highlighted in this work such as strategic diffusion, which involves rewarded spreading of content, and key components of social media, like sharing, reputation, and relationships. The initial investigation found that initial follower count and users' willingness to interact were both significant predictors of the number of users outside the organization's original network who saw the content, and who shared the content/entered the giveaway. Individually, initial follower count weighed heavier on the amount of outside users who saw the content, and willingness to interact weighed heavier on the amount of outside users who engaged with the content. More investigation into this subject will be beneficial, but these preliminary findings can begin to inform social media strategies for small businesses.

ENGAGEMENT AND RETENTION IN A LONGITUDINAL STUDY DURING THE PANDEMIC: THE MI DIARIES STORY TEAM

Lindsay Moore

Digital Humanities, Oral Presentation
Section: 2
Presentation Number: 192
Mentor(s): Anthea Ye, Betsy Sneller, Suzanne Wagner

The pandemic and social isolation requires a research project to not only collect data but also connect people to each other without direct interaction. In a traditional sociolinguistic research, we conduct interviews to collect casual spontaneous speech from people, which is rendered impossible due to the social distancing regulations. The sociolinguist lab launched a project, MI Diaries at the beginning of the pandemic which allows participants to submit self-recorded speech to an app in a continuous fashion. By collecting audio we are able to analyze whether and how a prolonged isolation from the speech community impacts patterns of Michiganders' language change. The diaries project solved the sociolinguistics problem while maintaining a human focused angle. One major challenge we face in this longitudinal project is the retention of the participants. Our major objective is to recruit new participants while keeping the existing participants engaged. To achieve this goal, we formed a story selection team that goes through diary entries every week and select stories from people's submissions to feature on our website. We have an entire archive of speech/stories going back to April. Storytelling is important, not only because it lets participants know they're being heard and acknowledged, but we anticipated people will recognize how diverse their experiences are.

ANALYZING THE PERCEPTION OF GENDER: NARRATIVES WRITTEN WHILE LISTENING TO INSTRUMENTAL MUSIC

Grace Bonnema, Kat Murray, Kenzie Baum, Khushi Kapoor
Digital Humanities, Oral Presentation
Section: 2
Presentation Number: 193
Mentor(s): Mitch Carr, Natalie Phillips, Soohyun Cho

The Digital Humanities and Literary Cognition Lab and the Timing, Attention, and Perception Lab at Michigan State University conduct a National Science Foundation-funded interdisciplinary study, “The Role of Narrative Listening in Music Perception”, which explores if participants imagined or heard stories when they were exposed to musical stimuli. The dataset used by this poster comes from an experiment conducted across Michigan State University, the University of Arkansas, and the University of Hong Kong in Dimen, China. The participants were exposed to various pieces of Western and Chinese instrumental music. Not only did participants in this study imagine and hear stories, these stories contained various uses of gender. A particular gender was mentioned more with association to specific stimuli. The perception of gender of individuals can also be observed through the music narratives participants provided. For example, in the Western instrumental music dataset from Michigan State University, 'soldiers' and leadership roles are referred to with masculine pronouns (W18, W46), while stories including 'dancers' and/or characters in dependent or helpless roles use feminine pronouns (W39, W79, W44). In this poster, the use of gender in narratives produced from instrumental stimuli will be analyzed to explore whether or not particular instruments or styles of music are associated with distinct genders. This exploration of these uses of pronouns in narratives produced can expose societal gender biases to attain a different perspective on how particular instruments influence a perception of gender.

CREATIVITY IN THE TIME OF COVID-19: ART AS A TOOL FOR COMBATING INEQUITY AND INJUSTICE

Akanksha Kapur, Jacob Okulewicz, Tushya Mehta
Digital Humanities, Oral Presentation
Section: 2
Presentation Number: 194
Mentor(s): Nancy DeJoy, Natalie Phillips

This project explores how individuals—particularly those hardest hit by the pandemic—are using creative outlets to cope with COVID-19 and challenge systemic discrimination to imagine a more just future. COVID-19 has called attention to the vast disparities in our society today, specifically how disproportionately minority populations are affected by this pandemic. The power of Black Lives Matter, the outrage over separation of immigrant and refugee families, and the harsh toll taken on racial and economic minorities, LGBTQ+, and disability communities all illustrate the importance of listening to the people whose lives have been most impacted; their creative practices illuminate new paths toward social justice. The aim of this project is to explore how diverse individuals are using creative practices that resist injustice, foster healing, and push back against the systemic inequities of COVID-19.

DIVERSITY & INTERDISCIPLINARY STUDIES

BECOMING ISRAELI: STORIES OF ALIYAH

Pelli Mechnikov
Diversity and Interdisciplinary Studies, Oral Presentation
Section: 1
Presentation Number: 197
Mentor(s): Yore Kedem

This article discusses the experiences of five different immigrants to Israel and discusses whether they ultimately feel Israeli or not. The overarching question being pursued in this article is "What makes an immigrant to Israel feel Israeli?" The conclusion drawn is that several topics, such as language barriers, family, cultural disparities, and religion, have a strong effect on whether an immigrant to Israel feels Israeli or not, however, this is severely limited by the small sample size and possible reservations of the interviewees.

PROMOTING DIVERSITY, EQUITY, AND INCLUSION WITHIN U.S. GEOGRAPHY DEPARTMENTS THROUGH AN EVALUATION OF DEMOGRAPHICS AND MEASURES IN PLACE TO PROMOTE OPENNESS.

Melissa Checo
Diversity and Interdisciplinary Studies, Oral Presentation
Section: 1
Presentation Number: 198
Mentor(s): Erin Bunting

In 2018, 146 U.S. citizens and permanent residents graduated with PhDs from U.S. Geography Departments. Of these, six were Black/African American, four were Hispanic/Latinx, and two were American Indian/Alaska Native. These numbers underscore an uncomfortable fact: this cohort of American geographers, like previous cohorts, does not reflect the nation's current level of diversity or academia's developing focus on social inclusion, diversity, and race equity. To foster increased DEI it is critical to document spatial patterns, historic trends, and highlight successes of both individuals and programs. This proposed project casts a critical eye on DEI within US Geography Departments to measure DEI metrics and document stories of success. Three nationwide surveys are being conducted with department chairs, faculty members, and graduate students. Through both quantitative and qualitative survey questions we look to measure DEI demographic trends within departments, initiatives, college / university support, teaching / research approaches that promote inclusivity, and drivers that help or hamper such work. This project is conducted in collaboration with the Association of American Geographers as well as faculty in the MSU department of Geography, Environment, and Spatial Sciences.

NEIGHBORHOOD CHANGE IN CHICAGO: A CASE STUDY OF GENTRIFICATION, DISINVESTMENT, AND DISPLACEMENT AND THEIR CONSEQUENCES ON AFRICAN AMERICANS

Wisdom Henry
Diversity and Interdisciplinary Studies, Oral Presentation
Section: 1
Presentation Number: 199
Mentor(s): Noah Durst

The purpose of this study is to analyze the consequences of gentrification and disinvestment occurring simultaneously and parallel to one another in low-income, predominantly minority neighborhoods in Chicago. I specifically focus on African American communities affected by the process of gentrification, disinvestment, and displacement because of the systemic racial discrimination endured by this group. Racially discriminatory lending practices of the mid

1940's compounded with redlining of low-income African American neighborhoods produced pockets of urban ghettos within Chicago. Furthermore, economic loss after World War II exacerbated deindustrialization of manufacturing plants and white flight into safer, cleaner suburban areas. Thus, gentrification provides a solution to revitalize and repopulate disinvested and abandoned, predominately African American, communities. In the current literature the process of neighborhood change is viewed primarily as gentrifying or disinvested, however, I argue that both gentrification and disinvestment occur concurrently with displacement being the final result of each. For this study I utilize median household income, vacancies, educational attainment, the percent white, and the percent black from the 2010 and 2017 American Community Survey to analyze changes in the composition of neighborhoods over time. I find that poor census tracts that experience disinvestment are surrounded by economically dissimilar tracts that are likely to gentrify and to displace low-income African Americans very quickly. Moreover, I present evidence that although gentrification is occurring in some low-income black neighborhoods, almost equal amounts of disinvestment and displacement take place in neighboring communities.

RACIAL DISPARITIES IN ORGAN DONATION AND TRANSPLANTATION: COVID-19 SUPPLY AND DEMAND SHOCKS

Alison Ferer
Diversity and Interdisciplinary Studies, Oral Presentation
Section: 1
Presentation Number: 200
Mentor(s): Michael Conlin, Stacy Dickert-Conlin

The COVID-19 pandemic caused both supply and demand shocks to the organ donation and transplantation process. Previous research also suggests there are racial disparities that exist in the process, disadvantaging patients of color. In this project, we perform a descriptive analysis to examine whether the shocks have affected pre-existing racial disparities. We analyze the changes in organ donations, organ transplants, and waitlist additions and exits by race and ethnicity. We focus on the three largest racial and ethnic groups: non-Hispanic white, black, and Hispanic or Latino. We use patient-level data from the Scientific Registry of Transplant Recipients. In our descriptive analysis, we compare trends between 2020 and 2019, as well as analyze changes throughout 2020. In addition, we focus on differences between deceased and living donor transplants. We then perform a multivariate analysis to examine how location and patient-level factors affect racial disparities. We specifically look at COVID-19 cases and policies, and patient education and healthcare. The goal of the project is to detect if there are increased racial disparities caused by the shock. This would help to prepare the system for future shocks, as well as fully understand the impact of the pandemic on organ donors and patients.

THE IMPACT OF OUR POLARIZED DEFINITIONS OF LIBERTY ON ADOLESCENT WAYWARD BEHAVIOR

Emily Schultz
Diversity and Interdisciplinary Studies, Poster Presentation
Section: 2
Presentation Number: 203
Mentor(s): Eddie Boucher

The Lockean ideology underpinning the founding documents of the United States purported to ensure liberty for all citizens. However, many interpret liberty in conflicting ways. Consequent of current socio-political polarization, many often distort liberty to justify unlawful actions. Recently, this ideological battle over liberty has intensified and is increasingly infiltrating all segments of society. Many are using their definition of liberty to excuse anarchy, violence, and theft; some have coordinated the occupation of cities to

advance their particular interpretation. Thus, to ensure the safety and unity of America, investigation into the tumultuous impact of this dangerous conflict is imperative. The chaos manifesting from the divisive conceptualization of liberty necessitates further research into this pressing social problem. My research will investigate the potential ramifications that the escalation of this ideological conflict has on America's next generation. How may adolescent perceptions of others' ideas about liberty impact their own beliefs? Further, how do adolescent beliefs about liberty shape their behaviors and expressions of freedom? I will examine the possibility of a relationship between the current polarized conceptions of liberty and adolescent commission and justification of unlawful behaviors. To study this complex issue, I will use an interdisciplinary approach, capturing insights from political philosophy, social psychology, and criminal justice. I will conduct interviews and survey Michigan State University students to gather information about their commission of status offenses and examine their social connections that may impact their beliefs about liberty. Subsequently, I will triangulate the data and comprehensively address this dynamic issue.

ILLUMINATING THE INVISIBILITY OF LESBIANS IN THE JAPANESE ANIME CARDCAPTOR SAKURA

Delaney Fedewa
Diversity and Interdisciplinary Studies, Poster Presentation
Section: 2
Presentation Number: 204
Mentor(s): Catherine Ryu

This presentation aims to demonstrate the lack of visibility and representation for lesbians by using Cardcaptor Sakura (1998-2000) as a study case. More specifically, this presentation focuses on the interactions between the main character, Sakura, and her best friend, Tomoyo, as a lens through which to analyze insight into the cultural representation of lesbianism in the shojo (a Japanese genre marketed for young female consumers) anime. To articulate the significance of these female characters' interactions, I will also examine the interactions between Sakura's brother, Toya, and his boyfriend, Yuki. Such a comparative analysis will delineate the dominant gender ideology of contemporary Japan that shapes the difference between male same sex relationships and female same sex relationships as reflected in this anime. This project will ultimately argue that the portrayal of lesbians is much more subtle than that of heterosexuals or male homosexuals and elaborate the significance of this finding.

ACCESS TO HEALTHCARE IN THE UNITED STATES FOR CITIZENS WITH INVISIBLE ILLNESSES

Reece Ohmer
Diversity and Interdisciplinary Studies, Poster Presentation
Section: 2
Presentation Number: 205
Mentor(s): Eddie Boucher

Healthcare in the United States has always been a social and often politized issue, but in more recent times and with the growing population, Americans with invisible illnesses and diseases have had limited access to seeking treatment. My research topic for this project is to look into this issue further and to see if there are any commonalities preventing citizens with invisible illnesses from getting care. What are the most common factors preventing people with invisible illnesses from getting the treatment that they need in the United States? For this project, I will investigate this issue using the sociological, psychological, and economical disciplinary lenses in order to best understand all of the complex layers of this problem.

BUILDING INCLUSIVITY IN VIRTUAL SPACES: RCAH SISTER CIRCLE MENTORING PROGRAM'S TRANSITION FROM IN-PERSON TO ONLINE
Alissa Hakim, Kim Guerra
Diversity and Interdisciplinary Studies, Poster Presentation
Section: 2
Presentation Number: 206
Mentor(s): Sitara Thobani, Tama Hamilton Wray

This project sets out to evaluate the experience of RCAH Sister Circle mentoring program from in-person to an online format. Sister Circle aims to support undergraduate women of color at Michigan State University by tending to academic, personal, and professional needs. We have held intimate events that cultivate connection and community among participants. Some events consist of: Internship and Resume Workshops, Study Sessions, Brunches, Check-Ins, etc. These events have helped prioritize the needs of students and further develop relationships outside of the program on campus. On March 11th, 2020, the program completely moved online and has had a new outlook on hosting events. As this transition was new to everyone, I am interested in learning more about how this experience has impacted student participation. What are some of the challenges and benefits from moving from in-person to online? I am going to interview students who attend regularly and compare the responses to those who have stopped attending since the online transition. The interviewees will be from different racial and age backgrounds to provide a wider range of perspectives. These results can help inform other mentoring programs about student experiences and how different formats can affect student lives, meanwhile analyzing what type of events students are more prone to attend. This information will also help RCAH Sister Circle gain insight on how to reinforce our goals through our future events.

EDUCATION

TURNING VISIONS INTO REALITY
Ashley Siwek
Education, Oral Presentation
Section: 1
Presentation Number: 211
Mentor(s): Denise Acevedo

Writing is a tool that has many purposes and can be used as a stepping stool to achieve a variety of desired goals. This particular project was designed to help faculty participants identify and bond with their authentic personal and professional selves through collaboration, reflection, and writing. The project intends to: first, share this artifact of resiliency with colleagues internal and external to the humanities so they, too, can use their written narratives to straighten their instruction and commitment to students and colleagues; second, to offer new and current writing teachers a framework for a faculty professional development experience that encourages collaboration, reflection, and writing to ensure ongoing personal and professional change and growth. My goal for this project; was to make my mentor's vision a reality. To give this project life, in a visual aspect. To do this, I created a project website and a variety of other social media accounts to facilitate the dissemination of their research on a broader scale. Being part of this research team taught me many valuable lessons. That has helped me grow both personally and professionally.

WHY WON'T THEY TALK

Apichaya Thaneerat, Juhua Huang, Ky Chimrak
Education, Oral Presentation
Section: 1
Presentation Number: 212
Mentor(s): Cheryl Caesar, Joyce Meier

A globally diverse institution, MSU welcomes thousands of international students each year. But how can we 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 members of a vibrant faculty/student team that meets regularly to discuss and research these issues, we are preparing a series of instructional films (for iteach.msu.edu) for faculty that address these questions. In our current video, "Why Won't They Talk?" we look at issues of in-class participation, from the perspective of international students.

INTERNATIONAL STUDENTS GATHER ONLINE FOR MUTUAL ASSISTANCE

Zhengxu Tang
Education, Oral Presentation
Section: 1
Presentation Number: 213
Mentor(s): Cheryl Caesar

There are about 5.3 million international students around the world. Since the advent of COVID, university shutdowns and the move to online classes, many of them are now isolated from both home and university, studying online, often in a distant time zone. What can be done to help? Some international students have banded together to form a free online community, Ongather, for academic help and social support. Founded in November 2020, it now includes 270 members, both graduate and undergraduate students, who study together, share their research, read literature, play games and chat at weekly tea parties. In a recent survey, 99% of respondents said that Ongather helped them with changing the inefficiencies they faced in the pandemic and making new friends. Students need additional resources during these difficult times. But these resources need not always be top-down, created by the universities. Students are also finding creative solutions on their own, solutions which universities may wish to examine.

UNTOLD HISTORY: A VISUAL ANALYSIS ON THE CULTURAL THEMES IN HISTORY TEXTBOOKS

Erykah Benson, Mikayla Ward, Nathaniel Penning, Ren Mueller
Education, Oral Presentation
Section: 1
Presentation Number: 214
Mentor(s): John Waller, Melissa Fore

This study aims to analyze the visual representation of racial and ethnic groups in a best-selling high school history textbook. Past scholars have asserted that a multiculturalist approach to history education may help American students better understand the country's past as well as the present socioeconomic disparities amongst racial and ethnic groups. This study adopts the perspective of Banks (1991), which recommends nine historical themes to help students better understand racial and ethnic relations. While some themes help students understand the experiences of minorities as victims of racism, others refer to active resistance strategies to racism. This study also adopts the Contributions Theory of Gordy and Pritchard (1995), which assesses the level of depth to which the perspectives of minorities are represented. Level 1 is the most basic level, where racial and ethnic minorities are represented solely by famous people, holidays, and cultural events. Level 4 is the highest level, where

representations of minorities are told from their own perspective and encourage students to draw critical connections between the past with present inequalities in the United States. Our method involves conducting a systematic visual analysis of the paintings, political cartoons, illustrations, graphical imagery, and corresponding captions of people in the 2016 edition of Visions of America: A History of the United States by Pearson Publishing Company. This presentation will review the findings regarding numerical representation by racial and ethnic group and the multicultural historical themes commonly associated with each group.

WHO BELONGS IN HISTORY? THE NUMERICAL VISUAL REPRESENTATION AND PORTRAYAL OF RACIAL AND ETHNIC GROUPS IN A MAINSTREAM HIGH SCHOOL HISTORY TEXTBOOK

Jasmine Jordan, Justin Crouch, Michael Schiestel, Roxy Sprowl
Education, Oral Presentation
Section: 1
Presentation Number: 215
Mentor(s): John Waller, Melissa Fore

This study aims to analyze the visual representation of racial and ethnic groups in a best-selling high school history textbook. Past critics of K-12 curriculum and textbooks have shown that history textbooks often erase, misrepresent, or omit the histories of racial and ethnic minorities. For example, past content analyses of history textbooks have shown that racial and ethnic minorities often receive representation in selective points in the history textbook, thereby producing disjointed representations of racial and ethnic minority history, which often perpetuate stereotypes about specific groups. Our method involves conducting a systematic analysis of the paintings, political cartoons, illustrations, graphical imagery, and corresponding captions of people in the 2016 edition of Visions of America: A History of the United States by Pearson Publishing Company. A count of the explicit numerical representation of racial and ethnic groups were conducted, while images were also coded for image type and activity. This presentation will provide an overview of the findings regarding the numerical representation of racial and ethnic groups in the selected text, followed by a description of image themes and activities that were commonly associated with each racial group. Content analyses that focus on the visual representation of racial and ethnic groups play an important role in understanding the historical experiences that high school students learn about from mainstream high school history textbooks. History education plays an important role in shaping how American students interpret their country's past as well as the present socioeconomic disparities amongst racial and ethnic groups.

HOW SCAFFOLDING AND RESOURCE ACTIVATION AFFECT STUDENT PREDICTIONS OF ORGANIC CHEMISTRY REACTIONS

Jacob Starkie
Education, Oral Presentation
Section: 1
Presentation Number: 216
Mentor(s): Samantha Houchlei, Melanie Cooper

Two fundamental concepts within theories of learning are to first, recognize the prior knowledge a student holds effects how experiences are incorporated into their conceptual framework. Secondly, those experiences are specific to the context they occur. In the context of organic chemistry education research, studies have investigated the use of scaffolding to prompt students during organic chemistry assessments, such as prompts involving the prediction of reaction mechanisms. Using the literature described above, this study further investigates how prompting affects undergraduate student responses when predicting organic reaction mechanisms. When predicting reaction mechanisms, leveraging partial charges which arise from differences in electronegativity is a critical step in developing a

plausible outcome of the reaction. Two version of a similar prompt were administered to similar cohorts of students. The scaffolded prompt used in this study asked students to draw the partial charges on a molecule before predicting a reaction mechanism. The second cohort received the un-scaffold prompt and were not asked to draw the partial charges and were only asked to predict the reaction mechanism for the same molecule. Within the scaffold group, students who could correctly label the partial charges where significantly more likely to have predicted the correct reaction mechanism. This may point toward a possible instruction strategy in organic chemistry classes during reaction mechanism prediction, by helping students activate productive resources for the given context.

RELATIONSHIP BETWEEN COMPUTERIZED AND STANDARDIZED LANGUAGE MEASURES OF CHILDREN WITH ASD RECEIVING EARLY INTERVENTION

Sarah Palmer
Education, Poster Presentation
Section: 2
Presentation Number: 217
Mentor(s): Joshua Plavnick, Sarah Avendano

The positive effects of early intervention on child language development is well documented. Standardized measures such as the Mullen Scales of Early Learning (MSEL) are often used to measure that development. However, those measures are administered infrequently and in contrived environments making them impractical to influence the intervention a child is receiving in a timely manner. The purpose of this exploratory study was to compare automated computerized language measures that can be administered more frequently and in natural environments to standardized language assessments. Specifically this study focused on the relationships between a child's vocalization ratio (VR), estimated mean length of utterance (EMLU), number of vocalizations (CV), and MSEL expressive language subscale and composite score. The participants included thirty-three children ages 2 to 5 years old diagnosed with autism spectrum disorder (ASD) who attended the Early Learning Institute (ELI). A correlational analysis was used to evaluate the relationships. This study compared MSEL scores, collected yearly to measure overall cognitive functioning of each child, to Language Analysis Environment System (LENA) data collected within one month of their MSEL administration. Results and implications will be discussed.

THE PARADOXICAL RELATIONSHIP BETWEEN THE DEVELOPMENT OF WRITING ACCURACY AND COMPLEXITY IN GRADES 3-10

Ellie Friedman, Sam Bourgeois
Education, Poster Presentation
Section: 2
Presentation Number: 218
Mentor(s): Adrea Truckenmiller

Learning to spell increasingly complex words is related to improved writing quality throughout K-12 schooling. The paradox in the development of writing is that accuracy and fluency with spelling may decrease as complexity increases because more skilled writers begin to attend to generating new and complex ideas, choosing sophisticated words, and adhering more closely to text structure, genre, and conciseness. Consequently, students may be more prone to spelling errors as they attempt to expand their lexicon, while other students may opt to include words they already know how to spell rather than risking error by selecting more advanced vocabulary. Ultimately, while the two variables tend to have independently linear relationships with age and development, we hypothesize that these two variables will have a curvilinear relationship with each other. In a study of students in grades 3 through 10 (n = 926), we will empirically evaluate this paradoxical relationship between accuracy (the number of words spelled incorrectly) and complexity (concreteness, a quality

determined by Coh-Metrix). At the word level, we expect to find a significant quadratic relationship between spelling errors and descriptive vocabulary?one where the highest vocabulary levels will have lower than anticipated spelling levels and, conversely, the lowest vocabulary levels will have higher than anticipated spelling levels. Through our findings, we hope to develop a more comprehensive understanding of skill development and consider how educators in all disciplines can account for this paradox in their writing instruction.

AN OVERVIEW OF THE TEACHERS4RESEARCH POOL

Sydney Padgett
Education, Poster Presentation
Section: 2
Presentation Number: 219
Mentor(s): Eric Hunter

So much research has gone into creating the best learning environment for children, and in the Voice Biomechanics and Acoustics Laboratory our Teachers4Reasearch project aims to give those that facilitate learning environments the voice to speak on important issues. A large data collection project to invite teachers from all over the nation to join this research pool has progressed during this school year and 5,540 teachers from nine States have received invitations to join. These numbers will continue to grow as our collection efforts continue. Their contact information has been collected in a systematically formatted way to ensure the invitation process through Qualtrics runs smoothly. Email addresses, first names, last names, and positions have been recorded in that order and then transferred over to Qualtrics to be used as contact lists to distribute our three-phase email invitation campaign. Using the three-phase campaign, one initial contact email is sent out to specific teacher contact lists followed up by two reminder emails. This overview is meant to highlight the process, the schools, response rates, and the demographics of respondents. By utilizing this pool, we have gained insight into vocal health and the impacts of online instruction due to COVID-19. It is our hope that this can be a tool for researchers to have access to a diverse population of educators as well as a resource for teachers to be able to share their vital experiences on a broad scale that has never been done before.

RESPONSE TO COVID-19: STRESS OF TEACHERS IN SIX SOUTHERN STATES

Brooke Barendsen
Education, Poster Presentation
Section: 2
Presentation Number: 220
Mentor(s): Eric Hunter

Teachers in primary and secondary education were ill-prepared for the COVID-19 pandemic, which caused insurmountable stress and anxiety for teachers and students alike. A survey created by MSU's Teachers4Research was sent out to educators across the nation regarding COVID-19 in the spring of 2020; questions about stress and anxiety were included alongside more general questions pertaining to each educator's overall wellbeing. Of the 889 responses from around the nation, there were 177 that came from the following South Eastern States: Alabama, Tennessee, Georgia, Kentucky, South Carolina, and Florida. The teachers were asked the following questions regarding stress and anxiety which is as follows. “Using the scale above, what is your current stress and anxiety level? (1 is mild, 10 is severe) - Overall Stress Level; Using the scale above, what is your current stress and anxiety level? (1 is mild, 10 is severe) - Overall Anxiety Level; List up to three significant factors which are contributing to your current stress or anxiety levels.” The teachers were given space to list significant factors that contributed to their stress, whether it be social, physical, or a result of having to move education to an online format. The survey showed that teachers in the South Eastern states experienced many forms of stress, across the board. School systems attempted to lessen

stress and anxiety by providing days off for professional development as well as holding virtual conferences for the teachers to learn how to better educate using an online format.

ANALYZING STUDENTS' CHOICE OF MODE OF REPRESENTATION

Donovan Dumoulin
Education, Poster Presentation
Section: 2
Presentation Number: 221
Mentor(s): Joelyn Delima, Tammy Long

On assessments, students often are presented with a question and required to respond using the mode the instructor specifies (e.g., model, graph, etc.). However, it is unclear what mode of response students would prefer, and whether this influences the quality of their responses. Additionally, would giving students the option of responding using multiple modes help them articulate ideas? We wanted to understand the choices students make when presented with a prompt requiring them to respond in two different modes. In this study, I am interested in the mode of representation students choose to complete first and reasons for making that choice. We asked MSU students enrolled in introductory biology for majors to respond to one prompt using two modes - essay and model. Responses were analyzed quantitatively to determine which mode of representation they chose to construct first, and qualitatively to determine the reason for that choice. We found considerable variation among students for the mode chosen to complete first and their reasoning for that choice. However, a theme that emerged in their reasoning was choosing the first mode with the expectation that it would help structure their response for the second mode. As an educator, this research will help in determining whether students benefit from answering a question in multiple modes and whether one mode of representation is more beneficial to students than others. My study contributes to the evidence base about designing assessments that enable diverse students to learn and effectively represent their thinking in college biology classrooms.

ANALYZING STUDENTS' MECHANISTIC EXPLANATIONS OF PHENOTYPIC VARIATION TO IMPROVE INSTRUCTION

Elijah Persson-Gordon, Estefany Beltran-Flores
Education, Poster Presentation
Section: 3
Presentation Number: 225
Mentor(s): Joelyn Delima, Tammy Long

Mechanistic explanations are a method of explaining a phenomenon by unpacking how factors at a lower scalar level affect the phenomenon. Constructing mechanistic explanations is not only central to understanding basic concepts of biology (e.g., phenotypic variation arising from genetic variation), but it is also a transferrable skill to other STEM disciplines. However, we do not know if and how students use mechanistic explanations when responding to prompts on their assessments. The goal of our study is to analyze how students use mechanistic explanations to explain phenomena and determine whether this varies depending on the course a student is currently taking. We asked students enrolled in multiple chemistry and biology courses to explain how phenotypic variation occurs among organisms in a population. We are coding responses to determine which scalar levels and causal associations are used. We predict that students in upper-level courses will write explanations that are more mechanistic on account of their greater writing experience and exposure to biological content. Our findings will help inform instructors about how to design curricula and instruction that helps students write and reason using mechanistic explanations.

DISTRICT SIZE AND ACCESS TO SLP SERVICES IN SCHOOLS: A COMPARISON OF MICHIGAN AND ILLINOIS

Julia Plesz

Education, Poster Presentation
Section: 3
Presentation Number: 226
Mentor(s): Eric Hunter

By law, public schools are required to provide speech and language services to eligible students. Both Michigan and Illinois laws require a maximum of 60 students per speech language pathologist. To gain understanding of the relationship between district size and accessibility to SLP services in schools, we sampled 15 public schools from three population ranges (1,000-9,000, 10,000-30,000, 100,000+) in both Michigan and Illinois. Data was collected from the Michigan Department of Education and the Illinois State Board of Education. This data was used to compare the size of school districts in the adjacent states and details about each district, such as the number of speech language pathologists within each district and students receiving services. Based on the data that was available, in both Michigan and Illinois public schools, the amount of speech language pathologists provided per district is much lower than the amount of students per district. This and other data will be discussed. Such data is necessary to understand coverage, benefits, and deficits in public schools.

HOW FEMALE SELF-EFFICACY AND IDENTITY PREDICTS PERSISTENCE IN THE FIELD OF ENGINEERING

Danielle Berry

Education, Poster Presentation
Section: 3
Presentation Number: 227
Mentor(s): Daina Briedis, Lisa Linnenbrink-Garcia, S. Patrick Walton, Stacy Priniski

Among the many motivational constructs, self-efficacy (i.e. a student's belief in their ability to successfully perform a task) and identification with their intended field are major factors that predict a students' personal confidence and persistence in their major. Many studies have examined how self-efficacy and identification with others in the engineering field are important for positive experiences in engineering education. Additionally, literature often suggests that female persistence is comparably more influenced by personal identification and self-efficacy than males. To better understand engineering persistence, this study seeks to examine the extent to which self-efficacy and an engineering identity are related to students' aspirations to continue pursuing a career in the field of engineering. Furthermore, the study investigates whether these constructs predict female persistence in the field more than male persistence in the field. Females are underrepresented in the engineering field; thus this study further investigates whether these relations of self-efficacy and identity to persistence vary by gender. Engineering students were surveyed about their self-efficacy and engineering identity in the spring of their freshman year and about the strength of their intention to pursue an engineering career in the spring of their sophomore year. The sample consisted of 30% females and 70% males. Regression analysis will be used to analyze the relations of self-efficacy and identity to persistence in engineering and to consider whether those relations vary as a function of gender. Results from this study will provide insights into how we can improve female experiences and confidence in order to help researchers and universities aiming to support and retain female engineering students.

SOCIAL NETWORK ANALYSIS ON DISCUSSION BOARD INTERACTIONS

Joao Gurgel
Education, Poster Presentation
Section: 3
Presentation Number: 228
Mentor(s): Andrea Bierema

In this study, we analyze students' interactions over a discussion forum using social network mapping, course evaluations, and statistics. Dr. Andrea Bierema teaches two sections each semester of ISB 202, Applications of Environmental and Organismal Biology, and I am one of the Undergraduate Learning Assistants. We examined both sections in the Spring 2020 semester with intentions of determining how to increase interactions between students. Each week, students are graded on their participation on D2L's Discussion Board platform. We posted initial topics relating to that week's objectives- this was typically two separate threads. We implemented two approaches on the discussion boards. We required students in one of the sections to reply to other students three individual days of the week, whereas students in the other section had to do three replies total. The original research question was, "Does requiring students to post on different days foster discussion?", but as the project has gone on, it morphed into two research questions, "Does having the requirement of posting on separate days foster a back-and-forth discussion?", and "Which characteristics (i.e., the day the original post was made and its word count) of a post obtain the most responses?". Currently the project is in the data analysis portion as we attempt to use statistical methods to provide further evidence. Thus far, we have found back-and-forth interactions are less common in both sections than originally anticipated, and that students tend to reply to other students who posted early in the week, regardless of word count.

IMPROVING MACHINE-LEARNING SCORING MODELS OF WRITTEN STUDENT RESPONSE ASSESSMENTS BASED ON PROBABILITIES

Nicholas Yoshida
Education, Poster Presentation
Section: 3
Presentation Number: 229
Mentor(s): Kevin Haudek, Megan Shiroda

Computer scoring models (CSMs) using machine-learning techniques can be used for predicting scores of student-constructed responses without human involvement, making constructed responses more accessible in academic settings for professors to understand student thinking with more insight and similar time requirements as multiple-choice responses. Training CSMs is time-consuming because each CSM requires data with human-assigned scores and each CSM has different issues during development. One way of improving CSM accuracy is to add additional data to the training set. When training a CSM, Cohen's Kappa is used to measure reliability, or agreement with human assigned scores. Probability is the confidence a CSM has when assigning a score to a new response. We hypothesized that using subsets of response with different probabilities would lead to different effects on the CSM Kappa. We tested this by creating experimental data sets (EDSs) of responses with CSM predicted scores, with specified probability cutoffs. Control data sets (CDSs) were also created for each EDSs, matching the number of responses but with randomized probabilities. Each data set was added to the original training set, then used to re-train the CSM. After comparing the resulting models, we found that data sets both with higher number of responses and probability cutoffs produced CSM with higher Kappa. Furthermore, CSM from CDSs had remained relatively stable in resulting Kappa's and even had higher Kappa's than EDSs with lower probability cutoffs. From these results we conclude that researchers should train their models with a high number of responses that have higher probabilities. Moreover, the stability of the performance using CDS indicate that

the probability of responses added to training sets has a significant effect on resulting Kappa. Yet, further research should be conducted on other CSMs to confirm these findings are broadly applicable.

SUPPORTS THAT HELP MEN AND WOMEN PURSUE ENGINEERING

Meredith Geletzke
Education, Poster Presentation
Section: 3
Presentation Number: 230
Mentor(s): Amalia Lira, Daina Briedis, Lisa Linnenbrink-Garcia, S. Patrick Walton, Stacy Priniski

Women are underrepresented in the science, technology, engineering and mathematics fields. For instance, the field of engineering is predominantly male, with only 13% of the discipline being women. There are extra supports, from universities and colleges, that help students succeed and continue to pursue engineering. For instance, tutoring centers, scholarships, resume workshops and living with other engineering students. These supports can influence an undergraduate's continuation in the field of engineering. The main purpose of this study is to help colleges better understand the types of supports, needed to help both men and women succeed. Over the course of a two-year period, second-year engineering students took part in focus groups about their personal experiences, including the types of support from the college of engineering that they felt helped them to pursue engineering. I am coding two focus groups guided by the following questions: (1) What kinds of supports do engineer students report as being beneficial? (2) Are the supports different for men and women in this discipline? The results from my examination can help provide insights for educators and administrators as to what kinds of services and assistance motivate undergraduates to pursue an engineering degree, as well as diving deeper into understanding the different supports men and women benefit from in the discipline of engineering.

ENGINEERING, COMPUTER SCIENCE & MATHEMATICS

THE EFFECTS OF HEATING RATE ON DEFECT REDUCTION BY RECRYSTALLIZATION IN DEFORMED POLYCRYSTAL NIOBIUM

Elizabeth Nicometo
Engineering, Computer Science and Mathematics, Oral Presentation
Section: 1
Presentation Number: 233
Mentor(s): Thomas Bieler

Niobium superconducting radio frequency cavities are the central core structure of particle accelerators. When in the superconducting state, defects such as dislocations and low angle grain boundaries arising from ingot production and sheet metal processing can trap magnetic flux and dissipate energy that degrades cavity performance (and thermal conductivity). We hypothesize that a more rapid heating rate than in current use will enable recrystallization that is more effective in removing defects. Two sets of polycrystal niobium samples with different orientations with respect to the rolling direction (one each from the cavity itself and from the adjacent material trimmed before forming the cavity) were studied by analyzing local average misorientation values collected by electron backscatter diffraction analysis before and after heat treatment. By understanding how initial deformation gradients from forming influences recrystallization after heat treatment, adjustments in the process can make future cavities more consistently efficient by minimizing defects.

THE MATH BEHIND THE GAME OF SHIKAKU

Jadyn Morris, Kaylee Chang, Lydia Valtadoros
Engineering, Computer Science and Mathematics, Oral Presentation
Section: 1
Presentation Number: 234
Mentor(s): Robert Bell

We investigate the game of Shikaku, a tiling puzzle game played by taking a board of dimensions n by m with integers placed in some of the unit squares. To win, one must divide the board into rectangles such that each contains exactly one integer, and this integer is equal to its area. Shikaku is similar to a more familiar game, Sudoku, as both games have integers in certain squares. In Shikaku, however, there is more freedom to choose the board size and the placement of integers. We study boards that give one solution, others that admit more than one solution, and the growth rate derived from examining all of the solutions to all possible number assignments for a given m by n board. The study of Shikaku is also related to common problems of tilings and tessellations, so we apply similar methods in our study of the game. Lastly, we study which mathematical properties of puzzles make them enjoyable, including elements of logical thinking in place of trial and error, and a unique solution.

TILING PARTIAL CHESSBOARDS WITH DOMINOES

Carley Holcomb, Destinny Todd, Nikki Williams
Engineering, Computer Science and Mathematics, Oral Presentation
Section: 1
Presentation Number: 235
Mentor(s): Robert Bell

We investigate the problem of tiling 2n x 2n chess boards with exactly 2 black squares and 2 white squares missing, while allowing dominos to wrap from top to bottom and side to side. Tiling requires covering all squares of the chessboard with 2x1 dominoes with no overlapping pieces. Tilings have existed since ancient times in works of architecture and design. The mathematical study of tilings was underway by the late 19th century and developed into a subfield of its own by the mid to late 20th century. We apply some standard techniques from this theory such as coloring arguments, closed path methods, and flip moves. Tilings are not limited to square chessboards and 2x1 tiles. We also investigate other shapes of boards such as Aztec diamonds and other non-uniform shapes. Additionally, we investigate the problem of counting the number of different tilings up to symmetry, as well as how wrapping the board in different ways affects the possibilities.

MULTI-ROBOT LEARNING AND COVERAGE WITH HETEROGENEOUS SENSING INFORMATION

Andrew McDonald
Engineering, Computer Science and Mathematics, Oral Presentation
Section: 1
Presentation Number: 236
Mentor(s): Vaibhav Srivastava

Heterogeneous multi-robot sensing systems are often able to characterize physical processes—such as pollution events or wildfires—better than homogeneous systems. For example, a network of drones and unmanned aquatic vehicles monitoring the waters of a lake or ocean may together be able to detect harmful algal blooms (HABs) more accurately than a homogeneous system consisting exclusively of one or the other. Access to multiple modalities of sensory data allows heterogeneous systems to fuse information from different sources and ultimately learn a richer representation of world around them. We consider the problem of robotic coverage in this context, wherein a team of heterogeneous agents aim to distribute themselves throughout an environment to measure a process of interest as

accurately as possible. We assume that demand for agents is nonuniform (higher in some areas and lower in others) throughout the environment but unknown ahead of time, and frame the task as a problem in which agents must balance learning with coverage to detect and address demands within their environment. Specifically, we leverage multi-fidelity Gaussian Process regression to (i) fuse heterogeneous sensory data and learn an unknown sensory function while (ii) simultaneously performing coverage on the inferred function. We then propose two algorithms which balance learning with coverage, prove they converge asymptotically, and demonstrate their empirical efficacy through numerical simulations.

IMPACTS OF THE DELIVERY MODEL OF AN INTRODUCTION TO COMPUTER PROGRAMMING CLASS ON STUDENT SUCCESS

Erika Christensen
Engineering, Computer Science and Mathematics, Oral Presentation
Section: 2
Presentation Number: 239
Mentor(s): Laura Dillon

We are exploring how three delivery models for the Introduction to Programming class impact student success and if simultaneously taking a supplemental instructional class (SI) improves outcomes. We are particularly interested in the differential impact on success of women and minorities in computing as compared to majority groups (Asian and Caucasian males). Impact will be measured by two factors: 1) grades received at students' first attempt of the programming class and 2) the 3-semester retention after students' first attempt. We hypothesize that as the delivery model goes from lecture-based to flipped and fully online, women and minority groups in computing may experience higher attrition rates and larger dips in performance than the majority groups. These findings would be consistent with findings that non-academic factors, such as learning climate, culture of collaboration and encouragement, and developing relationships with peers and instructors, have a stronger impact on retention of women and minority students than on majority students in engineering fields. We also hypothesize that concurrent enrollment in SI may decrease the differences in success rates because it helps students find community, build their peer network, and promotes a growth mindset. We are using the generalized linear model to assess these hypotheses.

MANIPULATING ABELIAN SANDPILES TO MODEL DISEASE SPREAD

Jack Anderson, Madelyn Jeffrey, Nikit Parakh
Engineering, Computer Science and Mathematics, Oral Presentation
Section: 2
Presentation Number: 240
Mentor(s): Richard Edwards, Robert Bell

Disease spread largely affects the global population; abelian sandpiles may be a useful tool to model disease spread based on preventative measures and immunity. Abelian sandpiles are graphs consisting of nodes and edges. Abelian sandpiles use “chips” to add weight to a node. We will use these attributes of Abelian sandpiles to represent nodes as people and edges as their connections through physical interactions; we will use chips to represent a person's exposure to a disease. The number of chips is indicative of a person's exposure or susceptibility to a disease as well as how contagious they are. The number of edges that connect to one node is defined as that node's degree. When a node contains a number of chips that matches or exceeds its degree, the node represents a person who is contagious. Then the chips are dispersed to the surrounding nodes to represent disease spread through intrapersonal contact. Sandpiles can be modeled and studied through computer simulations. Abelian sandpiles are coded by placing a predetermined number of chips on a specified node. Seeding any node with as many chips as its degree or more causes it to lose that number of

chips by adding one to each adjacent node. We will demonstrate the ways in which abelian sandpiles can be manipulated to model the spread of an infectious disease. Our model will consider factors such as immunity, wearing masks, and social distancing.

UNDERSTANDING PHASE SEPARATION OF PHOTOPOLYMERIZED DENTAL RESTORATIONS

Sarah Holles
Engineering, Computer Science and Mathematics, Oral Presentation
Section: 2
Presentation Number: 241
Mentor(s): Caroline Szczepanski

Dental restorations are complex biomaterials, as they have many requirements in terms of physical and mechanical properties. Restorations must be biocompatible, mechanically robust, have an appearance that is aesthetically pleasing to patients, and most importantly, should have long lifespans. For safety and aesthetic reasons, photopolymerized restoratives based in three-dimensional polymer networks have become more favorable in recent years. However, these materials have an incredibly high failure rate compared to previously-employed amalgam-based restorations. To try and reduce the failure rate, a deeper understanding of these materials is needed. Current research attributes restoration failure to inconsistent polymerization at the interface between the native tooth structure and the restoration. These inconsistencies can be a result of phase separation during photopolymerization, which produces a distribution of more densely cross-linked (strong) and loosely cross-linked (weak) domains. To understand this phase separation behavior and identify solutions to mitigate this challenge, our work investigates the phase behavior of photopolymerizable formulations similar to dental adhesive materials currently on the market. To determine the ultimate driving force for phase separation, the formulations are varied in terms of crosslink density, ratio of hydrophilic and acid-etching monomers, as well as the fraction of a water/ethanol co-solvent. FTIR spectroscopy and dynamic mechanical analysis (DMA) are employed to characterize phase composition, thermomechanical behavior, and extent of conversion of these model formulations. Initial results support the hypothesis that solvent fraction most significantly influences phase separation. With these findings, effective strategies to mitigate failure of these materials will be discussed.

SEMI-SUPERVISED LEARNING

Alexander Sietsema, Nicholas Grabill, Hu Yunzhang
Engineering, Computer Science and Mathematics, Oral Presentation
Section: 2
Presentation Number: 242
Mentor(s): Ekaterina Rapinchuk

Many machine learning models are supervised: to predict an output from a given input, the model trains on many samples of input data labeled with the correct output. In practice, such labeled data may be difficult or expensive to produce. There are also semi-supervised models, which instead train on a small amount of labeled data in tandem with a large amount of unlabeled data. We present comparisons of the performance of supervised and semi-supervised models with respect to the availability of labeled training samples.

FACE MASK EFFICIENCY OF FILTERING THE COVID-19 VIRUS

Sarah Judis
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 3
Presentation Number: 245
Mentor(s): Carl Boehlert, Per Askeland

The filtration efficiency of face masks is imperative to prevent the spread of COVID-19, especially in large gatherings and medical centers. A NIOSH (National Institute of Occupational Health and Safety) certified N95 mask, a 3 ply disposable polypropylene non-medical grade mask, and a single layer spandex/nylon reusable mask will be studied under the scanning electron microscope to examine the porosity diameter and distribution of the material. The topography, using backscatter imaging, will demonstrate the interconnections of the fibers. ImageJ will measure the porosity diameter of the sample. Smaller porosity diameter and even distribution will be the most effective in preventing the virus and respiratory droplets from entering or leaving the mask. Factors such as the particulate's Brownian Motion and air flow for breathing must be considered as well.

RESIDUAL STRESS OF THE LEFT VENTRICLE: DEPENDENCE ON BREED, HYPERTENSION, AND CONSTITUENT ISOLATION

Sara Purdue
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 3
Presentation Number: 246
Mentor(s): Sara Roccabianca

Previous studies have determined the effect of myocytes and collagen on the state of residual stress in the left ventricle (LV) of Sprague-Dawley (SD) rats, both male and female. Recently, we tested the dependence of breed and hypertension using LVs from (all female): normotensive SD, normotensive Dahl salt-resistant (SR), and hypertensive Dahl salt-sensitive with a controlled diet (SSCD) and a high fat diet (SSHFD). Ring-shaped LV samples were treated with collagenase and detergent to isolate the myocytes and collagen, respectively, followed by opening angle tests. In myocytes-only samples, the SD and SR showed similar results, and had larger opening angles than SSCD and SSHFD. In contrast, SR, SSCD and SSHFD had similar results in intact tissue, with SD samples showing much higher opening angles. Following a similar pattern, SD collagen-only samples resulted in higher opening angles than SR and SSCD, but SSHFD had measurements between the two groupings. There was a large variance in which breeds were affected by differing factors. Constituent isolation, breed, diet, and a combination of the three all led to varying effects on the opening angle results. The previous studies mentioned above concluded that collagen has the most impact on residual stress in the LV of rats. However, our results show that conclusion should not be applied across differing breeds and diets of rats.

WHY THERE ARE DIFFERENT PAINTBRUSHES FOR DIFFERENT PAINT

Qian Bates
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 3
Presentation Number: 247
Mentor(s): Carl Boehlert, Per Askeland

There are different kinds of paintbrushes for different types of paint, but what makes them more suitable to some mediums than others? Do the natural fibers of oil brushes differ much from the synthetic ones of acrylic? I want to use secondary electron imaging to look at the surface details of paint brush bristles to see what properties make them better for different

paints. I want to determine whether it's better to buy different types of brushes or just use the same ones for different mediums.

EXTRACTION AND DETECTION OF FOODBORNE PATHOGENS WITH A DNA BIOSENSOR

Emma Dester
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 3
Presentation Number: 248
Mentor(s): Evangelyn Alocilja, Saad Sharief

Foodborne disease outbreaks are a significant cause of illness and death in the United States, with more than 3,000 preventable deaths occurring annually. Certain types of bacteria, such as Salmonella spp., Listeria monocytogenes, Bacillus cereus, and Escherichia coli are commonly associated with these outbreaks. Traditional protocols for detecting these pathogenic bacteria have been successful but often require overnight culturing to increase the target bacterial concentration and minimize interfering microorganisms. Finding a more rapid and cost-effective assay can help reduce the labor and time associated with these currently successful protocols. This research seeks to address those concerns through a nanoparticle-based biosensor. In these experiments, target bacteria in food matrices were bound to magnetic nanoparticles for extraction and concentration. After a four-hour incubation of the concentrated sample, DNA was extracted for use in a one-pot colorimetric DNA biosensor. Gold nanoparticles (GNPs) bound to a bacteria-specific DNA probe were used to detect the presence of target DNA. The GNPs retain their wine-red color in the presence of target DNA and aggregate in its absence. Preliminary results show colorimetric changes are evident in as little as 5 minutes after the procedure is complete. Extraction, concentration, growth, and detection can all be completed with this method in a single work day, eliminating the need for overnight incubation. This method has the potential to significantly reduce the time and cost associated with detecting foodborne pathogens.

IMPROVING TOYOTA PRIUS TRACTION MOTOR PERFORMANCE USING EVOLUTIONARY ALGORITHM OPTIMIZATION

Marcus Wolff
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 3
Presentation Number: 249
Mentor(s): Shanelle Foster

The optimization of electric machine design is paramount within both commercial and personal contexts. Bettering the performance of vehicle motors is no exception, as consumers demand increased performance in their cars with each year that passes. This research aims to optimize torque performance while reducing torque ripple in a 2010 Toyota Prius motor by altering ten different motor variables, while remaining subjected to nine design constraints to ensure a feasible geometry. Machine design is being optimized using the multi-objective evolutionary algorithm NSGA-II. Currently, the research involves running an algorithm that uses Pymoo framework to generate random values for design solutions, communicate these solutions to a MATLAB script and update the machine model in Altair Flux-2D using these values, solve the updated model to get objective function values, use NSGA-II within Pymoo to optimize the objective functions, and generate the next generation of design solutions to start the cycle over again. Results from two types of algorithms are compared, one with using a “normal” NSGA-II optimization cycle, and second with a repair operator applied to the NSGA-II algorithm, which corrects infeasible solutions to render them feasible. For a certain computational effort, pareto fronts obtained from the two methods will determine the best design solutions. While the focus of the research is optimizing the Toyota Prius drive motor, further research questions can be considered in ways to reduce computational time as well.

EFFECTS OF BIOCHAR ON MICROBIAL COMMUNITY DYNAMICS AND ANAEROBIC DIGESTION OF CORN STOVER BIOOIL

Annaliese Marks
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 3
Presentation Number: 250
Mentor(s): Wei Liao

The objective of this study is to determine the effects of biochar on anaerobic digestion of biooil, which is produced from the pyrolysis of corn stover. The biooil was used as a co-substrate at different concentrations (1, 2, and 4 %) along with the liquid digestate obtained from a demonstration-scale anaerobic digester at the MSU Anaerobic Digestion Research and Education Center. The anaerobic digestions of biooil were operated semi-continuously for 80 days with a hydraulic retention time of 20 days. The production of biogas was measured daily during the testing period. Operational parameters (total solids, total volatile solids, methane content, chemical oxygen demand, and content of volatile fatty acids) were measured as well to characterize the performance of the digesters during every HRT cycle. Moreover, microbial community samples were taken and analyzed at the end of every HRT cycle. The experimental data showed that the cumulative biogas volume produced in the digestions containing 1% biooil was higher than the control reactors receiving only anaerobic digestate. Methane content of the biogas from the digestion with 1% biooil was 60%. A nonmetric multidimensional scaling (NMDS) analysis elucidated that the biochar addition can change the microbial community and correspondingly influence the digestion performance. These results concluded that biochar can facilitate the digestion of biooil, which provides another route to turn crude biooil into a bioenergy product - methane.

USING BEND SENSORS TO TRACK SINGLE-AXIS MOVEMENTS FOR VIRTUAL REALITY ENVIRONMENTS

Nathan Kowalski
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 3
Presentation Number: 251
Mentor(s): Justin Scott, Tamara Bush

Virtual reality (VR) systems must be able to accurately track complex movements in real-time to recreate lifelike movements in a VR engine. First, movement or location data must be collected by some sort of sensor—then these data points must be transmitted, often wirelessly, to the host system where they can be interpreted. Often, sensors used in these systems are cameras, touch sensors, or gyroscopes. In our research, we sought to use a bend sensor to track joint movements of a user, such as the bending of a knee or elbow. Our goal was to wirelessly measure the bending of a single-axis sensor and create a system that visualizes those values on-screen in real-time. To do this, a BendLabs one-axis bend sensor evaluation kit was used to gather bend and stretch values. These data were then sent via Bluetooth to an intermediate Adafruit microcontroller board, which received the data and forwarded it to the central computer using a wired serial connection. These values were then used in a Python script to visually simulate the bending of a simple joint on screen, consisting of two lines that form an angle. Thus far, our visualization was able to bend in real time when the sensor was bent manually. This visualization tool shows the ability of the system to collect and transmit interpretable data to a host computer. In a VR engine, these data will be used to better recreate the movements of a player within the virtual environment.

NEW METHODS FOR FAILURE ANALYSIS IN HEALTH CARE APPLIED TO DEEP LEARNING CLASSIFICATION

Gian Batayola
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 4
Presentation Number: 253
Mentor(s): Adam Alessio, Muneeza Azmat

Diagnostic error rates in medical imaging range from 3% - 5% globally. Despite the high prevalence of errors, there are limited analysis techniques designed to specifically evaluate the frequency and origin of errors. Many machine learning algorithms have been proposed to mitigate these diagnostic errors. Typically, performance of Machine learning diagnostic techniques are reported in summary measures of average accuracy, precision, and specificity. These measures fall short of summarizing outlier performance. This signals a critical need for new evaluation techniques. This research study reflects on the viability of using Python machine learning models contained in the scikit-learn library for medical imaging applications. In the process, we created a new performance metric called the "probabilistic confusion matrix", which overlays a confusion matrix with a probability heatmap, displaying both a classification bin's percentage share of the total as well as its average confidence.This metric provides insights into how the classification probabilities of different classes are affected by addition of increasing amounts of randomized noise. Charting the results revealed that the models exhibit certain aspects of the Dunning-Kruger effect found in humans. Low noise results in high accuracy and high confidence. Moderate noise results in moderate accuracy and low confidence. High noise results in low accuracy and high confidence. This suggests that current machine learning models are limited when classifying noisy imaging data. It may be necessary to implement a dynamic learning mechanism to ensure that accuracy and confidence measures maintain consistently high levels before further usage for medical diagnosis.

THE STEREOCHEMISTRY OF PLA AND ITS EFFECT ON MATERIAL PERFORMANCE

Nicole Mancina
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 4
Presentation Number: 254
Mentor(s): Mo Alhaj, Ramani Narayan

Polylactide (PLA) is a biobased and biodegradable polymer known for its high versatility to be used in various commercial applications (i.e., packaging, 3D printing, medical devices, etc.). The composition of the lactide isomers determines the material properties of the resulting polymer, which determines the final application of the PLA product. Lactide possess three stereoisomers (L-lactide, D-lactide, and meso-lactide), each of which produce a polymer with varying material properties. By copolymerizing these stereoisomers at different ratios, one can produce various PLA grades for different applications. The Biobased Materials Research Group (BMRG) has analyzed the effect of meso-lactide on PLA's crystallinity and material properties. Copolymers of meso-lactide and L-lactide were produced via melt polymerization at 130C using stannous octoate (M/C=5000) as a catalyst. Even though meso-lactide is an optically inactive monomer, it has an effect on the stereochemistry of PLA when copolymerized with L-lactide, in that an increase in meso content leads to an increase in amorphous regions in PLA. Using differential scanning calorimetry (DSC), the transition from semi-crystalline to amorphous PLA was depicted. It was concluded that PLA transitions from semi-crystalline polymer to an amorphous grade structure between 10-20% meso content. Tensile properties (tensile strength, elongation at break, stiffness, etc.) of commercial grade PLA were finally quantified to analyze the effect of meso content on PLA's mechanical

behavior. A slight decrease in tensile strength was seen as more meso content was added, but there was an increase in stiffness as well.

ANALYSIS OF RUSTED CAR BODIES CAUSED BY OUTDOOR CONDITIONS

Mason Miller
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 4
Presentation Number: 255
Mentor(s): Carl Boehlert, Per Askeland,

A continental climate zone's annual freezing and thawing cycle is the basis for rapid and abundant oxidation of steel on car bodies. Outdoor conditions of rain, ice, snow, and particularly salt during colder months result in the oxidation of steel, forming rust. A common way to analyze rust is to use a scanning electron microscope (SEM). A SEM provides magnified images of the topography on the surface the rust is on. Using energy dispersive spectroscopy (EDS), beams of X-rays interact on the surface of the samples providing images displaying the difference in densities between samples and the distribution of elements within them. This study involves analysis of rust samples from a 1996 Ford Bronco and a 2011 Ford Escape by imaging the samples under the SEM and performing EDS. The results of the study better the understanding of rusting on car bodies and considers the precautions taken to prevent it.

AB-INITIO THERMODYNAMIC ANALYSIS OF THE DECOMPOSITION OF METHYLAMMONIUM LEAD IODIDE

Douglas Heine
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 4
Presentation Number: 256
Mentor(s): Hui-Chia Yu

Methylammonium lead iodide perovskite (MAPI) is a promising semiconductor material for use in solar cells, LED's and other applications. However, its practical use has been hindered by poor stability: when heated, illuminated, exposed to moisture or subjected to electrical current, it promptly decomposes to form lead iodide and various volatile products. This project attempts to probe the thermodynamics of this decomposition and develop a nucleation model to approximate the energy barrier and critical nucleus size. To this end, the computational quantum chemistry/solid state physics technique known as density functional theory (DFT) is applied, as implemented in the Fritz-Haber Institute ab initio molecular simulations (FHI-aims) software package. Results will be discussed.

CONSIDERING THE SUSTAINABILITY OF WASTEWATER TREATMENT BY LAND APPLICATION AS OPPOSED TO TREATMENT IN A PLANT

Lindsey Hassel
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 4
Presentation Number: 257
Mentor(s): Steven Safferman

The treatment of wastewater by land application instead of being treated in a traditional wastewater treatment plant has proven to be a viable option for facilities looking to reduce the cost of wastewater treatment. Land application entails applying wastewater directly to agricultural fields to be treated as it flows through the soil. Not only does this process cost less than the use of a traditional wastewater treatment plant, but it also can reduce greenhouse gas emissions and water use, two benefits that should not be overlooked as environmental health concerns become more omnipresent. Additionally, the application of

wastewater to agricultural fields provides key nutrients to the soil that help fertilize crops. This study considers the benefits of treating wastewater from food processing plants via direct land application as opposed to more traditional treatment methods. A comprehensive review of literature regarding the sustainability of traditional wastewater treatment plants, as well as the potential benefits of land application, was conducted so that comparisons could be made between the two. Additionally, a goal of this study is to produce a spreadsheet that could be used by food processing plants to determine if it would be more beneficial for them to use traditional methods of wastewater treatment, or if land application would provide more benefits and be more sustainable in the long term.

INFORMATION EXTRACTION FROM PUBLICATIONS FOR THE HUBBLE SPACE TELESCOPE

Vicente Amado
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 4
Presentation Number: 258
Mentor(s): Jack O'Brien, Wolfgang Kerzendorf

The modern scientific community relies on instruments and data provided by large scientific institutions, such as the Hubble Space Telescope and the Large Hadron Collider. For these institutions to optimally serve the scientific community, it is crucial to track how often and in what way their instruments are being used. The community, however, does not provide usage data directly but embeds this in plain language in their publications. Simple solutions to extract usage information from publication (such as full-text searches) fail as authors often just mention institutions (e.g. Hubble Space Telescope is often mentioned in astronomy papers) even though they do not use them in the present work. The current approach is to use the valuable time of scientists at these institutions on the menial task to perform manual searches of the exponentially growing literature. In this poster, I will present a solution using Machine Learning and Natural Language Processing to automatically extract such information with high accuracy from published works. Our algorithm performs with an 85% accuracy on an initial project for the Hubble Space Telescope team that is currently being implemented in production workflow. One of the main findings of this study is that a focussed approach on only parts of the text (paragraphs) performs better than full text algorithms. I will conclude by providing an outlook on our future work that focuses on using recently published natural language processing algorithms to increase the algorithms accuracy.

MACHINE LEARNING APPROACH FOR CLASSIFYING HAND GESTURES

Katie Albus
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 5
Presentation Number: 261
Mentor(s): Arun Ross

Hand gestures can supplement verbal communication as a natural way to express our emotions and forms a part of our inherent behavior. This non-verbal mode of interaction is pivotal in sign-language as it provides a conduit for communicating between persons with disabilities. Hand gestures are becoming increasingly important in delivering an inclusive human-computer interaction (HCI) along with voice activation. As a result, it has been deployed in automotive HCI applications and gaming systems like Kinect. Real-time hand gesture recognition is therefore essential to improve the effectiveness and efficiency of these applications. Towards that end, we combine 3D hand pose estimation with gesture classification to create a real-time based solution to identifying hand gestures. In this work, firstly, we detect positions corresponding to twenty-one joints located on the hand. Next, we use the configuration of the positions located in the first step to identify a gesture. The

proposed solution integrates pattern recognition and machine learning for providing an inclusive experience to improve current HCI. The results of this study can serve as a tool to enhance communication across virtual platforms. Future work will focus on augmenting hand gesture recognition with a facial expression classifier to assist in communication for individuals requiring special needs, thereby providing a community-based platform for social good.

MORPHOLOGICAL EFFECTS OF REVERSIBILITY ON IMIPENEM EXPOSED SALMONELLA TYPHIMURIUM AND ESCHERICHIA COLI

Chloe Zaborneykline
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 5
Presentation Number: 262
Mentor(s): Evangelyn Alocilja, Oznur Caliskan-Aydogan

Antimicrobial resistance (AMR) has been an increasing threat to global health and development, as identified in the World Health Organization's list of top ten global health threats to humanity. Not only does it drastically increase rates of illness and death, but AMR also poses a significant economic impact by requiring longer hospital stays and intense treatments. Along with natural evolution, AMR is exacerbated when bacteria are exposed to subinhibitory doses of antibiotics, which allows them to propagate further. The purpose of this research is to investigate morphological effects of reversibility on imipenem exposed bacteria at different doses by doing subsequent removal of these antibiotics. In this study, Salmonella typhimurium and Escherichia coli are the bacteria of interest. Original studies showed that bacteria exposed to higher concentrations of the antibiotic for longer periods of time tend to result in more round-shaped bacteria, as opposed to their typical rod shape. This research reverses the original procedure by removing the antibiotic and observing the changes in the bacteria under a microscope. The goal of this is to determine if the bacteria will return to their rod shape or if the majority will retain their spherical morphology. Preliminary studies indicate that the bacteria begin to return to their original shapes after the antibiotic is removed. This research aids in the study of antimicrobial resistance by revealing morphological changes in bacteria and assisting in global efforts to understand the effects of AMR.

NECK AND SHOULDER POSTURE CHANGES DURING SEATED AND STANDING OFFICE WORK

Katharine Walters
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 5
Presentation Number: 263
Mentor(s): Teresa Bellingar, Archana Lamsal, Tamara Bush

According to the U.S. Bureau of Labor Statistics, 18.5 million workers were employed in office and administrative support occupations in 2019 and worked an average of 7.25 hours per day. These jobs included working on a computer, and a previous study correlated head, neck, and shoulder posture during computer work and pain in those regions. However, that study did not quantify changes in posture between seated and standing work and between mousing and typing office tasks. The aim of this work was to determine how the angle of shoulder rounding and neck flexion deviated from the ergonomic position while completing office work in seated and standing positions. Kinematic position data for 30 test participants was collected using a Qualisys motion capture system. Participants were asked to perform alternating mousing and typing tasks, each with a 15-minute duration. Four tasks were performed in a seated position, followed by two tasks in a standing position. Changes in the angle of shoulder rounding and neck flexion from the beginning to the end of single tasks, as

well as throughout the duration of the total seated and total standing time, were measured to determine in which position (seated or standing) and during which office task (mousing or typing) people maintained the most ergonomic shoulder and neck position. The results of this study are important because understanding the posture in which a person maintains the most ergonomic shoulder and neck position may inform changes to the traditional keyboard and mouse use in an office environment.

QUANTIFYING WORD COMPLEXITY AND UNDERSTANDABILITY TO HELP COMMUNICATE BIOMEDICAL SCIENCE IN PLAIN LANGUAGE

Matthew Artuso
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 5
Presentation Number: 264
Mentor(s): Anna Yannakopoulos, Arjun Krishnan

Biological and biomedical science literature contains jargon to facilitate efficient communication between experts in an increasingly specialized research space. However, this jargon also makes research inaccessible to non-experts who follow these sciences, owing to their direct impact on health and wellbeing. To break down this barrier in making biological and biomedical research findings broadly-accessible, we propose a new measure of word complexity that quantifies a word's likely understandability. To develop this new measure, we used Wikipedia articles and their category tags to generate statistical distributions of individual words across categories. Then, for each word, we calculated the uniformity of its distribution and combined it, using dimensionality reduction, with that word's median frequency to get a single word complexity score. We also repurposed this procedure to develop a novel method to automatically identify basic terminology specific to a scientific field defined based. This field-specific complexity score combines how non-uniform a word is in science but common in a specific field to a single score. Combining both of these word lists creates a dictionary of basic english and elementary scientific terminology with a very adaptable method that can be applied to nearly any scientific field, without requiring any manual curation of a word list. We are implementing this complexity word score in a new tool called SimpleB.io, a feature-rich text-editor that enables experts to simplify dense technical and scientific texts and enables building a community of researchers, instructors, students, and the general public around science communication and learning.

VALIDATION OF A SILICONE FLEX SENSOR USING MOTION CAPTURE

Paige Cordts
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 5
Presentation Number: 265
Mentor(s): Justin Scott , Tamara Bush

For any new data-collection technology, validation of the collected data is an important step in the evaluation process. To ensure a sensor is collecting accurate data, it must be compared to a gold standard of what has been proven to be accurate. In this project, we evaluated the accuracy of a flexible silicone bend and stretch sensor to test its viability for use in measuring small displacements. To do this, we tested the sensor in two ways: stretch with no bend restrictions, and stretch with minimized bend. The sensor was manually stretched and bent with one reflective marker attached to the base of the sensor and one attached to the end. We validated the data collected from the sensor by comparing them to motion capture data of the reflective markers obtained simultaneously during the trials. There were several rounds of testing as we discovered type of movements has higher levels of accuracy, starting with stretch without restriction, and then moving on to stretch with bend limited as we discovered that the bend can interfere with the stretch readings. We found that there was a linear

relationship between the stretch data and the motion capture data if the sensor moved in a linear displacement with no bend taking place. This linear relationship had an r2 value of 0.92. Now that it has been tested for accuracy, this sensor has the potential to be used in many ways to track small movements, for example, joint or skin movement or movement in devices or electronics.

AUTOMATING IMAGE SEGMENTATION WORKFLOWS

Cameron Hurley, Emani Hunter
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 5
Presentation Number: 266
Mentor(s): Dirk Colbry

Every scientific image analysis problem is unique; some problems are simple, whereas others are complex. Scientists often collect data as images/videos which they then need to process to make measurements and test their scientific questions. This measurement process tends to take a significant amount of time and requires manual input. For example, if a researcher were to take MRI scans of an animal, they would sift through hundreds of images, and segment each image accurately in order to collect necessary data. Ideally there are automated tools to do this segmentation but creating such a tool often takes more time than manually segmenting by hand. This research is about developing tools that will utilize genetic algorithms (GAs) and machine learning (ML) to aid scientists in automatic discovery of scientific image understanding solutions. As a proof of concept, this work demonstrates a tool that searches for image segmentation algorithms specific to a unique scientific workflow. In the best case, a good candidate algorithm can be automatically identified that will speed up the laborious annotation process, reducing researcher time and expediting workflow. The overall goal of this project is to develop a web-based Graphical User Interface (GUI) which allows researchers to segment images “in the foreground” while large scale computers search through possible algorithms “in the background”. This project uses an open-source framework called Plotly Dash, which aids in the creation of interactive web-based applications. The presentation will showcase the current state of the Graphical User Interface and example image segmentation problems.

SHOLL ANALYSIS OF NEURONS SURROUNDING IMPLANTED ELECTRODE ARRAYS IN THE BRAIN

Kathleen Williams
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 5
Presentation Number: 267
Mentor(s): Bronson Gregory, Erin Purcell

Implanted electrodes have become a crucial tool for the growing field of neural engineering due to their ability to detect signals directly from brain tissue in vivo. A consequence of electrode implantation in the brain is the subsequent damage to neighboring neurons which can cause a loss of signal amplitude and stability. In addition to a decline in neuronal density, we hypothesized that changes in signal strength may be due to alterations in neurons' dendritic arbors, where a majority of synaptic input occurs. The purpose of this study was to compare the dendrites of neurons near electrodes fabricated from materials used in both traditional (silicon) and newer (polyimide) polymer-based designs. Adult rats were implanted with either a silicon or polyimide device in their primary motor cortex, and after either 1 or 6 weeks post-implant, animals were sacrificed in order to isolate the tissue that contained the electrode. Neurons were filled with a fluorescent dye and imaged using a 2-photon microscope, and the dendritic arbors were analyzed for branch-complexity using Sholl analysis plugins in ImageJ. Our results showed that implantation of either electrode type

caused a significant reduction in dendrite branching within 100 μm of the device at both time points. These data were compared to neurons located 500 μm from the implantation site and neurons from naïve rats. We revealed new information on the impact of implanted electrodes on neuron dendritic structure, suggesting that damage occurs to the broader synaptic network generating the local field potential.

MUSICAL SQUARES: STUDYING THE EFFECTS OF MUSIC ON HUMAN BEHAVIOR AND SKILL ACQUISITION

Rachel Townson
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 6
Presentation Number: 269
Mentor(s): Mohammad Ghassemi

We generally view music as a background aspect of our daily lives: we listen to it while driving, while exercising, while working, or even while falling asleep. But what if this tiny aspect of our environment impacts our ability to complete these activities? Could matching the proper music to an activity or scenario improve one's likelihood to thrive in that environment? The motivation for this project is to understand the effects of music on concentration, competitiveness, and general cognitive ability in humans. To test the impact of music on human behavior, each participant completed a survey to gauge their music listening habits. Then they participated in a series of trials that involved playing a web game in a few different musical environments. In my poster, I will present and analyze data collected from player interactions with the game. I anticipate that my research will show that certain types of music positively influence human behavior. I hope that my research will contribute to the variety of current studies proving that music can enhance human health, cognition, and more. If we can begin to understand the effects of music, we might be able to use them to benefit individuals or society as a whole.

COMPUTATIONAL EXPERIMENTS TO INVESTIGATE BIOLOGICAL QUESTIONS

Maria Pacifico
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 6
Presentation Number: 270
Mentor(s): Kevin Liu, Rei Doko

Programs have been developed for comparative genomics and the creation of phylogenetic trees using algorithms. Within the program ms, we are studying population genetics and phylogenetics. Ms generates a simple sample model according to the Wright-Fisher neutral model based on chosen parameters. Parameters may include recombination, population size, migration, and gene conversion. For this experiment, we are using ms and seq-gen to examine the distances of the random outputs and analyzing the differences.
orking with bioinformatics can help further advancements in biomedicine and our understanding of evolutionary biology since programs like ms and seq-gen are continuously being updated to be more accurate and efficient.

IMAGE SEGMENTATION WITH TRANSFER LEARNING

Nate Britton
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 6
Presentation Number: 271
Mentor(s): Dirk Colbry

Image segmentation has a plethora of applications in numerous fields, ranging from artificial intelligence to security to medicine and more. The SEE-Insight Team has already developed

powerful software that uses machine learning to search the algorithm space to be able to segment problem-specific images. The aim of this research going forward is to refine this tool so that it becomes more accurate and more adaptable. To accomplish his, this project will explore transfer learning, which is a useful tool that allows improvement of learning speed and accuracy using information gained from previous segmentation data on entirely different projects. Each new segmentation is more refined and its parameters more attuned to the image dataset at hand. Moreover, transfer-learning opens the door to auto-adaptive behavior in which a program can choose the best algorithm and refine its own parameter space based on past results. In other words, the segmentation tool would have its own heuristic by which it could improve itself with each new image introduced into the system. Research on this project has been and will continue to be largely implemented in Python as an open source project shared on Github. In the presentation of this research, I will explore the progress that has been made thus far in researching and implementing transfer learning.

EXAMINING SAMPLES CREATED FROM MS AND SEQ-GEN PROGRAMS

Bella Said
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 6
Presentation Number: 272
Mentor(s): Kevin Liu

It's important to test different hypotheses in bioinformatics and computational biology. We can utilize some of these programs that were created to better understand certain parameters or further examine polymorphism data under different conditions. Two programs that allow for this are ms and Seq-Gen. Ms is a program that generates samples under neutral models. This program allows us to investigate estimators and statistical tests of these samples. This in turn aids us in the ability to interpret polymorphism data, which is extremely crucial in bioinformatics and computational biology. The ms program allows for many different possibilities including recombination and symmetric migration among subpopulations. The program also assumes an infinite-sites model of mutation. This allows many different kinds of models to be tested and examined. Ms can output gene trees which can in turn be used as inputs for other programs such as Seq-gen. Seq-Gen can simulate the evolution of nucleotide sequences and amino acid sequences along a phylogeny. The program is also equipped to handle large amounts of input trees so large simulations can be created. Using the two programs together, much research can be done to further examine the behaviors of different model parameters, and what different outputs are generated.

STUDY OF AIR FLOW AND CO2 CONCENTRATION IN AN MSU CLASSROOM

Camille Maradiagaponce
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 6
Presentation Number: 273
Mentor(s): Maddalena Fanelli, Susan Masten

Several studies have concluded that high concentrations of carbon dioxide, CO_2, in enclosed spaces contribute to lower cognitive functional performance. Proper ventilation is necessary to maintain appropriate rates of convective mixing and air quality. Estimates of pollutant concentrations in indoor environments are often based on simple mass-balances that account for net infiltration of outside air and indoor sources and sinks in completely well-mixed spaces. During the COVID-19 pandemic, monitoring air quality in enclosed spaces became crucial to minimize the risk of transmission of the SARS-CoV-2 virus. CO_2 is exhaled alongside aerosols. Therefore, CO_2 concentration can be used as a proxy to monitor levels of the SARS-CoV-2 virus. The purpose of this study is to begin to construct a computational fluid dynamics model to estimate CO_2 concentrations across an MSU classroom. The software

COMSOL Multiphysics is first used to create and validate flow through a simple air space and then applied to better understand the trajectory and distribution of airborne particles across the actual classroom. CO_2 concentration data obtained in a previous monitoring study are used for reference.

BODY MOVEMENTS EXPRESSED DURING SITTING AND STANDING COMPUTER TASKS

Sloan Kanat
Engineering, Computer Science and Mathematics, Poster Presentation
Section: 6
Presentation Number: 274
Mentor(s): Teresa Bellingar, Tamara Bush

The U.S. Census observed an increase in the number of households owning a computer from 57% in 2000 to 77% in 2016. Current research states a wide range of negative physical effects that can be attributed to incorrect posture and body position when using computers for prolonged periods of time. Since the number of computers per household is continually rising, research on understanding body positions while working is becoming ever more important to prevent these negative effects. The aim of this study was to capture the number of times individuals moved during prolonged computer use and, determine if there was a significant difference in number of movements between sitting and standing postures. Participants' body movements and postures were monitored while performing mousing and typing tasks, in the sitting and standing positions. Kinematic data were collected using a Qualysis Motion Capture System. Analyses of the movements performed throughout the seated and standing tasks are expected to find an increase in movements throughout the duration of the test, and also give insights into the best position to work to promote an ergonomic posture. This research is important in the prevention of negative effects related to poor posture during computer use.

ENVIRONMENTAL SCIENCE & NATURAL RESOURCES

TRENDS IN MONITORING OF LAKE WATER QUALITY IN WHITE & BIPOC COMMUNITIES

Jessica Diaz, Maggie Haite
Environmental Science and Natural Resources, Oral Presentation
Section: 1
Presentation Number: 277
Mentor(s): Ian McCullough, Kendra Cheruvelil

The quality of the environment a person lives in can have drastic impacts on the health and future of that person, and while everyone should be guaranteed a safe environment, this is not the case. Countless studies have shown that Black, Indigenous, and People of Color (BIPOC) communities are more likely to be neglected when it comes to environmental health and access. This only amplifies the environmental and social injustices that those communities already experience. An emerging area of study is water justice, which includes ensuring communities have access to clean water for drinking, subsistence, recreation, and cultural uses. Existing water justice studies have shown that lower income and non-white groups are more likely to live near degraded water bodies, but they are conducted at local scales without commonly measured water quality variables. Patterns of water injustices can only be found if sampling of water bodies is occurring. Race/ethnic data from the 2010 U.C. Census and water quality data from LAGOS are used to answer the question: Are lakes located in BIPOC communities sampled as thoroughly as lakes located in white communities? The LAGOS database spans the 48 conterminous states of the U.S., allowing us to fill the gap of water justice trends on a large-scale. A framework has been developed to analyze the data using ArcGIS, a spatial mapping software, and Rstudio, a statistical computing program.

DEVELOPING A START-UP APPROACH FOR A DECENTRALIZED HIGH-STRENGTH WASTEWATER TREATMENT SYSTEM

Blake Smerigan
Environmental Science and Natural Resources, Oral Presentation
Section: 1
Presentation Number: 278
Mentor(s): Wei Liao

In our ever-expanding world, centralized wastewater treatment is becoming less sustainable due to both environmental and economic considerations of its large-scale implementation (pipeline leaking concern and expensive infrastructure upgrading). Decentralized treatment systems attract an increasing interest as an alternative to treat wastewater from small municipalities, rural communities, and industrial and military operations. In this study, we focused on developing a quick start-up strategy to start a compact baffled bioreactor to treat a high-strength wastewater – blackwater. The unit is operated in a newly established site on the MSU Campus (Kalamazoo Street), which has the infrastructure to adjust the wastewater composition using pump station and incline plain primary clarifier installed. The black water with the desired composition was obtained using the pumping rates of sludge and supernatant of the primary clarifier and fed to BBR unit with 1000 gallons per day flow rate. To initiate nitrification and denitrification, which are the rate limiting biological processes for organic and inorganic nitrogen (N) removal, in addition to carbonaceous organics by activated sludge unit, a shock dose of C and N rich substrate was applied. The removal kinetics of the significant pollutants (COD, TN, NH3-N, and TP) was monitored for the first 48 hours and then the unit was operated for a period of 45 days. The influent and effluent samples from the unit were analyzed daily using standard methods and had statistical analyses carried out using R statistics.

ANALYSIS OF INTERVENTIONS TO MANAGE IUU FISHING IN COMPARATIVE CONTEXT: TRANSPONDERS AND PSMA TO ENHANCE TRANSPARENCY

Allison Lobbia
Environmental Science and Natural Resources, Oral Presentation
Section: 1
Presentation Number: 279
Mentor(s): Mark Axelrod

Every year, billions of US dollars are lost due to illegal, unregulated, and unreported (IUU) fishing around the world, but countries can take action through policy to combat these practices. India, Cambodia, Namibia, Peru, Somalia, and Indonesia, six countries with variable levels of government involvement in international sustainable fisheries policies, are compared to determine if certain policies lend themselves to decreases in IUU fishing. By assessing catch quantities and IUU catch estimates over multiple data points, trends were discovered in connection with policy implementation choices. While illegal behavior is difficult to control and detect, certain governance actions such as transparency, communication and cooperation can combat IUU activity. Those countries engaged in data transparency from vessel monitoring showed improvements in identifying vessel activity. Conversely, the countries widely did not share the same improvements by implementing the Agreement on Port State Measures (PSMA) but did facilitate communication between governments. In this way, PSMA has been able to increase global response and encourage more widespread sustainable governance while combatting IUU fishing. As these findings show, the use and sharing of transponder data will be influential in the coming years, and will promote more countries to increase monitoring, transparency and global communication. This study demonstrates the importance of not only monitoring resource use, but also how that information is used after it is collected. Additionally, while PSMA facilitates increased communication and transparency, it does not influence countries' IUU responses to the same level transponders are able to achieve.

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

Maria Berry

Environmental Science and Natural Resources, Oral Presentation
Section: 1
Presentation Number: 280
Mentor(s): 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.

HUMANITY'S ROLE IN PROPELLING ANIMALS TOWARDS EXTINCTION

Logan Bry

Environmental Science and Natural Resources, Poster Presentation
Section: 2
Presentation Number: 283
Mentor(s): Eric Freedman

In a modern world with a seemingly heavy focus on conservation, one would think that the inhabitants of said world could rest easy in knowing that their species are safe from being wiped out entirely. However, human meddling still holds a tight grip on the fate of all other animals on Earth, with scientists predicting that dozens of species go extinct every day, often completely unnoticed. This poster will detail what I've learned about human involvement with animal conservation and extinction through editing the book Professor Eric Freedman is involved with, Endangered Species and Us: Environmental Communication, Culture, Public Opinion and Public Policy.

THE EFFECT OF SONICATION PRE-TREATMENT ON MEMBRANE FILTERED BIOSOLIDS

Brynn Chesney, Marshall Weimer

Environmental Science and Natural Resources, Poster Presentation
Section: 2
Presentation Number: 284
Mentor(s): Steven Safferman

The recovery of valuable resources such as nitrogen and phosphorus from waste is necessary to meet the demands caused by a growing human population and lack of renewability of

these and other resources. Membrane filtration is one method of separating valuable resources from biosolids and other waste. However, in order for the filtration technology to be economical, the efficiency must improve. In many food processing unit operations, sonication has become a popular method of forcing molecules into suspension. We propose that if sonication is applied to biosolids found in wastewater biosolids, we will be able to separate the biosolids. The following experiment will test varying conditions of sonication of the biosolids, exploring how sonication affects the degree of fouling in the membrane system, as well as the effect of sonication on the yield of resources. By measuring the resource yield from these experiments, changes can be made to better utilize the grey water that will be produced from the membrane filtration, and improve the sustainability of the system. However, further research needs to be conducted to better understand the potential composition and applications of the remaining biosolids post filtration. In conclusion, the goal is the successful design of a pilot system with the best membranes that can be used for long-term applications in the field of wastewater treatment.

ESTABLISHING THE CONDUITS OF MASSIVE FLOOD BASALT ERUPTIONS IN THE GREAT LAKES REGION

Aditi Mahantesh
Environmental Science and Natural Resources, Poster Presentation
Section: 2
Presentation Number: 285
Mentor(s): Tyrone Rooney

The Mid Continent Rift (MCR) is a 1.1 billion year old failed rift and flood basalt province located in the Great Lakes Region and represents an early manifestation of modern-style plate tectonics. Establishing the conduits for the vast volumes of lavas erupted there can help establish where magmatism was focused and how this focus may have changed over time. Dike swarms represent these conduits. For this study, a geochemical dataset of dike swarms from Wetmore Landing, located on the shores of Lake Superior near Marquette, Michigan was collected. Our dataset has been compared to a chemically and stratigraphically constrained flow regime from Mamainse Point, Ontario, Canada. Mamainse Point was chosen as the point of comparison given that the complete history of the MCR is present there, and it has been established that the temporal change in lava composition at Mamainse Point occurs throughout the MCR. Our comparison to the temporally well-constrained Mamainse Point lavas allows us to establish the relative timing of the dikes based on their chemistry. Our results show that there are three chemically distinct dike swarms from Wetmore Landing, and that the chemical comparative analysis between the two datasets indicated that a match to the Late-Early and Intermediate flows from Mamainse Point (Groups 2,3, and 5a). These results show an absence of “Main Phase” and “Late Phase” conduits in the Wetmore Landing field site and thus temporal heterogeneity in the conduit system feeding the MCR.

PETROGRAPHIC DESCRIPTION OF PLIOCENE BASALTS FROM THE TURKANA REGION IN KENYA

Chloe Mikelsons
Environmental Science and Natural Resources, Poster Presentation
Section: 2
Presentation Number: 286
Mentor(s): Sahira Cancel Vazquez

The East African Rift System (EARS) represents the most important modern example of how a continent breaks apart. Located between the Kenyan and Ethiopian Rifts, the Turkana Depression has an exceptional record of magmatic activity with ca. 40 million years rift magmatism available for study. We focus on widespread basaltic events that took place during the Pliocene Epoch. Initial magmatism during this Epoch occurred in the form of

widespread flat-lying sheets of lava, represented by the Gombe Group in Turkana. Subsequently, magmatism migrates to focused shield volcanoes (e.g., Kankam-Lenderit). We have conducted a comparative petrographic analysis of the rocks in the region during the Pliocene Epoch and interpret the magmatic processes that occurred. We find that although the composition of the rocks studied is ubiquitously basaltic, their textures vary significantly between regions. Samples from the initial phase southwest of Lake Turkana are coarser grained and contain a higher olivine/clinopyroxene to plagioclase ratio than the temporally equivalent samples located along the eastern side of Lake Turkana. The subsequent shield volcanoes are found only on the southeastern side of Lake Turkana but have some variability: Kankam samples appear to contain less glass and more euhedral/larger crystals than Lenderit. The bulk major chemical composition of the rocks allows us to infer the differentiation processes. We use these textural observations to explore the geochemical diversity in the lavas, and thereby interpret the differentiation history of magmas in the Turkana Depression during this Epoch.

ORGANIC FARMING'S EFFECT ON WILDLIFE ABUNDANCE AND DIVERSITY

Katie Joles, Taylor Schellmat
Environmental Science and Natural Resources, Poster Presentation
Section: 2
Presentation Number: 287
Mentor(s): Georgia Peterson, Steve Marquie, Steven Safferman

Environmental conditions (such as pH, soil moisture, soil temperature) not only differ from environment to environment, but also serve as critical factors for wildlife attraction and wildlife prosperity. Therefore, there is a significant opportunity to exploit this difference in environments to learn about the critical conditions for different types of wildlife, and how those critical conditions affect wildlife diversity and abundance. A meta-analysis study reviewed the effect of organic farming on wildlife diversity and reported that "on average more than 50% of organisms are more abundant in organic farming systems". With this information in mind, we would like to look into wildlife diversity and abundance for two different local farms that are in East Lansing (conventional and organic.) This information can better improve interactions between farms and wildlife health. Using wildlife surveys, made possible by utilizing camera traps, along with soil tests (pH, moisture, as well as biotic factors found through surveys of nematodes and arthropods in the soil at each site) at both conventional and organic farming sites, we aim to see whether organic farming effects the types of wildlife inhabiting the site.

OUR ROLE AS CONSUMERS TO REDUCE THE EFFECTS OF FOOD WASTE

Dallas Vanacker, Kayla-Thao Bullock
Environmental Science and Natural Resources, Poster Presentation
Section: 2
Presentation Number: 288
Mentor(s): Dana Kirk

Food waste in developed countries occurs in the greatest quantity at the consumers' level. The US wastes 40% of our food that is processed, 78% of this waste caused by the consumer. Food waste alone contributes to 8% of our gas emissions and increases prices of food and maintenance of food waste. Despite this, more than 13.7 million US households are food insecure, meaning not knowing when their next meal is and not being able to access healthy and affordable food. Our goal is to use our research to identify problems with consumer habits, by measuring the food waste of students in IAH 231 and ISB 202 and discussing consumer habits that influence waste. The goal of this class project is to identify preventative measures and strategies to decrease food waste. We hope to inform the public/consumers about how influential their habits are and how they can easily cut down their daily food waste

and therefore decrease our materialist view on food and increase efficiency of it. This can change public attitudes towards food, use leftover food to feed those who are food insecure, and reuse it for other purposes (other than just throwing it into a landfill).

PROBING TEMPORAL CHANGES IN A CONTINENTAL FLOOD BASALT PROVINCE: A PETRO-STRATIGRAPHIC INVESTIGATION OF OLIGOCENE EAST AFRICAN MAGMAS

Stanley Wickman, Tanner Manvydas
Environmental Science and Natural Resources, Poster Presentation
Section: 2
Presentation Number: 289
Mentor(s): Tyrone Rooney

Continental flood basalts are the largest eruptions on the planet, blanketing the landscape in hundreds to thousands of meters of lava. We lack a modern active example of this process, however, the ca. 45-30 Ma lavas of Eastern Africa are among the youngest and well-preserved continental flood basalts. We explore a sequence of lavas within the Turkana Depression of the East African Rift with the aim of determining how and where the magmas evolved within the crust. The existence of a stratigraphic sequence, wherein one lava is superimposed on another permits a temporal study of these crustal differentiation processes. We present a newly compiled unified stratigraphic section, compiled from field observations and measurements of different continuous sections of the stratigraphy. Field-descriptions of rocks within this unified stratigraphy indicate that there are three dominant types of flows: plagioclase-phyric, olivine-phyric, and clinopyroxene-phyric. The plagioclase-phyric flows are typically located stratigraphically lower than the olivine-phyric flows. Another stratigraphic section shows the clinopyroxene-phyric to occur above olivine-phyric flows These results show that the composition of the magma erupting began as a plagioclase-rich composition and then changed to an olivine rich flow towards the end of the eruptions in this region. To improve the tentative field-based rock interpretations we present new microscope-based descriptions of the petrology of these lavas. This petro-stratigraphic data will assist in future geochemical analyses of flows as it provides an independent and parallel set of data against which to test new data.

WASHABLE PAPER BAG VS REGULAR PAPER BAG

Kimberly Kerzel
Environmental Science and Natural Resources, Poster Presentation
Section: 3
Presentation Number: 291
Mentor(s): Carl Boehlert

The purpose of the research project is to compare the differences between a washable paper bag and a regular paper bag. As a packaging major, this project interests me as the future of packaging is sustainability. A Scanning Electron Microscope will be used to research the materials. I suspect that the washable paper bag will have a different structure or other materials incorporated into the bag compared to the regular paper bag.

ANALYSIS OF THE EFFECTIVENESS OF PFAS RESPONSE IN MICHIGAN WATERSHEDS

Adrien Jund, Isaac Miller, Kevin Jumaa, Maggie Le, Marie Kroneman, Miranda Triolet, William Aufdemberge
Environmental Science and Natural Resources, Poster Presentation
Section: 3
Presentation Number: 292
Mentor(s): Steven Safferman

Per- and polyfluoroalkyl substances (PFAS) are man-made chemicals that do not break down in nature or the human body and have toxic effects on humans and animals, leading to

developmental disorders. These chemicals enter the environment through point sources of pollution, such as most nonstick or waterproofing materials, firefighting foam used against fires in airports and manufacturing facilities, and biosolids from wastewater treatment plants. Locating the sources of these pollutants, as well as the effectiveness of community responses can give insight into which responses actually help decrease the amount of PFAS in watersheds and which areas and practices lead to an increased amount. This study will focus on communities throughout Michigan that have already had prior testing done for PFAS. For example, a small county on the Grand River might detect dangerous amounts of PFAS in their watershed and decide to put regulations on the amount of PFAS point sources that are allowed to be dumped. This response would then be compared to another, similar community which might have used a different solution, such as reverse osmosis, to remove PFAS. This will be done in order to discern and deliver the most optimal ways to remove and prevent PFAS from watersheds. In addition, factors such as how wealthy a community is that influence a community's response can show why some are more effective than others. By searching databases, noting regulatory laws, contacting representatives of communities, and consulting experts, we will locate relevant PFAS levels and response tactics in each community.

THE EFFECT OF PRESERVATION ON THE GEOCHEMICAL ANALYSIS OF FORAMINIFERAL TESTS FROM THE MID-MIOCENE EASTERN PACIFIC

Jordan Pack
Environmental Science and Natural Resources, Poster Presentation
Section: 3
Presentation Number: 293
Mentor(s): Dalton Hardisty

The tests (shells) of foraminifera—single-celled marine organisms ranging back to the Cambrian Period—can be used to study the climatic conditions under which they lived and are used to research the chemical compositions of both modern and ancient oceans. This is because different conditions such as seawater temperature and ocean carbon chemistry affect the composition of the tests. These factors can also affect the preservation of the foraminifera in ancient ocean sediments, potentially skewing reconstructions of past oceans and climates. We studied the preservation and determined the reliability of foraminifera as records of ancient ocean chemistry during the Miocene Climatic Optimum (MCO; 14-17 million years ago), a period which contained uniquely high global temperatures, and elevated levels of dissolved carbon in the ocean. In order to document conditions of preservation during the MCO we looked at physical indicators of preservation quality in foraminiferal tests from two sites in the Eastern Pacific. We analyzed these samples using microscopy and compared traits like overall appearance, and breakage levels. The assessment of preservation combined with existing palaeoceanographic reconstructions for the time of deposition will reveal the different preservation conditions that affected foraminifera over both spatial and temporal scales during the time period. This information will be used to analyze both the connection between the environment and the preservation of the tests, and the variation of climatic conditions across the Miocene Climatic Optimum. Additionally, documenting the preservation of foraminifera across the interval will provide important context for planned geochemical analyses of these samples.

MATERIAL GROCERY BAG INQUIRY: DOES AVAILABILITY IMPACT CONSUMER CHOICE

Evan Morton

Environmental Science and Natural Resources, Poster Presentation
Section: 3
Presentation Number: 295
Mentor(s): Julie Libarkin

Within sustainability it is understood that plastic is a serious problem facing society, unlike other disposable products plastic takes a over a century to fully composed. There is limited information available to describe the impact consumer bag choice has in plastic pollution. My proposed research topic will investigate how bag availability has a impact on consumer bag choice and I will be addressing these questions as listed: What role do demographics, norms, and availability play in consumer bag choice? Assuming availability will have some influence on choice, which of the following do consumers support? Tax on [plastic, paper, reusable] bags that would support government initiatives for education/environment/other? Increase requirements/regulation for lowering the environ impact of [plastic, paper, reusable] bag production? Providing incentives for stores to offer more bagging options? Through using scholarly research journals and creating a survey, we compiled results into regression analysis to explore how demographics, norms, and availability influence bag choice. The anticipated outcome of this project is to create a steppingstone into a larger issue, factors that contribute to plastic waste in the environment. This information will in turn help future research in understanding what a consumer would want in terms of sustainability within consumer culture.

OIL SPILLS UNDER ICE: KINETICS OF OIL SPREADING AS A FUNCTION OF ICE COVER CHARACTERISTICS

Vincent Marinelli

Environmental Science and Natural Resources, Poster Presentation
Section: 3
Presentation Number: 296
Mentor(s): Volodymyr Tarabara

Installed in 1953, Enbridge's oil pipeline “Line 5” transports 540,000 barrels per day of light crude oil and natural gas liquids beneath the Straits of Mackinac. American portions of Line 5 start in Superior, Wisconsin and across Michigan's Upper Peninsula, then across the lakebed in the Straits of Mackinaw before terminating in Sarnia, Ontario. Recent events have raised concerns about Line 5's safety and spill potential in ice-covered conditions. An ice cover may restrict the spread of oil by shielding the released crude from wind transport and partly immobilizing the spill. Absent turbulent conditions, crude constituents should rise to the ice-water interface and pool at the ice's underside, with laboratory and field observations indicating that oil will coalesce, form a slick, and spread while resting on the ice-water interface. As a result, the morphology of the ice-water interface is of critical importance to the potential spread of oil. In this study, we simulate oil spills under ice in laboratory experiments with a water tank. Experimental variables include oil release rate and the nature of the ice cap (crushed ice vs integral ice cap). The working hypothesis is that the morphology of the oil plume follows the fractal scaling law and can be predicted based on the fractal dimension. Current work focuses on establishing a relationship between the structure of the ice-water interface, oil properties and morphology of the plume. The ultimate goal of the project is to develop a set of recommendations for under-ice oil spill remediation policy.

SIFTING THROUGH THE SILT: IDENTIFYING A MAJOR CLIMATIC EVENT IN THE POST-GLACIAL MIDWEST USING LOESS STRATIGRAPHY

Riley Gugel

Environmental Science and Natural Resources, Poster Presentation
Section: 3
Presentation Number: 297
Mentor(s): Randall Schaetzl

Deposits of loess—silty, wind-deposited sediment—formed as strong winds blew across cold, dry, landscapes during the late Pleistocene Epoch, some 18,000 years ago. We studied loess deposits of the Chippewa River Valley in western Wisconsin. Loess forms by glacial action, as glacially-derived silts are picked up by winds, when blowing sands impact them. These processes result in vast blankets of evenly deposited loess on downwind landscapes. However, in the Chippewa Valley, large areas are devoid of loess. We hypothesized that, in these areas, loess was originally present but later eroded and was blown away by strong northwesterly winds, leaving behind thick loess deposits only in areas sheltered by large, isolated, bedrock ridges. During this erosional event, could this “redistributed loess” have accumulated in protected areas, as behind a snowfence? We sampled a deposit of thick (>5 m) loess in the lee of a bedrock ridge to determine if any of the original loess remained, and could be differentiated from a later deposit. The samples, recovered every 10 cm from a core, were analyzed using laser particle-size analysis. Within this core, a clear sedimentary boundary was observed at ≈130 cm. Below this boundary, loess sediments are silty, with lower sand contents. This boundary likely represents the contact between two separate and distinct periods of loess deposition. We hypothesize that lower sediment is the original loess, whereas the upper sediment represents redeposited loess, mixed with sand—like a snowdrift of loess, retaining some of the sand that drove it there.

EPIDEMIOLOGY & PUBLIC HEALTH

DEGRADATION OF SINGLE USE "DISPOSABLE" FACE MASKS AS IT RELATES TO EFFECTIVENESS IN DISEASE PREVENTION AND ASSOCIATED MASK HYGIENE

Erika Buhk

Epidemiology and Public Health, Poster Presentation
Section: 1
Presentation Number: 299
Mentor(s): Carl Boehlert

Due to the current COVID-19 Pandemic, many Americans are wearing face covering in public to reduce the spread and prevent further outbreak. As a result, controversy has spread regarding the effectiveness and usage of such face coverings. I conducted research on the degradation of disposable face masks. I utilized electron microscope technology to capture electron level images in contribution to a fabric analysis to compare the fiber degradation of single use “disposable” masks. This analysis includes distributions of fabric changes on the SEM images. I used these images paired with research on the functionality of face coverings to highlight the importance of proper mask usage and how common incorrect and re-use can result in adverse health effects.

ANALYZING AGE-RELATED NEUROCOGNITIVE VARIATIONS.

Will Schieber

Epidemiology and Public Health, Poster Presentation
Section: 1
Presentation Number: 300
Mentor(s): James Anthony

For the past several decades, survey methods have shifted away from paper-and-pencil-interviews, often administered by a staff member. Epidemiological studies based on computer-assisted-self-interviews (CASI) have become commonplace. Typically, a field staff member teaches the survey participants about CASI and the use of a laptop or tablet computer. Then, the staff member makes standardized ratings about each participant's difficulty understanding the survey questions. For this neurocognitive aging project, the aim is to estimate age-specific and cohort-specific proportions of survey participants who experience these cognitive difficulties. Estimates are from large (n>55,000) nationally representative cross-sectional samples of US community residents drawn each year since 2002 for United States National Surveys on Drug Use and Health. For age 12 to centenarians, I plotted age- and cohort-specific estimated proportions. I now am deriving estimates for the Hill function's P(min), P(max), P(50), and slope parameters expecting shifts between 2002 and 2019. Estimation requires processing the de-identified data with analysis weighting and calculus-based variances and confidence intervals (CI). My Hill parameter estimates show age and aging-related increases in cognitive difficulty. Discussion points include some possible improvements of variance estimation via bootstrap re-sampling and the potential utility of these standardized interviewer ratings in future neurocognitive aging studies.

ANALYSIS OF GLOBAL COVID-19 RESPONSES AND IMPACT ON ANTIMICROBIAL RESISTANCE

Jeswin David, Kaily Kao

Epidemiology and Public Health, Poster Presentation
Section: 1
Presentation Number: 301
Mentor(s): Evangelyn Alocilja

With over one hundred million cases of COVID-19 worldwide, this pandemic has had a lifelong impact on many people and changed the daily lives in most countries. During the COVID-19 outbreak, many countries have had to learn what procedures work best to maintain the health of their population. Through trial and error, countries are learning what policies work most efficiently and financially manageable. This study seeks to review policies implemented in various countries to determine their effectiveness in reducing infection rates, as well as analyze possible long-term effects of this pandemic on rates of antimicrobial resistance. These experiences can be further used to develop strategies for any possible pandemics that may come. One issue that has been impacted by this global pandemic is antimicrobial resistance (AMR). Due to the limited information healthcare workers had at the beginning of this pandemic there has been an increase in improper treatment of patients with antibiotics. Factors such as antibiotic use in hospitals, infection prevention and control in hospitals, antibiotic use in the community, and community hygiene practices all could impact antimicrobial resistance. Throughout this research, we examined the antimicrobial usage during the COVID-19 pandemic from selected countries and compared them to usage before the pandemic period. This analysis can expand to other countries once data becomes available. Initial findings show that COVID-19 responses have increased antibiotics. The question is, will this increased usage translate to increase in antimicrobial resistance? Will this practice impact the United States and the world for years to come?

TUBAL LIGATION AND THE DESIRE FOR REVERSAL AMONG WOMEN IN THE UNITED STATES

Elizabeth Pauley
Epidemiology and Public Health, Poster Presentation
Section: 1
Presentation Number: 302
Mentor(s): Claire Margerison, Danielle Gartner

Tubal ligation is a permanent contraceptive operation, but a considerable number of women who have a tubal ligation express a desire for reversal afterwards. However, reversals can be expensive, ineffective, and increase risk of infection, ectopic pregnancy, and scarring of the fallopian tubes. Our objective was to determine how the prevalence of desiring a reversal differs according to the following factors: age, race/ethnicity, educational attainment, insurance coverage, and previous contraceptive use. Using data from the National Survey of Family Growth, 2015-2017 and 2017-2019, we ran Chi-square tests to test whether the probability of desiring a reversal differed by the factors of interest. Of the 1553 women who had a tubal ligation, 335 (21.6%) expressed desire for reversal. Desire for reversal differed significantly ($p<0.05$) by age (46.7% for 15-29 vs. 27.5% for 30-39), income (24.9% for under $20,000 vs. 20.2% for $20,000-$59,999), insurance coverage (16.8% for private vs. 25.8% for government), educational attainment (25.9% for no high school diploma vs. 21.9% for high school diploma or some college, 19.3% for college graduate, and 10.8% for more than college), and long-acting reversible contraception usage (27.4% for previous use vs. 20.3% for no previous use). Our next steps will be multiple regression analysis to estimate adjusted relationships between covariates and desire for reversal. Given historical (and current) abuses of procedures that result in sterilization (hysterectomy, tubal ligation) among Black, Latina, Indigenous and low-income women, investigation into the distribution of sterilization reversal, as well as its correlates, is called for.

ASSESSMENT OF CONSUMER FLOUR THERMAL TREATMENTS ON THE REDUCTION OF SALMONELLA

Kase Nelson
Epidemiology and Public Health, Poster Presentation
Section: 1
Presentation Number: 303
Mentor(s): Bradley Marks, Ian Hildebrandt, Michael James

Increased public awareness of risks involving products containing raw flour, such as raw cookie dough, has resulted in online resources offering home-scale solutions for reducing pathogens. However, there is limited evidence validating the efficacy of these treatments. The purpose of this study was to determine the efficacy of home-scale raw flour heat treatments on the reduction of Salmonella in a variety of flour types. An online search for home-scale instructions for flour heat treatment informed the experimental design. All-purpose, whole-wheat, and gluten-free varieties of flour were inoculated with Salmonella (~8.65 log CFU/g), and conditioned to a water activity (aw) of ~0.45. Samples were spread into a uniform layer ~ 0.5 cm thick, heat-treated in a convection oven at 177°C up to 10 min, then transferred to sterile bags, cooled, serially diluted, and plated on differential media. After a 10 min treatment, Salmonella in all-purpose, whole wheat, and gluten free flours resulted in log reductions of 3.28 ± 0.52, 4.09 ± 0.46, and 4.13 ± 0.67, respectively. There were significantly less Salmonella reductions in all-purpose than in whole-wheat and gluten-free flour. Samples did not achieve over a 4 log reduction after a 10 min treatment ($P < 0.05$). Awareness of microbial hazards associated with low-moisture products is increasing; however, none of the home-scale solutions evaluated eliminated all Salmonella. While treated flour resulted in less Salmonella, it may not be sufficient to consider the product safe.

MONTH-SPECIFIC ESTIMATES OF ALCOHOL AND OTHER DRUG USE DURING PREGNANCY: UNITED STATES, 2002-2019.

Ishana Galgali
Epidemiology and Public Health, Poster Presentation
Section: 2
Presentation Number: 307
Mentor(s): Madison Walsh, Omayma Alshaarawy

This project aims to seek estimates about the degree to which United States (US) diversity subgroups of pregnant mothers abstain from drinking alcohol and extra-medical use of internationally regulated drugs such as cannabis and prescription opioids (EMIRD), month by month during pregnancy. Estimates are from large nationally representative cross-sectional samples of US community residents drawn each year for the National Surveys on Drug Use and Health. This project's subsamples included pregnant women age 12 to 44 years, aggregated by combining four-years of survey data: 2002-2005, 2006-2009, and 2010-2013. For each diversity subgroup (e.g., Hispanic versus non-Hispanic), and with past-month alcohol and EMIRD use assessed via computer-assisted self-interviews (CASI), I am deriving estimates for the Hill function's P(min), P(max), P(50), and slope parameters. Estimation requires processing the de-identified data with analysis weighting and calculus-based variances and confidence intervals (CI). If I can solve some problems created when survey methods changed after 2014, I should provide a comprehensive report with additional estimates from the four-year interval from 2014-2018. I should strengthen the variances by learning and applying a bootstrap re-sampling approach before the URAAF presentation. My discussion covers limitations such as pregnancy and CASI self-reports without lab assays and strengths such as the large nationally representative samples, not limited to the prenatal clinic or other medical records. To the best of my knowledge, this is the first time the Hill functional analysis has been used to disclose ethnic subgroup variations of importance in minority health research.

DIABETES AND KIDNEY DISEASE COMORBIDITY: MALE-FEMALE AND OTHER SUBGROUP VARIATIONS

Elise Trost
Epidemiology and Public Health, Poster Presentation
Section: 2
Presentation Number: 308
Mentor(s): James Anthony, Madison Walsh, Omayma Alshaarawy

This study aims to estimate a comorbidity that links diabetes mellitus (DM) with kidney disease (KD) in United States community populations, with an initial focus on female-male variations in the degree of DM-KD association as manifested in odds ratios (OR) stratified by age. As I progress, I intend to estimate DM-KD comorbidity for traditionally disadvantaged diversity subgroups (e.g., Hispanic/Latinx; Native Americans). Estimates are from five recent probability samples of more than 55,000 non-institutionalized civilian residents aged 12 years and older, with samples drawn each year 2015-2019, representing all 50 states and the District of Columbia. Participants completed a computer-assisted self-interview with standardized items about physician-diagnosed DM and KD. Estimation required analyses of de-identified diagnostic data from public use datasets with analysis weighting and calculus-based standard errors and confidence intervals (CI). I am using a meta-analysis approach to confirm the reproducibility of each year's estimate. I then use meta-analysis to produce a meta-analysis summary with 95% CI. The preliminary estimates disclosed statistically robust and reproducible DM-KD associations. The work helped me identify directions for extending and strengthening this line of research. Additional strength will come once it is possible to answer questions about temporal sequencing of DM and KD and a potential Berkson's fallacy in this type of community survey comorbidity research.

HIPPOCAMPAL SUBFIELD VOLUMES ARE CORRELATED WITH MULTIPLE DIFFUSION PARAMETERS IN THE FORNIX IN OLDER ADULTS

Ali Ghazi

Epidemiology and Public Health, Poster Presentation
Section: 2
Presentation Number: 309
Mentor(s): Jazmin Sotomayor Ortiz, Andrew Bender

Older age is associated with changes in brain structure, including cortical and subcortical atrophy and microstructural white matter alterations. Intriguingly, recent findings show variable patterns of associations between volumes of distinct subregions of the hippocampus and its connected white matter pathways. In the present study, we used newer methods for characterizing brain structure using diffusion MRI and voxel-wise analysis to investigate and localize how differences in hippocampal subfield volumes are associated with microstructure in the bilateral fornix. Participants included older adults (N=337; 38.3% women; age range=61-82 years; mean age=69.66, SD=3.92 years) drawn from the Berlin Aging Study-II who underwent MRI scanning. Volumetric estimates were sampled from aggregated hippocampal subfield volumes (i.e., subiculum, CA1/2, CA3/dentate gyrus) segmented from high-resolution MRI scans using automated software; these served as predictors of multiple diffusion parameters in the bilateral fornix. Diffusion MRI data (3T Siemens, 60-direction, b=1000) were processed via MRtrix to yield group-registered data for multiple voxel-wise models, separately by hippocampal subregions, and also accounting for age and education. Larger subiculum volume was associated with lower fornix fractional anisotropy (FA) and lower crossing fiber entropy (CFE); however, larger CA1/2 volumes were associated with higher FA and with both higher and lower CFE in the fornix. Covarying for education eliminated the negative effect on CFE, suggesting higher education may enhance the signal from crossing fibers in fornix. These findings illustrate that the brain is intercorrelated through our parameters.

GWAS ANALYSIS ON SNPS AFFECTING GOUT PATIENTS

Wesley Bird

Epidemiology and Public Health, Poster Presentation
Section: 2
Presentation Number: 310
Mentor(s): Ana Vazquez

Gout is a form of arthritis where increased urate accumulates and forms crystals in joints, causing pain and inflammation in the affected area. Both serum urate levels and the immunological response to serum urate crystals is determined by particular environmental factors and genetics. With a Genome Wide Association Study (GWAS) it is possible to find genetic variation associated to particular outcomes in the general population. The UK Biobank, consists of demographics, health data and genetic information from over 450,000 individuals. We conducted GWAS for gout outcome in subjects with hyperuricemia (Serum Urate> 350 umol/L), there are 87,861 white unrelated individuals used with hyperuricemia, 3.86% of those people had gout. In this analysis we used a logistic regression, and included recruitment center, gender and age as covariates. The resulting p-values were FDR adjusted to reduce false positive findings. The results of the GWAS indicated there are 27 SNPs that are significant (P<5x10-8). Ten SNPs are within the SLC2A9 locus, nine SNPs are within the ABCG2 gene, two SNPs are within the SLC22A11 locus and one SNP is within PKD2. These genes encode proteins involved in urate regulation in the kidney or intestines. One SNP is found on PPM1K, which regulates mitochondrial permeability. One SNP is found on C14orf166B. Our gout GWAS study using hyperuricemia controls, implicated genes known to be associated with urate. It is possible that the amount of serum urate beyond hyperuricemia

is still a risk factor for gout and or that the genes have pleiotropic inflammatory effects.

HOW MIGHT RELAXED CANNABIS POLICIES BE AFFECTING AGE-SPECIFIC RISK PERCEPTION OF CANNABIS USE?

Karthik Kolisetty
Epidemiology and Public Health, Poster Presentation
Section: 2
Presentation Number: 311
Mentor(s): Olga A Vsevoloszkaya, James (Jim) Anthony

Globally, cannabis policies are relaxing. Even so, some young people might ignore the legal minimum age at 21 years, possibly due to shifts in perceptions about cannabis safety. For this epidemiological research project, we aim to estimate this age-specific risk perception of cannabis use, studying temporal stability and change in estimates for the United States (US). The population under study consists of non-institutionalized civilian US residents age 12 years and older, with sampling, recruitment, and assessment each year from 2002-to-2018 as part of the National Surveys on Drug Use and Health (NSDUH; n>55,000/year). Standardized computer-assisted self-interviews measured age, past 30-day cannabis use, and perceived risk of smoking cannabis once or twice a week, from which we estimated analysis-weighted risk perception percentages using a non-parametric smoother and Hill functions. Our approach shows from 2002 to 2008 the perception of marijuana safety has increased across all age groups. More individuals perceive marijuana use to be safe at earlier ages. In our discussion of these findings, we draw attention to study limitations as well as strengths. In our conclusions, we clarify how estimates of this type can be used in future evaluations of recent changes in cannabis policies in Michigan and elsewhere, as well as our directions for future research.

IMPACT OF SCHOOL-AGE AND COLLEGE-AGE INDIVIDUALS ON COVID-19 TRANSMISSION IN INGHAM COUNTY, MICHIGAN

Jacob Stabler
Epidemiology and Public Health, Poster Presentation
Section: 2
Presentation Number: 312
Mentor(s): Susan Masten

With the massive impact of COVID-19, it has become imperative to figure out strategies and solutions in our everyday lives to bring an end to the seemingly unstoppable spread. One area of interest which has very influential implications is that of university populations. Through Ingham County COVID-19 reporting data, for the period of time from July 2020 to the present, individuals between the ages of 10-29 have had the most significant increase in cases, with those in the 20-29 range providing the largest case counts. This study aims to aid in stopping the spread of covid by analyzing when spikes in certain age groups happened and what was responsible. With this data, strategies can be developed that would be most effective against fighting covid through such groups. Implications can be useful to determine events such as the reopening of schools for the fall semester or how to mitigate the transmission of COVID-19.

COVID IMMUNIZATIONS, CRIADL, AND WOMEN?S HEALTH: WILL COMPUTER-RELATED INSTRUMENTAL ACTIVITIES OF DAILY LIVING (CRIADL) DELAY IMMUNIZATION?

Reema Mody
Epidemiology and Public Health, Poster Presentation
Section: 2
Presentation Number: 313
Mentor(s): James (Jim) Anthony, Madison Walsh

Public health efforts in COVID immunization scheduling now depend heavily upon competence in computer-related instrumental activities of daily living (CRIADL). We seek to compare females and males (F/M), age by age, in CRIADL. Hypothesized F/M expectations suggest age- and aging-related increased proportions with CRIADL difficulties during audio computer-assisted self-interviews (ACASI). Secular (time) trends are possible, given broad population trends for using computers and internet tools over time. Estimates are from large (n>55,000) nationally representative cross-sectional samples of US community residents drawn each year for National Surveys on Drug Use and Health. Here, the initial focus is on ~30,000 female participants in 2002-2003, and new samples were drawn in 2012-2013. From age 12 to age 93+ years, age-bin-specific proportions of women with CRIADL are estimated by processing de-identified datasets, analysis weighting, and calculus-based estimations of variances and confidence intervals (CI). Illustrative results for 33-37 year olds in 2002-2003 and 2012-2013 show 6.8% and 6.1% with CRIADL difficulty, (95% CI = 5.6%, 8.4%) and (5.3%, 7.0%), respectively. Corresponding CRIADL estimates for 93+ year old women sampled these years are 48.9% and 41.9%, (95% CI = 24.5%, 73.8%) and (24.9%, 61.0%), respectively. These preliminary estimates for 2002-2003 and 2012-2013 do not provide statistically robust evidence of expected CRIADL performance improvements, but age-related CRIADL difficulties are noteworthy. This early report on work-in-progress offers an initial look at our study estimates. In the URAAF presentation, I will describe the CRIADL construct, its public health immunization and outreach importance, and implications for future CRIADL research.

FILM & DIGITAL MEDIA

ONLINE LEARNING DURING A GLOBAL PANDEMIC

Darby Pickford
Film and Digital Media, Showcase Presentation
Section: 1
Presentation Number: 315
Mentor(s): Eddie Boucher

Our documentary, Online Learning During a Global Pandemic, uses interdisciplinary lenses to address the detriments COVID-19 has had on our educational system. In our film, we acknowledge the opinion of different socioeconomical populations. This includes unique interviews with elementary and high school teachers and principals, parents of multiple young children, and students ranging from elementary through the college level. Our film explores cultural values, which includes how each home varies with the challenges of different screen time permissions, the possibilities of limited access to a device, shared devices within the household, or the reliability of a steady internet connection, if available. We've used our interviews and research to pinpoint the advantages and disadvantages an online education has to consider.

WE ARE NOT YOUR PROFIT

Lucy Foguth
Film and Digital Media, Showcase Presentation
Section: 1
Presentation Number: 316
Mentor(s): Eddie Boucher

My documentary examines the effects of nonprofits in Guatemala through various lenses such as a cultural anthropology lens, a historic, economic, and a global lens. My main focus will be the relationship the Global North has with the Global South and the fine line between nonprofit's appropriation of the country and appreciation of the culture.

THE PSYCHOLOGICAL AND CULTURAL EFFECTS OF SMARTPHONE USAGE

Ryan Mize

Film and Digital Media, Showcase Presentation
Section: 1
Presentation Number: 317
Mentor(s): Eddie Boucher

The daily average that millennials and baby boomers use their smartphone is around 5.4 hours, that number jumps to 7+ hours among teens. To put those hours into perspective, the millennials and baby boomers spend on average 122.85 wakeful days a year looking at their smartphones, while teens spend an astounding 159.25+ days having their attention locked onto their smartphone. It's a device that some might even spend more time doing than sleeping. With technology that's so prominent in our lives, it's important to understand how it's affecting our brains, behaviors, and ultimately our culture. In order to gather information, I interviewed experts in behavioral addiction, as well as high school principals. I read countless scholarly articles as well journals ranging from neuroscience, psychology, and anthropology, as well as news articles relating to culture, politics, and current events. In this performance, I will present the research in the form of a short educationally driven documentary exploring the shocking psychological and cultural effects that come with smartphone usage and addiction. I hope to prove that this is more than just a "Social Dilemma" and that this is a device that is dangerously harmful to our brains as well as our culture.

MEDIA HELPING FAMILIES

Dylan Kissel

Film and Digital Media, Showcase Presentation
Section: 1
Presentation Number: 318
Mentor(s): Amol Pavangadkar

All families have difficulties. My research and video creation has allowed me to work with my partners, Amol Pavangadkar and Kendal Holtrop to create a series of videos about parenting. These videos are now available to the public through the MDHHS online, allowing for any families to access the program. The program focuses on key areas of parenting that creates strong, healthy, and productive communication between caretakers and their children. We follow five families and see how they are able to properly implement these parenting styles to grow closer with their children and establish health bonds with each other.

RACISM; AN AMERICAN RECKONING

Julianna Lavey, Nala Davis

Film and Digital Media, Showcase Presentation
Section: 2
Presentation Number: 321
Mentor(s): Amol Pavangadkar

Last year an estimated 15 to 26 million people took part in what became the largest mass protests in the history of the United States of America. There is a deep divide in our nation surrounding race, and certainly a deep wound. This documentary explores why that divide endures and endeavors to discover what racism in America looks like today. Moreover, we investigate how racism affects the people who experience it first hand and how we might pave a pathway forward.

TWIN PANDEMICS
Cherished Kirkland, Nala Davis
Film and Digital Media, Showcase Presentation
Section: 2
Presentation Number: 322
Mentor(s): Amol Pavangadkar

This documentary short follows 3 college students as they confront two great threats facing our nation; the coronavirus pandemic and police brutality. The film follows students from March through January as they combat isolation, coronavirus, and the tragic murder of George Floyd all while still attending classes. In a world where 'I can't breathe,' is symptom of both police brutality and COVID-19 these students must find a way to navigate their new reality.

THE BLIND LEADING THE BLIND
Anna Forest
Film and Digital Media, Showcase Presentation
Section: 2
Presentation Number: 323
Mentor(s): Eddie Boucher

This mini-documentary highlights qualitative research done on blind students' experiences on college campuses, specifically through the entry point of material culture. Many blind people use canes to increase mobility, allowing them to travel independently in a multitude of settings. Although these canes are thought to be useful, the majority of blind people choose not to use them. This film asks blind students why they think this occurs, addressing stigmas, low expectations, and preconceptions associated with blindness and blind people around the country. Through multiple interviews, it was found that many blind people experience premature judgement based on their disability rather than their character, leading to feelings of self-doubt and inferiority, often manifesting in an attempt to hide or minimize their blindness. This short film aims to challenge viewers preconceptions about blindness as a disability through a lens that is rarely seen; through that of blind people themselves.

ANTI-FACTS FILM
Brendan Kelly, Kayla Katona, Kendall Veasey, Spencer Irvine
Film and Digital Media, Showcase Presentation
Section: 2
Presentation Number: 324
Mentor(s): Amol Pavangadkar

Anti-Facts is a film meant to shed light on the flaws behind the logic of college students who don't take the pandemic seriously. The film features a fake documentarian, Maverick Archibald, who interviews various twenty-somethings about their opinions on the pandemic and coinciding lifestyle restrictions. Subjects include a conspiracy theorist, a frat boy, a valley girl, a truth-speaking med student no one believes in, and several others. Each of which bring a different reason as to why they believe the coronavirus is more or less a myth. In setting out to reinforce his own beliefs that the danger of the virus has been largely exaggerated, the point of the Maverick's documentary is to showcase the negative impacts of online learning and COVID guidelines. Unfortunately for Maverick, his own recklessness comes with consequences. As the film progresses, so do his COVID symptoms. What starts as “just an itch in his throat” turns into shortness of breath, excessive coughing, fever, loss of taste, and eventually a fainting spell and visit to the hospital. The film ends with a zoom-style interview due to Maverick's condition. The point of this mockumentary film is to use humor to accentuate a very real issue, which is that many young people are causing harm to others by not following COVID guidelines.

HEALTH SCIENCES

LIMITED CHILDCARE OPPORTUNITIES DURING COVID-19 PANDEMIC DECREASING PARENTS' MENTAL HEALTH

Paige Duren
Health Sciences, Oral Presentation
Section: 1
Presentation Number: 327
Mentor(s): Jiying Ling, Kristen Bilyea

The COVID-19 pandemic has placed a variety of stressors on families including the limited access to childcare, especially among low-income families. However, few studies have been done to determine the repercussion of the limited childcare opportunities on parents' mental health. This study examined the relationships of limited childcare opportunities with low-income parents' stress, anxiety, and depression. A cross-sectional study was conducted. Eligible, consented parents were invited to complete an online survey measuring demographics, perceived stress, anxiety, and depression via Qualtrics. A total of 408 parents participated. A majority of the parents were female (87.5%), with an average age of 31. Approximately 70% had an annual income less than $30,000 and had been laid off or had their hours reduced due to pandemic. Most parents had two children (30.1%), while 29.2% had one child, 40.7% had three or more children. Around one half had difficulty finding childcare, and 86.6% had moderate to high stress levels. Parents who had difficulty finding childcare had significantly increased levels of anxiety (58.07 vs. 56.50, p=0.032) and depression (53.82 vs. 51.78, p=0.017) than those without difficulty. Overall, parents with one child having difficulty with childcare had the highest levels of stress, anxiety, and depression. Difficulty in finding childcare during pandemic negatively affected parents' mental health, especially among parents with only one child. Parents with poor mental health are more susceptible to making unwise decisions and developing poor physical health. Thus, equipping low-income parents with effective stress management strategies is needed.

CONSISTENCY OF SARS-COV-2 VIRAL LOADS ACROSS VARYING SAMPLE TYPES OVER TIME

Gwyneth Dunbar, Kaitlyn Hutchins
Health Sciences, Oral Presentation
Section: 1
Presentation Number: 328
Mentor(s): Jade Mitchell

The COVID-19 pandemic, which has swept the world since late 2019, has caused devastating loss of life and a scientific race to learn more about the disease. Due to the gravity of the world's condition, massive amounts of research are being published every month with a wide variety of data being reported. Our focus in microbial risk assessment has led us to delve into the realm of viral loads and their potential impact on disease severity, though the reporting of this type of data is thoroughly inconsistent. The viral load is the amount of SARS-CoV-2 in a person's given clinical sample. We performed a meta-analysis on viral loads over time, across multiple sample types and the relationship to disease severity. We defined three main categories of severity: mild, moderate and severe, and organized sample types into the following categories: nasopharyngeal, throat, fecal, saliva, sputum, urine, blood, and ocular. We will report on how these findings relate to viral load and recommend a standardized process of reporting viral load data in this presentation.

MARIJUANA AND CIGARETTE SMOKING ON THE RISK OF ADENOMYOSIS: A NOVEL CASE-CONTROL STUDY

Grace Joachim
Health Sciences, Oral Presentation
Section: 1
Presentation Number: 329
Mentor(s): Kristen Upson

The uterine condition adenomyosis can produce substantial symptoms, including painful menses and heavy menstrual bleeding. Although the etiology of adenomyosis remains enigmatic, estrogen plays a central role in disease development. Two common exposures that may alter estrogen concentrations and affect adenomyosis risk are marijuana and cigarette smoking. We investigated these exposures in relation to adenomyosis using data from a novel case-control study of adenomyosis conducted among female enrollees ages 18-59 years of a large, integrated healthcare system in Washington State. Cases were women with incident, pathology-confirmed adenomyosis diagnosed by hysterectomy in years 2001-2006 (n=386). Given the potential for different results based on control group selection, two control groups were used: 1) randomly selected enrollees with intact uteri, age-matched to cases ("population controls", n=323), and 2) hysterectomy controls (n=233). Data on marijuana and cigarette smoking were collected by in-person structured interviews; joint-years of marijuana smoking and pack-years of cigarette smoking were estimated. We conducted unconditional logistic regression to estimate the adjusted odds ratios (OR) and 95% confidence intervals (CI), comparing cases with hysterectomy controls and population controls separately. Using either control group, we observed no association between marijuana smoking and adenomyosis. However, smoking more than 15 pack-years (vs. never smoking) was associated with a 30% increased risk of adenomyosis in analyses using population controls (OR 1.3, 95% CI: 0.8-2.2) and a 60% increased risk of adenomyosis in analyses using hysterectomy controls (OR 1.6, 95% CI: 0.9-2.8). Our results suggest that cigarette smoking, but not marijuana smoking, increases adenomyosis risk.

AN IGNORED PANDEMIC: RACIAL/ETHNIC MORTALITY RATES AND COVID-19

Joan Sirigiri
Health Sciences, Oral Presentation
Section: 1
Presentation Number: 330
Mentor(s): Horng-Shiuann Wu

As the COVID-19 pandemic unfolded across the United States, it became apparent that Black, Native American/Indigenous, and other people of color (BIPOC) populations were disproportionately being affected. In New York City, Latinx and Black populations had higher mortality rates, i.e.,187 per 100,000 and 184 per 100,000 respectively, compared to the White population with a mortality rate of 93 per 100,000 deaths. Native American/Indigenous people compose 9% of New Mexico's population but represented 38% of total deaths. The purpose of this study was to identify the social determinants of health experienced by BIPOC during the pandemic. A literature review was conducted using PubMed with the search criteria including COVID-19, minority populations, mortality rate, and United States. The search produced a total of 58 studies and 15 studies were selected after excluding systematic reviews and including studies which discussed social determinants of health. Results showed the largest contributing factor for high mortality rate in BIPOC was the higher rates of comorbid conditions at younger ages. Hospitalized Black and Latinx COVID-19 patients were, on average, 6 years younger than White patients and nearly 90% had at least one chronic condition. All articles showed BIPOC had higher rates of cardiovascular, metabolic, and pulmonary problems. Chronic conditions were caused by environmental factors such as toxic exposures and neighborhoods in food deserts. Furthermore, BIPOC faced challenges with

access to affordable healthcare and medical mistrust. Recommendations for clinicians include increased implicit bias and awareness trainings. National health policies are needed to provide accessible healthcare and healthier environments.

DIFFERENTIATING THE EFFECTS OF CLINICAL EXPOSURE VERSUS MEDICAL EDUCATION ON TRANSPHOBIA AMONG A SAMPLE OF EMERGENCY ROOM PRACTITIONERS

Ishaan Modi
Health Sciences, Oral Presentation
Section: 1
Presentation Number: 331
Mentor(s): Deirdre Shires

Transgender individuals are a marginalized population in the United States, facing systemic discrimination from housing to employment to education. However, an area of discrimination that is equally as omnipresent is in healthcare. Transgender individuals may often face microaggressions or explicit discrimination from providers or staff; when this occurs in the emergency room, this transphobia (prejudice against transgender people) could be deadly. For this reason, this project will be focusing on transphobia of emergency room clinicians. This project is a secondary analysis of a study by a team of researchers from Henry Ford Health System and MSU, in which 81 emergency room clinicians completed a survey on caring for transgender patients. This survey touched upon a variety of variables from race/ethnicity, gender identity, comfort for and knowledge on caring for transgender patients, and transphobia (among multiple others). This project aims to narrow the focus further the parent study, by examining whether clinical exposure to transgender patients and level of informal and formal education around transgender health are associated with transphobia. Descriptive and bivariate analyses will be conducted to answer the research question. The implications of this could suggest more efficacious ways to train healthcare professionals to combat transphobia in their healthcare settings, yielding in more culturally competent care.

THE USE OF FUNCTIONAL MRI IN THE ASSESSMENT OF MICROVASCULAR FUNCTION IN ADVANCED DIABETES

Natalie Phillips
Health Sciences, Oral Presentation
Section: 1
Presentation Number: 332
Mentor(s): Jill McMahon

Small blood vessel function (microvascular function) is critical in blood flow regulation of skeletal muscle. Advanced diabetes, including diabetes with peripheral neuropathy is associated with reduced microvascular function. Exercise has the potential to reverse losses in microvascular function. Early findings following 10 weeks of training in patients with diabetic peripheral neuropathy will be presented.

PHYSICAL ACTIVITY AND SEDENTARY SCREEN TIME AMONG UNDERSERVED ADOLESCENTS

Kendall Piper
Health Sciences, Poster Presentation
Section: 2
Presentation Number: 334
Mentor(s): Lorraine Robbins

National recommendations call for adolescents to attain 60 minutes/day of moderate-to-vigorous physical activity (MVPA) and have <2 hours/day of sedentary screen time. The purpose of this cross-sectional study was to evaluate the physical activity (PA) and sedentary

screen time behaviors for 10-13 year old, racially-diverse 5th-7th grade adolescents. Eighty adolescents from 2 schools in low-income urban areas completed surveys (paper-pencil). Written parental/guardian consent and adolescent assent were obtained prior to participation. Age, sex, race/ethnicity, socioeconomic status, body mass index (BMI), PA and sedentary screen time were assessed. Frequencies, percentages, means, and standard deviations were calculated. Mean age was 11.2 years (SD=0.92), and 51.2% were female. Adolescents were racially diverse: 56.3% black, 22.5% white, and 21.3% multiracial or other. The majority (69.2%) had annual family incomes <$30,000. Close to half (47.5%) were overweight or obese. No more than 10.0% met the MVPA recommendation, and 13.8% reported 0 days of MVPA for both the past week and a usual week. Over one-third (37.5%) had no school gym class. Finally, 45.1% reported playing video or computer games (unrelated to schoolwork) for more than 3 hours on a usual school day with 22.5% reporting 3 5 hours/day. On a usual weekend day, these percentage increased to 51.3% and 27.5%, respectively. The findings demonstrate an urgent need for interventions to increase MVPA and reduce sedentary screen time among young adolescents, especially those who are underserved (low-income/minority) and at high risk for being overweight or obese and developing chronic health conditions.

CONFIDENCE IN PATIENT PROVIDER COMMUNICATION

Sydney Padgett
Health Sciences, Poster Presentation
Section: 2
Presentation Number: 335
Mentor(s): Jennifer Neal

Patient provider communication impacts the quality of care received by the patient and the level of ability to pursue quality clinical gains on the side of the provider. In particular, in the field of Speech Pathology, providers not only act as clinical workers but also act as counselors to patients, which requires strong patient-provider communication. Providers' confidence in their ability to have effective patient provider communication may differ from classroom practice to real-world settings. In this study, I used a survey research design to examine levels of confidence in patient-provider communication among Speech Pathology Masters students. In particular, to gain insight into predictors of confidence, I collected data from Speech Pathology Masters students using the Self-Efficacy in Patient Centeredness Questionnaire (SEPCQ-27), questions geared toward assessing the level of understanding for specific CSD 888 Counseling in Communicative Disorders course objectives, open-ended questions that give participants the opportunity to provide further information to explain their answers, and demographic questions. This is significant work because much of the research supporting patient centered communication excludes psychological counseling within Speech Pathology. With all of the areas that Speech Pathology touches, excluding this field from this research creates a gap in the scholarly support for the psychological benefits of competent patient-provider communication.

THE LIVED EXPERIENCES AND ROLE IMPLICATIONS OF MICHIGAN CLINICAL NURSE SPECIALISTS DURING THE COVID-19 PANDEMIC: A MIXED METHODS ANALYSIS

Ryan Rezaee
Health Sciences, Poster Presentation
Section: 2
Presentation Number: 336
Mentor(s): Jackeline Iseler

The aim of this study is to describe the relationship between individual, institutional, and geographic factors that correlate to the informal and formal role changes of Clinical Nurse Specialists in Michigan during the COVID-19 pandemic, and any barriers they faced. Further,

this study aims to examine the lived experiences of Michigan CNSs as they personally and professionally navigated the frontlines of the COVID-19 pandemic. This mixed methods study aims to analyze the relationship between individual and institutional factors and the complex, and often misunderstood, role of the CNSs in Michigan before and during the 2020 pandemic. Specifically, a cross-sectional, descriptive design to obtain quantitative data and ethnography will be used to obtain qualitative data. Michigan CNSs will be recruited through the Michigan Association of Clinical Nurse Specialists (MI-CNS) listserv and social media outlets (MI-CNS Facebook, Instagram, and Twitter). These CNSs will then be asked complete a questionnaire through Qualtrics, consisting of short answer questions that allow the participant to expand on their personal and professional experiences. Furthermore, some of the CNSs will be asked if they would like to also participate in an interview completed over the phone or Zoom, that will allow them to elaborate on their answers and experiences.

THE COVID-19 PANDEMIC NEGATIVELY AFFECTED LOW-INCOME FAMILIES' LIFE

Meghana Jalagam, Nandini Koneru
Health Sciences, Poster Presentation
Section: 2
Presentation Number: 337
Mentor(s): Jiying Ling

First documented in December 2019, the SARS-CoV-2, also known as COVID-19, has spread across the world rapidly to cause a massive global pandemic. In addition to the health crisis, families are facing challenges to their everyday life, specifically families under the poverty level. However, limited studies were conducted among low-income families with young children; thus, this study aimed to assess the effects of COVID-19 on low-income families' lives. Using a cross-sectional study design, we collected data from low-income parents regarding their emotional and behavioral changes during the pandemic. Participants were recruited from Michigan Head Start organizations and Qualtrics panel. The sample consisted of 408 parents with an average age of 31 years. The majority of participants were female and earned an annual income <$30,000. Additionally, 21% were Black, 17% were Hispanic, and 44% were unemployed. Around 79% admitted that the pandemic had negatively impacted their life, and 72% were laid off from work or had reduced work hours. Greater than 83% felt more stressed, anxious, or depressed, and 79% spent more time on screens. About two thirds struggled to pay bills. Nearly half had difficulty getting necessary food and finding childcare. Only about a third reported participating in more physical activity and ate healthier. Nearly 89% reported a closer relationship with their children. The negative effects of the COVID-19 pandemic reported by low-income families could produce long-term consequences. Therefore, it is necessary to design interventions to promote stress management and healthy lifestyles among these low-income families.

PREGNANT WOMEN SEEKING INFORMATION TO MANAGE ANXIETY DURING COVID-19: AN EXPLORATORY STUDY

Alison Duff
Health Sciences, Poster Presentation
Section: 2
Presentation Number: 338
Mentor(s): Joanne Goldbort

COVID-19 may have led to increased anxiety for pregnant women. This study investigated the relationship between anxiety and information seeking by pregnant women searching for answers related to COVID-19, and the potential effects on pregnancy, the fetus/newborn, and breastfeeding. An online QualtricsTM research survey (this study is a subset from a larger study) was completed by 22 pregnant women between the ages of 18 to 45, with a mean age of 31.68 years (SD = 6.36%). 82% were Caucasian; 91% had some college education; and the

average income was $70,000. 91% reported that they would seek information to reduce anxiety even if they discovered information that would negatively affect them or their fetus/newborn. 82% managed anxiety through seeking information regularly throughout the pandemic, primarily via the Internet. 91% agreed that breastfeeding was important to them, and the intent to breastfeed was distributed evenly, at 33%, among the three categories of choosing to breastfeed, choosing not to breastfeed, or remaining neutral regarding whether they would breastfeed. Pregnant women in this study explored information regarding their health, their fetus/newborns' health, and breastfeeding as a coping strategy to reduce uncertainty and anxiety. Searching the Internet was their first choice for information. The challenge healthcare providers face is providing timely evidence-based information to pregnant women to lessen anxiety that pregnant women may experience during any pandemic.

ANALYZING DISCREPANCIES IN THE ACCURACY OF PULSE OXIMETER READINGS: A REVIEW

Harsna Chahal, Kanishka Wijewardena, Olivia Sowa
Health Sciences, Poster Presentation
Section: 3
Presentation Number: 342
Mentor(s): Prem Chahal

The use of pulse oximeter devices to determine blood oxygen concentrations is a common medical diagnostic practice. COVID-19 adversely affects the respiratory system, prompting healthcare treatment facilities to use pulse oximeters to increasingly assess patient care. Health care workers rely on the accuracy of these devices to make life-changing decisions, such as which patients require intensive care treatment. Studies from the past few decades point to inaccuracies in pulse oximeter readings across ethnic groups, specifically more significant inaccuracies among people of color. This review attempts to understand the possible causes of variances in pulse oximeter readings for different demographics by analyzing existing literature on the aspects of biology, technology, and device utilization. The main goal of this review is to propose targeted research based on which of these factors appear to most significantly impact reading inaccuracies.

HOW POSTPARTUM DEPRESSION TREATMENT AFFECTS QUALITY OF LIFE

Lauren Latiff
Health Sciences, Poster Presentation
Section: 3
Presentation Number: 343
Mentor(s): Ann Annis, Rebecca Lehto

Postpartum depression is the most common psychiatric complication of pregnancy and birth, affecting as many as 1 in 5 women each year. Postpartum depression often goes unrecognized and untreated. This lack of appropriate management can be due to the new responsibility of having a child or the stigma associated with mental illness. The failure to identify and treat postpartum depression may diminish the quality of life for women and their capacity to adapt to new parenthood. For this project, I conducted a literature search for studies that evaluated the effects of treatment or lack of treatment on the quality of life for women with postpartum depression. The search engines of PubMed and CINAHL will be explored using the search terms: postpartum depression, quality of life, pregnancy, and mental illness. Peer-reviewed studies conducted in the U.S. and published within the past ten years were included. It is important to address postpartum depression because early diagnosis and treatment may significantly alter the quality of life trajectory for thousands of women each year. Nurses and other health providers are ideally positioned to recognize symptoms of postpartum depression and identify women at high risk, and findings from this

work may help inform treatment options for these women. Future research of this topic should explore the direct effects of mothers not seeking treatment and how it negatively affects their baby.

IMPROVING QUALITY OF LIFE AND HEALTH PROMOTION IN TYPE II DIABETES: CURRENT TRENDS IN LIFESTYLE AND PHYSICAL ACTIVITY PROMOTION IN REDUCING MORTALITY AND COMORBIDTIES

Karen Pham
Health Sciences, Poster Presentation
Section: 3
Presentation Number: 344
Mentor(s): Ann Annis, Rebecca Lehto

In 2016, 89% of adults diagnosed with type II diabetes were overweight and 38% were physically inactive. Chronically ill individuals who are inactive are at increased risk of poor health outcomes, including impaired quality of life and premature death. Sedentary lifestyles have been increasing over recent decades due to technological advancements, such as the use of cars, computers, remote work, and social media. The situation is worsened by the recent COVID-19 pandemic and associated activity restrictions. The management and prevention of type II diabetes heavily emphasize the importance of a healthy, active lifestyle. A literature search utilizing databases PubMed and CINAHL was conducted to determine recent trends in mortality rates and quality of life among adults with type II diabetes in relation to sedentary lifestyles and physical activity. Inclusion criteria were peer-reviewed studies that examined adults with type II diabetes, quality of life, mortality rates, comorbidities, and physical activity, published within the past five years. Studies focusing on type I diabetes, diet, and non-adults were excluded. Findings from this review may inform public health programs aimed at preventing adverse health outcomes for individuals with type II diabetes and guide strategies towards the maintenance of a healthy lifestyle to reduce mortality, chronic disease and promote quality of life. Nurses can use evidence-based guidelines when curating a management plan for those diagnosed with type II diabetes. This review will also identify future research needs to best manage type II diabetes, including risk reduction and health promotion for this population.

MAPPING KEY ETHICAL ISSUES SURROUNDING ELECTROCEUTICAL TREATMENTS FOR DEPRESSION

Eleni Varelas, Marissa Cortright
Health Sciences, Poster Presentation
Section: 3
Presentation Number: 345
Mentor(s): Aaron McCright, Eric Achtyes, Laura Cabrera Trujillo, Robyn Bluhm

Failure of first-line treatments for some patients with depression has mobilized scientific communities to look toward electroceuticals - interventions which employ electric and magnetic stimulation therapeutically. A growing body of literature investigates how to improve clinical protocols for electroceuticals like electroconvulsive therapy (ECT), transcranial magnetic stimulation (TMS), and deep brain stimulation (DBS) in depression. While this literature recognizes that electroceuticals raise significant ethical questions, little research has focused on the interrelations of ethical issues across these interventions. We are developing an analytic map to identify shared concerns, interrelations, and differences across interventions. Here we present examples of the analytic map we are developing based on our literature review. To illustrate the benefits of using this approach we present two key areas - informed consent and clinical guidelines. For example, patient capacity to consent is an overarching argument throughout the electroceutical literature, while patient selection criteria is a topic heavily discussed in clinical guidelines. This map will form part of a larger

project that includes the creation of analytic maps from interview results and national survey results with three stakeholder groups. Using this information, we will create a final map that integrates different sources of information, and that accounts for multiple stakeholder's perspectives and views on different modalities. This map approach can help anticipate ethical issues that need consideration, strategize methods to address these issues, and provide rich and diverse information in a way that promotes meaningful engagement.

THE NEUROTENSIN SYSTEM IS DIFFERENTIALLY REGULATED IN TWO BRAIN AREAS IMPLICATED IN MODIFYING BODY WEIGHT

Morgan Sotzen
Health Sciences, Poster Presentation
Section: 3
Presentation Number: 346
Mentor(s): Anna Makela, Gina Leinninger

Obesity is increasing worldwide due to increased caloric intake and reduced energy expenditure. However, there are few effective pharmacological treatments to modify these behaviors to sustain weight loss. The neuropeptide neurotensin (Nts) may be useful to support weight loss because it suppresses feeding and increases energy expenditure, but the specific brain areas mediating these effects are unknown. We hypothesized that Nts and the Nts receptors (NtsR1, NtsR2, NtsR3) may be regulated within two brain regions that influence body weight: 1) the lateral hypothalamic area (LHA) that modulates feeding and 2) To examine this, C57/Bl6J male and female mice were fed either a chow diet to maintain a normal weight or a high-fat diet to induce obesity (n=8). After 16 weeks, the high-fat diet fed mice weighed significantly more than the chow-fed mice, confirming induction of diet-induced obesity. The LHA and mPOA were dissected from the brains, RNA was extracted, converted to cDNA and assessed for gene expression of Nts, NtsR1, NtsR2 and NtsR3 using TaqMan-based reverse-transcriptase PCR. No changes in gene expression were observed in the LHA due to sex or diet. By contrast, in the mPOA NtsR2 gene expression was significantly higher in males compared to females, and trended lower in obese males compared to normal weight males. These data suggest that Nts-NtsR2 signaling may be altered in the mPOA, and warrants further investigation in control of body weight.

THE ROLE OF INTEGRATIVE THERAPIES FOR SYMPTOM MANAGEMENT AND QUALITY OF LIFE FOR CHILDREN WITH CANCER

Casey Kramer
Health Sciences, Poster Presentation
Section: 3
Presentation Number: 347
Mentor(s): Ann Annis

Understanding how integrative therapies affect the mind and body is a crucial step in advancing the care of children with cancer. Music and pet therapy are two integrative therapies that have been used to reduce symptoms related to cancer treatment. Symptom burden associated with medical treatment for cancer can have a negative impact on quality of life (QOL) of children. These symptoms may include pain, fatigue, depression, and hopelessness. There is increasing recognition of the role that integrative therapies can provide to bolster quality of life for children with cancer. Integrative therapies holistically affect the mind-body connection, and thus, may improve the patient's symptoms, such as pain, and emotional distress. A literature search was conducted using PubMed and CINAHL to identify published studies that assessed integrative therapies in children with cancer. Studies conducted in the U.S. and published in 2010 or later were included. Evidence from the literature related to the effects of music and pet therapy on the symptoms and quality of life of children with cancer will be summarized. Because integrative therapies can be employed

within the home as well as in hospital settings, they have the potential for feasibly enhancing the care children with cancer receive. Integrative therapies are also an important intervention nurses can employ. As nurses are involved in the direct care of children with cancer, they would be ideal providers to support these integrative therapies. Future research should continue to explore how integrative therapies can potentially provide benefits for children with cancer.

A SYSTEMATIC REVIEW OF THE EFFECT OF MINDFULNESS-BASED INTERVENTIONS ON BEHAVIORAL OUTCOMES

Kayley Berceau
Health Sciences, Poster Presentation
Section: 4
Presentation Number: 350
Mentor(s): Tsui-Sui Kao

While the effectiveness remains unclear, mindfulness-based interventions have become recommended for improving eating and physical activities. Six databases were searched (PubMed, CINAHL, Psych Info, Cochrane, Embase, and Web of Science) and eleven articles met the criteria. Risk of bias assessment revealed low to moderate risk (Rangescore=3-12/18). Majority of participants (85%) were female (Mage =30.87, rangeage=6.5-49.5; MBMI=29.53 kg/m2, rangeBMI=18.5-35.95). Ten studies (91%) were randomized controlled trials (RCT) and one single-arm clinical trial (9%). Interventions were designed to improve eating behavior (s=6), eating behavior + physical activity (PA, s=2), and stress reduction (s=3). Ten of eleven studies (91%) observed meaningful changes in eating habits or PA. Of those aimed at eating behavior, eight of nine outcomes (89%) had statistical significance (↓ emotional eating, s=3, p<.05 [67% of studies]; ↓ sugar/candy, s=2, all p<.05; ↑ fruit/veg, s=1, all p<.05; ↓ fatty food, s=1, all p<.001; ↓ calories, s=2, all p<.05). Those aimed at eating and PA, four of six (67%) achieved statistical significance (↑ fruit/veg, s=1, p>.05; ↓ fatty food, s=1, p<.05; ↓ calories, s=1, all p<.05; ↑ MVPA, s=1, p<.05; ↑ light PA, s=1, p<.05) with one insignificant finding (↓ MVPA, p>.05). Of studies aimed at reducing stress, four of eight (50%) outcomes reached statistical significance (↓ emotional eating, s=2, p<.05; ↓ sugar/candy, s=2, p<.05 [50% of studies]; ↑ fruit/veg, s=1, p>.05; ↓ fatty food, s=1, p>.05; ↑ light PA, s=1, p>.05). Participants' eating and PA were mostly improved by the mindfulness-based interventions. However, more studies are needed to delineate their effects on various populations.

A SYSTEMATIC REVIEW OF THE EFFECT OF MINDFULNESS-BASED INTERVENTIONS ON BODY FAT DISTRIBUTION

Jordan Fransik
Health Sciences, Poster Presentation
Section: 4
Presentation Number: 351
Mentor(s): Tsui-Sui Kao

This systematic review examines the effects of mindfulness-based interventions on anthropometric (i.e., body mass index [BMI], waist circumference [WC], percent body fat [BF%]). PubMed, Psycinfo, Cochrane, CINAHL, Embase, and Web of Science were searched to identify relevant articles. Nine articles met the inclusion and exclusion criteria. Six articles had low to moderate risk bias and three had moderate to high risk. The participants' mean age was 28.37 years old, (range 8-65; children, s=3; adult, s=6), mean BMI was 28.93kg/m (range 15.25-35.7). 81% of participants were females. 78% of studies were randomized controlled trials (RCT), the others were a quasi-experimental design (s=1), and a single-arm trial (s=1). Mindfulness-based interventions include mindful movements (i.e., yoga, qigong, and physical activity (s=4), counseling/education (s=2), mindful eating (s=5)). 67% of studies demonstrated statistically significant (p<.05) anthropometric outcomes (↓ BMI, ↓ WC, ↓ BF%).

73% of anthropometric outcomes showed statistically significant changes (↓ BMI, s=4; ↑ BMI, s=1; ↓ WC, s=3; ↓ BF%, s=3). Two mindful eating interventions had a significant decrease in BMI. Two had significant decreases in WC and BF%. WC and BF% changes mostly resulted from mindful eating interventions and one mindful movement. More studies are needed to delineate different effects from various mindfulness-based interventions, this review confirmed that mindful eating interventions were most likely to generate significant anthropometric changes (BMI, WC, and BF%).

ADHERENCE AND COMPLIANCE IN VOICE THERAPY LITERATURE

Ajay Sreedhar, Andrew Frey
Health Sciences, Poster Presentation
Section: 4
Presentation Number: 352
Mentor(s): Eric Hunter

Patient compliance refers to the extent to which a patient adheres to a recommended treatment regimen. Compliance is known for its impact on the quality of a patient's therapeutic outcome. The purpose of this study was to review and define the factors affecting patient compliance and adherence to voice therapy. Three reviewers independently searched for articles including the terms adherence, compliance, therapy, and treatments and their synonyms in various combinations of voice and speech therapy. All searches were carried out on the PubMed database and led to the iinitial gathering of 135 articles. After a quick review of duplicates, this number was brought down to 78 and later—after a peer-backed analysis of the article's focus. Initial results indicate that time commitment and travel accommodations are among the leading factors contributing to the detriment of patient compliance to therapy. A better understanding of the factors that impact patient adherence is vital in the creation of treatment regimens and ensuring better therapeutic outcomes.

DUAL DIAGNOSES OF SUBSTANCE USE AND MENTAL HEALTH DISORDERS AMONG U.S. ADULTS: BEST TREATMENT PRACTICES

Nicole Horton
Health Sciences, Poster Presentation
Section: 4
Presentation Number: 353
Mentor(s): Ann Annis, Rebecca Lehto

Almost 50 percent of U.S adults diagnosed with a substance use disorder (SUD) are dually diagnosed with a co-occurring mental health disorder. Individuals with mental health disorders may use substances to self-medicate aversive mental health symptoms, including anxiety, mania, and depression. Moreover, substance use can lead to changes in the brain increasing the risk of individuals developing a mental health disorder. Individuals dually diagnosed are at high risk for substance use relapse following recovery interventions. Improving access to effective treatment can potentially improve quality of life and improve mental health outcomes in this population. The purpose of this research is to explore the state of the science in regards to best treatment approaches for dual diagnosed SUD and mental illness. A literature search using Pubmed, PsychInfo, and CINAHL databases, using keywords: substance use, SUD, mental health, dual diagnosis, treatment, cognitive behavioral therapy, and psychiatric illness will be conducted. Inclusion criteria will be: adults, dual diagnosed mental health disorders, SUD, and published within the last 10 years. Identifying effective treatment approaches is important for nurses and mental health providers who are treating increasing numbers of individuals with dual diagnosed mental illness and SUD. Future research that evaluates best strategies to ensure patients are receiving optimal mental health and substance use interventions is essential.

SLEEP PROBLEMS IN ADOLESCENTS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER

Megan Ciric
Health Sciences, Poster Presentation
Section: 4
Presentation Number: 354
Mentor(s): Horng-Shiuann Wu

Attention Deficit Hyperactivity Disorder (ADHD) is a common disorder found in 3 to 7% of adolescents. Adolescents with ADHD experience impulsiveness and restlessness which impact their school and social performance. Problematic sleep is prevalent in 25 to 50% of adolescents with ADHD, and negatively affects ADHD symptoms, e.g., inability to focus and regulate emotions. The purpose of this review was to evaluate problematic sleep experienced by adolescents with ADHD. The literature review was conducted through PubMed. The keywords included adolescence, sleep, and ADHD. Systematic reviews, studies about sleep disorders, or studies with participants over the age of 18 were excluded. Eight articles focusing on specific sleep problems were chosen. Daytime sleepiness is the most frequently reported sleep problem in adolescents with ADHD. Based on parents' report, approximately 43% of adolescents with ADHD had a sleep latency of >30 minutes compared to 24% in those without ADHD. Parents also reported more mental confusion and slower thinking in their child due to excessive daytime sleepiness. Adolescents with ADHD had a shorter sleep duration than those without. Actigraphy findings showed that 20% of adolescents with ADHD slept less than 7 hours compared to 10% of those without ADHD. Polysomnography showed that those with ADHD slept 33 minutes less than those without ADHD. Adolescents with ADHD suffer from greater daytime sleepiness, shorter sleep duration, and problematic sleep initiation. These results support that the every-day symptoms of ADHD are negatively impacted by problematic sleep. Future research can explore ways to assist with these sleep problems.

SPEECH TREATMENT OUTCOMES FOR PATIENTS WITH HEAD AND NECK CANCER: A SCOPING REVIEW

Kate Oconnell, Madison Dunn, Pritha Gangapur
Health Sciences, Poster Presentation
Section: 4
Presentation Number: 355
Mentor(s): 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.

HISTORY, POLITICAL SCIENCE & ECONOMICS

EFFECTS OF COLONIZATION IN PUERTO RICO: MOVEMENT AND MIGRATION PRE/POST HURRICANE MARÍA

Rachel Voelkner
History, Political Science, and Economics, Oral Presentation
Section: 1
Presentation Number: 358
Mentor(s): Anna Pegler-Gordon

The neocolonial relationship existing between the United States and Puerto Rico is based on a history of colonization from Spain and the US which has manifested historically and modernly through political actions (and inactions) on parts of both the US and Puerto Rico. This has impacted how, when, and why Puerto Ricans migrate. These colonial/neocolonial policies, including the Foraker Act, Jones Act, and PROMESA, in hand with natural disaster Hurricane Maria, have driven people out of the Island in unprecedented numbers, which creates worsening austerity. Thus, Puerto Ricans remaining suffer from increasing poverty and unemployment as the ruling political classes of the US and Puerto Rico leave them abandoned. Puerto Rican's mistreatment throughout history has created strong local and community ties, which have continued to be reinforced in the aftermath of Hurricane María. Puerto Ricans have created forms of resistance to their controlling government exhibited in protests and rallies with the demands of ending PROMESA and other political goals. Solutions regarding the next steps of progress for Puerto Rico will not be successful unless how democracy operates fundamentally changes in both the US and Puerto Rico, and grassroots movements on the Island have shifted their demands to the creation of a democratic government that values accountability, equity, and social justice.

DRAINING THE SWAMP: THE DESTRUCTION OF ESSENTIAL LANDS

Dale Mize
History, Political Science, and Economics, Oral Presentation
Section: 1
Presentation Number: 359
Mentor(s): Susan Sleeper-Smith

The Black Swamp was an irregular strip about thirty miles wide, lying parallel to the east bank of the Maumee River from Lake Erie southwest to New Haven, Indiana. This great swamp, once 1,500 square miles, was an ecosystem that supported vast vegetation and wildlife. Native Americans lived along the swamp, using its rich soil for farming and the wildlife for hunting. However, by the 1850's with the increased number of settlers a new ideal of American progress was created, in which the swamp came to be "improved." We may think of environmental issues as a modern problem but in the 1800's the drainage and destruction of the Black Swamp helped create the environmental problems we face in the present day. The destruction of the swamp justified by the need for reliable roads as well as the desire to secure highly fertile farmland. To transform the swampland into farmland tile factories were established to supply the tiles that drained the swamp. These factories used clay directly from the swamp in order to create tiles and in combination with large drainage ditches the swamp was transformed into farmland. The destruction of this environment had a lasting impact on the land as well as the waterways that helped to feed the swamp.

HISTORY AND TESTIMONY IN THE DIGITAL AGE: STUDYING HOLOCAUST SURVIVORS. PANEL 1

Harika Gatla, Karina Canning, Lia Bergin, Maya Manuel, Ruby Congleton-Giancaspro
History, Political Science, and Economics, Oral Presentation
Section: 1
Presentation Number: 360
Mentor(s): Lynn Wolff

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 three) reflects study of Doris Bergen's authoritative War and Genocide and presents examples from the testimony of Holocaust experience on these themes: a) The roles of bystanders; b) Medical experiments on twins; c) Assaults on women; d) Trauma related dreaming in the post Holocaust years; and e) Persecution of the disabled.

HISTORY AND TESTIMONY IN THE DIGITAL AGE: STUDYING HOLOCAUST SURVIVORS. PANEL 2

Barshad Guragai, Chloe Shemano-Krupp, Jordan Smith, Logan Patterson, Phat Nguyen
History, Political Science, and Economics, Oral Presentation
Section: 1
Presentation Number: 361
Mentor(s): Deborah Margolis

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 three) reflects study of Doris Bergen's authoritative War and Genocide and presents examples from the testimony of Holocaust experience on these themes: a) The uses of faith in conditions of extreme suffering: b) Communism as a Nazi target; c) Zionism in the post-Holocaust years; d) Children in hiding; and e) Concentration camps as cites of medical experimentation.

HISTORY AND TESTIMONY IN THE DIGITAL AGE: STUDYING HOLOCAUST SURVIVORS. PANEL 3

Andrea Werkema, Bhavya Thotakura, Leah Welch, Margaret Stosio, Peyton Young
History, Political Science, and Economics, Oral Presentation
Section: 1
Presentation Number: 362
Mentor(s): 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 three) reflects study of Doris Bergen's authoritative War and

Genocide and presents examples from the testimony of Holocaust experience on these themes: a) The uses of faith in conditions of extreme suffering: b) Communism as Nazi target; c) Zionism in the post Holocaust years; d) Children in hiding; and e) Concentration camps as cites of medical experimentation.

COMMON THREADS: TRANSCULTURATION, SLAVERY, AND POLITICAL ECONOMY IN AMERICA AND ZANZIBAR, C.1800-1860

Jakob Myers
History, Political Science, and Economics, Oral Presentation
Section: 2
Presentation Number: 364
Mentor(s): John Aerni-Flessner

We may not notice them often, but goods like cotton and coffee are major parts of our lives even today. This was also true in the early 19th century, when American merchants brought cotton cloth to Zanzibar, where it was exchanged for goods like coffee, cloves, and ivory. American cloth was particularly desired and often used as a form of currency in the inland areas of Tanzania where the Sultanate of Zanzibar, which then ruled much of the East African coast, carried on much of its trade, bringing ivory and enslaved people to its coastal domains. merican merchants' interactions with the Sultan and his government were full of contradictions. Most of them hailed from the abolitionist hotbed of Massachusetts, yet made money from trading partners who depended on slavery. Many of them also arrived in the midst of a highly imperialist and expansionist period in American history, but the United States had only a weak naval presence in the region to back up its imperial pretensions. The goods Americans brought to East Africa were economically significant on a global scale as well. While mass-production of textiles in New England mills inaugurated a transition in the US from “commercial capitalism” (mediated by merchants and oriented around agriculture and trade) to modern “industrial capitalism”, it also increasingly brought the Zanzibari shamba (farming estate) and Zanzibar's ruling class into global streams of trade, thus transforming its economy as well.

ENVIRONMENTAL AND INDIGENOUS POLICIES IN CHINA AND TAIWAN: DOES A RELATIONSHIP EXIST?

Kathleen Fallon
History, Political Science, and Economics, Oral Presentation
Section: 2
Presentation Number: 365
Mentor(s): Mark Axelrod

This work seeks to ask if environmental policy divergence may be correlated to the treatment of Indigenous groups in the jurisdiction of Mainland China and Taiwan respectively. This question operates off the divergence of environmental policies between the two states and the role Indigenous groups play in improving the environmental policies of their host country. The driving hypothesis in this work is that among China and Taiwan, the state with better provisions to Indigenous groups will show greater adherence to certain articles of the UN's 2015 Sustainable Development Goals. To better understand this relationship, this work compares major Indigenous policies from both states and their application of Articles 2, 3, 18, and 24 of The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and then compares major environmental policy from both states and their application of Articles 7 and 12 from the UN's 2030 Sustainable Development Goals. The results of this analysis found that, as presented within the confines of this research, China fulfilled all of the environmental goals considered in the paper, whereas Taiwan did not. This finding disagrees with the original claim that there is a positive relationship between Indigenous policies and environmental policies, at least within the context of the articles and goals selected for this

work. The conclusion of this work encourages further research on the subject of Indigenous and environmental policy, and the relationship between them to be explored in future scholarship.

COMPARING SURVEY RESPONSES OF DEMOCRATIC AND REPUBLICAN CAMPAIGN CONSULTANTS

Natalie DelVecchio
History, Political Science, and Economics, Oral Presentation
Section: 2
Presentation Number: 366
Mentor(s): Matthew Grossmann

Will progressive left “resistance” movements have a lasting impact due do their growing popularity? Has the Trump Presidency and the popularity of Trump significantly changed the republican party? These are some of the questions I will assess from the perspective of political campaign consultants, who make decisions about how candidates can appeal to voters in primary and general elections. The Institute for Public Policy and Social research has conducted several surveys amongst various media and general strategy campaign since 2007- and most recently 2020. These surveys asked questions about both the extent to which the consultants agreed with specific statements and the demographics of those consultants. Majority of the statements on the surveys cover elections, candidates, campaigns, consultant attitudes and demographics, and political parties. The statements ask about historical, current, and future perceptions to help understand how the consultants feel these topics have changed or will change over time. For example, there are specific questions about social and political movements, including the impact of the progressive movement and supporters of Donald Trump. Another section of the survey focuses specifically on candidates and asks the consultants to rate characteristics on importance, including candidate ideologies, morals, and experience. Through this research, I hope to organize the responses to the questions to evaluate consultant views and compare the views of Democratic and Republican consultants. I will also explore the differences in opinion and practices based on the demographics of the consultants. In addition, I will use comparisons to prior surveys to understand how campaigns have changed over time.

TPS: NOT SO TEMPORARY PROTECTED STATUS

Zack Beculheimer
History, Political Science, and Economics, Oral Presentation
Section: 2
Presentation Number: 367
Mentor(s): Anna Pegler-Gordon

At this moment over 411,000 individuals live in the United States on the TPS program (Temporary Protected Status). For perspective, that's roughly the same size as the city of Minneapolis, one of the 50 largest cities in the United States. This easily makes TPS one of the most significant temporary immigration programs in the United States. However, since its origin in the 1990 Immigration Act, the United States Temporary Protected Status program has struggled to live up to a rather important part of its name: temporary. Since its inception the program has grown exponentially, increasing both its total populations and the average duration of status considerably. As the program has grown so too have the issues and externalities that accompany it and impact the lives of its status holders. The yearly process of renewals, lack of ability to apply for new and alternate statutes, and limited government safeguards within the program have led to excessive hardships for these residents, particularly families. This research seeks to study the externalities the program has created for families in the areas of social development, mixed-status impact, and remittances. To accomplish this the study will analyze secondary sources that discuss specific conditions and

effects of TPS such as “liminal legality” and “permanent temporariness” and apply them to primary sources and evidence of El Salvadoran families in order to provide evidence of these effects firsthand.

THE COST OF COVID: ASSESSING THE IMPACT OF COVID-19 ON MICHIGAN’S BUDGET

Michael Breslin
History, Political Science, and Economics, Oral Presentation
Section: 3
Presentation Number: 370
Mentor(s): Matthew Grossmann

COVID-19 has left state governments facing revenue deficits, budget cuts, and in desperate need of federal aid. Michigan is no exception. However, Michigan’s public finances have fared better than many other states. Because its tax revenue is projected to be greater than expected, the state made minimal cuts to its budget. What’s more, those cuts were largely offset by federal coronavirus relief funds. This research explores how Michigan’s revenues and expenditures were impacted by COVID-19. It also asks why Michigan’s revenue outperformed expectations. By synthesizing and analyzing state-level fiscal data, the research finds that swift federal relief largely mitigated the economic impacts of COVID-19 in Michigan as the state took full advantage of available federal aid, moving money between pools to compensate for losses. Differing tax revenue sources also helps explain inter-state disparity: Michigan relies on sales tax, which has rebounded during the pandemic. By examining what factors helped Michigan stave off a deeper budget hole, as well as what hurt states that were not so lucky, this research hopes to provide a roadmap of fiscal policy for future economic shocks to Michigan and its counterparts.

WHY CONTACT MATTERS FOR DEMOCRATIC INCORPORATION OF WOMEN OF COLOR

Jasmine Jordan
History, Political Science, and Economics, Oral Presentation
Section: 3
Presentation Number: 371
Mentor(s): Nazita Lajevardi

Does personal and contextual contact with women of color shape the levels of discrimination that other Americans perceive women of color to experience in political, social, and economic spaces in the US? Contact between people is fundamental to societies. While numerous policies in pursuit of democratic incorporation mean to improve outcomes for minorities in the US, setbacks remain, particularly for women of color, who report higher levels of discrimination, are frequently targeted by politicians and policies that single them out, and are disparately affected in health outcomes and in the labor market. Scholars argue that contact is an important mechanism for prejudice reduction and for socioeconomic mobility, though they rarely distinguish between personal and contextual contact, often fail to develop historical accounts and group-specific theories, and to date have neglected women of color—a most important group that has been overlooked by the scholarly literature. In this project, we will pool together several large original surveys of Americans and evaluate whether contextual contact—or the types of passive interactions that individuals have in the neighborhoods where they reside—and personal contact—or the type of active contact that individuals form in schools, in social settings, in families, and in the workplace—with women of color affects individuals' understanding of the levels of discrimination that individuals perceive women of color to experience in politics, day-to-day social interactions, and the workplace. Together, our project will highlight the experiences of women of color and will answer increasingly pressing policy questions about how they fare in American democracy.

PRESERVING HUMAN RIGHTS: AN ANALYSIS OF THE FIGHT TO END CONVERSION THERAPY

Kristin Mertz
History, Political Science, and Economics, Oral Presentation
Section: 3
Presentation Number: 372
Mentor(s): Patrick Arnold

The pathologization of homosexuality is the product of the long-standing oppression and stigmatization of LBGTQ+ individuals in the U.S. While homosexuality is no longer classified as a mental disorder, conversion therapy still exists as a destructive force that threatens the human rights and autonomy of many minors. As of March 2020, 19 states, including the District of Columbia, Puerto Rico, and many municipalities, have banned conversion therapy (Bracken 334). For some parents, the conflict between religious morality and homophobia can raise extreme conflict between two supposed lifestyles. It can be theorized that at the core of this fear is the potential loss of belief systems, family community and core identity. In an effort to implicate conversion therapy bans, it is important to investigate the following questions: How is it that conversion therapy is still taking place? What are the mechanisms that allow it to function? What are the arguments for supporting conversion therapy in the U.S.? In order to dismantle the ideologies of oppression facing LBGTQ+ people on the basis of religion, it is vital to take a critical look at the detrimental outcomes of conversion therapy on the individuals it affects. Proponents of conversion therapy rely on the lack of research condemning their actions, thus there is a need to evaluate the experiences of survivors as adequate evidence for the need to ban conversion therapy on a national and global scale.

WE ARE NOT OUR ANCESTORS: RACISM AND THE POST-BELLUM EXPERIENCE OF THE OPPRESSED

Courtney Parker
History, Political Science, and Economics, Oral Presentation
Section: 3
Presentation Number: 373
Mentor(s): Delia Fernandez

Throughout American history, southern black folk have been denied equal freedom, justice before law, and thus prescribed to second class citizenship as a condition fundamental to contemporary American life. First by law, and tantamount by legislature, the timeline of 1865 through 1930s in the United States encapsulates the essence of racial discrimination. This paper analyzes W.E.B. Dubois' Black Reconstruction as a primary source, along with critical analysis of the judicial and legislative precedent: the separate but equal doctrine, Southern Black Codes, and in the country's developing educational system. Laws passed within this era illuminate the changing ideas around how blacks will participate in post-bellum life by holding the line for inclusion, and how only through lawsuits coupled with widespread re-examination of typical American attitudes dismantled social and economic discrimination not at one time, but across a period of consciousness did black people get some rights underwhich they were entitled in the US Constitution. This research asks: Through what ways has the Government of the United States between the years of 1865-1955 denied blacks full citizenry given in the Fourteenth, Fifteenth, and Sixteenth Amendment? What does sharecropping and thus migration mean for the Southern planter class?

STUDY OF GREAT LAKES REGION CIRCULAR ECONOMY PRACTICES

Kisanet Gebresilase, Lea Dyga
History, Political Science, and Economics, Poster Presentation
Section: 4
Presentation Number: 376
Mentor(s): Rex Lamore

Our current supply-chain paradigm is centered around a linear economy in which we make-take-waste, leading to overproduction and increased waste in the ecosystem. In fact, recent studies indicate that the global human-made mass exceeds all living biomass. The circular economy is an intentional framework shift that addresses this disconnect between economic and environmental health and sustainability by offering radical waste management policies and practices to address the issues at their source. Implementing circular economy practices helps to mitigate climate change, reduce waste, and enhance environmental quality. It is evident that transitioning to a circular economy requires the involvement of government agencies, private sectors, consumers, as well as research and educational institutions, hence all stakeholders should stay connected and work collaboratively. To facilitate this transition, the Michigan State University Center for Community and Economic Development's circular economy research team developed a short survey to begin canvassing the Great Lakes region and to understand where states and provinces stand in their progress around and attitude towards circular practices. Specifically we examined existing circular economy initiatives and extended producer responsibility policies, strategies on waste management, and the challenges that hinder a state or province from transitioning to a circular economy. We identified leaders and lagers in the regions, points of intervention, benchmarks for progress, and examined successful programs in action. Based on the findings, we compiled a list of recommendations and datasets that could set a direction for future circular economy initiatives and programs in the Great Lakes Region.

CREDIBLE INFERENCE USING CELL PHONE TRACKING INFORMATION

Jack Mueller, Nicholas Ditommaso
History, Political Science, and Economics, Poster Presentation
Section: 4
Presentation Number: 377
Mentor(s): Michael Conlin

Governments across the world have implemented policies to reduce the transmission of the COVID-19 virus. Medical doctors, epidemiologists and social scientists have all conducted research to quantify both the transmission and economic impact of these policies. To measure the degree to which communities undertook social distancing, many researchers used measures of cell phone movement as proxies for social distancing. One of these measures is the number of cell phone visits to different types of “establishments” such as grocery stores, restaurants, retail stores, public buildings, and other locations that individuals congregate. Using daily-store level transactions from a large grocery store chain, we consider how well establishment level cell phone data proxies for the number of grocery store customers and the amount of social interaction that is occurring within grocery stores. More importantly, we test whether the relationship between the number of cell phones and store transactions changes due to the pandemic and whether this change is a function of a store's market and customer demographics. Our main finding is that the change in this relationship at the start of the pandemic varied significantly based on the age, racial composition and income of a store's market and customer base. This finding suggests researchers using establishment-level information on number of cell phones to proxy for social mobility should consider the potential selection issues associated with this proxy and whether these selection issues influence the interpretation of the researchers' empirical findings.

PERSONALITY TRAIT ESTIMATION OF SUPREME COURT SHORTLISTERS

Justin Fernando, Kelsey Reichert, Lilli Meng
History, Political Science, and Economics, Poster Presentation
Section: 4
Presentation Number: 378
Mentor(s): Jonathan King, Ryan Black

The United States federal judiciary is a hierarchy with the Supreme Court sitting at the top. Logically, scholars have been drawn to study the behavior of the court of last resort. Nominations to the Supreme Court captivate the public's attention and provide substantial media coverage. Nominating a Supreme Court justice is, arguably, one of the most important and long-lasting actions of a presidency. We know that qualifications, ideology, and luck all play important roles in being nominated. What is less understood, however, is the role of personality. This deficit has not gone unnoticed with scholars of the U.S. Supreme Court recognizing the need for studies examinations of the impact of personality on the nominations process. Our research seeks to answer this call. In order to develop personality trait estimates on shortlisters, texts and speeches given by the candidates must be collected. Information on shortlisted candidates can be difficult to come by. Gathering years of academic articles, blog posts, and speeches, amongst others, requires hand coding and significant research using a variety of sources including the Federal Judicial Biographical Center, Google Scholar, LexisNexis, and individual judge websites. Further, the texts, once collected, must be cleaned to a machine-readable format. Our research team provides the first large-scale data collection and cleaning project of shortlisted candidate writings for all Supreme Court shortlisters including the 2016 shortlist of Donald Trump and the soon-to-be-released 2020 shortlists. This provides a first glimpse of shortlister personality traits.

GERMAN COMMUNISTS AND COMMUNISM'S PRESENCE DURING THE HOLOCAUST

Bhavya Thotakura
History, Political Science, and Economics, Poster Presentation
Section: 4
Presentation Number: 379
Mentor(s): Deborah Margolis, Lynn Wolff, Steven Weiland

The Holocaust was a global event that has led to worldwide consequences. It was a gradual process carried by sequential events along with tension caused by World War II. While the Holocaust was anti-Semitic against the non-Aryans (opposite of Jews), it was also an attempt to suppress Communism and expand the Nazi regime. Communism had a great presence in the Holocaust from Germany-Soviet Union tensions from Hitler wanting to expand eastwards and due to political ideology differences. Communism was a target of Nazism and Jews were accused of having created it as a way to destroy Germany. The Nazi revolution of 1933 and 1934 brought a great number of communists into concentration camps. Moreover, hatred stemmed from the belief that Jews and Communists caused Germany's defeat in World War I. German Communists were outcasted and placed into reeducation camps where they would be turned into useful citizens under the Nazi regime's ideology. This paper will study four main subtopics: (a) why communism was a threat to the Nazis, (b) how Soviet and Nazi tension affected the Holocaust, (c) daily treatment of German communists and their treatment in concentration camps, and (d) if there was any German communist resistance against the Nazi regime.

COVID, FEDERAL AID, AND MICHIGAN FARMWORKERS

Danny Olweean
History, Political Science, and Economics, Poster Presentation
Section: 4
Presentation Number: 380
Mentor(s): Anna Pegler-Gordon

The purpose of this study is. to gain the perspectives of those in the agricultural industry on federal relief during COVID-19 for farmworkers. Specifically, questions were asked on how relief is structured, dispersed, and impacted by COVID guidelines.

HUMAN SOCIETY & RELATIONSHIPS

DO WE GET ALONG?: UNDERSTANDING RACE RELATIONS AND RACIAL CLIMATE AT A PREDOMINATELY WHITE UNIVERSITY (PWI)

Antanae Love-Humble, Casey Pearson
Human Society and Relationships, Poster Presentation
Section: 1
Presentation Number: 384
Mentor(s): Terry Flennaugh

As a part of a youth-led undergraduate research project, students examined how their classmates at a large mid-West research university understood the relationship between different racial groups on campus. Over 200 students responded to an online survey to gather information on sources of information about racial climate on campus, stereotypes about different racial groups, and individual attitudes about socializing with students from different racial groups. Survey results highlight the complexity of racial understandings and social practices at racially diverse college campuses. Study findings have implications for higher education researchers and university staff and students interested in bettering the racial climate on college campuses.

SURVEY-BASED ASSESSMENT OF COMMUNITY CAT WELFARE AND SOCIOECONOMIC CORRELATIONS

Ashley Dunn
Human Society and Relationships, Poster Presentation
Section: 1
Presentation Number: 385
Mentor(s): Jacquelyn Jacobs

When surrendered and stray animals outnumber suitable adopters, the typical outcome is euthanasia. While the rates of euthanasia have declined in recent years, overpopulation of dogs and cats in the United States remains a pressing concern. In cats, a major contributor to the excess of unwanted animals is unowned outdoor cats (commonly known as feral or community cats). These individuals, who are often unsocialized and tolerate only limited human contact, breed prolifically, resulting in exponential population growth. The only effective and humane approach to managing community cat colonies is trap-neuter-return (TNR). Through this project, I aim to map the welfare of community cats across Ingham County and identify correlations with socioeconomics. I will measure welfare based on actions, attitudes, and knowledge of community cats. I plan to survey residents of each of the 21 county subdivisions in Ingham County. By better understanding how the welfare of community cats varies geographically, future intervention programs can be implemented in a targeted manner. Doing so will maximize the efficiency of the limited resources held by shelters and rescue groups, improving the quality of care provided and increasing the number of animals reached.

PARENT PERCEPTIONS OF INTIMATE RELATIONSHIP EXPERIENCES OF ADULTS WITHIN INTELLECTUAL DISABILITIES: COMPARISONS WITH TYPICALLY DEVELOPING SIBLINGS

Alanna Desibour

Human Society and Relationships, Poster Presentation
Section: 1
Presentation Number: 386
Mentor(s): Rebecca Kammes, Sarah Douglas

This study examines the role that parents play in the creation and maintenance of intimate relationships for their adult child with an intellectual disability (ID). This was done by asking parents who have an adult child with ID, as well as a typically developing (TD) adult child, to compare their experiences between these two adult children. This study finds that parents struggle with determining the appropriate level of involvement they should have in the romantic relationships of their adult child with ID, and that there is a strong need for coaching and mentoring for parents to help them navigate these experiences successfully.

UNDERSTANDING THE EXPERIENCES OF SIBLINGS OF INDIVIDUALS WITH AUTISM SPECTRUM DISORDERS

Rachel Elms

Human Society and Relationships, Poster Presentation
Section: 1
Presentation Number: 387
Mentor(s): Sarah Douglas

Our qualitative meta-synthesis analyzed the relationship and experiences between typically developing siblings and their sibling with ASD. The research is important for identifying the needs of siblings of individuals with ASD, whether that is therapy, social support, etc. and can also be applied to educating positive coping and problem-solving strategies for typically developing siblings. We utilized a theory generating meta-synthesis, which allowed us to create a theory that is generalizable and can broaden the understanding of the social support needed for siblings with ASD and their typically developing siblings.

OUTLINING THE PROCEDURE AND FEASIBILITY OF ADAPTING A BEHAVIORAL SELF-REGULATING MEASURE FOR REMOTE DATA COLLECTION.

Laura Scarcelli, Toriona Day

Human Society and Relationships, Poster Presentation
Section: 1
Presentation Number: 388
Mentor(s): Hope Gerde, Sammy Ahmed

The COVID-19 pandemic has led to a significant shift in the way research is carried out with populations of young students. Not only do school closures and distance learning have implications for how instruction is provided, but have also significantly changed the ways in which data can be gathered from young students. In the current study, we describe the various challenges and considerations of adapting a direct measure of children's behavioral regulation (Head-Toes-Knees-Shoulders Task; HTKS) for a remote-testing study of 97 preschool students. We will describe how issues related to access to technology and reliable internet, ample testing space in children's homes, and differences in guardianship across households informed our task adaptation and data collection procedure. Next, we will carry out tests of reliability and compare the child scores on our behavioral regulation measure gathered using the in-person format (fall 2019) and remotely (fall 2020) to ensure our task adaptation was successful. The findings from this study have the potential to inform task selection and adaptation for remote-testing studies involving young students and have implications for the way early childhood research can be conducted remotely.

A STRATEGIC APPROACH TOWARDS UNDERSTANDING COMPANY AND UNION POWER

Claire Bahorski, Haley Blackmon, Jayla Jolly, Shianne Booth

Human Society and Relationships, Poster Presentation
Section: 1
Presentation Number: 389
Mentor(s): Maite Tapia Y Van Maldeghem, Stacy Hickox

This research focuses on understanding to what extent companies maintain their labor and human rights standards. Across the world, workers are struggling to survive in the face of the globalization of firms. Firms are no longer bound by national boundaries but have worldwide operations and are ready to move their investment often to exploit cheap markets and cheap labor. Specifically, in this research project, we conducted strategic corporate research to understand the corporate social responsibility strategies, labor rights, and brand image among others of United Health - the largest healthcare company in the world and the 6th largest corporation in the US according to Fortune 500. This research was done in collaboration with UNI Europe, the European Services Workers Union, representing more than 7 million workers and the School of HRLR. Some of our main findings show that United Health is dedicated to serving their communities by investing over $500 million in housing projects around the United States, and donating over $2 billion in coronavirus aid to care providers. Our research also found that United Health has acquired multiple companies by 'quietly' buying specialty pharmacies and merging them into their pharmacy benefit management business, OptumRx. Acquiring these companies allows UnitedHealth Group to venture into other insurance industries as well as eliminates competition from other organizations. It appears that they are primarily focused on the insurance industry and are going to continue acquiring various companies as their prime sector. Through this project, we have gained research skills as well as a better understanding of the practices of UnitedHealth.

A QUALITATIVE META-SYNTHESIS TO UNDERSTAND THE FRIENDSHIP EXPERIENCES OF INDIVIDUALS WITH DEVELOPMENTAL DISABILITIES

Karli Carpenter

Human Society and Relationships, Poster Presentation
Section: 1
Presentation Number: 390
Mentor(s): 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 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. 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.

HUMANITIES

STITCHED TOGETHER: DOCUMENTING THE VIBRANCY OF BLACK BOTTOM DETROIT COMMUNITIES THOUGH REDWORK QUILTING

Berkley Sorrells
Humanities, Oral Presentation
Section: 1
Presentation Number: 392
Mentor(s): Marsha MacDowell

The Black Bottom neighborhood of Detroit was once home to a thriving African American community, with homes, schools, businesses that was razed in urban renewal efforts by the city of Detroit for the construction of interstates and manufacturing plants in the mid 1960s. In 2018, the Michigan State University Museum acquired a unique redwork quilt with twenty squares of fabric containing the unique signature of the individual square makers, often followed by an address or phone number. A majority of these addresses traced back to Black Bottom and surrounding areas, with each square foretelling an individual story of a greater narrative that had been woven together. Of the homes whose addresses are documented on the quilt, none remain standing today; rather they are barren strips of grassy land east of bustling Midtown Detroit. Utilizing online platforms like Ancestry.com, the Quilt Index, city directories, and multiple newspaper databases such as the Michigan Chronicle, along with other virtual archival materials, I have worked to uncover the stories of these twenty women and their families initiated by the material evidence provided by the quilt. This research journey uncovers their stories, shows what links them together, and documents the vibrancy of the now vacant land where they once lived. While the homes and individuals are not standing, they are preserved in the lives of those who lived to see them. In amplifying the voices of the twenty women and their families, we fill in previously blank pages in collective history.

COVID-19, CAPITALISM AND DEATH: HOW AND WHY BLACK LIVES MATTER

Fatima Konare
Humanities, Oral Presentation
Section: 1
Presentation Number: 393
Mentor(s): John McClendon

I have been working on two book manuscripts with Dr. John H McClendon that will be a part of a published series. This semester I have been focusing on Book 1, Black Lives Matter: Philosophical Considerations on Political Economic Contradictions. I will be focusing critically on my research done in chapter 3. The data I am collecting is both qualitative and quantitative in nature. In my statistical analysis, I will look at the allocation of funds to the Justice Department by way of an Executive order signed, which enabled a federal police operation, also known as "Operation Legend," to suppress the Black Lives Matter movement. My analysis will also include homelessness rates due to COVID-19, vaccine hesitancy in black communities, the experience of many black women during the global pandemic, and the Material Conditions of African American Deaths. The Coronavirus Pandemic explicitly shows how capitalism and racism are more than risk factors for dying of COVID-19; Instead, it is precisely why black people are dying at an exponentially higher rate. In analyzing my qualitative data, I will give a descriptive, diagnostic, predictive, and prescriptive analysis of the dialectical materialist philosophical notions and their implications on putting black lives more at risk for catching covid-19. My research with Dr. McClendon fills a vital intellectual/academic lacuna concerning the historical juncture that contextualizes such significance for fundamental social change.

LOST IN TRANSLATION: STORYTELLING ACROSS LANGUAGES & CULTURES

Matthew Miller
Humanities, Oral Presentation
Section: 1
Presentation Number: 394
Mentor(s): Stephen Esquith

Since last spring, I have been involved in various projects through RCAH with the Malian Commission Vérité, Justice, et Réconciliation (CVJR). This commission provides a platform for survivors of violence at the hands of the Malian state and various rebel groups to have their stories heard publicly. Our teams at RCAH and in Bamako have worked together to create storyboards and video animations based on this testimony, which will soon be reviewed by community focus groups in Mali. While the video will be viewed in French, many people in these groups will likely not have a very high level of French and will therefore conduct the conversations in their local language. I will be analyzing this unique linguistic environment, pulling on notes and interviews with the Malian fieldwork team to understand the role language will play in the success of these sessions. My creative project will take the form of an autoethnography, reflecting on what I learn from our Malian partners and drawing on my own experiences with language learning and storytelling in cross-cultural contexts. I hope to gain a better understanding of how we can work to bridge the language and cultural barriers in situations where mere translation may not suffice.

PSYCHOLOGICAL HORROR IN THE WORKS OF STEPHEN KING

C Widmann
Humanities, Oral Presentation
Section: 1
Presentation Number: 395
Mentor(s): Hui-Ling Malone

Stephen King has long been the patriarch of the horror genre; his 87+ books have sold millions of copies nationwide. His books range from alarming to all-out-terrifying, exploring seemingly every avenue of horror at some point in his works. But what makes his work truly terrifying is the psychological horror that supersedes any other type of horror in his works. Body horror, psychological horror, and supernatural horror are the conventions of modern horror works, and King blends them to create his personal brand of writing. In this paper I will examine King's prominent works and identify the elements of psychological horror that play a more effective role than body horror or supernatural, though the three elements are interlinked in his brand of horror writing.

SECRETS OF THE YEAR: SWISS ALMANACS FROM THE 18TH CENTURY

C Widmann
Humanities, Oral Presentation
Section: 1
Presentation Number: 396
Mentor(s): Liam Brockey

Michigan State University Special Collections acquired a set of 5 Swiss almanacs dating to the 18th century, all containing handwritten notes in French and German. The owners of the almanacs were unknown, and no translations had been made. A basic translation and examination were conducted, and three authors identified. Two of the three authors discovered were able to be tracked through Swiss genealogy and referenced in historical texts. Further translation of the almanac notes revealed the author's day-to-day activities, and connections were made to the social and political climate of Switzerland at the time. This aided the MSU Special Collections in updating its catalog and the added knowledge of the

texts increased their usefulness as a classroom primary source.

INTEGRATIVE BIOLOGY & ORGANISMAL BIOLOGY

FMR1 GENE EXPRESSION IN HOMO SAPIENS AND BOER GOATS BY RECORDING RESPONSES TO VISUAL PHYSICAL CUES

Troy Todd
Integrative Biology and Organismal Biology, Oral Presentation
Section: 1
Presentation Number: 398
Mentor(s): Douglas Luckie

Homologous genomes responsible for certain behaviors through evolutionary conservation can be linked between species of similar evolutionary descent. The purpose of the research about this phenomena was to document learned behaviors in humans and Boer goats (capra aegagrus hircus). Both subjects were challenged to complete a novel task and their responses were compared to discover homologous shared behaviors. Human subjects were subjected to a number of trials where they were shown 2 inverted bowls, one of which was baited with a reward for the subject. The baited bowl was gestured towards by a researcher using one of 3 physical cues, including looking at, pointing toward, and touching the bowl. In control trials, the researcher simply looked straight ahead, not gesturing at the bowl in any way. It was found that the gestures that included the hands (pointing and touching) were significantly more successful in cueing the subject towards the correct bowl than those that only included the head (looking and the control). A possible homologous gene that connects the two species' behavior could be the FMR1 gene, which is responsible for neuron plasticity that is necessary to respond to physical cues and to learn novel tasks. Primers to perform PCR and gel electrophoresis targeting the FMR1 gene, a possible homologous gene, have been designed (the forward primer: 5'-CGGCAAATGTGTGCCAAAGA-3'; reverse primer: 3'-AGGTCTCCCCATACCATGGT-5'). These will be used to identify and document conserved DNA sequences between species.

SALAMANDER SCENTS

Meigan Starr
Integrative Biology and Organismal Biology, Oral Presentation
Section: 1
Presentation Number: 399
Mentor(s): Danielle Whittaker, Louise Mead

Plethodon cinereus, the red-backed salamander is a terrestrial, lungless salamander found throughout the Eastern United States. The species is known to use proteinaceous pheromones produced by a specialized gland on the chin, known as the mental gland, for communication during courtship. These pheromones have been well-characterized but have not been found to be expressed outside of this gland. However, past studies have indicated that P. cinereus often uses fecal pellets to communicate information to conspecifics about sex, kin, and individual recognition, raising the question of whether they use alternate forms of communication outside of pheromones. Studies have shown that birds and mammals have symbiotic bacteria that produce volatile compounds used for communication, and we predict that the bacteria associated with salamander cloacae, including both skin and gut microbes, produce volatile compounds used by salamanders for communication. In this study, we characterized bacteria found on the mental gland, the ventral side, and the cloaca of P. cinereus as well as in fecal pellets. We also characterized the volatile compounds given off at each of the four target areas.

VARIATION IN PHENOTYPIC TRAITS WITH LATITUDE WITHIN THE COASTAL PERENNIAL ECOTYPE OF MIMULUS GUTTATUS

Thomas Zambiasi
Integrative Biology and Organismal Biology, Oral Presentation
Section: 1
Presentation Number: 400
Mentor(s): David Lowry

Adaptive variation in plants is vital to their survival and can be especially pronounced across geographic clines. The coastal perennial ecotype of Mimulus guttatus differs phenotypically from the inland annual ecotype; the damp coast promotes perennial growth, thicker stems, and taller plants. However, variation also exists within these coastal environments. Not only are climates cooler at higher latitudes along the United States Pacific coast, but wind speeds also increase. Preliminary observations of M. guttatus in the field noted phenotypic variation within the coastal ecotype. This led us to collect measurements from two separate experiments—each growing seed from multiple populations of the coastal perennial ecotype—to assess variation in plant height along a latitudinal gradient. Taking mean plant height from across each study population, we evaluated the linear relationship between population latitude and average height. In both growth experiments, plant height decreased with an increase in latitude. These results suggested that one or several variables correlated with latitude could affect the height of coastal M. guttatus, such as temperature, precipitation, salt spray, and wind speed. This opens the door for further investigation into the effects of varied environmental factors on the growth and reproduction of coastal perennial Mimulus.

USING PLANT AND FRUGIVORE TRAITS TO UNDERSTAND BIODIVERSITY ACROSS SCALES AND INFORM CONSERVATION

Hazel Anderson
Integrative Biology and Organismal Biology, Oral Presentation
Section: 1
Presentation Number: 401
Mentor(s): Beth Gerstner, Patrick Bills, Phoebe Zarnetske

Global changes like climate change and habitat destruction are threatening species and causing declines in biodiversity. The Neotropical region is predicted to be an area of particularly high risk of extinction and is home to 37% of the world's known plant species. To conserve biodiversity and identify biodiversity hotspot locations, we need to know where biodiversity is highest and most threatened. Plants are essential to ecosystem functioning and understanding their patterns of biodiversity can help identify regions for conservation for numerous species relying on them. Unfortunately, we lack information on plant biodiversity patterns as well as their respective conservation statuses. Knowing how certain plants and their traits are distributed in relation to animals that eat fruits (frugivores) and their traits could help quantify spatial distributions of biotic interactions and map patterns of biodiversity. Most conservation decisions are made based on a simple metric of species richness, but multiple dimensions of diversity should be used to quantify biodiversity as it creates a more holistic picture. This study used already existing big datasets of species occurrence records and functional traits to determine where are the spatial patterns of taxonomic and functional diversity most correlated between plant and frugivore species in the Neotropical country of Ecuador. Quantifying these relationships is important because multiple dimensions of biodiversity can be more comprehensive in identifying conservation priorities.

ROLE OF THE VENTRAL PALLIDUM IN THE REGULATION OF SOCIAL PLAY BEHAVIOR IN JUVENILE RATS

Elie Huez
Integrative Biology and Organismal Biology, Oral Presentation
Section: 1
Presentation Number: 402
Mentor(s): Alexa Veenema, Jessica Lee

Social play behavior is a rewarding behavior and displayed by juveniles of many mammalian species. Engagement in social play behavior is important for the development of social competence throughout life. Children diagnosed with neurodevelopmental disorders such as autism spectrum disorder (ASD) show social play deficits, which may contribute to their life-long social deficits. Therefore, it is essential to understand how the brain modulates the expression of typical and impaired social play behavior. In the present study, we aimed to determine the role of the ventral pallidum (VP) in modulating social play behavior in male and female juvenile rats. The VP is a brain region that regulates adult social behaviors such as maternal behavior and pair-bonding, but its role in regulating juvenile social behaviors, such as social play, is unknown. We first determined whether activation of the VP is required for the expression of social play by temporarily inactivating the VP via local infusion of the GABAA receptor agonist muscimol. We found that pharmacological inactivation of the VP decreased social play behaviors in male and female rats. Next, we determined whether exposure to social play altered neuronal activation of the VP using fos as measure of cellular activity. We observed that social play exposure increased the number of fos-positive cells in the VP in males while no changes in fos-positive cells were observed in females. Together, these findings provide first evidence that activation and sex-specific recruitment of VP cells is essential for the expression of social play behavior in juvenile rats.

TEMPORAL DYNAMICS OF SOCIAL VERSUS FOOD INVESTIGATION IN C57BL/6 MICE AND WISTAR RATS

Valerie Khaykin
Integrative Biology and Organismal Biology, Oral Presentation
Section: 4
Presentation Number: 701
Mentor(s): Christina Reppucci

We recently characterized the Social versus Food Preference Test, a behavioral paradigm designed for investigating competition between the choice to seek social interaction versus food, and examined how stimulus preference was modulated by social isolation and/or food deprivation using a 2x2 within-subjects design in C57BL/6 mice and Wistar rats. During 10-min tests, each subject was placed in a 3-chamber apparatus where it could freely explore a social stimulus (novel species-, age- and sex-matched conspecific) and a food stimulus (standard lab chow) that were corralled on opposite ends. Previously, we found that social isolation did not alter stimulus preference in either species, but that food deprivation induced a food preference in mice and reduced a social preference in rats. Here, we expanded our analyses by determining how time spent in stimulus zones changed over the course of the test periods. In mice, time in the social zone was stable across the test period under all conditions, while time in the food zone increased over the course of the tests conducted under food-deprived conditions. In rats, time in the social and food zones was stable across the test period under all conditions. These results indicate that the length of the test matters for choice behavior in mice but not in rats because we showed that the food deprivation-induced food preference in mice is driven by behavior in the latter portion of the test, while the food deprivation-induced reduction in social preference in rats is reflective of behavior throughout the test.

NEURAL SUBSTRATES OF SOCIAL AND FOOD INVESTIGATION IN ADOLESCENT C57BL/6 MICE

Navya Kalia, Valerie Khaykin
Integrative Biology and Organismal Biology, Oral Presentation
Section: 4
Presentation Number: 702
Mentor(s): Alexa Veenema, Christina Reppucci

Social interaction-seeking and food-seeking behaviors are both motivated behaviors that we hypothesize are regulated by overlapping neuronal populations. To test this, we exposed male and female adolescent C57BL/6 mice to either a food stimulus (standard lab chow), a social stimulus (unfamiliar age- and sex- matched mouse), or an empty corral. Before testing, all mice were socially isolated and food-deprived to increase their motivation to investigate the stimuli. Overall, mice spent more time investigating the food stimulus than the social stimulus, and tended to spend more time investigating the social stimulus than the empty corral. Following the test, the mice were sacrificed and their brains were collected to measure neuronal activation (using Fos induction as a marker) in response to stimulus investigation. We examined activation of orexin neurons in the lateral hypothalamus (LHA) and dopamine neurons in the ventral tegmental area, two neuronal populations shown to regulate motivated behaviors, including social- and food-related behaviors. We observed no significant differences in Fos induction for either neuronal population between groups, suggesting that these populations are not selectively recruited by investigation of social or food stimuli. However, trending positive correlations between medial LHA Fos induction and investigation time in all groups suggests that this population may regulate nonspecific investigation. Examining the same brains, we are currently investigating the activation of another neuronal population implicated in social- and food-related behaviors: oxytocin neurons in the supraoptic and paraventricular hypothalamic nuclei, to continue the search for a neuronal population that regulates social interaction-seeking and food-seeking behaviors.

GEOGRAPHIC, LANDSCAPE, AND SEX VARIATION IN ADULT BLOW FLY MICROBIOMES: IMPLICATIONS FOR FORENSICS

Kadie Bernstein
Integrative Biology and Organismal Biology, Oral Presentation
Section: 4
Presentation Number: 703
Mentor(s): Jennifer Pechal, Joe Receveur, Mark Benbow, Nick Babcock

The internal microbiomes of insects are greatly influenced by their environment and can have dramatic effects on growth and development. For many taxa, such as the forensically important blowflies (Diptera: Calliphoridae) there remains limited investigation of how internal microbiomes differ between sexes, species, and various geographic regions. Studies have shown that blowflies are forensically important, but, the effect of how different sexes and ecological locations of blowflies' effect internal microbiomes for forensics has not yet been studied. The purpose of this study was to investigate how adult fly microbiomes vary between sexes captured in three geographic regions of the USA (Appalachia, southeast Alaska, and Mid-Michigan), and determine the impact of land cover (urban vs rural) on internal blowfly microbial structure. Blowflies were collected using passive bait traps and the internal bacterial communities were identified using high-throughput targeted amplicon sequencing of the 16S gene. The most abundant species collected were Phormia regina, Calliphora terraenovae and Lucilia sericata. The internal microbiome community structure of the most abundant blowfly species varied among locations and sex. From Appalachia, the three predominant phyla were Bacteroidetes, Firmicutes, and Proteobacteria. The internal microbiomes of blowflies collected from Alaska consisted predominantly of Proteobacteria and Firmicutes. From Mid-Michigan (urban and rural locations), the predominant phyla were

Bacteroidetes, Firmicutes and Proteobacteria. This observed variation in internal blowfly microbiome communities within and across geographic regions and species may have future utility as potential evidence in criminal investigations and highlights the species-specific nature of the insect microbiomes of forensically relevant insect species.

EVOLUTION OF SENSORY SYSTEMS IN STICKLEBACK FISH

Hailey Jennings
Integrative Biology and Organismal Biology, Oral Presentation
Section: 4
Presentation Number: 704
Mentor(s): Janette Boughman

As we are experiencing climate and ecological change, many species are forced to adapt quickly to survive. Native to Iceland, Three-spined Stickleback fish (Gasterosteus aculeatus) are are of no exception due to the rapid growth of turbid glacial lakes. While occupying a large range of rapidly changing habitats, from marine to freshwater lakes, variation of olfactory systems is expected. Olfactory organs in fish are of emence importance in the detection of the surrounding environment, survival and reproduction. Variation of olfactory systems are of great diversity, both within and between species, which is quantifiable. These differences are important to identify and can improve predictions for organismal responses to disturbance.

THE HUNTING MODES OF HUMAN PREDATION AND POTENTIAL NONCONSUMPTIVE EFFECTS ON ANIMAL POPULATIONS

Abigail Comar, Roxy Lisowsky, Storm Miller
Integrative Biology and Organismal Biology, Poster Presentation
Section: 2
Presentation Number: 405
Mentor(s): Robert Montgomery

When seeking prey, predators have adaptively evolved to use sit-and-wait, sit-and-pursue, or active hunting modes. Extensive research has examined the impact of these hunting modes on predator fitness, predator-prey population stability, and ecosystem structure, more broadly. To date however, the most dominant predator on earth (humans) has not been featured among this research. We reviewed the literature to document the terrestrial prey species targeted by humans, the spatial configuration and techniques used in these hunting attempts, and the human hunting modes deployed. While non-human predators tend to be evolutionarily adapted for the use of just one hunting mode, humans demonstrate profound plasticity by deploying all three hunting modes, switching among them with ease, in pursuit of prey species spanning six orders of magnitude in body size. Considerable evidence has catalogued the vast number of ways in which humans directly impact the functioning of the natural world. Our research complements that work by demonstrating the indirect pathways by which human hunting modes may structure prey populations, and the landscapes where human-prey interactions occur, via nonconsumptive effects governed by the hunting modes of human predation. Synthesizing the results of our analysis, we illustrate that humans are a very different kind of predator.

EFFECTS OF PARASITISM ON FEMALE THREESPINE STICKLEBACK (GASTEROSTEUS ACULEATUS)

Brooke Harper
Integrative Biology and Organismal Biology, Poster Presentation
Section: 2
Presentation Number: 406
Mentor(s): Janette Boughman

Reproductive success is a key component of an organism's fitness, indicating how well adapted it is to its environment. Individuals that are well adapted to local environmental conditions are thus expected to show high reproductive success, measured as a high number of offspring produced either during a given breeding season or over their lifetime. One of the factors that may greatly influence reproductive success is parasitism. Parasitized individuals require more energy to maintain their body condition, but food limitation and the energetical cost of producing gametes means that there might be a trade-off between survival and reproductive success. Here we analyze data on female ovary size and egg number for 137 individuals from 13 populations of threespine sticklebacks (Gasterosteus aculeatus), and present results on the effect of parasitism by the cestode Schistocephalus solidus on ovary size and egg production. We find that parasitized females generally have smaller ovaries across habitat types, but substantial variation between freshwater populations in the effect of parasitism on ovary volume suggests that these females might adopt different strategies in response to the parasites. We discuss the value of comparing wild datasets from multiple populations for understanding how local ecology can influence reproductive strategies.

EXAMINING THE INFLUENCE OF DIFFERENT MICROBIOTA COMPOSITIONS ON MALE MOUSE BONE DENSITY AND ARCHITECTURE USING MICROCOMPUTED TOMOGRAPHY

Soumya Chennupati
Integrative Biology and Organismal Biology, Poster Presentation
Section: 2
Presentation Number: 407
Mentor(s): Ho Kang, Laura McCabe, Narayanan Parameswaran

Osteoporosis, a disease that results in bone loss, affects more than 10 million Americans. Bones provide structure, allow for locomotion, and are a storage site for minerals and marrow as an essential organ in the human body. Bones consist of two components: cortical (compact outside shell) and trabecular (cancellous inner region). Cortical bone provides strength and stability, while trabecular bone is more metabolically active because of its architecture which increases its surface area and makes it a site where osteoporosis can readily be seen. My research project tested the effect of different microbiota compositions on bone density architecture. Germ-free adult littermate male mice received one of 3 different microbiota and were examined 4 weeks later. Examination of the trabecular bone parameters of the femur and vertebrae of each mouse revealed no significant differences in trabecular bone volume fraction, bone density or structural parameters (trabecular number, thickness, spacing) between the three different mouse groups. The lack of a difference was surprising, given the important role of the microbiota composition in regulating bone volume. Interestingly, analysis of femoral cortical bone parameters suggests that one of the microbiota compositions may have a negative effect on cortical bone area, thickness and overall shape. This change also negatively affected bone strength. While more mice are needed to make conclusions, my studies suggest that different microbiota compositions may affect bone components differently. In the future I will determine links between the microbiota components and the bone changes.

HYENA URBANIZATION AND MORPHOLOGY

Daniel Macina
Integrative Biology and Organismal Biology, Poster Presentation
Section: 2
Presentation Number: 408
Mentor(s): Lily Johnson-Ulrich

Since the dawn of man, humans have been manipulating their environment for the betterment of themselves. In today's modern age, humans have dramatically altered nature by means of urbanization and agricultural expansion. These anthropogenic changes to the environment can be very stressful for residing organisms, especially large carnivores. This study looks at morphological changes in spotted hyenas (Crocuta crocuta) due to life in urban environments. Physical morphology can change as a result of the organism's lifestyle on both evolutionary and developmental time scales. Previous studies have found morphological changes in organisms after occupying increasingly urban environments. We investigate whether shoulder and limb morphology changed in spotted hyenas as a result of urbanization. We tested this hypothesis by analyzing limb and shoulder lengths of spotted hyenas living in urban or natural environments. We used the photogrammetry software ImageJ on still captures of spotted hyenas to measure shoulder height, lower leg length, scapula length, upper leg length, front foot length and hind foot length. Our results suggest urban spotted hyenas have shorter limbs. One possible explanation is the switch to scavenging in urban environments. Longer limbs are necessary for covering large distances when hunting ungulates on the open plains. This extra muscle and length might be less adaptive when scavenging or preying on domestic livestock. Shorter limbs may also be better adapted for quick movements over short distances common to urban environments. It will be important to further evaluate how organisms adapt to increased anthropogenic change to better protect nature and ourselves.

THE ROLE OF GENISTEIN AND EXERCISE IN MAINTAINING BONE HEALTH

Morgan Roegner
Integrative Biology and Organismal Biology, Poster Presentation
Section: 2
Presentation Number: 409
Mentor(s): Ho Kang, Laura McCabe, Narayanan Parameswaran

Osteoporotic bone fractures affect one in every four people in their lifetime. Many factors can contribute to bone loss including poor diet, such as a high fat diet (HFD), and sedentary lifestyle. Our lab has become interested in the effect of exercise, diet and nutraceuticals (naturally sourced compounds with supplementary health benefits) on gut and bone health. Genistein is an isoflavone compound, produced by soy plants, that is widely used in supplements due to its many benefits including bone health. To examine the benefits of exercise and genistein on bone health in high fat diet mice, we conducted an experiment using male mice at 6 weeks of age, that were treated for 12 weeks with a lean diet (control), a high fat diet (HFD), a HFD and exercise, a HFD with dietary genistein (600mg/kg food), or a HFD with exercise and dietary genistein. The mice exercised 30 minutes per day on an exercise wheel for 5 days per week. At the end of the study, I used microcomputed tomography (micro-CT) to analyze trabecular (inner bone architecture) and cortical regions (outer bone shell) of the femur. All scans incorporated a determined phantom for standardization of bone calcium measurement and a common threshold number was derived to separate bone mineral from other tissue components such as marrow. Through reconstructing and analyzing bone scans to assess bone microarchitecture. I hypothesize that the dietary genistein in combination with exercise work will counteract the effects of the HFD induced bone loss.

OVARIAN FOLLICULAR STRUCTURES IN MEXICAN WOLVES: CLUES TO INFERTILITY

Heather Sayles
Integrative Biology and Organismal Biology, Poster Presentation
Section: 2
Presentation Number: 410
Mentor(s): Dalen Agnew

Mexican wolves are carefully monitored and their reproduction controlled because of their endangered status. The genetic variability in this species is low due to inbreeding, which lowers their reproductive success and overall population health. In humans and other species, premature ovarian senescence has been linked to infertility. To better understand the reproductive problems plaguing this species, ovaries are collected from Mexican wolves after death or elective sterilization and evaluated grossly and microscopically in order to identify abnormalities. 37 ovarian cross-sections from 27 females were included in the study. The quantity and quality of follicular structures and corpora lutea were determined, including primordial, primary, secondary, and tertiary follicles, corpora lutea, corpora hemorrhagica, corpora albicans, and atretic follicles. To evaluate the density and distribution of follicles, the mean number of all stages of follicles per linear cortical surface area was calculated after observation under a microscope. Evaluation of the follicles was conducted without prior knowledge of the age, previous parity, and other relevant information of the females. Increased prevalence of atresia in primordial and primary follicles might implicate premature ovarian senescence as a factor in the infertility observed in Mexican wolves. With this knowledge, appropriate breeding recommendations and possible therapies may be instituted to improve ovarian function.

SPOTTED HYENA AGGRESSION DURING A CLAN FISSION

Emma McCarthy
Integrative Biology and Organismal Biology, Poster Presentation
Section: 3
Presentation Number: 413
Mentor(s): Maggie Sawdy

Group fissions occur in many different species and can take place for a variety of reasons such as low food availability and access to vacant neighboring habitats. Previous work suggests that aggression rates may increase before and then decline after a group fission. We have examined a group fission event in a social carnivore, the spotted hyena (Crocuta crocuta). We calculated aggression rates before, during, and after the event, from 2014 to 2018.

THE ARRANGEMENT OF NEUROMASTS IN THE LATERAL LINE SYSTEM OF THREE-SPINED STICKLEBACK (GASTEROSTEUS ACULEATUS)

Mckenzie Mazur
Integrative Biology and Organismal Biology, Poster Presentation
Section: 3
Presentation Number: 414
Mentor(s): Janette Boughman, Whitley Lehto

The melting of glaciers leads to new habitat conditions and the opportunity to study the effects of climate change on the adaptation of sensory systems important for survival and reproduction. In fish, the lateral line system detects changes in water movement and pressure and is composed of units of hair cells called neuromasts. Three-spined stickleback fish (Gasterosteus aculeatus) in Iceland reside in lakes with either opaque glacial or clear spring-fed water. These lakes also vary in elevation, which is related to the length of time that the population has been separated from ancestral marine populations (higher elevation = older). It is expected that populations of differing water source and elevation show variation in the

lateral line along the body trunk. This study used photographs of stained neuromasts along the trunk line to examine differences in neuromast patterning, as well as overall number for populations from five different ecotypes: highland glacial, highland spring-fed, lowland glacial, lowland spring-fed, and marine. Ecotype and sex both play a role in neuromast arrangement, with highland glacial and marine females having more neuromast patterns than males, while the opposite is true for highland spring-fed females. There was no difference between the sexes for lowland ecotypes. The total number of neuromasts in the trunk line is greater for males in the highland glacial, lowland glacial, and marine populations, but shows no difference in either spring-fed ecotype. It appears that sex differences in neuromast patterning coincide with elevation, while differences in total number are related to water source.

MICROSATELLITE GENOTYPING TO INVESTIGATE POTENTIAL CANNIBALISM IN AFRICAN ELECTRIC FISH

Douglas Maldonado-Torres, Emily Parker, Kristen Lounsbury
Integrative Biology and Organismal Biology, Poster Presentation
Section: 3
Presentation Number: 415
Mentor(s): Jason Gallant, Sophie Picq

Paramormyrops kingsleyae is a species of weakly electric fish that use electric organ discharges to communicate and locate prey. Very little is known about the diet of these fish. After several DNA extractions to determine the gut contents of these fish, it was noticed that there were sources of DNA that seemed to appear to be from fish in the same species. This has brought up the question: Are Paramormyrops kingsleyae cannibalistic? We are now aiming to determine if this is a possibility, or if the extra DNA is due to self-contamination from consumer DNA. We used microsatellite analysis from fin clip and stomach contents DNA to determine whether or not the mormyrid DNA in the stomach contents belonged to a different fish. Microsatellites are highly repeated DNA sequences that show strong allelic diversity, which allows for easier identification of an individual's DNA. We extracted and amplified the microsatellite sequences for both the fin clips and the stomach DNA and compared the allele profiles in order to determine if a fish ate another fish, which would be indicated by a difference in fin and stomach microsatellite alleles. Following analysis, we will be able to determine whether or not Paramormyrops kingsleyae are cannibals. If it is found that these fish exhibit cannibalism, it will lead to a whole new set of studies on the pressures that lead to this behavior and the type of cannibalism exhibited by this species.

USING SPECIES' TRAITS TO IMPROVE EXTINCTION RISK ASSESSMENTS

Erik Ralston, Minali Bhatt
Integrative Biology and Organismal Biology, Poster Presentation
Section: 3
Presentation Number: 416
Mentor(s): Beth Gerstner, Phoebe Zarnetske

Biodiversity has been declining exponentially over the past century due to global changes, including climate and land-use change. Montane forests of Central and South America are especially susceptible to biodiversity loss, because they are inhabited by many specialized species. Fruit-eating or frugivorous birds are dependent on specific dietary and habitat requirements, decreasing their ability to adapt in the face of a changing environment and worsening the impact of threats on species' populations. Many species are unable to track the changes in climate, which is compounded by lagging changes in forest distributions, rendering sensitive bird species unable to move to regions that fulfill their habitat requirements. This project aims to understand the relationship between Neotropical montane bird species' traits and vulnerability to extinction. For these species, we quantified

correlations between the International Union for the Conservation of Nature (IUCN) Red List extinction threat and trait data on diet breadth, habitat, body size, range size, and generation time. This knowledge could be used to predict species at risk in the future, and aid in classifying threats to data deficient species. When combined with information on threats to species, the results of this study will identify traits that may indicate increased susceptibility to extinction, informing extinction risk assessments and improving predictions for global change impacts on biodiversity and ecosystem functions.

EFFECTS OF MANAGERIAL PRACTICES ON THE FEEDING ECOLOGY OF THE SPOTTED HYENA

Annica Brocker
Integrative Biology and Organismal Biology, Poster Presentation
Section: 3
Presentation Number: 417
Mentor(s): Julie Jarvey, Kay Holekamp, Sabrina Salome

The spotted hyena (Crocuta crocuta) is the most abundant large carnivore in Africa. Spotted hyenas are flexible foragers and switch prey with changing ecological conditions, making them an ideal species to study the effects of management strategies. The Maasai Mara National Reserve, Kenya is home to a large population of hyenas, distributed across regions with varying management strategies. The Mara Conservancy has received little human impact beyond tourists visiting, whereas the Eastern Reserve has been used by Maasai herders to graze their livestock and experiences more tourism. Our research inquires how these different ecological conditions influence hyena diets by quantifying and comparing feeding ecology across years and season of hyenas in the Mara Conservancy and Eastern Reserve. Hyena feeding behavior was recorded during daily observation sessions around dawn and dusk. If the prey being consumed was identifiable, the type was noted. Within the Eastern Reserve, the count of livestock was determined, and also prey counts throughout the sites, twice a month. The amount of gazelle in the diet of Eastern Reserve hyena's decreased as the amount of livestock increased. The diet of the Mara Conservancy hyena's increased in buffalo by the end of the study period. Eastern Reserve hyenas may rely on livestock more when migratory herbivores are absent from the Reserve, whereas Mara Conservancy hyenas do not have access to livestock. The different managerial styles within the National Reserve coinciding with these hyena populations may be a determining factor in the discrepancies seen between their feeding ecologies.

CONSCIENTIOUS MAMMALIAN DETECTION OF EARTH'S GEOMAGNETIC FIELD

Megan Weil
Integrative Biology and Organismal Biology, Poster Presentation
Section: 3
Presentation Number: 418
Mentor(s): Christine Camel

Changes in Earth's magnetic field are known to influence the behavior of organisms from all five kingdoms of life. In mice, the cryptochrome-2 repressor is the recognized protein responsible for their magnetoreception capabilities. The extent of the receptor's influence is unknown, and whether its associated responses are due to subconscious instinct or conscious choice. We tested if the mice learn to immediately run to the corresponding area they were trained based on the presence or reduction of Earth's magnetic field, that they possess a conscious recognition of Earth's geomagnetic field. To test for this, we trained three CD-1 mice to run to a designated side of an experimental area given the state of their exposure to Earth's magnetic field, normal or weakened. The results of the study supported strong evidence that magnetic field influences mice impact on roaming ($p = .0028$), with a reduced magnetic field decreasing the amount of time the mouse roamed. Additionally, these findings

support with little evidence that mice can consciously detect Earth's geomagnetic field (p = .0765). This suggests that the cryptochrome-2 protein may be more complex than initially understood and that magnetic fields could be a conscientious stimulus impacting mouse behavior and location preferences. This is crucial for understanding the extent of the capabilities of the cryptochrome-2 protein, applicable to the influence of Earth's geomagnetic field on humans. As humans also possess the protein, such research is especially useful for understanding the arising field regarding the impacts of magnetic field exposure on human health.

KINESIOLOGY

EVALUATION OF UPPER EXTREMITY IMPAIRMENTS USING MOTION ANALYSIS

Chris Sadler
Kinesiology, Poster Presentation
Section: 1
Presentation Number: 421
Mentor(s): Tamara Bush

Arthritis associated with the hand is a debilitating problem, affecting over 54.4 million U.S. adults resulting in $303.5 billion in medical bills according to the Centers for Disease Control and Prevention (CDC). Challenges with arthritis include inhibited mobility and range of motion; leading to weakened muscles that alters one's way of life. This research's goal is to quantify ranges of movement used during daily technology-based activities. With an increased number of older adults in a technology-based workforce, the use of one's hands has continued to be crucial to success. To understand everyday motions (reaching, grasping, rotating), the range of motion for one's hand can be studied through the mapping of index finger, thumb mobility, and arm posture. For this study, a motion capture system and custom written software code were used to determine the range of motion of one's hand and arm while conducting various daily activities, specifically those related to technology (computer keyboard, cell phone, etc.). Reflective markers were placed on key anatomical landmarks of the hands and arms, which were used to obtain X, Y, and Z coordinate data locations. It was found that keyboards required the most index mobility and cell phones required the most thumb mobility. With these data, we were able to quantify the ranges of motion necessary to accomplish these tasks and visually show these movements. Moving forward, this approach can be used in the rehabilitation community to develop new techniques and exercises for the hand and upper extremity to help maintain full function.

REACH AND GRASP- AN ANALYSIS ASSOCIATED WITH HEALTHY UPPER EXTREMITY FUNCTION

Chris Sadler
Kinesiology, Poster Presentation
Section: 1
Presentation Number: 422
Mentor(s): Tamara Bush

According to the Alzheimer's Association Report, dementia alone affects 5.8 million Americans who are 65 or older today. This is expected to grow to upwards of 13.8 million. With these rising numbers, early detection is becoming crucial. Early detection could help combat Alzheimer's and dementia by providing treatments earlier which could lead to improved or maintained function longer. According to the Mayo Clinic, medication and physical exercise can help slow this disease and lesson symptoms, however there is still no cure. The goal of this study was to identify how a healthy individual reaches to grasp an object in front of them and the path taken to perform the reach. A motion capture system and a custom set of written code were used to measure the angle between the elbow and

shoulder when reaching for objects at different heights and orientations. We hypothesize that patients with dementia will take a less direct path to the object and will have a reduced visual focus time on the object. We also expect that dementia patients will have a smaller distance from the head plane to the hand because further focus on the object with hand placement is predicted. Pilot work on healthy participants is currently underway. These comparisons may lead to earlier detection of Alzheimer's, or dementia. The team has hopes of using these data to find irregularities between healthy subjects and those with dementia that will lead to early diagnosis, leading to improved function over a longer period of time.

THE ACUTE EFFECTS OF HIGH INTENSITY INTERVAL EXERCISE ON ENDOTHELIAL FUNCTION IN PATIENTS WITH CORONARY ARTERY DISEASE.

Hayden Stauffer
Kinesiology, Poster Presentation
Section: 1
Presentation Number: 423
Mentor(s): Katharine Currie, Kayla Soave

Coronary artery disease (CAD) is characterized by the development of plaque inside the arteries of the heart. Endothelial dysfunction describes when the vascular endothelium does not properly regulate vasodilation or vasoconstriction and evidence demonstrate it precedes and contributes to the development of plaque build-up. Thus, interventions aimed at maintaining and improving endothelial function are paramount to the prevention and treatment of CAD. Cardiac rehabilitation programs have utilized moderate-intensity continuous exercise (MICE) to improve endothelial dysfunction in patients with CAD. A barrier to MICE, however, is the lack of adherence due to time constraints. High-intensity interval exercise (HIIE) consists of short burst of intense intervals separated by bouts of lower-intensity or passive recovery. Compared to MICE, HIIE has produced similar improvements in endothelial function assessed by flow-mediated dilation (FMD) in patients with CAD and requires less time. However, an optimal HIIE protocol that improves FMD has not been identified. The purpose of this study is to compare the acute change in FMD response to three HIIE protocols and MICE in individuals with CAD. Eligible participants were recruited from a cardiac rehabilitation program and participated in four visits each containing a different exercise protocol in randomized order (3 HIIE and 1 MICE). Endothelial function was assessed using FMD measurements taken pre and 60 minutes post-exercise. Data analysis is currently ongoing. The results of this study may identify an optimal and time efficient exercise protocol to improve endothelial function that could be used in cardiac rehabilitation programs.

DETERMINING THE RELIABILITY OF BLOOD FLOW RESPONSES DURING EXERCISE

Brooke Chmiel, Zac Wright-Fisher
Kinesiology, Poster Presentation
Section: 1
Presentation Number: 424
Mentor(s): Katharine Currie

Blood flow through the vasculature increases during exercise which is considered an important physiological stimulus. This increase in blood flow can elicit changes within the blood vessels and may lead to overall improved vascular health. Quantifying the blood flow response during exercise will help us to understand the “exercise stimulus”. However, presently it is unknown if the blood flow responses to a standardized exercise bout are reproducible. Therefore, this study was designed to determine the test-retest reliability of the blood flow responses during a standardized exercise session. Fifteen healthy participants completed two identical exercise bouts on separate days. The participants were tasked with cycling for 30 minutes on an ergometer designed to continually adjust resistance to induce

65% of maximum heart rate. Thirty second brachial artery videos were collected using duplex ultrasound pre-exercise and at 8, 18 and 28 minutes during exercise on both days. Data analysis is ongoing. Videos will be analyzed using a specific software program that uses an automated algorithm to determine arterial diameter and blood velocity, which will be used to calculate blood flow. From these measures, the test-retest reliability of blood flow at each time point for exercise bout 1 and 2 will be determined using intraclass correlation coefficients. By determining the blood flow responses to exercise are reliable, future studies can use this measurement to assess the "exercise stimulus" of different exercise protocols intended to improve cardiovascular health across various populations.

GESTATIONAL AND POST-GESTATIONAL DIETS IN MICE WITH CONTROLLED EXERCISE

Lila Drake-Flam, Zoe Morley
Kinesiology, Poster Presentation
Section: 1
Presentation Number: 425
Mentor(s): David Ferguson, Eric Leszczynski

Exercise during pregnancy has been shown to have significant beneficial effects on both the mother and the developing child. However, the effect of an exercise program has not been evaluated in mothers experiencing low-protein diets, a condition common in developing countries. Therefore, the purpose of this study was to determine the effect of a submaximal exercise protocol on maternal weight gain (gestational and post-term) and offspring weights in mice experiencing a low-protein diet. Dams were fed a normal or low-protein diet 2 weeks prior to breeding, then exposed to a submaximal exercise protocol from days 1-17 of gestation. Body weights were measured throughout pregnancy and post-birth, as was the number of pups born, average pup weight, and average litter weight. There was a significant exercise effect for weight gain during gestation (P=0.0358), as dams exposed to the exercise intervention gained significantly less weight than sedentary controls. There was no significant change in weight gain after birth, although CON dams trended to gain more weight than LP (P=0.0656). There was no significant effect for average litter weight; however, there was a significant reduction in pups born in exercised dams (P=0.0210), although exercised dams birthed significantly more pups (P=0.0267). Exercise during pregnancy resulted in a significant reduction in body weight throughout gestation, and reduced birth weight of pups. This confirms previous literature, where exercise significantly normalized birth weight of offspring, as well as reducing maternal weight gain.

IT'S NOT RANDOM PLAY: YOUNG CHILDREN'S MANUAL EXPLORATORY BEHAVIORS ARE GUIDED BY OBJECT PROPERTIES

Amanda Lopez, Autumn Bennett, Taylor Altergott
Kinesiology, Poster Presentation
Section: 1
Presentation Number: 426
Mentor(s): Jennifer Burns, Mei Hua Lee, Priya Patel

Our ability to skillfully interact with everyday objects undergoes a tremendous change in early childhood. Infants interact with objects by putting everything in their mouth, but by the time they become preschoolers, they can skillfully use objects (such as a ball or a bat) based on their purpose. Such transition in their actions is achieved after manually exploring objects of different properties for a substantial period of time. While such manual exploratory behaviors are well characterized in infants, there is a lack of knowledge in how this interplay between manual exploratory behaviors and object properties continues past infancy throughout early childhood. Therefore, the purpose of this study is to assess the effect of different object properties (size, shape, texture) in guiding manual exploratory behaviors in children during early childhood. To address this aim, manual exploratory behaviors were

observed in typically developing preschoolers (3 - 5 years) for different objects. Using video cameras, participants' exploratory behaviors were recorded while they explored 8 objects that varied in size (2" vs. 4"), texture (soft vs. hard), and shape (ball vs. cube). Preliminary findings indicate that for approaching an object, participants use one or two hands based on object size. After grasping it, they were found to explore objects based on their size and shape. This study finding will not only contribute to the developmental trajectory of manual exploratory changes during early childhood but may also provide insight into atypical exploration in developmental disorders such as autism.

TESTING HEART FUNCTION IN RESPONSE TO A CHANGE IN BODY POSITION IN SHORT DISTANCE VERSUS LONG DISTANCE SWIMMERS

Morgan Porter
Kinesiology, Poster Presentation
Section: 1
Presentation Number: 427
Mentor(s): Katharine Currie

There is evidence that shows exercise training can lead to structural and functional changes to the heart and that these changes are dependent on the type of training. In land-based athletes, long distance (LD) runners show greater left ventricular (LV) hypertrophy and improved LV emptying compared to short distance (SD) runners. In water-based athletes, LD swimmers have more efficient LV early diastolic filling at rest. These comparisons of LV function, however, were studied exclusively at rest. Research has yet to compare the effects of SD versus LD water-based training on LV function under a physical challenge. In this study, we aim to characterize the changes in LV function in response to a postural challenge and compare the changes in LV function between SD and LD swimmers. Data were collected from 48 swimmers who competed in the 2019 FINA World Championships. Participants consisted of male and female swimmers classified as SD (50-400m) or LD (1.5-25km). Echocardiography was used to assess LV systolic and diastolic function. Measurements were first taken in the left lateral decubitus (i.e., "horizontal") position, after which participants moved to a seated (i.e., "upright") position. For statistical analysis, we plan to compare LV functional measures between horizontal and upright postures, as well as the change in these LV functional measures between SD and LD swimmers. The results of this study may provide new insight into the effects of different water-based training on LV function not at rest.

THE EFFECT OF MATERNAL EXERCISE ON PHYSICAL ACTIVITY IN GROWTH-RESTRICTED MICE

Angie Stefani, Megan Thorn
Kinesiology, Poster Presentation
Section: 1
Presentation Number: 428
Mentor(s): David Ferguson, Eric Leszczynski

Early life growth restriction has been found to increase the risk of physical inactivity as well as cardiovascular disease, metabolic syndrome, obesity, and sarcopenia. However, studies have found that maternal exercise can protect against chronic disease susceptibility in offspring, but the specific effects on growth-restricted offspring are unknown. Therefore, this investigation exposed dams to a submaximal exercise intervention to reverse their offspring's physical inactivity. Dams were assigned to a low-protein or control diet two weeks prior to breeding, then given 24 hours to breed. The following day, dams were exposed to a treadmill protocol that elicited locomotion about 5-10% of a non-pregnant dam. This was conducted five times a week until day 17 of gestation. Pups were growth-restricted (PUN) by utilizing a validated cross-fostering nutritive model, or remained a fully nourished control (CON). All

pups were given access to a running wheel at day 45, and wheel revolutions were tracked for three weeks. CON pups from maternal exercised dams had higher levels of wheel running compared to sedentary CONs and both PUN groups, with a significant interaction effect (P=0.0097). Additionally, there was a significant diet (P=0.0172, CON>PUN) and exercise effect (P=0.0013, Exercised>Sedentary). These findings confirm the hypothesis that exercise during pregnancy will improve offspring's exercise engagement, but only in the control pups. Therefore, it's necessary to examine if a more intense or longer duration exercise program during gestation is required to elicit more beneficial effects in the growth-restricted pups.

LINGUISTICS, LANGUAGES & SPEECH

INTER-DIALECTAL PERCEPTION OF SPANISH ASSIBILATED RHOTIC VARIANTS

Maddie Hannon

Linguistics, Languages, and Speech, Oral Presentation
Section: 1
Presentation Number: 430
Mentor(s): Silvina Bongiovanni

This study investigates the perception of regional dialects within the Spanish language and focuses on designing a pilot study to explore how listeners with a varied degree of contact categorize assibilated variants. Assibilated variants characteristic to the speech of Argentina represent only a sliver of the linguistic variation that the Spanish language has developed over the 500 years of its establishment and diffusion throughout the world. Due to the sheer amount of linguistic variation across Spanish dialects, perception studies are necessary to understand how speakers communicate with one another. Recent research reveals that inter-dialectal speech perception depends, among a variety of factors, on listeners' own phonemic and allophonic inventory (i.e. the sounds of the dialect), contact, or experience with other dialects, and even geographic proximity. Latin American Spanish speakers will complete an identification task of pairs of sounds that are acoustically and perceptually similar to examine the interpretation of linguistic categories and intelligibility across Spanish dialects.

MII CHAN AND THE FISH, EMPATHY AND HUMAN CONNECTIONS IN JAPANESE LITERATURE

Jubilee George

Linguistics, Languages, and Speech, Oral Presentation
Section: 1
Presentation Number: 431
Mentor(s): Catherine Ryu

In this presentation, we take a look at themes of human connection and empathy within different types of Japanese children's literature. These topics will not only be explored as just themes within literature, but also as tool's that can connect people from different times and cultures, and how we can best express these themes through translation and cultural understanding.

BUILDING AN ONLINE LANGUAGE LEARNING COMMUNITY

Sam Liu

Linguistics, Languages, and Speech, Oral Presentation
Section: 1
Presentation Number: 432
Mentor(s): Xuefei Hao

A virtual language learning community helps learners stimulate language interest outside the classroom and promote independent learning motivation, especially under the pandemic. Based on the 5C principles of ACTFL, we are building a Chinese learning community by

registering as a student organization at MSU. Our community desires to construct a culture-bridge between language learners and native speakers, they will not only have the chance to apply using the target language in practical communication but also exchange cultures to develop a cultural awareness to each other by participating in online cultural events and other activities. We will discuss the feasible schemes with pros and cons of operating the community and running virtual events in detail through the presentation.

HOW GROWING UP BICULTURAL AFFECTS YOU

Clara Martindigon
Linguistics, Languages, and Speech, Oral Presentation
Section: 1
Presentation Number: 433
Mentor(s): Steven Fraiberg

Transnational border crossings are common in the context of 21st century globalization, as people are increasingly moving across countries. In this study, I wish to study this transnational phenomenon and the ways that it is shaping people's world views and how they are developing what is referred to as a “bifocal perspective”. Being bifocal means being able to see things through two different lenses; this is achieved by having experienced two or more cultures to their fullest extent. In this ethnographic study, I will find more in-depth information about college students that have had the chance to live in a culture different to their native one, and the degree to which it has shaped their world views and the development of a bifocal perspective. Grounding the study in an analysis of how it shapes their perspectives and day to day lives, I adopted an ethnographic perspective and engaged in a range of data collection methods to find the answers to this research question. I collected stories and examined artifacts (music, social media posts and followers, messages, apps) and interviewed ten participants. Triangulating the data, I identified key patterns and characteristics linked to the ways that being transnational has impacted their personal lives. In making this move, I examine what the findings suggest for understanding the effects that being a part of multiple cultures has on the perspectives and habits of college students.

SINGULAR ‘THEY’

Samantha James
Linguistics, Languages, and Speech, Oral Presentation
Section: 1
Presentation Number: 434
Mentor(s): Cristina Schmitt, Daniel Greeson

Many English speakers are increasingly avoiding the use of "he/she" in favor of "they" as a singular pronoun in everyday speech. "They" in singular contexts dates back to at least the 14th century; however, the contemporary use of singular "they" and the factors influencing its use are still under investigation. In this study we address the question of when singular "they" is deemed most acceptable. We hypothesize that the gender of the antecedent is relevant in determining the acceptability singular "they", with gender-neutral antecedents (student, manager, etc.) promoting the acceptability of "they" over "he/she". Previous studies have also suggested that speakers are more likely to use singular "they" with quantified antecedents, such as in "Every woman thinks they are smart", over antecedents that are not quantified, such as "That woman thinks they are smart". Our study deepens this research by testing whether two distinct quantifiers, "no" vs. "every", interact differently with singular "they". To answer the question of when singular "they" is deemed acceptable, we designed a between-subjects acceptability judgment task to test the acceptability of “he/she” and “they” with antecedents of different genders (male, female, neutral) and with different determiners (“every”, “no”, and “that”). In addition to gathering speakers' ratings of singular 'they' from 1-7 in different experimental contexts, we will collect demographic information such as age and

hometown. The results will give us a clearer picture of which linguistic and social factors condition the use of singular 'they' among English speakers in Michigan.

COMMUNICATION AFTER MANY YEARS AS A HEAD AND NECK CANCER SURVIVOR

Alyssa Spencer, Stacey Partain
Linguistics, Languages, and Speech, Poster Presentation
Section: 2
Presentation Number: 436
Mentor(s): Jeffrey Searl

The purpose of this study was to understand how communication is impacted in people treated for head and neck cancer (HNC). Particularly of interest was how communication has changed over time since completing the cancer treatment. Participants were adults with a diagnosis of HNC who completed their cancer treatment a minimum of 5 years before enrollment. Participants participated in a recorded individual interview by phone or videoconferencing and they completed additional surveys about their communication. Content analysis of recorded interviews was completed to identify themes and subthemes regarding communication abilities, speech-language therapy, motivation regarding improve communication and so forth. Discussion of results will focus on the long-term impacts of head and neck cancer treat and the evolving impact on a person's quality of life many years after ending cancer treatment.

INVESTIGATING THE USE OF DISTAL PROSODY IN SPEECH SEGMENTATION IN CHILDREN

Shubhangi Sharma
Linguistics, Languages, and Speech, Poster Presentation
Section: 2
Presentation Number: 437
Mentor(s): Carrie Kroger, J McAuley

Individuals learning a spoken language must be able to map portions of continuous speech into meaningful units (e.g., words). Dilley & McAuley proposed a perceptual-grouping hypothesis whereby distal prosodic cues, patterns of intonation temporally removed from a target region, create expectations about the grouping of later syllables into words. Support for this hypothesis comes from research with adults but has not been shown in children. Children ages 6-8 (n=23) studied twelve disyllabic target 'code' words in an artificial 'alien' language, then monitored utterances for code words that were congruent or incongruent with the distal prosody. Congruent items matched the intonation at the beginning of the utterance, but incongruent items did not. Participants rated how well they heard the 'code' words on a scale from 1-6 (1 = “I did not hear the code word”, 6 = “I heard the code word very well”). Half of the trials had a code word present in the utterance, while the other half did not. Local prosody of targets was held constant between congruent and incongruent contexts and only the distal prosody was different. Results indicated that children distinguished between target word present and absent conditions. Congruent words matching the prosodic pattern at the beginning of an utterance were better perceived than code words incongruent with it. These findings support the perceptual grouping hypothesis and suggest that, like adults, children ages 6-8 use distal prosodic context to group syllables into words.

MEASURING THE EYE GAZES AND ORAL LANGUAGE SKILLS OF PRESCHOOL AND EARLY ELEMENTARY CHILDREN

Jacob Richardson, Madison Brodoski
Linguistics, Languages, and Speech, Poster Presentation
Section: 2
Presentation Number: 438
Mentor(s): Sarah Goodwin

Oral language skills support literacy and prepare children for educational settings. Eye tracking, recording eye-movement patterns on a computer, has been used recently with young children to assess these important beginning literacy concepts, such as vocabulary recognition or attention to print. However, less is known about spoken language processing for children with speech and/or language impairment. The present study measures attention patterns on a computer-based assessment of phonological awareness, the ability to recognize and manipulate sounds and words (e.g., "What rhymes with cat?"). Our research seeks to uncover how children use the task: specifically whether children gaze more at provided picture responses than other screen contents. Participants (n=60) had, as defined by their Individualized Education Plan, either speech-language impairment (SLI) or SLI plus at least one other educational need (e.g., cognitive impairment). Using a Tobii X2-60 portable eye tracking unit, we measured gaze fixation duration to three side-by-side screen images. Results suggest that children did, as we anticipated, pay attention longest to the correct response. Moreover, children gazed at the choices in left-to-right patterns, similar to children with typical development. Findings indicate that young children, even those who do not use spoken language in typical ways, are able to engage with a measure of phonological awareness that allows us to measure their ability appropriately. Recommendations for future research and implications for practitioners will be provided.

ESTIMATED SHORT TERM VOICE QUALITY IMPROVEMENT DUE TO VOCAL WARM-UP BASED ON A WATER RESISTANCE VOICE THERAPY

Owen Cole
Linguistics, Languages, and Speech, Poster Presentation
Section: 2
Presentation Number: 439
Mentor(s): Eric Hunter

The voice can change over time, especially in people who use their voice as a working tool. Understanding voice changes over time and the effects of vocal warm-ups can be useful for those people who rely on their voice. The objective was to evaluate short-term voice changes after a brief vocal warm-up routine during each day. An individual performed vocal tasks before and after a common warm-up therapy. Over 50 days, they created 86 recordings. Each recording was trimmed and prepared into samples, of which we used a sample set containing a 2 sentence passage. Using PRAAT (a free computer software package for speech analysis in phonetics) we analyzed the 2 sentence passage and estimated the smoothed Cepstral Peak Prominence (CPPs) which correlates to perceived vocal quality. On average CPPs was shown to significantly improve before and after short warm-up. Although there was high variability day to day, the warm-up showed consistent improvement most days ($p<0.001$). The vocal warm-up resulted in consistent short term improvements of vocal quality. The therapy the warm-up is based on is a simple and cost effective technique for improving voice. And CPPs is an available tool, and easy to use, to track the effect of voice changes.

CODING AND ANALYZING THE VARIATION OF SPEECH IN ADULTS WHO STUTTER

Erika Mueller, Jenna Fisher, Kaylin Gray, Natalie Merriman
Linguistics, Languages, and Speech, Poster Presentation
Section: 2
Presentation Number: 440
Mentor(s): Gregory Spray, J Scott Yaruss

The analysis of speech and language takes a considerable amount of time; therefore, speech-language pathologists have started to use computer software to automatically calculate several language parameters. The CLAN/FLUCALC programs allow clinicians and researchers to perform a fluency analysis on a language sample to determine the stuttering severity of a speaker; however, the reliability of this method has been questioned. Thus, the primary objective of this project is to develop a standardized method of coding, which will increase the reliability of speech and language measures. In addition, this project might benefit clinical speech language pathologists by providing them with an additional tool for the assessment of language and stuttering. The current study will analyze 20 speech samples (10 conversation samples, 10 reading samples) collected from 10 people who stutter. CLAN/FLUCALC will be used to conduct language and fluency analysis by completing a speech transcription and coding each speech sample indicating the number of disfluencies observed, including: stuttering-like disfluencies (i.e., part-word repetitions, blocks, and prolongations) and other typical disfluencies that occur in speech (i.e., whole-word repetitions, phrase repetitions, broken word interjections, and revisions). In addition, each participant has completed the Overall Assessment of the Speaker's Experience of Stuttering, which examines the speaker's self-awareness and personal experience of stuttering using a 5-point Likert scale. The results of this project are expected to develop a standardized method for transcribing, coding, and analyzing stuttered speech for researchers and clinicians to use in order to better understand speech and language.

CODING NON-SPEAKERS SENTIMENTS REGARDING DAILY COMMUNICATION

Destyni Luna, Keyana Blake, Madison Wheeler, Mariam Sayed, Shannon Pavlak
Linguistics, Languages, and Speech, Poster Presentation
Section: 2
Presentation Number: 441
Mentor(s): Laura Dilley

Many non-speaking individuals feel disadvantaged due to their lack of verbal language use in daily communication. This study aims to examine the feelings and perspectives of non-speaking individuals in relation to their interactions in a predominantly speaking world. To produce the study, a coding system was developed to examine their experiences and dissect the meaning behind what the non-speakers are saying. Several short videos of non-speaking individuals and their experiences are analyzed by the coding group; each statement from the video is transcribed, and then categorized based on the communicative intent. The statements were coded in categories such as regret of opportunities, expression of feelings, neutral facts, or common misconceptions. Preliminary examination of the data shows that many of the statements express a desire to educate the public on many misconceptions and stereotypes surrounding non-speaking individuals. The implications of the experiment are expected to demonstrate how non-speaking individuals function and that many common perceptions of non-speaking individuals are not true.

INSTRUCTIONAL EFFECTS ON PHONOTACTIC ACCEPTABILITY JUDGEMENT TESTING

Jillian Burger

Linguistics, Languages, and Speech, Poster Presentation
Section: 2
Presentation Number: 442
Mentor(s): Darby Grachek

For this experiment I will be focusing on how acceptability judgements, the consciously perceived acceptability native speakers of a language use when comprehending how to interpret a word, change using two different instructions. Speakers make judgements on the sounds they hear to determine what is or is not acceptable not only in existing words, but also with nonsense words. By changing an instruction from “Is this English” or “Does this sound like English” to something like “There is a new word being used in many Southern US communities called [spling] to describe bouncing something, how likely are you to begin using it”, we can gain an insight into whether speaker variation in acceptability experiments is due to methodological factors like these instructions. In 2005, Schutze created three separate scenarios to be used as a way of discovering why speakers make these certain judgements when facing nonsense words. Specifically, for this task I will be using a dictionary scenario and a Neologism assimilation scenario in order to illicit different responses from these native speakers. I hypothesize the dictionary task will illicit responses that are influenced solely by the mental lexicon and the neologism assimilation will illicit responses which mirror how English speakers handle neologisms as described by Schutze.

COMPREHENSION ‘OR’ PRODUCTION: WHICH COMES FIRST?

Callista Lupa, Holly Langenstein

Linguistics, Languages, and Speech, Poster Presentation
Section: 2
Presentation Number: 443
Mentor(s): Cristina Schmitt, Rachel Stacey

'Or' is a scalar term that when used in different contexts allows for different interpretations: exclusive (one or the other but not both), and inclusive (one or the other or maybe both). The basic meaning of 'or' is inclusive, and the exclusive 'or' is derived through an inference process. In adults, the inclusive interpretation of 'or' is restricted to contexts such as free choice (“You can eat the cake or cookies”) or negation (“I don't eat the cake or cookies”). In other contexts, 'or' is most often interpreted as exclusive (“Last week, I ate cake or cookies”). Past studies on children's use of the word 'or' suggest that they struggle to use the various meanings of 'or' in the same way adults do. In particular, children seem to prefer the inclusive interpretation of 'or' over other possible interpretations. This has led to the current understanding that 'or' and other words like it are learned at a later age in children. However, in our corpus study where we examined instances of 'or' in child-directed speech we have found that children's production of 'or' matches that of the adults, including the production of exclusive 'or'. This doesn't mirror past experimental work. In our corpus study, we examine the different variables including age, syntax, and clause type to examine what causes this gap between production and comprehension.

MICROBIOLOGY, IMMUNOLOGY & INFECIOUS DISEASE

A REVIEW OF CURRENT COVID-19 VACCINE PHASE III AND EMERGENCY USE AUTHORIZATION CANDIDATES

Ashley Atkinson

Microbiology, Immunology, and Infectious Disease, Oral Presentation
Section: 1
Presentation Number: 444
Mentor(s): Iman Yeckehzaare

As the pandemic caused by SARS-CoV-2 continues into 2021, it is important to analyze available data for promising vaccine candidates. The purpose of this review is to summarize vaccine types and gather and evaluate public data regarding the safety, efficacy, and immunogenicity of twenty different COVID-19 vaccines in phase III trials as well as those authorized for emergency use. Searches were conducted using a combination of online databases including PubMed, Medrxiv, Biorxiv, NIH, and vaccine company websites. Among the vaccines reviewed, the mRNA-based vaccines (Pfizer-BioNTech and Moderna) had promising safety profiles and demonstrated effectiveness against COVID-19. However, it is still unknown if those who are vaccinated can spread the virus. Multiple viral vector-based vaccines, such as Johnson & Johnson's vaccine, are promising candidates with efficacy after the first dose. Although Moderna's, Pfizer-BioNTech's, and Johnson & Johnson's products are the only vaccines that have gained FDA emergency approval to date, other vaccines, such as the vaccine developed by AstraZeneca and Oxford, are also expected to be extremely effective against COVID-19. Further studies are needed to establish long term results of vaccine efficacy against SARS-COV-2 infection and efficacy against variants of SARS-COV-2. The COVID-19 pandemic called on scientists everywhere to expeditiously develop safe and effective vaccines, a call answered by unprecedented scientific achievement.

CONTRIBUTION OF SONGBIRDS IN THE MAINTENANCE OF THE TICK VECTOR, IXODES SCAPULARIS, AND THE LYME DISEASE PATHOGEN, BORRELIA BURGDORFERI, DURING BREEDING MONTHS IN MICHIGAN

Belinda Wilson

Microbiology, Immunology, and Infectious Disease, Oral Presentation
Section: 1
Presentation Number: 445
Mentor(s): Jean Tsao

Blacklegged tick (Ixodes scapularis) population establishment has become an increasing public health concern for the state of Michigan. The first established populations in Michigan were detected in 2002. Songbirds are an understudied host that are implicated in the spread of blacklegged ticks over many areas. This study examines the tick species composition on infested songbirds in the Calhoun County area. Here we present tick infestation records from 2018-2019 from songbirds at Fort Custer Training Center (FCTC). Songbirds at FCTC were mist netted from May-August at three sites in FCTC. Ticks collected from birds were sent to Michigan State University to be identified and assayed for Borrelia burgdorferi, the causative agent of Lyme Disease. 140 birds were infested with 382 ticks. Of these ticks, 365 (95.6%) were confirmed as I. scapularis. A total of 39 tick samples (10.3%) representing 28.5% of infested birds, and 3.6% of all birds captured, tested positive for B. burgdorferi. Past data, as well as what has been seen in the 2018 and 2019 seasons, show that there has been an increase in I. scapularis, as well as the prevalence of B. burgdorferi, on songbirds collected during the breeding seasons at FCTC, indicating the involvement of birds in the maintenance of local blacklegged tick populations and the enzootic cycle of the Lyme Disease pathogen.

USING VIDEO GAMES TO EDUCATE & VISUALIZE MICROBIOLOGICAL CONCEPTS

Rhys Gogonis

Microbiology, Immunology, and Infectious Disease, Oral Presentation
Section: 1
Presentation Number: 446
Mentor(s): Rabindra Ratan

Microbiology is the study of the invisible world that is ever present around us. Oftentimes, it can be difficult to communicate and visualize microbiological concepts due to many limitations. Static images in textbooks and simple representations of microscopic organisms & processes attempt to combat this, but it can be restricting. To address this, we seek to understand if interactive learning biology video games can lead to better concept retention & comprehension than traditional assignments, such as a reading article with static images. To analyze this, we will use Infection Defense (https://auxingames.com/game/), a free, appealing, easily accessible video game about the immune system; a highly relevant and important microbiological concept. Concurrently, we also seek to analyze participant interest before & after playing the game, compared to standard methods. It is reasonable that the use of a video game to learn can lead to enhanced comprehension and engagement in STEAM concepts.

IMPACT OF GARDENING ON HUMAN GUT MICROBIOME

Sarah Keller

Microbiology, Immunology, and Infectious Disease, Oral Presentation
Section: 1
Presentation Number: 447
Mentor(s): Alyssa Beavers, Sarah Comstock, Sihan Bu

According to the USDA, a single teaspoon (1 gram) of healthy soil contains more microorganisms than people on earth. An abundance of bacteria, fungi, and viruses are found in and outside of human bodies and are necessary to complete the total cell repertoire in order to achieve human health and wellness. With the Biodiversity Hypothesis in mind, the goal of our study is to understand how overall health and changes to an individual's microbiome occur when humans interact with the natural environment. The objective of this research is to determine how soil exposure, through regular gardening, alters the composition of an individual's gut bacteria. Gardening was the method used to interact with the natural environment since working with soil exposed participants to the myriad of microorganisms found within it. In addition, soils are commonly mixed with animal manure in which microbes can be passed from the animal and found in the soil. To conduct the study, 26 participants provided fecal and soil samples at three time points. Using the Qiagen DNAEasyPowersoil Kit, DNA from all samples was extracted and the V4 region of the 16S rRNA gene was amplified. From an analysis of the microbiota compositions, the gardeners' stool contained significantly different communities of bacteria than soil and most compost samples. The chicken compost had a bacterial composition that was more similar to that of human stool samples. The findings of our study will allow for future examination of how routine soil exposure influences an individual's gut microbiome and resistome.

CHARACTERIZATION OF SLIDING MOTILITY DRIVEN BY EXOPOLYSACCHARIDES AMYLOVORAN AND LEVAN IN THE FIRE BLIGHT PATHOGEN ERWINIA AMYLOVORA

Lauren Eldred

Microbiology, Immunology, and Infectious Disease, Oral Presentation
Section: 2
Presentation Number: 450
Mentor(s): George Sundin

Erwinia amylovora is a gram-negative plant pathogen that causes fire blight in rosaceous plants. This bacterium colonizes the flower stigma and utilizes a flagellum-dependent swimming motility to migrate from the stigma tip to the hypanthium, in which it enters the xylem through natural openings. Once inside the xylem, E. amylovora produces a biofilm consisting of three exopolysaccharides (EPSs), amylovoran, levan, and cellulose. Interestingly, a loss of flagella once inside xylem has been reported, suggesting that a flagellum-independent motility is required for migration of E. amylovora in planta. In this study, we constructed mutants lacking flagella in E. amylovora strain Ea1189 and found that these cells are unable to swim, but can still slide on sliding media the same as the wild-type bacteria. We demonstrated that the ability to produce amylovoran and levan, but not cellulose, is required for sliding when sucrose is the carbon source whereas amylovoran production alone is required for sliding when sorbitol serves as the carbon source. Comparison of Ea1189 to a more virulent strain of E. amylovora, Ea110, showed that Ea110 had increased sliding motility compared to Ea1189, suggesting that sliding motility is a virulence factor. We also showed that gravity has an impact on sliding: increased angles assist sliding motility on a decline surface, however, no sliding was observed on an incline. Finally, we observed different sliding behaviors between amylovoran and levan mutants when cells were co-sliding with the wild-type bacteria. Future studies focusing on the significance of sliding motility in planta will be conducted.

INVESTIGATING THE SUSCEPTIBILITY OF NEW CELL LINES TO FRESHWATER STRAINS OF VHSV

Parva Mashar

Microbiology, Immunology, and Infectious Disease, Oral Presentation
Section: 2
Presentation Number: 451
Mentor(s): Bartolomeo Gorgoglione

Viral Haemorrhagic Septicaemia (VHS), caused by Piscine novirhabdovirus (VHSV), is a notifiable infectious disease infecting over 90 fish species around the world. This negative stranded RNA virus evolved into four genotypes, with many more lineages and strains. Trout farming and freshwater wildlife in Europe are affected by the sublineage VHSV-Ia. The sublineage VHSV-IVb infects up to 32 fish species in the Great Lakes watershed, with relevance to fisheries and ecosystems. Diagnostic of VHSV is conventionally carried out using cell lines, such as Bluegill (Lepomis macrochirus) fry (BF-2) and Epithelioma papulosum cyprini (EPC). Other cell lines show specific susceptibility patterns, reflecting the natural host susceptibility to particular VHSV genotypes, for example, the Rainbow Trout (Oncorhynchus mykiss) gonad (RTG-2) cell line is permissive to VHSV-Ia but not to VHSV-IVb. In this project, we aim to assess the different susceptibility of new cell lines in comparison to conventional cell lines used as diagnostic tools. New cell lines were recently retrieved from common fish species from the Great Lakes, such as from Gizzard Shad (Dorosoma cepedianum), Lake Trout (Salvelinus namaycush), Brook Trout (S. fontinalis) and Walleye (Sander vitreus). Using virological essays, we are comparatively assessing the capacity of both VHSV freshwater sublineages to cause cytopathic effects when cultured in these unconventional cell lines. Results from this study will reveal which new cell line could be used sensitively to isolate

VHSV during natural mortality outbreaks and will provide additional indications on the susceptibility of the Great Lakes fish species to VHSV sublineages.

UNDERSTANDING THE CYCLIC-DI-GMP-MEDIATED REGULATION OF THE TYPE III SECRETION SYSTEM IN ERWINIA AMYLOVORA

Ishani Pandya
Microbiology, Immunology, and Infectious Disease, Oral Presentation
Section: 2
Presentation Number: 452
Mentor(s): George Sundin , Roshni Kharadi

Erwinia amylovora is a gram-negative bacterium that causes fire blight disease, which affects apple and pear production globally. The type III secretion system (T3SS) is a key virulence factor that E. amylovora utilizes to infect host cells through the translocation of effectors that can suppress the host immune response and can promote bacterial pathogenesis. T3SS works in response to a host cell's immune response by secreting numerous effector proteins that will help ensure the bacterial pathogen's survival. In E. amylovora, HrpL is an alternate sigma factor that directly regulates the expression of critical T3SS genes. Cyclic-di-GMP (c-di-GMP) is a pervasive bacterial second messenger that negatively regulates T3SS based virulence in E. amylovora. Increased intracellular levels of c-di-GMP have been correlated with significantly reduced hrpL expression in E. amylovora. However, the mechanism by which cyclic-di-GMP regulates hrpL expression, which in turn impact T3SS virulence, is not well understood in E. amylovora. Preliminary findings have shown that the transcription of hrpL is regulated by a LysR-family DNA binding protein, assisted by YajQ homolog. The YajQ-homolog has been known to bind to cyclic-di-GMP in other bacterial systems. Further, we are investigating a regulatory model in which hrpL transcription is dependent on LysR and YajQ, as well as modulated by varying intracellular levels of cyclic-di-GMP, which can alter the effectiveness of this hrpL transcription regulation. This study can ultimately lead to a greater overall understanding of how E. amylovora is able to effectively regulate the expression of T3SS virulence to successfully infect a desired host.

THE EFFECT OF ANTIBIOTICS ON THE MICROBIAL COMMUNITY IN CYSTIC FIBROSIS PATIENTS

Jeremy Feiner
Microbiology, Immunology, and Infectious Disease, Oral Presentation
Section: 2
Presentation Number: 453
Mentor(s): Robert Quinn

Cystic fibrosis is a chronic disease of the lungs. It is characterized by an overproduction of mucus, which provides an excellent environment for bacterial colonization. As a result, cystic fibrosis (CF) patients have a chronic bacterial infection of the lung tissue. Unfortunately, despite the importance of antibiotics in the treatment of CF, the effects of antibiotics on CF microbial communities is not well understood. Consequently, efforts to understand the impact that antibiotics have on microbial communities could help improve disease outcomes. To understand the impact of antibiotics samples of microbial communities from CF patients were collected before and after treatment with antibiotics. Furthermore, simplified communities were constructed to observe the effect of antibiotics on those communities.

CRISPR/CAS9 KNOCKOUT OF INFα RECEPTOR MEDIATED ANTIVIRAL RESPONSE IN PBS-12SF CELL LINE FOR VACCINE PRODUCTION

Noah Lubben

Microbiology, Immunology, and Infectious Disease, Oral Presentation
Section: 2
Presentation Number: 454
Mentor(s): Paul Coussens

Viruses such influenza viruses and coronaviruses are some of the most widely spread infectious diseases in humans and animals. Many such diseases can be prevented through vaccination. Large-scale vaccination requires generation of massive quantities of vaccines both efficiently and rapidly. Cell lines offer a means to quickly generate large quantities of virus safely and provide an adaptable method for various viruses. Our lab has developed the PBS-12SF cell line that supports replication of many viruses, including avian and human influenza viruses. Viral infection of cells triggers the interferon (INF) response carried out by type I INFs via the INF cell surface receptor and eliciting an antiviral response. In a previous demonstration project shRNA knock down of INF receptor (INFAR1) mRNA reduced the INF response, enhancing viral production in PBS-12SF cells. Currently, we are using CRISPR/CAS9 knockout of IFNAR1 to permanently modify PBS-12SF cells, crippling the antiviral response and enhancing viral production of influenza and other viruses, including adenovirus vectors used in some COVID-19 vaccines. To accomplish this, we first developed methods for detecting IFNAR1 protein on PBS-12SF cells. Next, we used a green fluorescent protein (GFP) expression plasmid to optimize transfection conditions, assessed by flow cytometry. We then co-transfected PBS-12SF cells with GFP plasmid and complexes of CRISPR guide RNAs+Cas9. GFP expressing cells were sorted using the Influx HT FACS at the MSU Flow Core Facility. We are currently growing both single cell clones (>1000) and larger scale cultures of sorted GFP+ PBS-12SF cells for testing of successful INFRA1 knockout.

WOLBACHIA BASED INCOMPATIBLE INSECT TECHNIQUES AND MOSQUITO POPULATION CONTROL

Lijie Han

Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 3
Presentation Number: 456
Mentor(s): Zhiyong Xi

Dr. Xi's lab focuses on developing Wolbachia-based control strategies to block dengue virus transmission in mosquitoes. Mosquito-borne diseases, such as dengue fever and ZIKA, deprive millions of lives worldwide each year. Due to the lack of effective vaccine and treatment, vector control has become a very promising aspect of achieving adequate control and prevention of mosquito-borne diseases by replacing the wild type mosquito populations with the modified populations which couldn't carry the viruses. Wolbachia, an endosymbiotic bacterium, may serve as a vehicle to deliver disease-resistance genes into mosquitoes or to reduce disease transmission ability directly. Therefore, the project I took part in aims to introduce Wolbachia into mosquito strains to generate sterile mosquitoes, replace the natural mosquito populations with our sterile mosquitoes so that we can reduce the risk of Dengue/ZIKA, etc. spreading by reducing the population of specific mosquito strains (like Dengue/ZIKA carriers). My main tasks here were to assist this process, and the results showed that only releasing a specific ratio of male and female mosquitos into the wild environment can significantly reduce the number of target mosquito populations. Now I am helping investigate the underlying mechanisms including the effects of molting hormones and various environmental conditions factors on the duration of mosquito pupation and molting.

CHARACTERIZING THE MECHANISM BY WHICH CYCLIC-DI-GMP MODULATES THE VIRULENCE OF ERWINIA AMYLOVORA

Jacob Hieber

Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 3
Presentation Number: 457
Mentor(s): Brian Hsueh, Christopher Waters

The Gram-negative plant pathogen Erwinia amylovora is the causative agent of the plant disease fire blight, primarily affecting apple and pear trees. This disease causes vast economic loss worldwide. E. amylovora disease progression involves a transition between a chronic biofilm state to a systemic acute infection state, utilizing the Type III Secretion System (T3SS). The ubiquitous second messenger molecule cyclic-di-GMP (c-di-GMP) regulates a wide variety of bacterial lifestyles, including biofilm formation, motility, and virulence. It has been shown that increased levels of c-di-GMP downregulates HrpL, the master regulator of T3SS in E. amylovora. Furthermore, c-di-GMP interacts with effectors, such as transcription factors, to regulate downstream pathways in many pathogens with T3SS. However, the molecular mechanism by which c-di-GMP regulates the signaling cascade leading to expression of the T3SS is less understood. I therefore hypothesize that c-di-GMP activates a repressor to downregulate hrpL expression, and thus inhibits T3SS in E. amylovora. Through random transposon mutagenesis, I have identified a putative transcriptional regulator that represses hrpL under high c-di-GMP levels. Current work is focused on characterizing how E. amylovora utilizes c-di-GMP to control this repressor to modulate gene expression and adapt to environmental signals that initiate infection in apple and pear trees. The regulation of T3SS is highly complex, and the implication that c-di-GMP signaling involving a c-di-GMP receptor contributes to controlling the T3SS could help us understand the mechanisms by which E. amylovora initiates infection. This, in turn, may bring about further advancements in controlling fire blight.

IMPROVED GENETIC ENGINEERING OF GRAM-NEGATIVE BACTERIA FOR BIOLUMINESCENT ASSAYS AND ANTIBIOTIC TESTING

Ihika Lagisetty

Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 3
Presentation Number: 458
Mentor(s): Cristiane Pereira Hicks, Michael Bachmann, Peter Bergholz

The resistance of bacteria to antibiotics is a growing worldwide public health threat. Half of the bacteria considered by the CDC as urgent or serious threats are gastrointestinal pathogens. Sensitivity to antibiotics is conventionally assessed by the Kirby-Bauer method where bacteria are grown on agar plates with antibiotic-soaked wavers and the size of the bacteria-free zone surrounding each waver indicates each antibiotic's effectiveness. However, we want to analyze the antibacterial efficacy of candidate antibiotics in real-time in vitro and in vivo using bioluminescence imaging (BLI). However, few bacterial species, e.g. some Vibrio cholerae strains, have an endogenous light-emitting luciferase enzyme, whereas most other species need to be genetically engineered. For this, we are using a mobile genetic element, the transposon Tn7, to insert a set of genes (lux operon) into the bacterial genome that encode a bacterial luciferase and the substrate synthesizing enzymes. The Tn7 plasmid, unfortunately, can only be selected for, making the removal of the plasmid backbone after transposition time-consuming. We are currently replacing the antibiotic selection marker, beta lactamase, with the tetracycline resistance marker, which can be both selected for and against. This modified plasmid will permit us to label clinical isolates of enteropathogenic E. coli (EPEC) and assess bacterial survival in response to various plant-derived antibiotics. Finally, in preparation for clinical trials we will assess their treatment efficacy in a mouse

model of gastrointestinal infection with bioluminescent EPEC that we will also monitor by BLI.

THE ROLE OF DDX5 IN HPV-ASSOCIATED CANCER

Danielle Hohman
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 3
Presentation Number: 459
Mentor(s): Dohun Pyeon

Dead-Box helicase 5 (DDX5) or p68 is an ATP-dependent RNA helicase that is involved in alteration of RNA structures, regulation of splicing, processing small noncoding RNAs, and can act as a coregulator of transcription. It has been found to be dysregulated in many cancers including prostate cancer, lung cancer, and ovarian cancer. DDX5 acts on many metabolic pathways and as a result promotes proliferation and metastasis. Currently, the role of DDX5 in HPV-associated cancers are unknown. Our preliminary results show that DDX5 is upregulated in both HPV-positive and negative head and neck cancers (HNC) compared to normal tissue. However, DDX5 shows higher nuclear localization in HPV+ HNC than HPV- HNC. This suggests differing roles for DDX5 when in the presence of HPV.

UTILIZATION OF MAGNETIC NANOPARTICLES FOR EXTRACTION OF LISTERIA MONOCYTOGENES IN FOOD MATRICES

Margarita Chekhova, Vedi Patel
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 3
Presentation Number: 460
Mentor(s): Evangelyn Alocilja

Each year, an estimated 1,600 Americans contract Listeria monocytogenes following consumption of contaminated food. Approximately 20 to 30 percent of these cases end in death, making it the third leading cause of death from foodborne illness in the United States. This infection can come from many foodborne sources, including unpasteurized milk, deli meats, and raw fruits and vegetables. The purpose of this research is to develop more efficient and cost-effective methods for detecting Listeria in various food matrices before it reaches the consumer. The first step to detecting foodborne illnesses is extraction, concentration, and isolation of the bacteria. In this experiment, interactions between bacteria and magnetic nanoparticles (MNPs) were utilized to improve this concentration process. Incubation of liquified food matrices with magnetic nanoparticles was followed by magnetic separation and re-suspension in phosphate-buffered saline solution (PBS, pH 7.4), thus, developing a cost-effective and rapid method for raising bacterial concentration to a detectable level. Preliminary results show this procedure can concentrate Listeria to 8 times its initial concentration in pure PBS samples. Further research has indicated the introduction of food matrices with natural microflora reduce this concentration factor, with magnetic nanoparticles preferentially concentrating other bacterial species. Thus, this process has the potential to be applied to a wide array of food matrices and food pathogens. Future research into these varying concentration factors can help identify bacterial species most suited for this extraction procedure, strengthening the early detection of foodborne illness and preventing sickness and potential loss of life.

LONGITUDINAL ANALYSIS OF CULTURED AND METAGENOMIC SPUTUM SAMPLES FROM CYSTIC FIBROSIS PATIENTS

Audrey Downs

Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 3
Presentation Number: 461
Mentor(s): Robert Quinn

Patients with Cystic Fibrosis are prone to bacterial infections in their lungs due to their lowered immune system. The bacteria that most commonly cause these infections are: Pseudomonas aeruginosa, Staphylococcus aureus, Burkholderia cepacia, Stenotrophomonas maltophilia and Achromobacter xylosoxidans. Samples were taken longitudinally from 11 different patients, the samples were cultured and analyzed using metagenomics. Metagenomics and culture results were compared in order to determine the difference between results of both tests. Metagenomics yielded a much higher amount of bacteria detection while culture only detected bacteria when present in high concentrations.

USING FUNGAL-FILTERS TO HARVEST MICROALGAE FOR HIGH-VALUE PRODUCTS MICROALGAE AND FUNGI

Conor Bertucci

Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 3
Presentation Number: 462
Mentor(s): Gregory Bonito

Unicellular Microalgae are photosynthetic organisms that can thrive in a plethora of habitats including fresh, brackish, and salt-water ecosystems, as well as in soil. Compared to terrestrial crops, microalgae have high photosynthetic efficiency, are fast growers, and contain high-value products such as polyunsaturated fatty acids, neutral lipids, proteins, pigments, and antioxidants that can be harvested. While microalgae are relatively easy to cultivate due to their simple energy and nutrient requirement, harvesting is challenging because of the small size of microalgae (2-20 um) and can also account for up to half of the total cost of the process using traditional methods. The primary objective of this research is to develop a filtration system that involves growing the soil fungi, Mortierella, into a novel fungal filter. By utilizing fungal filters made from Mortierella mycelium, the microalgae harvesting process can become more organic and efficient by replacing traditional mechanical and chemical harvesting methods. Additionally, Mortierella is capable of growing very fast under simple conditions such as on food and sewage wastes. Many Mortierella species are used for their arachidonic acid, an omega-6 polyunsaturated fatty acid that they produce which has human health benefits. Because of the high value products produced, the fungal-algal aggregates would be excellent for nutraceutical, food, and animal feedstock markets. The market for these high value products produced from fungi and algae such as protein and omega-3 and -6 fatty acids is large and expected to continue growing.

CURATING A COLLECTION OF SEED BACTERIAL COMMUNITY MEMBERS ENRICHED UNDER MATERNAL PLANT STRESS

Joanna Colovas

Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 4
Presentation Number: 464
Mentor(s): Abby Grieb, Ashley Shade

Many plants rely on interactions with microbes to gain essential nutrients for growth, and to promote stress tolerance. One way that plants can acquire their microbiota is via vertical transmission from the parent plant via the seed. However, there is currently a

knowledge gap regarding the seed microbiome and its consequences for the next generation of plants. Pilot experiments in our lab have shown that the seeds from common bean plants (Phaseolus vulgaris L.) that were stressed by either drought or excess fertilizer had an altered seed microbiome as compared to control plants. Now, we seek to understand the costs and benefits of an altered seed microbiome for the stress tolerance and health of the plant. Specifically, we are creating a representative collection of bacterial community members that are enriched under these stress conditions as compared to the community found in control seeds. To understand these members' consequences for plant outcomes under stress, we will perform controlled experiments in which we add the members to naïve plants and determine plant outcomes under stress. This research will inform which members of a seed bacterial community confer a protective, neutral or detrimental effect on plant health and aims to ultimately improve plant resilience via beneficial microbial community members. The ability to manipulate the seed microbiome to improve plant growth or resilience will benefit crop agriculture.

THE ROLE OF MISMATCH REPAIR IN THE FORMATION OF DOUBLE STRANDED BREAKS IN IMMUNOGLOBULIN CLASS SWITCH REGIONS

Em Segraves
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 4
Presentation Number: 465
Mentor(s): Kefei Yu

Immunoglobulin class switch recombination (CSR) is a DNA recombination event that allows B cells to switch their isotype from IgM to IgG, IgE, or IgA, altering the effector function of the antibodies they produce for better clearance of infections. In a physiological CSR reaction, activation-induced cytodine deaminase (AID) converts cytosine bases to uracil bases at immunoglobulin class switch regions. From there, uracil DNA glycosylase (UNG) removes the uracils, and then apurinic/apyrimidinic endonuclease (APE) generates nicks at the deamination sites. These nicks lead to the formation of induce DNA double strand break (DSB), which is a key intermediate in CSR. However, the mechanism by which nicks are converted to DSBs is poorly understood. Using CRISPR technology that can generate nicks (single-strand breaks) at precise locations in DNA, the Martin lab has shown that nicks separated far away (up to 250 bp) can trigger CSR; however, how these distal nicks are converted to DSB is unknown. Using the same experimental system, we tested the hypothesis that the mismatch repair (MMR) pathway plays a pivotal role of converting distal nicks to DSB. We used a mouse B cell line (CH12F3) that is capable of robust cytokine-induced CSR in vitro and compared the difference of CSR efficiencies in genetically engineered CH12F3 cells that are proficient or deficient in MMR. We found that an essential MMR factor (MSH2) promotes CSR induced by CRISPR-mediated distal nicks, suggesting that strand excisions during MMR helps convert nicks on different DNA strands into a DSB.

POTENTIAL MODULATION OF IMMUNE FUNCTION BY BP-3 SUNSCREENS

Carly Kocsis
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 4
Presentation Number: 466
Mentor(s): Richard Schwartz

Oxybenzone (benzophenone-3; BP-3) is a common active ingredient in sunscreens and other personal care products. It is found in urine of 98% of the U.S. population. A recent study found after a single heavy application of sunscreen that levels of BP-3 in blood exceeded Food and Drug Administration guidelines for chemicals requiring more study for potential toxicity. The Schwartz lab published studies on BP-3 effects on mammary cancer risk in a

p53-knockout mammary gland mouse model. While BP-3 effects varied depending on dietary fat, BP-3 exposure had adverse consequences for mammary cancer risk. In unpublished studies, the Schwartz lab found that BP-3 induced expression of RNAs encoding IL-4 and IL-13 in p53-knockout mammary glands of mice fed an adult high fat diet, conditions with the strongest BP-3 promotional effect on mammary cancer. IL-4 and IL-13 are potent immunoregulatory cytokines that can polarize macrophages to a tumor promoting phenotype, decrease the tumoricidal activity of T cells, and, apart from potentially promoting tumorigenesis, can promote allergy and asthma. We found in mice fed high fat diet that IL-4 and particularly IL-13 were strongly induced by BP-3 in parametrial fat distal to the mammary gland and likely uninfluenced by the p53-knockout mutation. IL-13 protein was also found in the plasma of these mice. To directly address whether IL-13 induction is independent of the p53-knockout, we are examining BP-3 effects on IL-4 and IL-13 expression in parametrial fat of wild type mice. A positive result will have important health implications for BP-3 exposure.

AVIAN MYCOBACTERIOSIS: DEVELOPING A RATIONALE FOR DIAGNOSTIC BIOPSIES

Bridie McClusky
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 4
Presentation Number: 467
Mentor(s): Dalen Agnew

Mycobacteriosis is a common disease that affects a wide variety of exotic animals and pets, including birds. This disease is caused by bacterial species and strains in the genus Mycobacterium. Currently mycobacteriosis is known to affect multiple organ systems and be spread through oral, respiratory, or dermal routes. Due to the variety of mycobacterial species, variable susceptibility, multiple routes of infection, widespread prevalence, and insidious signs can make diagnosis difficult. The purpose of this study is to determine the optimal organ to diagnostically screen for mycobacteriosis as surgical sampling can be costly and may result in mortality. We expect to see lesions most often in the liver or spleen and less often in the lungs and intestine. Lung, liver, spleen, small intestine and large intestine were sampled from a population of 89 Budgerigars in a managed flock in which atypical mycobacterium was commonly identified. Formalin fixed tissues will be sectioned, stained with hematoxylin and eosin and Ziehl-Nielsen acid fast stain. Presence and absence as well as relative abundance of acid fast staining will be used to evaluate the number of lesions using a digital imaging analysis program, Image Pro®. Our conclusions will guide diagnostic decision-making when evaluating future flocks for atypical mycobacteriosis.

DEFINING THE ROLE OF RIP1 IN MYCOBACTERIUM SMEGMATIS CITRATE RESISTANCE

Jared Fallon
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 4
Presentation Number: 468
Mentor(s): Robert Abramovitch

Mycobacterium smegmatis is commonly used in place of Mycobacterium tuberculosis (Mtb) because it is not infectious and has a faster doubling time. These properties allow experiments to be carried out in a BSL-2 lab instead of a BSL-3 lab, and in a week instead of a month. M. smegmatis has some shared physiologies with Mtb, making it an useful model to rapidly test hypotheses. Previously, we found that M. smegmatis is killed by treatment with concentrated citrate. A forward genetic screen was previously conducted to select for transposon mutants of M. smegmatis that are resistant to killing by citrate. RV_2579 (Rip1) was isolated from this screening but only one mutant in this gene was isolated. The goal of this study is to confirm that the rip1 mutant is resistant to killing by citrate, and if so, generate a complementation strain to confirm rip1 is responsible for the observed resistance. Wild type

(WT) M. smegmatis and the rip1 mutant were incubated in concentrated citrate and survival was defined by enumerating colony forming units. The result of this experiment was tolerance to citrate in the rip1 mutant when compared to the WT. Further testing is in progress to complement the rip1 mutant in M. smegmatis. The return of citrate susceptibility with the re-introduction of the Rip1 gene would support the association of the rip1 gene and susceptibility to killing by citrate.

THE EFFECT OF ARGININE ON TETRODOTOXIN PRODUCTION AND BACTERIAL GROWTH IN ROUGH SKINNED NEWTS (TARICHA GRANULOSA)

Roya Rochell
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 4
Presentation Number: 469
Mentor(s): Heather Eisthen, Samantha Westcott

Rough-skinned newts (Taricha granulosa) utilize a potent neurotoxin, tetrodotoxin (TTX), to block the voltage-gated sodium channels of potential predators as a defense mechanism. Previous work from the Eisthen lab has shown that TTX is produced by bacteria that live on the skin of newts. The factors that affect TTX production are not understood and its biosynthetic pathway is unknown, although arginine has long been suspected to be a precursor for TTX production. During experimentation I use both arginine enantiomers (D and L) to determine if arginine is involved in TTX production. Newts may supply bacteria with L-arginine to enable bacterial TTX production. Alternatively, some microbes produce D-arginine, which can potentially create competition with TTX-free bacteria. D-arginine's microbicidal properties might allow for D-arginine producing TTX strains to both proliferate within the environment on the newt's skin and produce larger cumulative quantities of TTX. We aim to discover whether D or L-arginine are components of TTX, and to what extent arginine affects growth in microbial populations. To determine whether either hypothesis has validity, I am provisioning TTX-producing microbes with varying concentrations of L-Arginine or D-Arginine, creating bacterial growth curves, then using solid phase extraction to assay the growth medium using HILIC-MS/MS to measure any resulting changes in TTX production.

THE REMOVAL OF SARS-COV-2 FROM WASTEWATER BY WASTEWATER TREATMENT

Andrew Ladd
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 4
Presentation Number: 470
Mentor(s): Joan Rose, Nishita D'Souza

It is known that SARS-CoV-2 can be found in sewage yet there is no effluent standard for how much SARS-CoV-2 should be removed for environmental discharge. The purpose of this study is to measure the concentration of SARS-CoV-2 in the influent and effluent of two wastewater treatment plants to determine the effectiveness of each plant's ability to remove SARS-CoV-2 from wastewater. Samples were retrieved from two wastewater treatment plants (WWTP-A and WWTP-B) and sent to the Rose Lab at Michigan State University. Influent samples were concentrated via polyethylene glycol (PEG) precipitation and centrifugation, and effluent samples were concentrated by a concentrating pipette. Viral RNA of influents and effluents were extracted by use of a QIAamp® Viral RNA mini kit (Qiagen). Results for both influent and effluent RNA samples were quantified via RT-droplet digital Polymerase Chain Reaction (RT-ddPCR) for the N1 and N2 genes. At this time, 4 influent and 4 effluent samples from WWTP-A have been processed, and 12 influent and 12 effluent samples from WWTP-B have been processed. Of the samples from WWTP-A, 75% (3/4) of the influent samples, and 100% (4/4) of the effluent samples, were positive. Of the 12 influent and effluent samples from WWTP-B, 66.67% (8/12) of the influent samples, and 25% (3/12) of

the effluent samples, were positive. Concentrations are being assessed and with these data, tables and figures will be used to display the overall average reduction of the SARS-CoV-2 virus from wastewater for specific wastewater treatment processes.

SWITCHGRASS PHYLLOSPHERE MICROBIOLOGY ACROSS A LATITUDINAL GRADIENT

Keean Dolan

Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 5
Presentation Number: 472
Mentor(s): Ashley Shade, Keara Grady

One of the core problems with currently prominent biofuel crops is that they have to be grown on fertile land that could also be used to produce food, creating the dilemma of whether to grow food or fuel. A second-generation biofuel crop, Switchgrass (Panicum virgatum), could address this issue in that it can be grown on marginal land, or land that is unsuitable for conventional agriculture. The Shade Lab with funding from the Great Lakes Bioenergy Research Center (GLBRC), has developed a project with the goal of improving the yields of switchgrass on marginal land fields through understanding and leveraging the microbial communities that live on the plant. Having an understanding of the microbiome of the plant could aid in enhancing plant traits such as flowering time, aiding in drought resistance, and in enhancing biochemical cycling of greenhouse gasses such as methane or N2O. Our lab chose sites across Michigan and Wisconsin at different time points throughout the growing season and collected swabs of the Switchgrass leaf surface along with leaves, roots, bulk soil, and contextual data. The metagenomic DNA of the bacteria on the swab was then extracted and sequenced. We hope to create a model of the microbial community on the plant both spatially and temporally, as well as understand the function certain taxa may serve within the community.

TWO AND THREE PARAMETER MODELS FOR MS-2 PERSISTENCE ON FOMITES

Stephanie Starr

Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 5
Presentation Number: 473
Mentor(s): 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 goodness of fit was evaluated via Likelihood Ratio Tests and Bayesian Information Criterion values. 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 challenge 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.

ASSESSING ANAPLASMA PHAGOCYTOPHILUM POPULATION DYNAMICS USING MULTI-LOCUS SEQUENCE TYPING

Joey Pastori
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 5
Presentation Number: 474
Mentor(s): Jean Tsao

Several factors, including land use and climate change, have resulted in the spread to ticks and tick-borne disease in North America1. Levels of tick-borne pathogens in 2017 were seen to be three times higher than they were in 20042. One such pathogen is Anaplasma phagocytophilum, which is responsible for causing anaplasmosis in humans and canines. Currently the population biology of A. phagocytophilum is not well studied in the Midwest and Northeast regions in the United States, where human and canine anaplasmosis have been emerging. In contrast the population biology of A. phagocytophilum has been much more researched in regions of Europe and Asia, including the development of a multi-locus sequence typing system (MLST). Building on these studies, we aim to use MLST to improve our understanding of the ecology, evolution, and emergence of A. phagocytophilum in eastern North America. The objective of this project is to develop the MLST for eastern North American A. phagocytophilum, which are maintained by blacklegged ticks (Ixodes scapularis) and various wildlife hosts. Based on prior studies, we will begin by targeting fragments already identified for eight housekeeping genes. We will optimize the MLST using samples detected from questing ticks previously collected from central Wisconsin, Massachusetts, and Rhode Island, where anaplasmosis is highly endemic. At each of these sites, A. phagocytophilum-infected host-seeking nymphal and adult blacklegged ticks were collected from three 1-ha grids from spring 2010 – fall 2012. These data will provide preliminary data on the diversity, relatedness and temporal dynamics of A. phagocytophilum genotypes and will lay the groundwork for further research on A. phagocytophilum using MLST methods.

ASSESSING DIFFERENTIATED TROPHOBLAST CELLS AS A MODEL FOR PLACENTAL LISTERIA MONOCYTOGENES INFECTION

Emily Hawker
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 5
Presentation Number: 475
Mentor(s): Jonathan Hardy

Listeria monocytogenes, the causative agent of listeriosis, is a foodborne bacterial pathogen that has most severe disease outcomes in immunocompromised individuals and pregnant women. Specifically, listeriosis is known to cause stillbirth and miscarriage, as well as serious neurological defects in surviving infants. L. monocytogenes invades the bloodstream, where it travels to and crosses the placental barrier and spreads to the fetus. Trophoblasts are a key cell type of the placenta and compromise the maternal-fetal interface, and as such are critical junction in the L. monocytogenes invasion of the placenta. In mice, trophoblast stem cells (TSCs) differentiate into syncytiotrophoblast cells (SynT) and trophoblast giant cells (TGC) to serve various functions of the placenta. This project focuses on the in vitro directed differentiation of isolated TSCs into SynT cells and TGC through exposure to specific compounds. Differentiation of TSCs will be confirmed using methods including light microscopy and western blot. The ultimate goal is to determine the susceptibility of differentiated trophoblast cells to L. monocytogenes infection, to improve this model for studying placental infection. This will be tested by utilizing a bioluminescent strain of L. monocytogenes and in vivo imaging system (IVIS), which allows for the immediate quantification of bacterial growth. Preliminary results indicate a decrease in L. monocytogenes infection in differentiated trophoblast cells.

PLASMID-MEDIATED TRANSFER OF ANTIBIOTIC RESISTANCE GENES (ARGs) TO COMENSAL AND MULTI-DRUG RESISTANT BACTERIA

Mia Vanallen

Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 5
Presentation Number: 476
Mentor(s): Azam Sher, Linda Mansfield, Lixin Zhang

Antibiotic resistant (AR) pathogens have become a major health problem: the CDC announced we are now existing in a post antibiotic era. Plasmids are the carriers of antibiotic resistance genes, and they spread between bacteria in the microbiome via a horizontal gene transfer mechanism called conjugation. During each conjugation event, plasmids enter a host cell and can express their antibiotic resistance genes, resulting in newly acquired antibiotic resistance for that cell. This process of unrestrained AR plasmid spread cultivates an evolving reservoir of antibiotic resistant pathogens and commensal bacteria in the human gut microbiome. This study aimed to replicate and observe the rate and patterns of transconjugant frequency of fluoro-tagged plasmids in combinations of commensal, pathogenic, and lab strain bacteria in vitro. Conjugation protocols that allowed for quantitating transconjugation events using both introduction and absence of antibiotic pressure for selection were created and employed. The transconjugant colonies were confirmed using colony PCR with primers selecting for antibiotic resistance genes. Growth curve assays were used to estimate transconjugation rate during an induced antibiotic pressure event. Fluorescent microscopy was used to observe the transconjugants directly. Using the transconjugant frequencies obtained, predictions of plasmid spread could be made that model those in the human gut microbiome. Additionally, the individual combinations of donor and recipient bacteria could give insight into strain-specific features that affect transconjugant frequency and plasmid spread effect. Understanding plasmid spread between gut microbiota is crucial to gain insight on how potential treatments can be developed to combat the spread of antibiotic resistance genes.

TESTING ANTIBACTERIAL ACTIVITY OF PLANT DERIVED COMPOUNDS AGAINST GENETICALLY ENGINEERED BIOLUMINESCENT NON-TYPHOIDAL SALMONELLA

Katie Singer

Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 5
Presentation Number: 477
Mentor(s): Cristiane Pereira Hicks, Michael Bachmann, Peter Bergholz

Antibiotic-resistant bacteria are increasing in frequency and species diversity and are considered one of the top public health threats by the CDC and the WHO. One such 'serious threat' identified by the CDC (2019) are non-typhoidal Salmonella strains that in the U.S. cause an estimated 212,000 infections and 70 deaths annually. Conventionally, the sensitivity of bacteria to antibiotics is measured with the Kirby-Bauer method, using agar plates with antibiotic soaked wafers. The efficacy of each antibiotic is measured by the size of the zone of inhibition around each wafer. This, however, does not allow the effects of antimicrobial compounds to be assessed in real time. To measure the efficacy of plant-derived antimicrobial compounds over time we are using bioluminescence imaging (BLI) of light emitting bacterial strains that have been engineered to express a bacterial luciferase enzyme. For this, we are using a modified Tn7 transposon, a mobile genetic element, that contains the lux operon encoding a bacterial luciferase and substrate-synthesizing enzymes. The Tn7 transposase inserts the Tn7-lux transposon into a defined locus of the bacterial host genome. Our preliminary data show antibacterial efficacy of plant-derived compounds against Salmonella enterica serovar typhimurium, a mouse pathogen. Here, we will engineer a clinical isolate of Salmonella enterica serovar Dublin, a gastrointestinal pathogen in cows and

humans, with Tn7-Lux and test their sensitivity towards various plant-derived compounds. Our final goal will be to assess the effectiveness of plant-derived compounds in a preclinical mouse model of GI infection with bioluminescent S. Dublin using BLI.

MYCOBACTERIUM TUBERCULOSIS PROTEIN PPE51 INTERACTION WITH GLUCOSE AND GLYCEROL

Megan Murto
Microbiology, Immunology, and Infectious Disease, Poster Presentation
Section: 5
Presentation Number: 478
Mentor(s): Robert Abramovitch

The proposed project for this semester, which is still in progress but it projected to be done by mid-March, is to inquire into different carbon sources that directly interact with the PPE51 protein. The PPE family protein PPE51 is proposed to be required for uptake of glycerol and glucose by Mycobacterium tuberculosis. With this project, I intend to test the protein's interaction with other small molecules and/or antibiotics to see what import is promoted, which can be tested by looking at the direct interactions with small molecules. I intend to examine the interaction of 6 protein variants with glycerol. These variants will be expressed from an E. coli BL21 (DE3) from the T7-inducible pET plasmid. The variants tested include PET-Wild Type PPE51, PET-A228D, PET-E215K, PET-S211R, and PET-PPGK, a negative control for glycerol testing, as it has been proven to show interaction with glucose. I intend to generate the above PPE51 variants, express and purify wild type and variant types from Escherichia coli, and use thermostability and other assays to measure interactions between carbon sources, beginning with glycerol, with the PPE51 protein.

NEUROSCIENCE

AN INITIAL INVESTIGATION OF OCTOPUS ARM MOVEMENTS FOR APPLICATIONS TO HAND PROSTHETICS

Brittany Bush
Neuroscience, Poster Presentation
Section: 1
Presentation Number: 480
Mentor(s): Galit Pelled, Garrett Weidig, Tamara Bush

For MILLIONS of amputees, having an easily manipulatable prosthetic is key to returning to daily activities. Unfortunately, current prosthetics do not provide full function nor fluid motions and are not easy to control. So, alternative strategies for controlling and moving prosthetics are needed. Our study investigated the adaptable movements of octopus arms to understand the fluidity of their movements and simplicity of control. The octopus was chosen because it can control its arm without using the brain. Complete control of the arm is possible from the axial nerve that runs through its center, allowing it to be functional even when not connected to the body. Motion capture data were collected from the detached arm of an octopus during manually recreated movements that we observed from live octopuses. With this data a series of calculations were performed to see the arms curvature and understand how it bends. These data can be connected to the neurological stimulation of the arm to relate stimulations to movements. For future work, neurological stimulations will be applied to an arm while motion capture data are collected to observe these relationships. The data collected will be used to design and control prosthetic devices with fluid movements and simple controls.

CELLULAR SENESCENCE AND TAU IN ALZHEIMER'S DISEASE

Varshini Perumal

Neuroscience, Poster Presentation
Section: 1
Presentation Number: 481
Mentor(s): Marcia Gordon

Cellular senescence is a phenomenon characterized by a cell's inability to progress through the cell cycle. Senescent cells secrete inflammatory mediators and could contribute to aging-related diseases such as Alzheimer's disease. I used transgenic mice that over-express the Alzheimer's disease-associated protein TAU. The cerebral cortex was collected at 6 or 16 months of age from transgenic mice and non-transgenic controls. To test which genes are induced by TAU, an RT2 Profiler plate-based microarray containing 84 senescent marker genes was performed. TAU induced 15 genes in 6-month-old transgenic mice compared with 6-month-old control mice. Fold inductions averaged 2.6 (range from 2-5-fold). The same genes were all induced more in older mice with more severe TAU pathology (mean induction 7.5-fold, range 2.6-24-fold). In addition, 25 more genes were induced in 16-month-old mice compared with age-matched controls. In contrast, aging-induced a single gene associated with cellular senescence (Cdkn2a). Quantitative real-time PCR was used to validate select gene expression changes and to examine the magnitude of induction in mice of different ages (2, 4, 6, and 16 months of age). These genes included Cdkn1a, Cdkn2a transcript 1, Col3a1, Egr, and Nfkb. These studies revealed that genes indicative of cellular senescence increase in the presence of TAU pathology. This could be because each senescent cell is expressing more of that RNA or that the number of senescent cells is increasing. These results suggest that Alzheimer's patients expressing more TAU would show more cellular senescence, leading to increased neurodegeneration in the brain.

NEURAL CONNECTIVITY MAPS

Arjun Balakrishnan, Stanley Wickman

Neuroscience, Poster Presentation
Section: 1
Presentation Number: 482
Mentor(s): Mark Reimers

Knowledge of brain region connectivity at a fine resolution is of both theoretical and practical interest for understanding the physical correlates of brain functions and dysfunctions. Mouse brains are relevant to research in psychology and pharmacology, making them a useful subject to learn more about. The neural circuitry of a mouse's brain can be displayed in the form of connectivity maps. A connectivity map contains a visual representation of the neural connections within a mouse's brain, which can reveal fascinating information about the connections between different regions of the brain. The Allen Institute for Brain Science (AIBS) did hundreds of tracing experiments and summarized their results in the form of a connectivity matrix with roughly 200,000 x 400,000 elements. This matrix contains the connectivity strength between each 100 micron voxel in the brain. Connectivity maps can be created by extracting rows or columns from this matrix. These maps can display the outputs from a certain voxel to the rest of the brain, or the inputs from the brain to a certain voxel. Connectivity maps can reveal useful information about a mouse's brain, such as the neural connections that govern emotional and sensory motor circuitry. Research into these subjects can greatly advance our knowledge about brain functions.

PROTECTIVE ROLE OF MAST CELLS IN INFLAMMATORY PAIN

Karli Monahan

Neuroscience, Poster Presentation
Section: 1
Presentation Number: 484
Mentor(s): Geoffroy Laumet

Chronic pain costs about $635 billion each year in the United States. Unresolved inflammation is a significant predictor for developing chronic pain and targeting inflammation mechanisms offers opportunities for therapeutic intervention. Mast cells are a type of immune cell that regulate inflammation in the skin. To overcome limitations of pharmacological approaches, we used transgenic mast cell deficient mice, to test the effect of mast cell on inflammatory pain. We hypothesized that the lack of mast cells will impact the pain response to skin inflammation. To test this, two groups of mice were used: wildtype (WT) with mast cells, and sash (SAH) without mast cells. Both groups received a 5 µl injection in a hind paw of saline (SAL, control) or complete Freund's adjuvant (CFA) to induce an immune response. Tissue samples were collected, and pain sensitivity, inflammation-induced edema, and gene expression of inflammatory mediators was assessed. SAH mice had significantly more pain sensitivity that took longer to subside compared to WT mice. The edema response to CFA was also bigger and longer in SAH mice. qPCR analyses showed that anti-inflammatory cytokines are upregulated in response to CFA but was similar in WT and SAH mice. The lack of mast cells drastically prolongs pain and delays resolution of edema. Therefore, targeting mast cells may provide new strategies to prevent chronic pain, but further studies are necessary to decipher the underlying mechanism.

ALTERED BEHAVIORS AND CHANGES IN NEURONAL MORPHOLOGY ASSOCIATED WITH THE VALPROIC ACID MODEL OF AUTISM IN MOUSE.

Ariana Zimmerman

Neuroscience, Poster Presentation
Section: 2
Presentation Number: 488
Mentor(s): Bronson Gregory, Charles Cox, Joseph Beatty

Autism spectrum disorders (ASDs) are characterized by a range of behavioral and neurological deficits. A mouse model of prenatal VPA exposure exhibits ASD-like behaviors such as impaired social interactions and repetitive behaviors. To determine if behavior was affected in the VPA mouse model, we investigated a repetitive behavior that is altered in other animal models of ASD. In addition, we tested if responses to nociceptive stimuli were altered in VPA model. Dendritic spine morphology has been shown to be altered in other ASD animal models, and we wanted to determine if such changes held true in the VPA model, so we examined spine density and morphology in layer 5 pyramidal neurons in primary somatosensory cortex. In utero saline and VPA treated mice of either sex were subjected to a hot plate test as adults to measure a pain response, and a marble burying test for repetitive behavior. Our results show an increased rate of marble burying similar to other ASD models and a reduced sensitivity to pain stimuli in VPA mice. To assess the density and morphology of dendritic spines, neurons from adolescent and adult VPA mice were imaged in brain slices using two-photon laser imaging. We found a decrease in dendritic spine density at both time points in VPA mice. These data confirm ASD-like repetitive behaviors, and a hyposensitivity to pain stimuli in the VPA mice. The novel changes observed in dendritic morphology for VPA mice may contribute to the ASD behavioral phenotype that persists in adulthood.

INVESTIGATING THE ROLE OF CANDIDATE GENES IN REGULATING NEURONAL DIFFERENTIATION IN THE ZEBRAFISH ENTERIC NERVOUS SYSTEM

Christina Liu

Neuroscience, Poster Presentation
Section: 2
Presentation Number: 491
Mentor(s): Julia Ganz

The enteric nervous system (ENS) is the largest branch of the peripheral nervous system. It regulates gut functions including motility, fluid transport, and nutrient absorption. The ENS is derived from the neural crest - a migratory cell population that gives rise to specialized cells. Once neural crest cells reach the gut, they colonize it and migrate to the distal end. When colonized, enteric progenitor cells (EPCs) differentiate into neurons and glial cells. Abnormal ENS development can result in diseases like Hirschsprung Disease. We know little about the regulation of differentiation and specification of ENS neurons. This project aims to understand the function of candidate gene jarid2a in regulating ENS neurogenesis. Preliminary data using CRISPR/Cas9 genome editing shows that functional loss of jarid2a reduces neuron numbers, suggesting that jarid2a plays a role in neurogenesis. I hypothesize that jarid2a regulates EPC proliferation, thereby affecting neuronal differentiation. To test the function of jarid2a in stable mutants, I have genotyped zebrafish to find carriers of mutant jarid2a alleles. To determine if jarid2a controls neuronal specification, I am investigating neuronal phenotypes in loss-of-function of jarid2a. To test if the functional loss of jarid2a affects ENS function, I will perform transient feeding assays 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 function. 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

Sara Cook

Neuroscience, Poster Presentation
Section: 2
Presentation Number: 492
Mentor(s): Julia Ganz

The enteric nervous system (ENS) is part of the peripheral nervous system, which innervates the gut, controlling gut functions. Zebrafish are ideal models to study ENS development as the ENS is accessible in transparent larvae. Although little is known about ENS developmental genes, several transcription factors were proposed to function in neuronal differentiation, including jarid2a. I aim to determine 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 proliferation of enteric progenitor cells, thus affecting neuronal development in the ENS. To test this, I am currently establishing stable mutant lines for jarid2a. For this, I have genotyped zebrafish identifying heterozygous carriers of mutant jarid2a alleles. I am also developing a restriction assay to genotype jarid2a mutant alleles. To test the role of jarid2a in ENS neurogenesis, I will co-stain mutant larvae with antibodies against pan neuronal and neuronal subtype markers. Analysis of these larval guts will determine if ENS neurogenesis is affected in mutant larvae compared to wildtype siblings. To determine effects on ENS function, I will perform feeding assays of 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.

USING 3D MARKERLESS POSE ESTIMATION PROGRAMS TO DETERMINE FEAR REACTIVITY IN HUMAN INFANTS.

Charlotte Best, Samantha Finkbeiner, William Quackenbush
Neuroscience, Poster Presentation
Section: 2
Presentation Number: 493
Mentor(s): Mark Reimers, Rebecca Knickmeyer

Infancy is a key period in the development of fear, an essential emotion involving recognizing and responding to threatening stimuli. Researchers studying infant fear rely on parental reports and direct assessment of child behavior either in the home or structured laboratory settings. The objective of our study is to develop automated approaches for direct assessment of infant behavior. Specifically, we are testing if a markerless pose estimation program can effectively track infants' reactions during a paradigm adapted from the Laboratory Temperament Assessment Battery (Lab-TAB) Mask episode. DeepLabCut and OpenPose are 3D markerless pose estimation programs based on transfer learning with deep neural networks. DeepLabCut was designed for a single animal, while OpenPose was trained to work on multiple human subjects. Both allow users to track key features on the body as they move through space. Our goal is to determine which program will give the most accurate motion tracking for our project. Videos were collected by a research team at the University of North Carolina at Chapel Hill. Poisson regression was used to determine whether body part movement during mask presentation predicts an expert rater's assessment of whether specific fear behaviors are present. Preliminary results suggest movement of the eyes and nose predict both the presence of bodily fear and startle responses with McFadden's R-Squared between 0.2 and 0.4. Ultimately, we hope to develop user-friendly methods of assessing highly complex infant behaviors, which could be deployed to a wide range of research labs.

MAST CELL-SEROTONIN INTERACTIONS AS A POTENTIAL MECHANISM UNDERLYING ANTI-ANXIETY EFFECTS OF MAST CELLS

Robby Teis
Neuroscience, Poster Presentation
Section: 3
Presentation Number: 496
Mentor(s): Adam Moeser, Alfred Robison, Natalia Duque-Wilckens

Mast cells (MCs) are known for their involvement in peripheral disease such as allergy, but they are also present in the brain where they can modulate behavior. We recently found that the MC deficient Wsh/Wsh mice show a phenotype consistent with increased anxiety/anhedonia: they show decreased time spent in the open vs. the closed arms in the elevated plus maze test and reduced sucrose preference. These results are consistent with previous findings and suggest that MCs exert anti-anxiety and anti-depressive effects under basal or mild stress conditions. One of the potential mechanisms by which MCs could reduce anxiety is by modulating the brain serotonergic network: MCs can synthesize, store, and quickly release a variety of molecules that can directly affect the activity neuronal function, such as cytokines, histamine, and serotonin. Further, pharmacological activation or conditional knock-out of MCs affect brain serotonin content. However, it is not clear whether this contribution is a direct result of MC serotonin release or MC modulation of neural serotonergic circuits. Here, we will use immunohistochemistry for serotonin and the immediate early gene c-Fos in brain slices to examine acute responses of serotonin neurons to mild restraint stress in wild type and Wsh/Wsh mice. Preliminary data suggest that,

compared to wild type, Wsh/Wsh mice show reduced number of serotonin neurons in the dorsal raphe, the largest brain serotonergic nucleus. This work will generate a new understanding of the cellular mechanisms by which mast cells could contribute to brain physiology and behavior.

THE ROLE OF MAST CELLS LINKING PERIPHERAL WITH CENTRAL INFLAMMATORY RESPONSES DRIVING DEPRESSION AND ANXIETY PHENOTYPES

Will Meaton
Neuroscience, Poster Presentation
Section: 3
Presentation Number: 497
Mentor(s): Alfred Robison, Natalia Duque-Wilckens

There is an urgent need for a better understanding of the mechanisms underlying the development of major depressive disorder (MDD), a major burden for current societies affecting ~265 million people worldwide. Although it is known that neuroinflammation -which involves activation of microglia, a specialized population of macrophages-like cells in the central nervous system- plays a central role in this disease, the mechanisms by which peripheral inflammatory responses lead to the persistent, exaggerated neuroinflammation leading to MDD are not fully understood. Mast cells (MCs), the effector cells of the immune system, are uniquely positioned to act as a bridge: they are distributed throughout the body, including the brain and meninges, and they can exert rapid and long-lasting responses through the release of pre-formed and de novo synthesized mediators that can directly alter microglial activity. Our lab has crossed the Mcpt5-Cre with the Cre-dependent B6-iDTR mouse lines to render MCs susceptible to temporal ablation following diphtheria toxin administration. Using this model in combination with behavioral analysis and immunohistochemistry for the microglia marker IBA1, here we will investigate the role that MCs play on short (6h) and long-term (48h) depressive and anxiety-like phenotypes as well as microglia activation in brain areas relevant to mood regulation. Preliminary data suggest that MCs contribute to short-term increased anxiety in response to LPS administration. This work will generate a new understanding of the mechanisms by which peripheral inflammatory responses can lead to MDD.

ASSOCIATION OF PLACENTAL INFECTION WITH LISTERIA MONOCYTOGENES AND NEURODEVELOPMENTAL DISORDERS

Prachee Pingle
Neuroscience, Poster Presentation
Section: 3
Presentation Number: 498
Mentor(s): Jonathan Hardy, Justin Lee

Maternal infection caused by an intracellular foodborne pathogen, Listeria monocytogenes, causes listeriosis which can have a detrimental impact on the development of the fetus. The maternal infection triggers an inflammatory response and may cause abnormal fetal brain development. Numerous studies have reported a correlation between maternal infection and neurodevelopmental disorders, such as Autism spectrum disorder (ASD) and schizophrenia (SZ). In this study, pregnant CD-1 mice were infected with L. monocytogenes to induce an infection response on gestational day 14.5. Disruptions in social behavior and social interaction of the offspring are major characteristics of ASD. To quantify the cognitive deficits, behavioral tests such as Three-Chamber Sociability and Social novelty tests were performed. 8-12 week old mice were introduced to novel and familiar subjects and were observed for differences in social interaction and repetitive behaviors. It is predicted that there will be significantly less social interaction in L. monocytogenes infected mice compared

to the control mice validating a disruption in their fetal brain development causing neurodevelopmental disorders.

COCAINE INCREASES CALRETICULIN VIA ΔFosB IN HIPPOCAMPAL PROJECTION NEURONS

Brooklynn Murray, Hayley Kuhn
Neuroscience, Poster Presentation
Section: 3
Presentation Number: 499
Mentor(s): Andrew Eagle

Ventral hippocampus neurons that project to the nucleus accumbens (vHPC-NAc) are critical to cocaine seeking behavior. We have evidence that demonstrates that cocaine directly alters the function of vHPC-NAc neurons suggesting that cocaine mediates changes in gene expression in this brain circuit. Our preliminary data using circuit-specific RNA sequencing of vHPC-NAc neurons in cocaine-exposed mice suggests that calreticulin is upregulated by cocaine and this may be mediated by the transcription factor ΔFosB. Calreticulin is a calcium binding chaperone found in the endoplasmic reticulum (ER) that plays a functional role in maintaining calcium homeostasis. Our study focused on whether ΔFosB is necessary in vHPC-NAc projection neurons for cocaine-induced calreticulin expression. We used viral tools to label vHPC-NAc neurons with GFP and conditionally knockout FosB (the gene that encodes ?FosB) in the same circuit in mice. WT (GFP-labeled vHPC-NAc) and KO (GFP-labeled & FosB knockout vHPC-NAc) mice were treated for 10 days with cocaine (intraperitoneal, 20 mg/kg) or saline. Twenty-four h after the last injection brains were collected and processed for immunohistochemical detection of calreticulin in vHPC-NAc neurons. Calreticulin expression was assessed by fluorescent signal intensity in GFP-tagged vHPC-NAc neurons. We determined that cocaine increases calreticulin in vHPC-NAc neurons and that knockout of FosB in vHPC-NAc blocks cocaine's effects on calreticulin expression. These findings suggest that cocaine, through ΔFosB, increases calreticulin in vHPC-NAc neurons. Furthermore, cocaine-induced calreticulin may mediate cocaine seeking behaviors by regulation of ER in this circuit.

NUTRITION & FOOD SCIENCE

FECAL BACTERIAL COMMUNITIES DIFFER BY LACTATION STATUS IN POST-PARTUM WOMEN AND THEIR INFANTS

Eliot Haddad
Nutrition and Food Science, Oral Presentation
Section: 1
Presentation Number: 504
Mentor(s): Sarah Comstock

Breastfeeding has numerous benefits for both the mother and her infant after birth. The gut microbiota, the collection of microorganisms inhabiting the human gastrointestinal tract, has been shown to be modulated in infants by human milk exposure. For lactating women, it has yet to be examined whether the gut microbiota differs by lactation status. As such, we aimed to determine whether gut microbial diversity differs by breastfeeding status in both women and their infants. By collecting and analyzing the fecal samples of N=24 women and their infants at 6 weeks after birth, we were able to perform statistical analyses of gut microbial diversity using the vegan package in the R software. Of the participants, n=14 were exclusively breastfeeding. Alpha diversity, or microbial diversity within an individual, was significantly lower in exclusively breastfed infants. Maternal breastfeeding status and alpha diversity were associated in univariate analysis, but this relationship disappeared when factoring BMI category in multivariate analysis. Beta diversity, or differences in microbial

diversity between groups, differed by breastfeeding status for both the women and infants. Of n=6 infants with Bifidobacterium longum subsp. longum in their fecal samples, all had mothers sharing the same species, suggesting vertical microbial transfer. In summary, maternal gut microbiotas differ by lactation status, a relationship that is likely mediated by BMI category. These associations between breastfeeding practices and the gut microbiotas of both women and their infants is critical to enhancing our understanding of the mediating role of the gut microbiota on maternal and child health.

INTAKE OF BIG 8 ALLERGENS BY YOUNG CHILDREN IN A MICHIGAN COHORT

Natalie Jabaay
Nutrition and Food Science, Oral Presentation
Section: 1
Presentation Number: 505
Mentor(s): Sarah Comstock

Over 5.6 million children in the United States are diagnosed with a food allergy and pediatric allergists are desperately searching for nutritional interventions and prevention strategies. As the recommendations for when to consume allergens change, it is unclear whether healthcare providers and parents are adapting to these changes. In a longitudinal study, we assessed the dietary intake of Big 8 allergens in Michigan children from infancy through 3 years of age. I performed literature reviews to consolidate recommendations regarding consumption of allergens, most of which suggested that the early introduction of allergens in infancy may be preventative against developing food allergies later in childhood. In my presentation, I will share findings from our data on children's dietary patterns, discuss the current recommendations for consumption of food allergens in children, and draw comparisons between the recommendations and what children are actually consuming. I anticipate to fill a gap in the literature regarding actual consumption and to aid healthcare professionals and parents in adapting to new recommendations in an effort to collectively reduce the risk for food allergy development in children.

MICHIGAN CHILD DIET STUDY: CURRENT INTAKE TRENDS VS NATIONAL GUIDELINES

Nikita Nel
Nutrition and Food Science, Oral Presentation
Section: 1
Presentation Number: 506
Mentor(s): Sarah Comstock

Nutritional guidelines for infants are constantly changing but are a critical aspect of proper childhood development. Identifying patterns of breastfeeding, along with food and beverage consumption, plays a major role in modifying these trends to best suit the needs of the general population and creating new, improved dietary guidelines. The purpose of this study was to identify and discuss infant breastfeeding and nutritional trends in 12-to-36-month old's and compare them to the state and national population. This study uses a cross-sectional survey given to mothers at three different recall periods, when their infants were 12 (n=44), 24 (n=46) and 36 months old (n=32). The survey recorded both a 24-hour and year-long diet recall, along with breastfeeding and dietary diversity trends, which was then compared to previous general consumption habits and national dietary guidelines. About 95% of the 12-to-24-month old's (n=46) in our population were ever breastfed. The percentage of infants with a diet based on 100% formula or other foods increased from 66% at 12-months to 88% at 24-months. Meat, fruit and vegetables were the three most consumed food categories in both the 24-hour and year-long diet recall, while candy and chocolate had the most drastic increases. Each recall period had an average dietary diversity score between 5.24 and 5.44. Breastfeeding trends among our cohort were above both state and national averages.

The cohort reported similar dietary diversity and consumption trends across the three recall periods, with the expectation of sweetened food and drinks.

SPICE STUDY: DETECTION OF PROTEINS RELATED TO INTESTINAL INFLAMMATION

Wreeti Kar
Nutrition and Food Science, Oral Presentation
Section: 1
Presentation Number: 507
Mentor(s): Sarah Comstock

The impact of dietary consumption of spices, such as cayenne pepper, on gastrointestinal inflammation in healthy individuals is unknown. During intestinal inflammation, two proteins, calprotectin and lipocalin, are released from neutrophils. The presence of these two proteins serves as a biomarker and increased concentrations would indicate that intestinal inflammation has occurred. Participants in the SPICE study drank tomato juice one week then tomato juice with 2g of cayenne pepper another week. All participants were healthy adults that did not regularly consume spicy foods. Using Enzyme-linked Immunosorbent Assays (ELISAs), the concentrations of calprotectin and lipocalin were measured in the stool samples. The average of the calprotectin concentration when participants were consuming cayenne was 537.5 ng/mL and when participants were not consuming cayenne was 685.76 ng/mL. On the other hand, the average of the lipocalin concentration with cayenne was 53.56 ng/mL and the concentration without cayenne was 55.63 ng/mL. There are no differences in the averages for either calprotectin and lipocalin with or without cayenne consumption. The small sample size and short treatment period are potentially why no differences in concentration were detected. Future work could involve increasing the sample size and the amount of cayenne and testing the effects on the microbiota.

CHARACTERIZATION OF GUT MICROBIOTA THROUGH NUTRITIONAL INTAKE OF INFANTS WITH RSV IN PICU

Madeleine Russell
Nutrition and Food Science, Oral Presentation
Section: 1
Presentation Number: 508
Mentor(s): Sarah Comstock

Respiratory Syncytial Virus (RSV) is the leading cause of respiratory tract infections in young children, and can lead to deadly secondary infections, including bronchiolitis and pneumonia. There are few nutritional mediated therapies for this disease, despite evidence that nutritional therapies improve health outcomes for infants within Pediatric Intensive Care Units (PICU). Furthermore, there is little understanding of the relationship between gut microbiota composition and nutrition within the PICU. Our objective was to characterize changes in the gut microbiome diversity across two time points, during peak illness and recovery, by patient nutritional intake. Twenty patients positive for RSV and ten sedation controls were enrolled for the study at Helen DeVos Children's Hospital. Patients were <6 month and were admitted to the PICU for severe bronchiolitis. Stool samples were collected at PICU admission and 72 hours, and the bacterial composition of these samples was analyzed by sequencing of the V4 region of the 16SRNA gene. Participants with RSV were grouped into three categories based on their percent caloric intake (<33% , 33-98.9%, 99-100%) in the past 24 hours, with the control infants grouped separately. RSV patients had gut bacterial communities that significantly differed from those of healthy control infants, with control infant bacterial communities containing more Prevotella and Porphyromonas. Dysbiosis of the microbiota of adult critical care patients has been well documented, including loss of commensals such as Prevotella. Future studies could assess whether modulation of infant PICU microbiota via

nutritional therapies that promote retention of protective bacteria improve RSV patient outcomes.

DIETARY HABITS AMONG UNDERSERVED 5TH-7TH GRADE ADOLESCENTS

Maddie Young
Nutrition and Food Science, Poster Presentation
Section: 2
Presentation Number: 510
Mentor(s): Lorraine Robbins

The purpose of this cross-sectional study was to assess eating habits of underserved adolescents (minorities; low socioeconomic status). Survey data were obtained from adolescents attending two urban schools in Michigan. The sample included 80 adolescents (48.8% male; 51.2% female). Their ages ranged from 10-13 years. Most were Black (56.3%), and 21.3% were multiracial or non-White. Over half (53.2%) were in families earning <$20,000/year. Before participating, parents and adolescents signed consent and assent forms, respectively. Adolescents completed a paper-pencil survey about their eating habits, and SPSS was used to analyze the data. The majority (70.1%) had at least 1 glass (8-12 fluid ounces) of sweetened drinks per day during the past week with 13.8% reporting ≥4 glasses daily. Close to one-third (31.3%) had <1 glass of milk in any given day of the past week with 22.5% having no milk during this time period. When asked about a usual day, over one-third (36.4%) reported drinking ≤2 glasses of plain water. Approximately 6.3% indicated they do not drink plain water on a usual day. Almost half of the adolescents (45.1%) consumed ≤1 serving of fruit per day during the past week. The majority (57.6%) had <1 serving of vegetables per day during the past week, with 10.0% having eaten no vegetables at all over the 7-day period. Adolescents are not meeting recommendations for fruit and vegetable consumption, and many have insufficient intake of water and milk. Interventions are needed to foster healthier eating among young adolescents, especially those in predominantly low-income communities.

CHARACTERIZATION OF ALLERGENIC PROTEINS IN AN ANCIENT WHEAT

Rajsri Raghunath
Nutrition and Food Science, Poster Presentation
Section: 2
Presentation Number: 511
Mentor(s): 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 genotype of wheat is not commercially available. Here we tested the hypothesis that the DD wheat will have salt-soluble allergenic proteins different from those of the AABB wheat. The DD wheat was grown in the green house of MSU. Salt-soluble proteins were extracted from the DD wheat and the commercial AABB wheat (durum). The proteins present in DD vs. AABB wheats were characterized using SDS-PAGE under reducing conditions. The molecular weights of proteins were determined via protein standards. Using a mouse model of AABB wheat allergy, a plasma bank containing high levels of anti-AABB wheat specific IgE antibodies was created. Using the plasma, an IgE-Western blot method was optimized to identify IgE binding protein allergens in AABB vs. DD wheat. We found a strikingly different pattern of IgE-binding protein bands in the AABB vs. DD wheat. In AABB wheat, there were 5 major and 3 minor IgE binding protein bands. In contrast, in DD wheat, there were 2 major and 3 minor IgE binding protein bands. Future work aims to determine the identity of the IgE binding allergenic proteins in the DD wheat.

COMPARING ANTIOXIDANT CONTENT IN COMPLEX PASTURE VS CONVENTIONAL FEED FOR BEEF CATTLE BY TIME

Esha Garg, Humza Ali, Srikar Kesamneni, Viji Jambunathan
Nutrition and Food Science, Poster Presentation
Section: 2
Presentation Number: 512
Mentor(s): Jenifer Fenton

Grass-finished beef is generally considered healthier than grain finished beef in part because the omega-6/omega-3 ratio is reported to be lower. However, complex pasture mixtures are also purported to contain higher concentrations of plant secondary metabolites; the consumption of which is thought to be important for human health. The objective of this study was to compare the carotenoids and chlorophyll in complex pasture vs conventional feed. Complex pasture containing a mixture of alfalfa, orchard grass, red and white clover, trefoil, chicory, fescue, timothy, and dandelion (n=22) compared to a mixture containing a mixture of 18% hay, dry and high moisture corn, and pellet (n=23). Total carotenoid concentration, chlorophyll A and B, \ were measured using previously described spectrophotometric methodology. Total carotenoid concentration was significantly higher in pasture samples vs grain (60.3± 2.58 vs 10.4± 0.03; p<0.0001). Chlorophyll A concentration was significantly higher in pasture samples vs grain (117±12.0 vs 34.4± 3.12; p<0.0001). Chlorophyll B concentration was significantly higher in pasture samples vs grain (28.3 ± 3.53 vs 10.6±1.26; p=0.0004). There was no significant variation by time. In conclusion, chlorophyll and carotenoids are significantly higher in complex pastures compared to conventional feed. Complex pasture consumption by cattle may lead to accumulation of higher concentrations of plant secondary metabolites in beef.

UNDERSTANDING THE EXPERIENCES OF NEW COMMUNITY GARDENERS

Za'Nyia Kelly
Nutrition and Food Science, Poster Presentation
Section: 2
Presentation Number: 513
Mentor(s): Katherine Alaimo

While substantial research has examined community gardening's potential to influence health behaviors, and physical and mental health, little if any research has focused on the experiences of new gardeners. New gardeners are an important focus of study for the future construction and restructuring of behavior-based health interventions that include community gardening. This study will assist with identifying supports, educational programs and coordinated activities needed for new gardeners to be successful. This study utilizes data from the Community Action for Prevention Study (CAPS), which is a partnership between: The University of Colorado, MSU, Colorado State University, the University of South Carolina and Denver Urban Gardens (DUG). The objective of this study is to analyze qualitative interviews to understand new community gardeners' experiences in terms of: 1) challenges and facilitators to success as a gardener. This study will utilize semi-structured qualitative interviews and select quantitative data from a subsample of participants (sample size=35 out of 291 participants) enrolled in a randomized controlled trial (RCT) examining the health behavior and health impacts of community gardening in Denver, CO (CAPS). Data will be analyzed by coding quotations using a standardized code book and creating summary statements. This research will allow us to better understand new gardener's needs and support for success. The findings from this research can be utilized by health professionals, citizens and community-based health/nutrition organizations alike in supporting new gardeners to improve individual and community health.

USING C. ELEGANS TO INVESTIGATE THE EFFECTS OF POLYUNSATURATED FATTY ACIDS AND THEIR METABOLITES ON LIFESPAN AND HEALTHSPAN

Benjamin Kessler

Nutrition and Food Science, Poster Presentation
Section: 2
Presentation Number: 514
Mentor(s): Jamie Alan, Kin Sing Lee

Specific omega-3 and omega-6 polyunsaturated fatty acids (PUFAs) have protective effects against aging-related conditions such as cardiovascular disease, inflammation, and Alzheimer's Disease. However, it is unclear which are required in the diet and how they affect human health and disease. This study will investigate the physiological roles of individual PUFAs in order to pharmacologically and dietarily promote healthy aging. We will use specific fatty acid desaturase enzyme knockout transgenic C. elegans srains to assess the in vivo effects of PUFAs on the aging process due to their varying in vivo unsaturated fatty acid compositions. This investigation will create a big dataset that includes lifespan and healthspan data, as determined by thrashing, for every available desaturase enzyme genetic knockout in the worm. Additionally, lipidomic or metabolic analysis will be used to assess the lipidome of key strains. We hypothesize that specific PUFAs modulate physiological processes through their corresponding downstream metabolites' role in lipid signaling. Our data confirm this hypothesis as mutants with genetically disrupted PUFA biosynthesis had decreased median lifespan and poor physical fitness. Interestingly, our results from several mutants are different from published data involving the use of FuDR, a chemical that prevents progeny. Lipidomic analysis of the knockout worms revealed that our in vivo observations are associated with an altered lipid panel, especially downstream metabolites. Taken together, our data suggest that genetically altering endogenous levels of PUFAs decreases lifespan and healthspan. Investigating this metabolic pathway may elucidate novel drug targets that could revolutionize chronic disease treatment and prevention.

IMPACT OF CARE OUTSIDE THE HOME ON THE GUT MICROBIOTA OF TWO-YEAR-OLDS

Dana Nzerem

Nutrition and Food Science, Poster Presentation
Section: 3
Presentation Number: 518
Mentor(s): Sarah Comstock

The hygiene hypothesis indicated that microbial exposure is beneficial to the immune system. Prior research demonstrated that childcare outside the home leads to more diverse microbiota compared to childcare inside the home; this was connected to a reduced risk of allergies. This research focuses on the diversity of the microbiota in children cared for outside the home as opposed to inside the home. We collected data on the microbiota of children at the age of 2-years. Caregivers were asked, "Is your child cared for outside of your home for more than 4 hours a day most days of the week?" Of 32 participants in the study, 8 were cared for outside the home ("YES") and 24 inside the home ("NO"). Neither alpha nor beta diversity differed by childcare in or out of the home. In the gut microbiota of 2-year-old children, the mean Chao 1 value was 83.16, the Shannon index was 2.15 and the Inverse Simpson was 4.68. Although childrcare was not associated with microbiota diversity in this population, the sample size was small, and the question addressed a short time period. In future studies, the child's microbiome should be analyzed before and after they are exposed to care outside the home which could help identify whether microbiota diversity originated from care outside the home.

INVESTIGATING COLLEGE-AGED STUDENTS AS AGENTS OF CHANGE TO SUPPORT DIETARY HABIT IMPROVEMENT AMONG THEIR FAMILY AND FRIENDS

Lasya Marla

Nutrition and Food Science, Poster Presentation
Section: 3
Presentation Number: 519
Mentor(s): Katherine Alaimo, Nicholas Drzal

Globally, It is reported that 2/3s of diseases are chronic diseases such as heart disease, hypertension, and diabetes. These diseases develop across the lifespan and are influenced by diet. Americans often fail to consume nutrient dense diets, consisting of vegetables, fruits, whole grains, etc. Fruit and vegetable intakes decline through adolescents and into adulthood. College-aged students experience weight gain, increased disordered eating, and poor diet quality. Thus, it is important to design effective dietary interventions for this age group as well as their family and friends, focusing efforts to increase plant food consumption. his formative research will inform the design of a future intervention using college-aged students as agents of change to support dietary changes among their family and friends. The research will explore two data sources collected through MSU's Introduction to Human Nutrition course. The first data source and research activity will scan HNF 150 'pea pod activities' and summarize what and how students shared information in previous classes. The second data source and activity will analyze post-course surveys and summarize nutrition knowledge deficits, proficiencies, favorable course activities, ways students shared course information, and to whom course information was shared.The results of this formative research will be used to create six agents of change student extension activities that students will implement with family/friends and inform the social media elements of the future intervention.

IRON AND FOLATE DEFICIENCY AMONG ADOLESCENT FEMALES IN GHANA: DIET-RELATED RISK FACTORS

Elana Lycos

Nutrition and Food Science, Poster Presentation
Section: 3
Presentation Number: 520
Mentor(s): Lorraine Weatherspoon

Iron and folate deficiencies (IFD) are a concern among adolescent females, particularly those who are pregnant in Ghana. The objective was to perform a literature review to determine if there is any association between agro ecological zone, dietary diversity and iron-folate status among adolescent females in Ghana, and to further identify the regions with the highest risk for teen pregnancies and poor birth outcomes associated with IFD. The Michigan State University Library, PUBMED, and LILACS-BIREME databases together with the Ghana Demographic Health Survey (2014) and the Ghana Micronutrient Survey (2017) were used for the study. A total of 95 scientific papers published in English between 2011 and 2021 about IFD among adolescent females were identified and appraised. Fifteen (15) articles meeting the inclusion criteria were reviewed. The studies revealed that teenage pregnancy and proportion of low birth rate is highest in the Eastern region of the Middle Belt (94 per 1000 women, and 14% respectively). IFD is most prevalent in the Northern Belt compared to the Middle and Coastal Belts, which reflects the low dietary diversity in this zone. The consumption of iron-rich foods based on 24-hour dietary recall is lowest in the Northern Belt (45%) and highest in the Coastal Belt (66%). Fair sources of heme-iron from animal source foods (poultry, eggs, fish) are consumed significantly less in the Northern Belt (45.6%) compared to the Coastal Belt (93.5%). In conclusion, there is a need for greater efforts and interventions aimed at reducing IFD among adolescent girls in Ghana.

UNDERSTANDING THE ASSOCIATION BETWEEN SOCIAL MEDIA AND DIETARY BEHAVIORS IN YOUNG ADULTS WITH TYPE 2 DIABETES.

Miranda Deal, Shikha Advani
Nutrition and Food Science, Poster Presentation
Section: 3
Presentation Number: 521
Mentor(s): Deanne Kelleher

Social media websites, such as Instagram, have become a platform for people to talk about nutrition related information. It ranges from regular people talking about their newest diets to companies and health professionals selling their nutrition products. Social media can cause misinformation to travel to people with medical conditions, such as Type 2 Diabetes (T2D), which can create harm. The purpose of this research is to examine the nutrition information that currently exists on Instagram, and to see if it is consistent with recommendations from health professionals. A set of 150 images were coded for nutrition theme, discussion of diets and body image, and Instagram user type.

OMEGA-3 FATTY ACID DOCOSAHEXAENOIC ACID (DHA) SUPPRESSES CATHEPSIN B RELEASE, CELL DEATH, AND PROINFLAMMATORY CYTOKINE/CHEMOKINE SECRETION IN ALVEOLAR MACROPHAGE-LIKE MPI CELLS

Adrianna Kirby
Nutrition and Food Science, Poster Presentation
Section: 3
Presentation Number: 522
Mentor(s): James Pestka, Kate Wierenga, Madduma Hettige Lichchavi Rajasinghe

Respiratory exposure to crystalline silica (cSiO2), an occupational toxicant, leads to the development of pulmonary inflammation, which can contribute to the autoimmune disease lupus. Alveolar macrophages (AM) phagocytose cSiO2 which induces a cycle of phagolysosomal permeabilization, inflammasome activation, proinflammatory cytokine/chemokine release, and cell death. These actions generate initial unresolved pulmonary inflammation and subsequent systemic autoimmunity in genetically susceptible individuals. Utilizing Max Planck Institute (MPI) cells, a novel AM model, we: 1) evaluate cSiO2's effects on cathepsin release, cytokine/chemokine secretion and cell death with and without LPS priming and 2) determine how DHA intervention influences cSiO2-induced aforementioned effects. MPI cells were i) preincubated with 25 μM DHA or Vehicle (Veh) for 24h, ii) primed with LPS (20 ng/mL) or Veh for 2h, and iii) exposed to cSiO2 (25 μg/cm2) for 1, 3 and 6h. ELISAs, Cathepsin B activity assays, and LDH cell death assays were performed. Following LPS priming, cSiO2 elicited robust IL-1α, IL-6, TNF-α, MCP-1 release, and inflammasome activation as reflected by IL-1β release at 3 and 6 h compared to time-matched controls ($P<0.01$). DHA significantly suppressed IL-1α, IL-1β, IL-6, and MCP-1 release by cSiO2 at 6h ($P<0.05$). At 6h DHA suppressed cSiO2-induced cathepsin release regardless of LPS priming. cSiO2-induced cell death within 1h of exposure, peaking at 6h regardless of LPS priming suggesting inflammasome-independent and -dependent cell death while DHA inhibited LDH release for all treatment groups. Taken together, these findings suggest DHA at a physiologically relevant concentration was capable of inhibiting cathepsin release, cytokine/chemokine secretion, and cell death.

PHYSICAL SCIENCES

DATA FITTING OF SCANDIUM 41 AND 45 FLUORESCENCE SPECTRA FOR NUCLEAR STRUCTURE STUDIES

Adam Dockery
Physical Sciences, Oral Presentation
Section: 1
Presentation Number: 526
Mentor(s): Kei Minamisono

This project is performed with the Beam Cooling and Laser Spectroscopy (BECOLA) group at Facility for Rare Isotope Beams (FRIB). The group is primarily interested in the distribution of protons inside a radioactive nucleus (charge radius), which is a useful physical property for understanding underlying nuclear forces and testing nuclear theories. To measure charge radius, an ion beam of interest will be received from the FRIB accelerator and used for laser spectroscopy. An electronic transition in the ions is excited with resonant laser light, and the resulting fluorescence is detected. A complicated spectrum of the resonant photons as a function of the laser light wavelength can be obtained (hyperfine spectrum). The spectrum is then fitted using a model-independent, theoretical function in order to deduce nuclear structure information, including the hyperfine coupling constants. The hyperfine coupling constants describe the splitting of electronic energy levels because of an interaction between nuclear and electron spins. In this project, I built a theoretical function based on the hyperfine interactions to fit measured spectra. I also developed a Python script for fitting the theoretical function to experimental data by nonlinear regression. I will apply the fitting program to multiple hyperfine spectra of stable scandium 45 to investigate different nuclear-electron spin couplings. Furthermore, I will fit the recently measured hyperfine spectrum of radioactive scandium 41 (with a half-life of 0.6 seconds) to deduce nuclear information, which will be compared with literature values. The construction of the fitting function and the fitting results will be discussed.

AUTOMATED PARTICLE IDENTIFICATION

Tom Ladouceur
Physical Sciences, Oral Presentation
Section: 1
Presentation Number: 527
Mentor(s): Chun Tsang, Man-Yee Tsang

The current method used to recognize the particles created in the SπRIT time projection chamber is time consuming, and requires active attention of a person through the process. To get any meaningful results out of the data, we have to sort the outputs into each particle created: pions, protons, deuterons, and so on. The goal of this project is to speed up and automate that process using a neural network. I took simulated data of the time projection chamber, and trained the computer to identify the particles based on their 3D momentum and their change in energy. I then compared this to the current method of making cuts by hand on the 2D plot of momentum and change in energy. At first the results looked as though the traditional method was still more accurate, but with filtering background noise and looking at more realistic data, the neural network has more accurate and reliable results.

RELATION BETWEEN DIFFERENT TYPES OF NUCLEAR OSCILLATIONS

Aaron Picard
Physical Sciences, Oral Presentation
Section: 1
Presentation Number: 528
Mentor(s): Vladimir Zelevinsky

The world of nuclear vibrations is filled with relationships between states and trends to be explored. Collective vibrations reflect the strong interactions at play at the subatomic level between neutrons and protons. Vibrations of several multipolarities, including the particularly interesting quadrupole (ellipsoidal-shaped) and octupole (pear-shaped), arise upon analysis. The relationship between these states in the same nucleus is not understood in its entirety. An idea predicting their relation was supported by experiments performed at MSU with xenon isotopes. A systematic analysis of isotopes occupying different locations on the periodic table was performed to see if this relationship would exist there. Diving deeper into these vibrations is important due to the dependence on fundamental properties of nuclear matter and searching for the nuclear dipole moment showcasing a violation of fundamental symmetries within nature. Using data provided by the National Nuclear Data Center, we analyze patterns by plotting specific states' energies, obtaining trendlines, and comparing data between different elements' isotopes. Within this project, we analyze the data on coupling between these states and its evolution as we move along the periodic table.

EXPERIMENTALLY DETERMINED DENSITIES OF DEUTERATED SOLVENTS FOR USE IN NMR SPECTROSCOPY

Andrew Norfleet
Physical Sciences, Oral Presentation
Section: 1
Presentation Number: 529
Mentor(s): Bill Killian

Nuclear Magnetic Resonance (NMR) is a universally recognized spectroscopic technique for the determination of chemical structure. A critical component of NMR analysis involves deuterated isotopologues of laboratory solvents, which establish a frequency lock for the instrument. While qualitatively establishing sample characteristics only requires the deuterons' presence, quantitative techniques require determining the concentration of species in solution, a function of temperature. This relationship is significant to the fields of kinetics and thermodynamics. Surprisingly, current literature fails to list deuterated solvents' density for temperatures beyond ambient, if at all. This work seeks to elucidate those properties and draw comparisons between the deuterated solvents and their natural variants. Data were collected for twelve liquid NMR solvents in a vibrating tube densitometer across a temperature range of 5 to 95 °C in five-degree intervals. Comparisons were drawn between the values presented in this work and the corresponding non-deuterated species' literature values. Notably, the molar volumes' trends demonstrate that the change in density varies across temperature and is not accounted for by the difference in the molecular masses.

AIDING IN THE CAPTURE OF RARE ISOTOPES

Ashton Dangelo
Physical Sciences, Oral Presentation
Section: 1
Presentation Number: 530
Mentor(s): Ryan Ringle

Through the MSU course UGS200H, I was assigned to work with Dr. Ryan Ringle on a project under his guidance. This presentation goes through the work I did with Dr. Ringle, and the lasting impact that it could have.

DETERMINING NEUTRON BACKGROUND FROM SHADOW BAR DATA

Jessica Ranshaw

Physical Sciences, Oral Presentation
Section: 2
Presentation Number: 532
Mentor(s): Chi Teh, Man-Yee Tsang

This project quantifies the abundance of background neutrons and their dependence on time-of-flight (ToF) in a recent nuclear reaction experiment conducted at the National Superconducting Cyclotron Laboratory (NSCL). The experiment aims to constrain our understanding on the nuclear equation of state (EoS), which in turn can improve our predictions about neutron star properties. Our primary interest is neutron detection. Nonetheless, neutron emissions from nuclear reactions are typically accompanied by charged particles and gamma rays. Charged particles are removed by using the anticoincidence technique, whereas gamma rays can be distinguished by performing pulse shape discrimination (PSD). As for the remaining neutrons, a fraction of them will be hitting the neutron detector only after they scatter off from the surrounding equipment. Scattered neutrons are discarded, as the paths they traveled cannot be determined, making the relation between ToF and kinetic energy impossible to establish. To quantify the abundance of these scattered neutrons, or background neutrons, we install shadow bars, slabs made of thick brass, to block off neutrons. The shadow bars will cast shadows onto the neutron detector. Hits within the shadows on the detector are then assumed to be the background neutrons. Their relative abundance is calculated by comparing the shadowed neutron yield to the yield outside the shadows. We found that as we increased the kinetic energy, the number of counts overall decreased. Additionally, as the energy was increased, our shadow bar counts decreased and the closer the counts came to the originally assumed theoretical zero.

INVESTIGATION OF THE REACTION MECHANISM IN THE SPECTROSCOPY OF NEUTRON UNBOUND ISOTOPES BY THE MONA COLLABORATION

Jared Bloch

Physical Sciences, Oral Presentation
Section: 2
Presentation Number: 533
Mentor(s): Belen Monteagudo Godoy, Paul Gueye, Thomas Baumann, Thomas Redpath

The MoNA Collaboration has been conducting experiments over the past two decades at the then National Superconducting Cyclotron Laboratory (NSCL) and is poised to expand its scientific program with the upcoming Facility for Rare Isotopes (FRIB), both located in East Lansing, MI. The Collaboration primarily focuses on the study of unbound isotopes along the neutron dripline using the invariant mass technique. A recent analysis of past data on the production of 25,26O from 27F and 29Ne beams incident on beryllium targets indicates a possible new and rich program to investigate the production mechanism of these neutron rich isotopes. We are currently extending this work to other unbound nuclei. The first phase of this research was to perform a comprehensive review of the aforementioned past experiments to identify relevant isotopes of interest and to develop a stand-alone C++ code to calculate the corresponding decay energies. The second phase of our project will consist of predicting the various fragments produced during these experiments using the LISE++ tool. The third and final phase will involve analysis of experimental data. This presentation will provide an overview of the current status of this work.

DATABASE FOR LANTHANIDE ABUNDANCE FROM NEUTRON STAR MERGERS

Pranav Nalamwar
Physical Sciences, Oral Presentation
Section: 2
Presentation Number: 534
Mentor(s): Jaideep Singh, Luke Roberts

Kilonovae are optical, astronomical events associated with neutron star mergers (NSMs) and are powered by the radioactive decay of heavy elements created by the rapid neutron capture process(r-process). It is important to note that the emission components from the kilonovae are greatly dependent on the distribution of the lanthanides and their various charge states in the merger material. To analyze these mergers and their abundances, we study the event through an atomic physics lens. Numerous kilonovae modeling groups employ unique atomic structure codes, often resulting in diverging results. To assist in benchmarking these models and codes, we study how varying atomic data inputs, such as atomic energy level information, affect the total abundance of these unique elements, which in turn affects light curves and the opacity of the material. Utilizing elemental abundances calculated by Skynet, a nuclear reaction network code, we uncover how distinct isotopes evolve over time due to variables such as temperature and the fraction of electrons per number of baryons. We then use these calculated elemental abundances, the Saha Equation, and NIST's ionization data to predict the ionization state populations of lanthanides on timescales similar to the expected time of the kilonova peak as well as ranking certain ionization state abundances weighted by probable Ye values. We will report on our most recent results, and how a multi-element merger material should evolve over time. This work is supported by Michigan State University and the Joint Institute of Nuclear Astrophysics.

DIFFERENCES BETWEEN CLAY AND GLAZE

Violet Lefrancois
Physical Sciences, Oral Presentation
Section: 2
Presentation Number: 535
Mentor(s): Carl Boehlert, Per Askeland

Three different clay bodies and three different glazes will be analyzed. A total of twelve clay samples will be analyzed and compared. There will be a control sample without glaze and three different glaze samples for each clay body. A Scanning Electron Microscope will be used to test the twelve samples. Backscatter electrons and secondary electrons will be used to compare the surface of the samples for each clay. Energy dispersive spectroscopy will be used to determine the chemical composition of every sample. It will be determined if there are structural and chemical changes when different types of glaze are applied to different clay bodies.

ULTRALUMINOUS X-RAY SOURCES IN EXTRAGALACTIC GLOBULAR CLUSTER (NGC 4472)

Wasundara Athukoralalage
Physical Sciences, Oral Presentation
Section: 2
Presentation Number: 536
Mentor(s): 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 X-ray data from Chandra space telescope available to monitor the behavior of these sources in NGC 4472 over the last 20 years, making them the most well monitored. These sources have exhibited variability in the past, and follow-up data shows that not all of the sources are persistently bright in these new data sets.

A SIMPLIFIED VIEW OF A MEDICAL ACCELERATOR DESIGN FOR PROTON THERAPIES

Elias Taira
Physical Sciences, Poster Presentation
Section: 3
Presentation Number: 538
Mentor(s): Yue Hao

As opposed to the standard electron-based radiation therapy, proton therapies offer a significantly less harmful alternative when it comes to treating cancer. Due to the tendency for protons to release most of their energy at a specific point in the body (also known as the Bragg Peak), it is possible to adjust the beam to focus the energy on the cancer cells, while mitigating damage to the surrounding healthy tissue. Unfortunately, due to the larger mass of protons, they can be rather difficult to manipulate within a linear accelerator, thus the machinery used to manipulate these subatomic particles is very large and very expensive. This has led to facilities offering Photon Therapy to not be very common within the US thus increasing the cost of treatment due to its low availability. In this project we worked to simplify the design of this accelerator by optimizing a ring-type accelerator to use as few elements (magnets) as possible while still being able to function as an accelerator. By simplifying the accelerator design, not only will the size decrease (as of now they are about three stories tall), but so will the cost to manufacture them. This will allow for more Proton Therapy facilities to be constructed, increasing the avaliability and lowering the cost of treatment.

SENSING ENERGY EIGENVALUES WITH THE RODEO ALGORITHM

Zhengrong Qian
Physical Sciences, Poster Presentation
Section: 3
Presentation Number: 539
Mentor(s): Dean Lee

The Rodeo Algorithm is a quantum computing framework introduced to boost the efficiency of quantum state preparation and also to determine or 'sense' the energy eigenvalues of any Hamiltonian. By recursively applying some specific combinations of quantum gates and introducing the tunable energy constant as well as some random numbers, we expect that all the undesired energy values are 'shaken off' in an exponential manner as the iteration goes. Based on this framework, our focus is to conduct the time evolution simulation of a random Ising model, then 'examine' if all of our targets (i.e. Hamiltonian energy eigenvalues) will stand out in the end. More specifically, we'll be focusing on a certain range of energy window whose boundary is given by our educated guess. If the targets are present in this range, the rodeo algorithm will give us a 'spike signal' as the indicator of 'success'. Due to the potential errors in quantum simulation, we'll run a noiseless simulation of a 4-site model using the IBM Qasm simulator, and a single-qubit Hamiltonian on a real quantum computer to demonstrate the effectiveness of this framework.

A COMPARISON OF COINS IN CIRCULATION

Brett Pawlowski
Physical Sciences, Poster Presentation
Section: 3
Presentation Number: 540
Mentor(s): Carl Boehlert, Per Askeland

Across the world, currency is minted in various ways to meet the specifications of the country producing it. Minted currency exists in a plethora of forms throughout sovereign states and is vital in commerce on a daily basis. This brings into question the durability and quality of the coins. With Scanning Electron Microscopy (SEM) the surface structure and quality can be examined at extreme magnification, exposing flaws and cracks invisible to the naked eye. Additionally Energy Dispersive Spectroscopy (EDS) is a technology that provides the chemical composition of a sample and can help explain its durability and strength. The stamped date on the coins is important when comparing damage relative to age, as is the alloy or pure metal that the coin is made of. Examining the data obtained among different currencies allows for a comparative analysis of each countries' minting process and its effectiveness as a regularly exchanged form of payment.

COMPTON TRACING IN A GAMMA RAY TRACKING DETECTOR USING A MANGANESE-52 SOURCE

Jenni Aubin
Physical Sciences, Poster Presentation
Section: 3
Presentation Number: 541
Mentor(s): Gregory Severin

The medical industry has been using radioactive isotopes and PET scans to locate sources of high metabolic activity, especially tumors. PET scans can be augmented with coincident Compton tracing to find these areas with a higher level of precision. Compton events occur when a photon, released in a nuclear decay, collides with an electron in a detector, scattering the electron and the photon. A certain amount of energy is deposited with the electron, and the photon will have the rest of the energy. These two energies combine to give the original energy of the photon released from the decay. The angle between the incoming photon trajectory and the outgoing photon trajectory can narrow down where the decay occurred. In this research, Compton tracing using annihilation photons following Manganese-52 decay are used to validate Compton reconstruction algorithms for medical applications. With annihilation photons, two photons are released in coincidence in the opposite direction of one another. When one photon undergoes photopeak absorption and the other Compton scatters in a detector array, all of the trajectories are defined and it is possible to compute the scattering angles. Using Python, the event stream from a gamma ray detector can run through a series of conditionals and calculations for finding these events, calculate their angles, and eventually develop an image of what the source looks like.

LABR3 SCINTILLATOR TIMING

Andrew Livingston
Physical Sciences, Poster Presentation
Section: 3
Presentation Number: 542
Mentor(s): Sean Liddick

The purpose of this experiment is to find the transition states of the rare isotopes Cu70, Co68, and Ni68. The transition states, which last for nanoseconds, are determined using the time difference between the electrons of neutron rich nuclei which is measured using the Lanthanum Bromide (LaBr3) scintillator. When the time difference of these nuclei entering

the scintillator are right around zero, the energy present is measured. The energy is determined by the electrons emitting a ÿ-ray that gets ejected due to the energy provided by the electrons that entered the scintillator.he experiment was conducted using stored data from previous experiments run on the scintillator. The energy present numbers measured are then run through a series of given code that calculates the time difference between the electrons and the ÿ-ray. If the time (t)=0, then the data is statistically significant and can be used to produce energy level diagrams and decay graphs. t=0 is used because it confirms the calibrations were correct of the scintillator, validating the data collected. The decay graph is started by the time difference between the electron going in and the ÿ-ray coming out. Thus, once the energy level diagrams and decay graphs are made the data is run through another provided series of code to produce a half-life which can be shown on the decay graph.

ANALYSIS OF THE OPTICAL TRANSMISSION OF FILMS FOR THE SINGLE ATOM MICROSCOPE

Joseph Noonan
Physical Sciences, Poster Presentation
Section: 3
Presentation Number: 543
Mentor(s): Jaideep Singh

Many of the heavy elements on Earth, including those that are essential to the functioning of our bodies and modern 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 ensure that this process works as intended, the films must be clear. Films formed at some temperatures have a low optical transmission, meaning they are not transparent, so a model was created to explain the transmission of films based on the scattering of light by small bubbles in the films. The model was compared to the observed transmission of films at different temperatures and wavelengths to determine if it could explain the quality of the films. In this presentation, I will describe our model, analysis, and the results so far.

ASSESSING TRUNCATION ERRORS IN RENORMALIZATION GROUP EVOLUTION

Richard Lin
Physical Sciences, Poster Presentation
Section: 3
Presentation Number: 544
Mentor(s): Heiko Hergert, Scott Bogner

Renormalization group (RG) methods are a powerful tool for identifying the most important degrees of freedom of quantum many-body systems like atomic nuclei. They not only offer important physical insights, but also provide a pathway for greatly simplifying microscopic calculations of a system's properties. A key step in any application is the selection of an appropriate set of "basis" operators for implementing the RG procedure numerically. Here, we use a previously unexplored class of basis operators, the so-called generators of the unitary group, and apply them to the RG treatment of a simplified model of an atomic nucleus. This work will contribute to a larger effort to enhance RG-based nuclear many-body calculations that is carried out by researchers at the Facility for Rare Isotope Beams (FRIB) and their collaborators.

CALIBRATING ATOMIC BEAM FLUORESCENCE FOR THE SINGLE ATOM MICROSCOPE

Abby Baratta

Physical Sciences, Poster Presentation
Section: 4
Presentation Number: 546
Mentor(s): Jaideep Singh

We are developing the technique of optically detecting individual atoms embedded in thin films of cryogenically frozen solids. Noble gas solids such as frozen krypton are an attractive medium because they are optically transparent and provide efficient, pure, stable, and chemically inert confinement for a wide variety of atomic and molecular species. The xcitation and emission spectra of atoms embedded in solids can be separated by up to undreds of nanometers making optical single atom detection feasible. We propose to couple a single atom microscope detector to a recoil separator with the goal of measuring rare uclear reactions relevant for nuclear astrophysics. The goal of our project is to determine how many atoms of rubidium are embedded in the krypton film by counting the number of photons that were emitted from these atoms under the illumination of laser light. We calibrate how many photons one of these atoms emits in order to get an atom count. This is done by fitting a spectrum showing the frequency of the laser versus voltage of the photons from the atomic beam before implantation. The area under the spectrum is directly proportional to the number of atoms being implanted into the film. Once the number of atoms in the film is determined we can calibrate the brightness of an individual atom embedded in the noble gas film. We will present our analysis and preliminary results.

PAPER TRAILS: A MICROSCOPIC EXAMINATION OF THE MARKS MADE BY WRITING UTENSILS

Jamie Eagle

Physical Sciences, Poster Presentation
Section: 4
Presentation Number: 547
Mentor(s): Carl Boehlert, Per Askeland

Most people are already aware of how writing utensils work on a basic level. However, information on the exact mechanics of how the different utensils interact with paper is harder to come by. This project uses scanning electron microscopy to further document and educate on how different writing utensils leave their marks on paper, examining the writing of pens, pencils, markers, and crayons. The SEM Images are augmented with further research, providing a visualization and explanation of how these utensils, when drawn across paper, leave trails behind.

PROBING THE MAGMA PLUMBING SYSTEM OF LAVAS ERUPTED DURING THE TERMINAL STAGES OF RIFTING IN THE AFAR REGION OF ETHIOPIA

Julia Bassier

Physical Sciences, Poster Presentation
Section: 4
Presentation Number: 548
Mentor(s): Tyrone Rooney

The Afar depression is described as a triple junction wherein the Red Sea, Gulf of Aden, and East African Rift system converge. Within this region, magmas superficially resembling Mid-Ocean Ridge Basalts (MORB) can be found, which are defined as Type VI based on previous work. However, Type VI magmas exhibit an unusual Ba-Sr enrichment not typically observed in MORB lavas. This enrichment has prompted previous researchers to suggest the Type VI lavas originated in the Afar Plume and not the source of MORB. An unexplored complexity in the magma system is the potential for the unusually large amount of Ba and Sr to be derived

from contamination with crustal materials while the magmas pond and crystallize before eruption. We present a study of a suite of Type VI lavas, exploring the geochemical and petrographic diversity within the suite. We compare these observations with another contemporaneous suite of lavas exhibiting a different composition, which erupted geographically near the Type VI lavas. Our study uses optical microscope imagery and laser ablation mass spectrometry to characterize the erupted crystals in these two suites of lavas. Our preliminary data shows the petrographic textures of the two suites are similar; we are continuing with our compositional analysis of crystals between the two suites. We aim to compare the magmatic system between the two suites and assess whether there is evidence of heterogeneity or if the sole origin of the established geochemical differences relates to processes within the mantle.

RARE INTERMEDIATE COMPOSITIONS OF CONTINENTAL RIFT LAVAS- PROBES OF MAGMA DIFFERENTIATION DURING CONTINENTAL RUPTURE

Kirsten Fentzke
Physical Sciences, Poster Presentation
Section: 4
Presentation Number: 549
Mentor(s): Alex Steiner, Tyrone Rooney

A fundamental paradigm in the plate tectonic model is that continental rifts become ocean basins through the process of lithospheric rupture. The processes associated with lithospheric rupture may be probed using lavas erupted in continental rifts as they are subject to processing during their traverse of the continental lithosphere. Lavas erupted in modern rift environments are usually bimodal - i.e., a relatively unprocessed primitive composition and highly processed evolved composition. There is a conspicuous lack of intermediate compositions. We examined unusually abundant intermediate composition rocks that erupted during the terminal stages of the 1.1-billion-year-old Mid-Continent Rift (North America) and established how these magmas were processed within the continental lithosphere. Crystals hosted within these intermediate lavas were analyzed using Laser Ablation ICPMS techniques to determine mineral compositions. Examination of preliminary mineral compositional data indicates diverse crystal populations within the same lava. We explain this observation either by the mixing of many pulses of magma entering either a single magmatic system or a complex, interconnected network of magma storage bodies: a conclusion consistent with the formation of intermediate lavas in other geologic environments. We are continuing with our data analysis of major and trace element composition of these crystals in order to constrain which model best describes the differentiation processes of these intermediate lavas.

RECURRENT NEURAL NETWORKS FOR ICECUBE-UPGRADE RECONSTRUCTION

Brandon Pries
Physical Sciences, Poster Presentation
Section: 4
Presentation Number: 550
Mentor(s): Claudio Kopper, Jessie Micallef

Neutrinos are some of the most abundant particles in the universe, but also one of the most elusive as their weak nuclear interactions and lack of charge makes them extremely difficult to detect. One instrument being used to study neutrinos is the IceCube South Pole Neutrino Observatory, which currently consists of 5,160 Digital Optical Modules (DOMs) situated on 86 strings over 1.5 km beneath the Antarctic surface. The DOMs detect light from neutrino interactions within the ice through the photoelectric effect, recording the time and charge of every electron - called a hit - the DOMs detect. We then use this information to reconstruct neutrino properties such as energy and direction. Reconstructing neutrino events in IceCube is especially difficult at lower energies (below 100 GeV) due to the inherent lack of light

produced during interactions and the large spacing between DOMs, which is optimized for higher-energy events. One way to reconstruct these events is with neural networks, specifically Recurrent Neural Networks (RNNs). RNNs excel at handling data with a sequential relationship such as time, which makes them a great candidate for reconstructing particle interactions. This study highlights some results of RNN applications to IceCube-Upgrade simulation data - specifically, comparisons to other low-energy reconstructions and how cutting for higher-quality data improves reconstructions.

SPANDEX VS JEANS: ANALYZING THE MICROSTRUCTURE OF ATHLETIC AND NORMAL CLOTHING

Brett Earnest
Physical Sciences, Poster Presentation
Section: 4
Presentation Number: 551
Mentor(s): Carl Boehlert, Per Askeland

For my project I will be studying the difference between different types of clothing. To be more specific, I am going to look at the difference between athletic clothing (like spandex shorts) and non-athletic clothing (like jeans). I will be using a scanning electron microscope for this project to look at the microstructure of both types of clothing. I am also going to put them through a tensile test within the scanning electron microscope to compare their stress and strain limits. Through this I am hoping that I will be able to spot differences between the two and draw conclusions as to why the spandex shorts are used for more athletic activities than jeans.

THE EFFECT OF STARS ON THE STRUCTURE OF SIMULATED GALAXIES

Trevor Fush
Physical Sciences, Poster Presentation
Section: 4
Presentation Number: 552
Mentor(s): Brian O'Shea

Cosmological simulations allow scientists to probe the farthest reaches of space and time without the reliance on telescopes and light sources in distant parts of our own universe. However, due to the complexity of galactic structure, it is impossible to represent every feature of a galaxy within a computer despite their importance to the galaxy as a whole. One of the most important features are stars, which provide a mechanism for energy to be transferred and new elements to be formed. Because these stars can't be represented individually within a galaxy simulation, the mechanisms through which they contribute to the cosmic structure have to be simulated at the scale that is computationally tractable. The goal of this project is to analyze different mechanisms by which the life of stars contribute to the structure of galaxies within cosmological simulations. We analyze 18 simulated galaxies using three prescriptions for stellar behavior, each prescription containing 6 distinct galaxies. Analysis of the simulations involves finding the galactic center, creating projections of different fields of the galaxy such as density, temperature, and metallicity, and analyzing star formation history data such as star formation rate and cumulative stellar mass as a function of time. We find that the prescription for stellar evolution makes a significant impact on the behavior of galaxies, and observe systematic trends within each simulation.

BETA DELAYED GAMMA DECAY OF 32AR

Evan Argo
Physical Sciences, Poster Presentation
Section: 5
Presentation Number: 554
Mentor(s): Christopher Wrede

The positron decay of 32Ar can be used for precision nuclear structure studies and to search for physics beyond the Standard Model. Data on the positron decay of 32Ar was gathered at the National Superconducting Cyclotron Laboratory (NSCL) using the Gaseous Detector with Germanium Tagging (GADGET) system. The goal of this project is to analyze the gamma rays emitted following the positron decay of 32Ar. Using the germanium detectors within GADGET, we can gain a better understanding of the 32Ar decay scheme and search for any coincidences between low energy proton and gamma decays.

PROBING THE ROLE OF SUBDUCTION WITHIN THE BREAKUP OF THE SUPERCONTINENT GONDWANA

Madison Kortas
Physical Sciences, Poster Presentation
Section: 5
Presentation Number: 555
Mentor(s): Chris Svoboda, Tyrone Rooney

Magmatism accompanying the rifting of continents plays a central role in destabilizing and weakening lithospheric plates. Disassembly of the supercontinent Gondwana (Africa, South America, Australia, and Antarctica) occurred synchronously during the Mesozoic. This was accompanied by wide-spread flood basalt volcanism caused by mantle plumes, and subduction-volcanism along the Pacific margin. Establishing the relative role of each process during the breakup of Gondwana requires investigating the origin of magmatism. Large Igneous Provinces are typically associated with flood basalts and mantle plumes. However, within Patagonia, Argentina the origin of the Chon Aike silicic large igneous province remains ambiguous. We examine relatively rare basaltic samples to constrain the origins of magmatism. Results of 40Ar/39Ar isotopic ages show that olivine phyric basalts are 156Ma old. These basalts feature a negative Nb-Ta anomaly and Ba/La 20-30; both are geochemical indicators for arc magmatism. Interpretation of these results suggests that subduction was driving Patagonia's separation from Gondwana. By linking these data with intermediate composition samples, we hope to establish potential magma differentiation pathways. Intermediate samples, in contrast to the basalts, contain biotite, plagioclase, and amphibole. These are common mineral phases found in arc derived intermediate rocks that have experienced fractional crystallization from basalt. Future work considers mineral chemistry and geochronological analysis. Constraining the timing of the intermediate stages between primitive and highly evolved magmas can help solidify that the source of volcanism was related to subduction as opposed to mantle plumes. These interpretations will allow us an improved understanding of Gondwana break-up.

CALCULATING THE POTENTIAL ENERGY SURFACE OF 196PB

Drew Pype
Physical Sciences, Poster Presentation
Section: 5
Presentation Number: 556
Mentor(s): William Lynch

Much like atoms can be excited to higher energy states, so too can nuclei. While atoms decay primarily through x-ray emission, nuclei have many more decay channels open to them, one of which is fission. Fission is the process by which an excited nucleus splits into two

fragments of roughly equal mass. The chance for fission to occur is determined by the excitation energy of the nucleus and the fission barrier, the maximum of the potential energy surface (PES). The PES of a nucleus maps out the energy it takes to deform, ie stretch, the nucleus. This work calculates the PES for 196Pb using the HFBTHO code. HFBTHO is a code for solving the quantum many-body problem using an energy density functional to extract the total energy of the system at different deformations. Results from the calculations, including fission barriers will be presented. These theoretically calculated fission barriers will be compared with a future work experimentally.

EXPLORING PARTICLE TUNNELING THROUGH A BARRIER

Kirthika Krishnan
Physical Sciences, Poster Presentation
Section: 5
Presentation Number: 557
Mentor(s): Filomena Maciel Nunes

This project was conducted to explore the tunneling of quantum particles through a barrier in relation to nuclear fusion reactions. In order to establish the necessary background needed to understand how tunneling is applicable to real-life situations, research on the principles of scenarios such as the infinite and finite potential well and the potential barrier was conducted. Once this knowledge was established, the software Mathematica was utilized to determine the solutions to various potentials using the Schrodinger equation. The end goal of this research is to use these solutions to determine the transmission for these potentials.

THE DETECTION OF PHYSICAL PHENOMENA USING HIGH PRECISION OSCILLATORS

Aliyah Jordan, Brenna Chetan
Physical Sciences, Poster Presentation
Section: 5
Presentation Number: 558
Mentor(s): Wolfgang Mittig

Oscillators are Instruments that are at the center of many physical experiments. These oscillators can range from simple mechanical oscillators like a pendulum to more complicated electronical oscillating devices. Still, the idea behind using these oscillators is relatively the same. By using the resonant frequencies of these devices, it is possible to detect weak signals coming from various phenomena. Understanding the precision of these devices is important and our main goal is to understand the limits of these current resonant devices and work to improve their sensitivity to further detect important phenomena.

SEARCH FOR LOW ENERGY PROTONS FOLLOWING 32AR BETA DECAY

Logan Schaedig
Physical Sciences, Poster Presentation
Section: 5
Presentation Number: 559
Mentor(s): Christopher Wrede

32Ar is one of the most thoroughly researched beta-delayed proton emitters and we have acquired data on this decay to expand our existing knowledge using the Gaseous Detector with Germanium Tagging (GADGET) at the National Superconducting Cyclotron Laboratory. GADGET's Proton Detector provided unprecedented sensitivity to the low energy protons, which can improve precision constraints on nuclear structure models and fundamental symmetries of physics. The data set also allows us to set upper limits on the intensities of low energy protons for the first time. The status of the data analysis will be presented.

A STUDY OF THE INTERACTIONS BETWEEN PHYSICS AND NON-PHYSICS STUDENTS DURING THE DEVELOPMENT OF A COMMUNITY OF PRACTICE

Raymond Smith

Physical Sciences, Poster Presentation
Section: 5
Presentation Number: 560
Mentor(s): Brean Prefontaine, Dena Izadi

As scientific subjects and careers become more essential to everyday life, it is apparent that scientists need better ways to communicate and collaborate with their peers and the general public who do not regularly practice science. This study seeks to investigate the ways in which the interactions between physics students and students from other disciplines affect the formation of a cohesive and productive team. We collected qualitative data in the form of interviews and written responses from a team of four college students, two of which study physics, and two that study graphic design. This data records the students' experiences as they work together to develop a science outreach project aimed at combining physics with art. Analysis consisted of using the Communities of Practice framework to understand how the group evolved and how the students developed their identities throughout the summer. This work contributes to our understanding of the ways in which the students help each other become more involved in the project and increase the knowledge of their peers.

INTERSECTION OF CONFIDENCE, CORRECTNESS, AND GROUP DYNAMICS ON FORMATIVE ASSESSMENT

Shanna Hilborn

Physical Sciences, Poster Presentation
Section: 5
Presentation Number: 561
Mentor(s): Ryan Sweeder

Formative assessment is critical for helping students develop and self-assess their understanding of core chemistry concepts. Using a texting system, we engaged students with regular out-of-class formative assessment questions that challenge students to create scientific explanations to phenomena. By asking students to evaluate their confidence level after each assessment, we can determine whether student confidence was influenced by individual student characteristics, such as gender or prior level of success in the class, and then if confidence was a predictor of correctness in their answers. After creating individual submissions, students work in groups to develop a consensus answer that would be expected to build on the strengths of the individuals' answers. However, some students will contribute more or less than others while creating a group answer. This inequality is driven by varying individual student confidence and other factors such as social gender norms, stereotypes, and past success. By measuring individual self-reported confidence levels and comparing individual student answers to the respective group answer, we were able to identify the factors that predicted whether or not a student's individual answer was likely to be incorporated into their final group answer. Understanding both how accurately students gauge their own confidence and how this translates to their willingness to advocate for their own answers in a group setting helps to influence how we can most successfully structure group formative assessment activities to be beneficial for all students involved.

PLANT SCIENCES

BAP2 FUNCTIONAL CHARACTERIZATION IN THE PLANT ER STRESS PATHWAY

Kaylie Barton
Plant Sciences, Poster Presentation
Section: 1
Presentation Number: 562
Mentor(s): Federica Brandizzi

The endoplasmic reticulum (ER) is responsible for phospholipid synthesis and Ca2+ storage as well as the synthesis and folding of the cellular proteome. Certain physiological and stress situations surpass the functional capacity of the ER which cannot meet the cellular demands for secretory protein folding. Under these conditions, the ER is unable to maintain homeostasis. This results in a potentially lethal condition called ER stress. Under ER stress conditions, cells trigger adaptive signaling pathways collectively called 'Unfolded Protein Response'. Molecular UPR sensors that are associated with the ER are responsible for detecting ER stress and activating this pathway. If these adaptive approaches fail, the UPR commits to pro-death pathways leading to cell death. Despite the importance of these processes, the mechanisms that regulate the transition from pro-survival to pro-apoptotic UPR are largely unknown. BAP2 has been identified as a possible modulator of programmed cell death (PCD) under ER stress conditions. To gain more insight into the role of BAP2 as a modulator of the UPR activity, transgenic lines were generated overexpressing BAP2 to analyze the induction of UPR genes under ER stress. In addition, a relationship was established between BAP2 and the ER stress sensors bZIP28 and bZIP60 by isolating and characterizing the triple mutant bap2bzip28bzip60. Finally, since BAP2 has been proposed to directly inhibit cell death induced by ROS signaling, the role of this allele was explored in the control of ROS-induced cell death by expressing this allele and wild-type allele in yeast and subsequent treatment with H2O2.

NEMATODES AS VECTORS OF MYCOAVIDUS IN FUNGI

Natalie Golematis
Plant Sciences, Poster Presentation
Section: 1
Presentation Number: 563
Mentor(s): Julian Liber

An endosymbiont is defined as an organism that can form a symbiotic relationship with another organism. Many organisms have this ability, but in this experiment the focus is on certain fungi and its symbiotic relationship with symbiotic bacteria that lives inside of it. It is hypothesized that nematodes can vector endobacteria within certain strains of fungi using data from other experiments showing that endobacteria can be transferred through other vectors such as whiteflies. It may be possible for nematodes to uptake an endobacteria by feeding them fungi that is wild type for the endobacteria, and furthermore it may be possible for a nematode that is carrying an endobacteria in its gut to transfer the bacteria to a strain of fungi that does not have an endobacteria. Specifically this presentation will cover the hypothesis that Aphelenchus avenae will be able to uptake the endobacteria Mycoavidus within the fungi strain NVP 64+, a strain within the genus Mortierella.

A CLOSE LOOK AT BREAD MOLD

Jacob Stacy
Plant Sciences, Poster Presentation
Section: 1
Presentation Number: 564
Mentor(s): Carl Boehlert, Per Askeland

Objective: Use the SEM to monitor the growth of mold on bread at different periods of time. Material: 1-3 different types of bread; fresh bread will be used as the control xperimental: Place pieces of bread in plastic bags and watch for the onset of mold growth. Photograph and acquire SEM images to document the mold growth. Analysis: Examine previously published literature to identify types of bread mold, making sure to carefully record the sources for citation. If more than one type of bread, compare the mold growths. Are they the same? Comment on the effectiveness of SEM for characterizing bread mold.

DEVELOPING ANTI-BROWNING DIPLOID POTATOES USING CYTOSINE BASE EDITORS

Jacob Jensen
Plant Sciences, Poster Presentation
Section: 1
Presentation Number: 565
Mentor(s): David Douches, Thilani Jayakody

Polyphenol oxidase (PPO) is a multigene encoded enzyme that catalyzes the oxidation of phenolics to quinones. This conversion leads to brown pigment formation upon oxidation in numerous crop species including potato (Solanum tuberosum). The objective of this project is to develop anti-browning potatoes via cytosine base editor mediated knock-out of tuber expressed PPO genes. Cytosine base editors are an emerging CRISPR/Cas gene editing platform that can create targeted cytosine to thymine changes in DNA that can be used to introduce premature stop codons. For this study, Atlantic, a chipping potato variety developed by researchers at USDA-Beltsville, Maryland, was selected based on it's amenability to plant transformation and advanced tuber traits. To identify potential target sites for cytosine base editing, we are creating a custom python function to identify regions in the coding sequences of tuber expressed PPO genes. We will introduce the cytosine base editing reagents into Atlantic using Agrobacterium-mediated transformation. Transformed lines will be screened for genomic edits using amplicon-sequencing and then assayed for browning phenotype and PPO enzymatic activity.

THE STRUCTURE OF FLOWER PETALS

Karen Gutierrez Chavez
Plant Sciences, Poster Presentation
Section: 1
Presentation Number: 566
Mentor(s): Carl Boehlert

Flowers in different environments have a different structure in their petals. I will be comparing multiple flowers from different environments to determine how flowers develop different microstructures to be able to survive in the different environments. I will use a scanning electron microscope to detect the differences and what causes the differences to arise in the pedals in order to compare them to one another.

CARBOHYDRATE CONCENTRATIONS OF DWARF ROOT STOCKS

Austin Chase

Plant Sciences, Poster Presentation
Section: 1
Presentation Number: 567
Mentor(s): Mokhles Elsysy

Frozen root stock underwent a process of cleaning and lysing of the cells to form pellets. These pellets were further broken down using four methods to produce observable concentrations of glucose, fructose, sucrose, and starch. Using a spectrometer, concentrations of the isolated molecules were observed from each sample and compared against each other to determine if there is a statistically significant difference between dwarf stock roots and wild type root stocks.

VALIDATION OF CRYO-PRESERVED SYNTHETIC COMMUNITIES FOR USE IN GNOTOBIOTIC PLANT GROWTH SYSTEMS

Tim Johnson

Plant Sciences, Poster Presentation
Section: 1
Presentation Number: 568
Mentor(s): Bradley Paasch

The use of gnotobiotic systems to probe the microbiome of different organisms is a powerful tool for biologists. It allows scientists to make comparisons between a colonized and sterile host, which offers insight into how microbiota assist their host as well as serving as a good model to study dysbiosis. But in order to understand which microbes or consortium of microbes is causing an effect, one must be able to define each member of the community prior to the host being exposed. Therefore a synthetic community is required. The word synthetic in this context is referring to the fact that the microbes are not necessarily sourced from an environmental sample, rather the community is created through a process of bacterial cultivation. In this specific example, bacteria were sourced from wild type Col-0 ‘Arabidopsis Thaliana’ as well as an ‘A. Thaliana’ mutant known to exhibit dysbiosis; mfec. The plants were then used to make a bacterial suspension which was then plated and incubated for each plant genotype. From there colonies can be picked, put into solution, and applied to plants as desired. While this process can reproducibly give the phenotype associated with the synthetic community, the broth containing the syn com can not be effectively stored at room temperature for an extended period. To solve this the He lab has been looking into using cryo stored syn coms to allow for batch scale production and storage. This will reduce possible variability and sources of error since the procedure does not need to be repeated for every experiment that requires syn coms. Cryo protectants and other chemicals are required to ensure the quality of the syn com after it freezes and thaws. The goal of my analysis is to verify that the steps the He lab has taken to ensure frozen synthetic

PSYCHOLOGY

COLLEGE STUDENT COPING STYLES AND THE PSYCHOSOCIAL IMPACT OF COVID-19

Erynne Dixon
Psychology, Oral Presentation
Section: 1
Presentation Number: 570
Mentor(s): Kaston Anderson-Carpenter

Currently the United States has experienced more than 24 million cases of COVID-19, with over 400,000 COVID related deaths. Since the first case of the virus was reported in the United States, many universities and communities have put in place social restrictions to promote public safety. Because mental health is significantly associated with academic outcomes among university students, it is important to examine how COVID-19 affects this population. One field of interest that could influence student stress and anxiety could lie in the application of coping mechanisms; however, little research has been conducted to examine the role of COVID-related coping on mental health in American undergraduate and graduate students. This study examines the relationship between COVID-related stress and coping strategies and mental health. In addition, the study investigates the relationship between the variables above and satisfaction with college experience. The results from this study will inform current and future program implementation efforts on an individual and university-wide scale.

POLITICAL ORIENTATIONS REFLECTING ON COVID-19 OPINIONS?

Alexandra Pawlaczyk, Mariana El-Tawil, Nicole Heinz, Ria Jain
Psychology, Oral Presentation
Section: 1
Presentation Number: 571
Mentor(s): Jeewon Oh, William Chopik

2020 was a unique year with the COVID-19 pandemic and the election. People's political orientations reflect their values, which may influence their response to the pandemic. In fact, research shows associations between political orientation and compliance with COVID-19 guidelines such as mask-wearing. Thus, to promote a safe culture in the MSU community, it is important to understand how political orientation is associated with students' responses to COVID-19. We surveyed 2181 MSU undergraduate students (Mage = 19.39, SD = 1.80; 28.8% men, 65.9% women, .7% other, 4.5% missing on gender; mostly white (62.4%)) between April and December 2020. The mean score on political orientation was 3.25 (SD = 1.63) on a scale from 1 (strongly liberal) to 7 (strongly conservative). We gathered opinions on risk behaviors, safety measures, in-person interactions with friends and parents, on which we ran a series of linear regressions. We found that higher conservative attitudes predicted greater risky behaviors ($b = .08$, $p < .001$), tendency to minimize COVID-19 ($b = .42$ $p < .001$), and in-person interactions with friends ($b = .11$, $p < .001$), as well as predicted more negative opinions toward safety guidelines ($b = .14$, $p < .001$) but political orientation did not predict in-person interactions with parents. In sum, students with greater conservative ideals tended to minimize the importance of COVID, viewed safety guidelines to be less important and met with friend groups outside more frequently. However, political orientation was not a significant predictor for seeing parents.

IMPACT OF STUDENT ENGAGEMENT IN COURSE-BASED UNDERGRADUATE RESEARCH ON SELF-EFFICACY AND SCIENCE IDENTITY

Morgan Jagiela
Psychology, Oral Presentation
Section: 1
Presentation Number: 572
Mentor(s): Louise Mead

Traditional lecture classes, particularly in STEM disciplines, tend to focus on the memorization of facts, leading students to report a lack of relevance, value, and meaning of science content. Alternatively, recent studies have shown that more active learning opportunities can lead to higher grades, lower failure rates, and more positive attitudes towards learning. Course-based Undergraduate Research Experiences (CUREs) create such active learning opportunities for students and the CURE model suggests that gaining experience in conducting scientific research should increase students' confidence in their abilities to function as scientists, and potentially increase self-efficacy and science identity. To evaluate the effectiveness of a CURE we studied students taking an Introductory Biology course that specifically included an independent research project focused on using Avida-ED, a digital evolution software program, to carry out scientific research on evolutionary questions. We used the Persistence in the Sciences (PITS) instrument to evaluate student self-efficacy and science identity, administering the surveys in a pre/post format, in the fall of 2019 (FS19), spring of 2020 (SS20), and fall of 2021 (FS20). Students' levels of self-efficacy and science identity increased after completing the course and independent research project. Additionally, their attitudes toward the research process improved, alluding to the validity of the CURE model. These increases were seen in all three semesters, however, the advent of the COVID-19 pandemic also provided an opportunity to examine potential impacts of moving from in-person to virtual classes.

PERSONALITY AND HEALTH RISK BEHAVIOR DURING COVID-19

Alexandra Pawlaczyk, Mariana El-Tawil, Nicole Heinz, Ria Jain
Psychology, Oral Presentation
Section: 1
Presentation Number: 573
Mentor(s): Jeewon Oh, William Chopik

In 2020, the Coronavirus surprised the world with its tragic effects and consequences. Many new guidelines and safety lockdowns were instilled, and health officials promoted behaviors to prevent the spread of the virus. There is mixed evidence regarding the role of personality in risk perceptions and following recommended health and safety guidelines. With universities all over the world switching to an online education experience to promote the safety of the community, it is important to study how MSU students respond to the coronavirus transmission risk and recommended guidelines. We studied how the Big Five Personality Traits were related to risky and safe behaviors in response to the worldwide pandemic. We surveyed 2181 MSU undergraduate students (Mage = 19.39, SD = 1.80; 28.8% men, 65.9% women, .7% other, 4.5% missing on gender; mostly white (62.4%)) between April and December 2020. After gathering information regarding personality traits of the participants (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Open Mindedness), we assessed opinions on risk behaviors and safety measures. We found that extraverts were more likely to minimize COVID-19 ($b = .24$, $p < .001$), meet friends in person ($b = .32$, $p < .001$), and overall be involved in risky behaviors, such as leaving home for necessities and non-essentials, contacting people outside of home, and going to work/study ($b = .20$, $p < .001$). In sum, extraverts tended to engage in more risky behaviors throughout COVID-19. We will present results for all Big Five Personality traits in our presentation.

THE EFFECTS OF CIRCADIAN RHYTHMS ON PLACEKEEPING PERFORMANCE DURING A NIGHT OF SLEEP DEPRIVATION

Bridgette Weiss, Erin Sawyer
Psychology, Oral Presentation
Section: 1
Presentation Number: 574
Mentor(s): Elle Wernette, Kimberly Fenn

Circadian rhythms are endogenously-generated rhythms that fluctuate with a period of 24 hours. In humans, these rhythms have pervasive effects on physiology and behavior. A vast literature has shown that circadian rhythms affect lower-level attention tasks across a night of sleep deprivation; performance peaks at the beginning of the night, then declines, with the lowest performance being at the circadian nadir (approximately 04:00-06:00). Performance then rebounds starting around typical waking hours. Much less is known about circadian effects on higher-level cognitive tasks. Previously, we found that a night of sleep deprivation impaired placekeeping performance, or the ability to follow a series of steps in order without repetitions or omissions, despite interruption. Here, we tested if placekeeping performance showed circadian variation during a night of sleep deprivation. Participants completed UNRAVEL, a placekeeping task, and the Psychomotor Vigilance Task (PVT), a measure of vigilant attention, 13 times during a night of sleep deprivation, once each hour from 23:00 to 10:45. Data collection is ongoing but preliminary results suggest significant variation across time; performance in both the PVT and UNRAVEL shows a general decline from 23:00 to 9:00 followed by a very slight uptick through the end of the measurement period. These results could suggest optimal hours for completing higher-level cognitive tasks overnight, and may inform strategies for students studying long hours or medical professionals working late shifts.

IS NORMALCY OR SOLIDARITY MORE EFFECTIVE IN REDUCING MENTAL HEALTH STIGMA

Isabel John
Psychology, Oral Presentation
Section: 1
Presentation Number: 575
Mentor(s): Nicole Buchanan

Mental health stigma is a significant barrier to receiving mental health care. Research on reducing stigma has discovered a variety of approaches, but there are no definitive conclusions as to which approach is most effective. The two primary approaches to reducing mental health stigma are normalcy and solidarity. Normalcy refers to efforts to reduce stigma by increasing understanding of the frequency and prevalence of mental illness and the similarities between those with and without mental illness. This method aims to normalize the experience of mental illness for those experiencing symptoms and for those interacting with others who have mental illness. Solidarity approaches attempt to increase public support for those with mental illness and acceptance of differences among those with and without mental illness. The current literature is unclear whether one approach is more effective than another in reducing mental health stigma initially and over time. An initial exploratory study of 120 undergraduate students suggests that normalcy messages were more effective in reducing stigmatizing opinions against those with mental illness, while solidarity messages reduced the likelihood of engaging in stigmatizing behaviors toward those with mental illness. The next phase of this project will include a larger, more diverse sample population, and analysis of longitudinal data. Findings from thisresearch can help organizations implement campaigns to reduce stigmatizing beliefs and behaviors about mental health. Over time, these efforts could result in less mental health stigma and improved outcomes for those experiencing mental

illness.

SEX DIFFERENCES IN INFANT STRESS RESPONSE AFTER PRENATAL EXPOSURE TO VIOLENCE

Will Eckerle
Psychology, Poster Presentation
Section: 2
Presentation Number: 577
Mentor(s): Alytia Levendosky

The hypothalamic-pituitary-adrenal (HPA) axis plays a significant role in the development of childhood psychological disorders and stress regulation (Lupien et al., 2009). Early life stress, including stress occurring during the prenatal period, can alter HPA function and increase the likelihood of later child psychopathology (Brennan et. al., 2008; Martinez-Torteya et al., 2017). Specifically, recent research has demonstrated an association between prenatal exposure to intimate partner violence (IPV) and infant cortisol reactivity (Levendosky et al., 2016); however, it remains unclear if the relationship between prenatal IPV and cortisol reactivity is affected by infant sex. Previous studies of prenatal stress offer equivocal findings-in some instances boys show greater cortisol reactivity while in other cases girls show greater reactivity. We hypothesized that exposure to high levels of IPV would positively predict cortisol response for boys only. Methods. After consenting, mother-infant dyads (n = 182, infant males = 74, age = 11.83 months) completed an assessment battery including an infant stress task and a retrospective measure of both prenatal and postnatal IPV. To control for maternal stress, a cumulative risk measure was created. Infant saliva, assayed for cortisol, was collected at baseline, 5, 20, and 40 minutes following the stress task and cortisol reactivity was indexed by area under the curve with respect to increase. Results. Hierarchical linear regression indicated a significant interaction. Results partially supported the hypothesis such that boys, but not girls, demonstrate altered cortisol reactivity. However, the data indicate diminished rather than increased cortisol response.

PRENATAL AND CUMULATIVE INTIMATE PARTNER VIOLENCE INFLUENCE MATERNAL AND CHILD CONTRIBUTIONS IN EMOTION CONVERSATIONS

Jennie Boulus
Psychology, Poster Presentation
Section: 2
Presentation Number: 578
Mentor(s): Alexandra Ballinger, Amy Nuttall

Exposure to intimate partner violence (IPV) during pregnancy is a risk factor for poor parenting while lifetime IPV exposure has deleterious effects on child functioning. Mother-child emotion conversations are an important for children's socioemotional development, however little is known about how IPV effects such conversations. The present study examined the impact of prenatal and cumulative IPV on emotion conversations in a prospective, longitudinal sample of mothers and children (N=206). We hypothesized that prenatal IPV and cumulative IPV would predict maternal contributions in the conversations while cumulative IPV would predict child contributions. IPV was assessed during the third trimester of pregnancy and annually between ages 1 and 7. Age 7 conflict discussions were coded using the Autobiographical Emotional Events Dialogue (AEED). Our hypotheses were supported; prenatal IPV was associated with greater maternal shift of focus and less acceptance and tolerance while cumulative IPV predicted less acceptance and tolerance from both child and mother. Shift of focus is characterized by repetition, focus on mother's own emotions, and attempts to control the child's behavior. Low acceptance and tolerance is marked by an inability to freely express thoughts and feelings due to criticism and hostility. Findings indicate that the impact of prenatal IPV on parenting persists through middle

childhood and underscore the importance of the developmental timing of exposure to violence on maternal-child outcomes.

PERSONALITY TRAITS AND THEIR CORRELATION TO ONLINE COURSE PERFORMANCE

Nathan Meram
Psychology, Poster Presentation
Section: 2
Presentation Number: 579
Mentor(s): Susan Ravizza

Online courses have rapidly become the new standard of instruction due to the ongoing pandemic. There is prior research to suggest that past academic performance is related to future online course performance; however, there is a lack of research on personality traits and learning in an online classroom. It is more important than ever to investigate certain personality traits and their connection to online course performance. The present study investigates whether individual trait differences relate to learning depending on whether the course is asynchronous or synchronous. Asynchronous courses are structured for maximum student autonomy by allowing the student to structure the class around their schedule. Having offline lecture videos and wide examination windows tests a student's self-discipline and desire for quality work. Higher levels of conscientiousness may be correlated with higher asynchronous course performance because of this. Synchronous courses closely resemble the face-to-face structure to which students have become accustomed. Consistently paying attention to a live lecture, however, may be challenging for many students especially from the comfort of their own home. Higher amounts of impulsiveness may be correlated with lower synchronous course performance, as impulsive behavior may lead to more vulnerability to distraction during lecture. This study will help determine if there is a significant correlation between these personality factors and online academic performance in either asynchronous or synchronous instruction modes. Participants will complete a survey measuring personality traits and impulsiveness in order to observe how they are related to synchronous or asynchronous course performance in Fall of 2020.

COULD YOUR PERSONALITY INFLUENCE YOUR FEAR OF COVID-19?

Erika Mueller
Psychology, Poster Presentation
Section: 2
Presentation Number: 580
Mentor(s): Jennifer Neal

As COVID-19 sweeps through our society unrestrained, it is important to be mindful of the experiences of college students, a vulnerable population. The pandemic is a difficult time to be navigating young adulthood, and it is vital for college students to receive adequate support. In this poster presentation I will explore associations between college student's neuroticism and fear of COVID-19, controlling for demographic covariates and perceived stress. I hypothesize that there is a positive correlation between student's neuroticism and their fear of COVID-19. Online Qualtrics survey data were collected from 193 students enrolled in the virtual Psychology 395 course at Michigan State University in the Fall 2020 semester. In this study, neuroticism was operationalized using the International Personality Item Pool, fear of COVID-19 was operationalized using the Fear of Covid Scale, and perceived stress was operationalized using the Perceived Stress Scale. I analyzed the data using a multiple regression. Results indicated that women experienced more fear of COVID-19 than men ($b = 4.08$, $p < .001$), and students who experienced higher levels of perceived stress experienced more fear of COVID-19 ($b = 0.172$, $p < .001$) than their less stressed peers. However, contrary to my hypothesis, controlling for demographic covariates and perceived stress, these was no effect of neuroticism on students' fear of COVID-19. Instead, findings suggest that female

students and students who experience high levels of perceived stress may need higher levels of support to alleviate their fear of the pandemic.

AN ANALYSIS OF TIKTOK CONTENT REGARDING AUTISM SPECTRUM DISORDER

Alyssa Ewell, Brynn Meulenberg, Jessie Greatorex
Psychology, Poster Presentation
Section: 2
Presentation Number: 581
Mentor(s): Brooke Ingersoll

The recent explosion in social media has made it possible to spread information in an instant, making it paramount that we understand the type of content that is consumed and how it may be perceived. Given the staggering amount of misinformation surrounding autism spectrum disorder (ASD), it is critical to explore how it is portrayed in social media. TikTok is a video sharing platform that consists of 3 to 60 second videos on a variety of topics. For this project, the first 1000 videos with #autism, will be gathered on one day, with the aim of gaining a better understanding of the type of interaction with ASD content. Videos will be coded based on the creator's relation to ASD and basic demographic evident from the videos (e.g., age, presenting gender). Thematic analysis using an inductive approach will be used to analyze the semantic content of videos. The authors independently viewed videos to familiarize themselves with the data and finalized the codes using an iterative process and created a codebook. After all videos have been coded, authors will organize the codes into themes and subthemes. Preliminary analysis suggests that content regarding ASD is largely aimed towards educating and that there is little negative content. Upon completion of the coding portion of the study, patterns in content type will be analyzed further. To our knowledge, no study has been done exploring ASD content on TikTok. This analysis will help guide future research and build an understanding of how the public views ASD.

INDIVIDUAL DIFFERENCES IN SPEECH-IN-NOISE UNDERSTANDING AMONG OLDER ADULTS

Alison Eberle, Anusha Mamidipaka, Kyle Oliver
Psychology, Poster Presentation
Section: 2
Presentation Number: 582
Mentor(s): J McAuley

For many in the elderly population, difficulties in understanding speech in noise can impede daily function. Speech-in-noise (SIN) ability, the ability to understand a target speaker amidst background sounds, varies across individuals and decreases with increased age. While hearing acuity accounts for some of the individual differences in SIN ability, a large portion of variance remains unexplained. This project examines how various factors contribute to SIN ability for a sample of older adults. Thirty-four adult listeners, ages 55-87, completed a five-session test battery that included an assessment of hearing acuity, SIN measures, cognitive ability measures, rhythm perception measures, the test of basic auditory capabilities (TBAC), and surveys that assessed musical training and experience. Results show a robust correlation among SIN measures with performance on most SIN measures decreasing with increased age. Consistent with the role of cognitive ability in speech understanding in noise, verbal IQ, non-verbal IQ, and working memory were predictive of SIN ability. Additionally, rhythm discrimination ability predicted some, but not all, of the measures of SIN performance. Concerning the TBAC, the most significant predictors of SIN ability were temporal order discrimination and gap detection. No evidence was found to support a role for music training/experience to SIN ability. Overall, results demonstrate the contribution of cognitive ability, rhythmic skills, and specific basic auditory capabilities to older adults' understanding of speech in difficult listening situations.

NARRATIVE PROCESSING OF MUSIC: HOW CULTURE INFLUENCES OUR PERCEPTION OF MUSIC

Grace Bonnema, Jethro Sarmientoolivares, Khushi Kapoor, Tushya Mehta
Psychology, Poster Presentation
Section: 2
Presentation Number: 583
Mentor(s): Mitch Carr, Natalie Phillips, Soohyun Cho

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 and Dimen, 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 (Key words: battle, violence, sadness, fear) while chinese listeners portrayed wars in the name of national pride (Key words: 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.

NARRATIVE PERCEPTIONS OF MUSIC: DO YOU HEAR WHAT I HEAR?

Anusha Mamidipaka, Jewelian Fairchild, Olivia Dodson
Psychology, Poster Presentation
Section: 3
Presentation Number: 585
Mentor(s): J McAuley

Previous studies have shown substantial within, but not between-culture consistency in the stories that people imagine when listening to instrumental music McAuley et al., (in review) recently examined how well listeners could match stories imagined by other individuals to the musical excerpt that triggered the imagined story. To do so, the authors selected ‘consensus’ stories imagined in response to musical excerpts from sets of stories generated in response to each excerpt by a sample of participants from Arkansas. The study found individuals from both Arkansas and Michigan could identify the stories that the original sample from Arkansas heard for the tested excerpts where foils were ‘correct’ matches to the other tested excerpts. The current study investigates how precise the consensus stories must be in order to elicit the same aforementioned within-culture matching performance. Using the same Arkansas-generated consensus stories, the experimenters made small modifications regarding the setting, actions, or characters of the narrative. Twenty-four participants listened to a musical excerpt and were given the original consensus (‘correct’) story or the modified (‘incorrect’) story and asked to match the correct story to the musical excerpt. Participants were able to choose the consensus story at about an 80% accuracy. Results provide evidence that people's ability to mind read the stories that other individuals hear when listening to instrumental music is quite precise.

WHICH CHARACTERISTICS OF ORGANIZATIONAL STATEMENTS ON RACIAL INJUSTICE IMPACT STUDENT PERCEPTIONS?

Spriha Sharma

Psychology, Poster Presentation
Section: 5
Presentation Number: 586
Mentor(s): Ann Ryan

With the rise of protests against injustice, many organizations have made statements in response to these recent movements. However, very little is known about how these statements are perceived. Previous work has identified ambiguity as a strategy in organizational communication pertaining to diversity, as audiences found informal agreements and weak links in statements just as acceptable as outlined goals, policies, and procedures. The present study aims to understand how different characteristics of organizational statements impact student perceptions and their intent to apply to the organization. Participants were presented with a single organizational statement through a randomized 2 (clear diversity support plan vs ambiguous plan) by 2 (emotional vs stoic language) by 2 (clearly described instances of police brutality vs ambiguous description of events) design and asked to respond to several perception measures. We hypothesize that on average, statements with a less clear plan, more emotional language, and clearly described instances of police brutality are to be perceived as more positive and may result in more positive applicant reactions. Full results will be included in the presentation. This work may help people become more aware of the perceptions of these statements and encourage organizations to better communicate support for social justice.

HOW DOES FEAR OF CRIME AND MARITAL CONFLICT PREDICT CHILDREN'S CALLOUS-UNEMOTIONAL TRAITS?

Allie Lapan, Heather Asuncion, Shree Mysore, Sydney Wojczynski

Psychology, Poster Presentation
Section: 5
Presentation Number: 587
Mentor(s): Sarah Carroll

Callous-unemotional (CU) traits (e.g., little empathy, exploitative tendencies) are characterized by a persistent disregard for others' rights and wellbeing. Their presence early in development is associated with severe presentations of antisocial behavior that often persist into adulthood (Frick & White, 2008). Neighborhood disadvantage, such as poverty and crime, has been found to predict children's antisocial tendencies, with children in high-risk contexts exhibiting elevated CU traits relative to their more affluent peers (Meier et al., 2008). Familial stress, such as poor marital quality, has also been found to predict CU traits in children (Mills-Koonce et al., 2016). Because no study has examined neighborhood characteristics and marital quality together as predictors, however, it is unclear whether they jointly and/or interactively increase risk for CU traits. The purpose of our study is to fill this gap in the literature. We hypothesize that fear of crime and poor marital quality will jointly and interactively predict CU traits in our sample. Participants will include 1,030 child twin pairs from the Michigan State University Twin Registry. Using neighbor reports of fear of crime and parent reports of marital quality and child CU traits, we will conduct a linear regression analysis to evaluate the role of both risk factors. Results will inform our understanding of the potential of positive marital quality to mitigate, and fear of crime to exacerbate, CU traits. Broadly, our study will shed light on the relative contributions of stress within the home and stress within the neighborhood context to child mental health.

COVID-19 PSYCHOLOGY STUDY

Meghan Abrom
Psychology, Poster Presentation
Section: 3
Presentation Number: 588
Mentor(s): Mariah Purol, William Chopik

Research indicates that attachment styles and personality play pivotal roles in the initiation of romantic relationships. The COVID-19 pandemic may have further influenced how people choose to start dating. In order to understand more about relationships during the pandemic, we surveyed 2,181 MSU undergraduate students on their personalities and relationship behavior (Mage = 19.39, SD = 1.80; 28.8% men, 65.9% women, .7% other, 4.5% missing on gender; mostly white (62.4%)) between April and December 2020. Attachment was measured with the Relationship Structures (ECR-RS) Questionnaire, a survey designed to capture both attachment anxiety and avoidance. Personality was measured via the The Big Five Inventory-2 Short Form (BFI-2-S). We found that those who began a relationship during the pandemic were lower in attachment avoidance (β = -0.06, p = 0.04), higher in attachment anxiety (β = 0.08, p = 0.03), higher in extraversion (β = 0.089, p = 0.01), and lower in conscientiousness (β = -0.088, p = 0.01) than those who did not. Notably, these effect sizes were small. Overall, we concluded that attachment styles and personality traits influenced whether or not students started a relationship during the pandemic. The effect sizes suggest that other factors likely play a role in predicting dating behavior during the pandemic.

FACTORS THAT HINDER AND HELP THE SUCCESS OF EMPLOYEE RESOURCE GROUPS IN ORGANIZATIONS: A QUALITATIVE APPROACH

Sam Shi
Psychology, Poster Presentation
Section: 3
Presentation Number: 589
Mentor(s): Ann Ryan

Employee resources groups (ERGs) are designed to connect employees from historically marginalized groups (e.g., based on race, ethnicity, gender, or sexual orientation) as one mechanism for increasing inclusion. In ERGs, members share resources and practice skills. Previous research has shown that ERGs can not only promote learning and development activities (Green, 2018) but also increase cognizance of diversity issues and create an inclusive workforce (Kelly, 2018). While previous work on ERGs has discussed the purposes these spaces serve, little if any research has considered factors that help ERGs thrive and those that inhibit them. Different organizations have different cultures, resource limitations, and other differences that may contribute to forming different ERGs. The aim of the present study is to explore the factors that inhibit the success of ERGs (barriers) and those that help them thrive (enablers) in the organizational context. We interviewed 16 employees who had experience developing, managing, or leading ERGs as part of a larger interview study. We asked participants about what they believed were key enablers and barriers of employee resources groups in their organization. This study reveals potential factors that contribute to promoting ERGs and possible factors that limit their impact. Future research may focus on relationships between specific types of ERGs and factors that promote or limit their development.

MOVEMENT VIGOR IN INDIVIDUALS WITH SCHIZOPHRENIA

Zeeba Ali
Psychology, Poster Presentation
Section: 3
Presentation Number: 590
Mentor(s): Katharine Thakkar

Negative symptoms of schizophrenia like flat affect, loss of pleasure, and amotivation impact one's ability to form relationships and function in everyday society. The mechanisms underlying negative symptoms are unknown, impeding treatment development. Negative symptoms are proposed to reflect a failure to allocate effort to obtain rewards; however, symptoms could also reflect a problem in assigning value to a reward. A novel angle for studying reward processing is to look at basic movement parameters? we move more vigorously the more we want a reward. Movement vigor is related to dopaminergic activity - indexing reward processing in the brain. Physiology data from non-human primates suggests that saccades made to more rewarding stimuli show more vigor and elicit more dopaminergic activity. Therefore we hypothesized that patients with more severe negative symptoms would show reduced saccade vigor. We hypothesized reduced saccade vigor in patients with schizophrenia, particularly those with severe negative symptoms. To investigate this, we measured peak velocities and saccade amplitudes of patients and healthy controls during a task where subjects made rapid saccades to visual stimuli. Consistent with our hypothesis, we observed reduced peak velocity, but not saccade amplitude, in patients with schizophrenia. Further, the group (patients vs healthy controls) affected the relationship between amplitude and peak velocity. Interestingly, the relationship between amplitude and peak velocity in the patient group was related negative symptom scores including poverty of affect and speech, and social motivational functioning. These findings may provide insights into mechanisms of reward processing in schizophrenia.

EXAMINING TRAIT ANXIETY AS A MODERATOR OF NON-DECEPTIVE PLACEBO EFFECTS IN REDUCING COVID-19 RELATED STRESS

Jade Moros
Psychology, Poster Presentation
Section: 3
Presentation Number: 591
Mentor(s): Darwin Guevarra

The COVID-19 pandemic has substantially increased the amount of stress and anxiety individuals experience across their daily lives. Placebos administered without deception (e.g., non-deceptive placebos) offer a cost-effective and scalable solution to help manage this pandemic-related distress. However, non-deceptive placebo interventions do not work for everyone. There are individual differences that contribute to how likely a participant will respond positively to non-deceptive placebo interventions. One possible individual characteristic that we identified was trait anxiety. Trait anxiety is one's general tendency to experience anxiety in response to the risk of potentially threatening stimuli. In this study we test whether people who are low or high in trait anxiety respond favorably to non-deceptive placebos administered during a pandemic. We are in the process of collecting data virtually. We measured participant's trait anxiety and then randomly assigned them to a control or non-deceptive placebo group, and measured their COVID-related stress at three time points. Previous studies suggest that deceptive placebos are effective for low to moderate levels of stress. We hypothesize that those who have lower trait anxiety scores will benefit more from the non-deceptive placebo intervention compared to those with high trait anxiety scores. Our study tests whether those with low trait anxiety are better candidates for a non-deceptive placebo intervention. These findings may offer suitable options for people who are low on trait anxiety without seeing a mental health professional.

STRESSOR LEVELS AND MICHIGAN'S COVID-19 WORK-AT-HOME ORDER

Kayla Behm
Psychology, Poster Presentation
Section: 4
Presentation Number: 593
Mentor(s): Chu-Hsiang Chang, William Chopik

The novel coronavirus (COVID-19) affected numerous people directly and indirectly in various ways. One of these major effects is the shift in workplace dynamics due to governments issuing work-at-home mandates. Over half of the people who were employed across the United States made the transition to working from home after the pandemic hit and the work-at-home order was issued. This study conducted a survey to collect data on changes in job characteristics and work stressors from employees who attended Michigan State University (N = 89) during November and December of 2020. These workers reside and work in Michigan and only started working at home due to the work-at-home order with the same employer prior to and during the transition of work location. We found that participants reported significant increases in scheduling autonomy and working conditions, but a significant decrease in social support from before the work-at-home mandate to working from home. The personality trait of conscientiousness, which refers to characteristics of responsible, organized, and hardworking, was found to be positively correlated with experiencing an increase in role clarity in the workplace after participants started working from home. Additionally, the number of children (5-12 years of age) in the household was correlated with a decrease in overall well-being. This study supports previous research regarding COVID-19 and its correlations to workplace changes and stress. Given the severity and numerous people affected by the pandemic, further research is needed with more participants to see if these results are generalizable to the general population.

EFFECTS OF INTERPERSONAL SYNCHRONY ON AFFILIATION

Cynthia Sridhar, Jess Truong, William Quackenbush
Psychology, Poster Presentation
Section: 4
Presentation Number: 594
Mentor(s): J McAuley

Interpersonal synchronization, the degree of coordination in time between two people, has been argued to promote affiliation between individuals. Supporting this view, previous work has shown that participants who performed a sensorimotor (finger tapping) synchronization task with an experimenter, perceived the experimenter to be more likeable when the experimenter had tapped synchronously with them compared to asynchronously. This finding has been interpreted as evidence that synchronization promotes social cohesion via overlapping perceptions of self and other. The present study extends previous work by examining the relationship between degree of interpersonal synchrony and affiliation for pairs of participants who completed an inter-personal version of the sensorimotor synchronization task. A secondary goal was to evaluate the potential impact of leader-follower roles in each participant pair on interpersonal synchronization and affiliation. In the experiment, participants tapped with their index finger in time with an auditory metronome (synchronization) and continued tapping at the same pace when the metronome stopped (continuation). In the paired tapping condition, participants received additional instructions to synchronize with each other during the performance of the synchronization-continuation tapping task. Both participants were in the room for the duration of the study. Following the experiment, participants completed an interpersonal affiliation survey. Motion tracking recorded continuous movement dynamics of each participant. Results will be discussed in terms of the relation between degree of inter-personal synchronization and affiliation, as well as any leader-follower effects.

HOW PERSONALITY TRAITS AFFECT ONLINE LEARNING PERCEPTIONS

Alexandra Pawlaczyk, Mariana El-Tawil
Psychology, Poster Presentation
Section: 4
Presentation Number: 595
Mentor(s): Jeewon Oh, William Chopik

Though online learning isn't new, COVID-19 has increased dependence on this avenue of learning, and many students are concerned that they are not receiving the same quality of education as they had previously. Thus, to ensure that all students are getting the most out of their education, it is important to consider the link between students' personality in the context of online learning to identify which students are doing well vs. having a more difficult time. We surveyed 2181 MSU undergraduate students (Mage = 19.39, SD = 1.80; 28.8% men, 65.9% women, .7% other, 4.5% missing on gender; mostly white (62.4%)) between April and December 2020. We regressed the Big Five Personality Traits (Extraversion, Agreeableness, Consciousness, Neuroticism, and Open Mindedness) on students' perceptions of online education. We found that, on average, students did not enjoy taking courses online, but more neurotic people ($b = -.14$, $p < .027$) and extraverted people ($b = -.26$, $p < .001$) enjoyed it especially less. Additionally, people high in Neuroticism struggled to keep up with deadlines ($b = .40$, $p < .001$) and thought they were learning less online ($b = .25$, $p < .001$). These results suggest that while some students are finding online learning is suitable, others are struggling to keep up with these new demands. Full results of all personality traits will be presented in the poster.

REASONS FOR SUBSTANCE USE IN TRANSGENDER INDIVIDUALS

Megan Wertz, Taylor Anderson, Terra Dunn
Psychology, Poster Presentation
Section: 3
Presentation Number: 596
Mentor(s): Jae Puckett

Transgender and gender diverse (TGD) people face many types of oppression. This mistreatment has been associated with drug and alcohol use. In this study, we explored rates of use in a sample of TGD participants and reasons for substance use. Data was collected from 181 TGD participants via a daily diary study. Participants completed a baseline questionnaire followed by 56 consecutive days of daily surveys. Participants ranged in age from 16-40, had a variety of TGD identities (trans men, trans women, genderqueer, and nonbinary), and mostly identified as sexual minorities and as white (85.1%). In the baseline data, the most commonly reported drug used by participants was marijuana (72.4%). Over a third of participants reported levels of alcohol use that was at the hazardous or dependent level and over a fourth reported at least moderate levels of drug use. In the daily data, participants reported any use and their reasons for use (via a checklist and an open-ended response). These written responses were analyzed using thematic analysis in order to code the data and determine themes. Many reasons for use were somewhat universal and could also be reasons for cisgender individuals' substance use. The top reported reasons for alcohol use were social, relaxation, and eating-related. The top reasons for drug use were for relaxation, physical pain, and being in social environments. Some participants reported reasons related to coping with the marginalization experienced by TGD people. Some of these stressors included stigma, lack of social support, being misgendered, or being deadnamed.

THE IMPACT OF COGNITIVE REAPPRAISAL ON MENTAL WELL BEING AND STRESS DURING THE COVID-19 PANDEMIC

Alexia Davis, Braden Kilpatrick
Psychology, Poster Presentation
Section: 4
Presentation Number: 597
Mentor(s): Christopher Webster, Jason Moser

During highly stressful events such as the COVID-19 pandemic, successful regulation of one's emotions greatly influences psychological well-being. One of the most prominent emotion regulation strategies studied is cognitive reappraisal, which involves reframing the meaning of emotional stimuli to reduce their negative impact. Cognitive reappraisal has been shown to be associated with decreased stress, anxiety, and depression. Despite its effectiveness, recent research suggests that reappraisal may not be as effective in high-intensity emotional contexts. In order to further explore the effectiveness of cognitive reappraisal in high-intensity emotional contexts, we aimed to assess the association between cognitive reappraisal and stress related to the COVID-19 pandemic. We predicted that if cognitive reappraisal is effective in high-intensity emotional situations, individuals who commonly practice reappraisal in their daily lives would be protected from increased stress-related COVID-19. Data from this study was part of a larger investigation that examined the efficacy of an emotion regulation intervention for individuals experiencing stress related to the COVID-19 pandemic. During baseline, participants completed the emotion regulation questionnaire, COVID-19 Stress Scale, and various mental health outcome questionnaires. Results indicated that cognitive reappraisal was not significantly related to COVID-19 stress despite being highly associated with decreased mental health symptoms. These data suggest that cognitive reappraisal may not be an appropriate emotion regulation strategy to protect people from stress and anxiety during a prolonged, highly stressful event such as a pandemic. Instead, more research is needed to identify alternative emotion regulation strategies that may be more effective during these highly stressful events.

VOICE NON-RECOGNITION IN THE WORKPLACE: YOUNGER WORKERS VS OLDER WORKERS

Xiaoqin Yan
Psychology, Poster Presentation
Section: 4
Presentation Number: 598
Mentor(s): Ann Ryan, Caitlin Briggs, Jo Alanis

Older workers (ages 50+) have become a growing source of the United States' labor force. Yet, evidence suggests that they are experiencing workplace discrimination. For instance, Cary et al. (2016) found evidence of two distinct types of ageism which supports the claim that ageism can predict attitudes towards older adults. Simultaneously, when an employee speaks up at work, an employee's voice may also hint at workplace discrimination. Howell et al. (2015) found that demographic features that signaled status had an influence on employee's voice recognition. In this study, we are interested in investigating whether age plays a role in acknowledging employee's voice behavior. Specifically, this study is focusing on finding out how age will contribute to voice recognition/non-recognition. We will use a 2 (Promotive voice vs Prohibitive voice) ✖ 2 (Younger worker vs Older worker) between-subject design to look at the role of voice behavior and age on employee's status, competence, perceived warmth, voice recognition. We hypothesize that employee voice behavior is positively related to outcomes of competence and voice recognition via perceived status; specifically, perceived status mediates the relationship between voice and these outcomes. Furthermore, employee age will moderate the relationship between voice and status in a way that older employees will be rated as lower status. In conclusion, we are

currently working on the data collection and analyses which will be done before UURAF. We expect our results to show that age plays a role in acknowledging employee's voice behavior.

ASSOCIATION BETWEEN ACCESS TO MENTAL HEALTH RESOURCES AND DELINQUENCY WITH AGENT-BASED MODELLING

Emma Nacker, Paul Schulte
Psychology, Poster Presentation
Section: 5
Presentation Number: 601
Mentor(s): Kathryn Clements

Mental health is a very important issue in society today, especially among adolescents. Previous studies have found that adolescents with untreated mental illnesses were more likely to engage in delinquent acts compared to those without mental illnesses. However, there may also be contextual factors specific to adolescents that impact their access to mental health resources and delinquency. To investigate this association, the current study uses an agent-based model to simulate students interacting with stressors and mental health resources. Students close to stressors increase in delinquency, while those close to mental health resources decrease in delinquency. The results showed an inverse correlation between the number of mental health resources and the average delinquency of the student population. In addition, when there was a very high number of students, those close to mental health resources stayed at low delinquency and blocked access to other students who were increasing in delinquency. Due to the nature of agent-based modeling, these results cannot be used as accurate predictors of real-life situations. Instead, they should be used to identify areas that should be investigated by future studies.

WHEN AND WHY DO COWORKERS VIEW CAREGIVING ACCOMMODATIONS AS FAIR OR UNFAIR?

Justin Duby
Psychology, Poster Presentation
Section: 5
Presentation Number: 602
Mentor(s): Ann Ryan

Workplace accommodations grant individuals the ability to favorably engage in employment through a time of need or assisted aid. Understanding coworker perceptions of the fairness of accommodations is crucial to enabling successful implementation of accommodations within organizations. Coworker input regarding the fairness of accommodations directly affects various aspects of the accommodation process, including the comfort level of an individual asking for accommodation, whether or not accommodation is actually granted, and even the public's approach towards relevant laws and regulations. We further investigated coworker perceptions of accommodations by comparing perceptions of caretaking responsibility accommodation reasons (i.e. childcare, eldercare, sandwich) via an experimental paradigm. 300 participants were recruited to answer survey questions, imagining that their theoretical coworker was accommodated to have each Friday off of work. The participants were asked their perceptions of the fairness and controllability of the accommodation when requested to fill in for the accommodated worker. We discovered that the perceived controllability of the accommodation caretaking reason is a crucial predictor of the fairness perceptions. Specifically, eldercare and sandwich caretaking responsibilities were perceived as less controllable and fairer of an accommodation reason than childcare. we put forth the current study as a crucial step in understanding accommodation culture and coworker dynamics within the workplace, as particularly related to caregiving circumstances.

CODING SCHEME ON OBSERVABLE PARENTIFICATION BEHAVIORS BY TYPICALLY DEVELOPING SIBLINGS

Megan Murrin
Psychology, Poster Presentation
Section: 5
Presentation Number: 603
Mentor(s): Amy Nuttall

Typically developing siblings (TDS) of individuals with Autism Spectrum Disorder (ASD) often provide high levels of caregiving for siblings, which is called parentification, and these caregiving responsibilities may be directed toward the sibling with ASD, a parent, or a combination of the two. Within the Autism Spectrum Disorder literature, there is little research conducted on the experiences of the typically-developing siblings, however, research has found that being forced into caregiving roles can affect adjustment and sibling relationships. This work seeks to gain a deeper understanding of these siblings and their experiences by creating a coding scheme for observable caretaking behaviors by teenaged TDS during a discussion task with their mother. Coders rated behaviors from the TDS based on whether the caretaking was directed towards the sibling with ASD or the mother, and whether it was emotional or instrumental caregiving. There was also one code focused on whether or not the mother tried to maintain boundaries for the TDS. The codes were rated on a 5-point Likert scale based on the severity of the caretaking or maintenance of boundaries with 1 being very low or absent caretaking behaviors and 5 being very high caretaking behaviors present.

EFFECTS OF MUSICIANSHIP ON HYPERMETRICAL INTERPRETATION OF RHYTHMS

Nathalie Nordan
Psychology, Poster Presentation
Section: 5
Presentation Number: 604
Mentor(s): J McAuley

Previous research has suggested that musicians are more likely to perceive the beat of a rhythm at a slower tempo (at a higher level in the metric hierarchy) than non-musicians. To investigate this possibility, participants completed two tasks for a set of thirty monotonic rhythms in either a Fast tempo (150 bpm, 400 ms inter-beat-interval) or Slow tempo condition (75 bpm, 800 ms inter-beat-interval). Their first task was to adjust the tempo of each rhythm in real time until it was at what they determined to be the best tempo; their second task was to tap along with what they felt was the beat of each rhythm. Participants did this both with and without an isochronous metrical context. Finally, participants' musical background was assessed using the Goldsmith's Musical Sophistication Index (GMSI). The ratio of the determined best tempo to the tapped tempo was calculated for each participant and rhythm. If participants tap a beat at the same tempo as their determined tempo, the ratio would be 1:1 between tapped and determined tempo. Of particular interest were ratios of 0.5, where participants tapped at half the tempo of the beat unit, a phenomenon known as a hypermetrical interpretation. Overall, participants produced more hypermetrical interpretations in the Fast tempo condition and for rhythms presented with a metrical context than without a metrical context. Moreover, participants with higher GMSI scores tended to produce more hypermetrical interpretations than participants with lower GMSI scores, but only in the Fast tempo condition.

THE INFLUENCE OF EXPERIMENTER WARMTH AND COMPETENCE ON THE EFFICACY OF NON-DECEPTIVE PLACEBOS IN REDUCING COVID-19 RELATED STRESS

Sharanya Subramaniam
Psychology, Poster Presentation
Section: 5
Presentation Number: 605
Mentor(s): Darwin Guevarra

COVID-19 has triggered increases in stress and anxiety amongst individuals over the course of the global pandemic. Placebos without deception (e.g., non-deceptive placebos) may offer a scalable intervention to help manage people's pandemic-related stress. However, it is still unclear on how to optimize the administration of non-deceptive placebo interventions for maximal well-being benefits. One situational factor that can influence the efficacy of non-deceptive placebos is the perception a participant has of the experimenter delivering the intervention. In this study, we test the importance of social perception of the experimenter in predicting treatment efficacy to reduce stress associated with the COVID-19 pandemic. We randomly assigned participants into a control or non-deceptive placebo group and measured their COVID-related stress and perception of the experimenter at three time points. We are in the process of collecting data. We hypothesize that participants who perceive experimenters as more warm and competent at baseline will show a larger decrease in COVID-related stress compared to participants who perceive experimenters as less warm and competent. These results will provide insight into the importance of a participant's perception of the experimenter in moderating the non-deceptive placebo response in stress. If increasing warmth and competence of an experimenter results in maximal benefits of the non-deceptive placebo, future studies should focus on training the person administering the intervention to be as warm and competent as possible.

THE ROLE OF NARRATIVE IN MUSIC PROCESSING: INVESTIGATING THE ASSOCIATION OF NARRATIVE CONVERGENCE AND THE CULTURAL INFLUENCES IT REPRESENTS

Carly Wholihan, Jacob Okulewicz, Jethro Sarmientoolivares, Kat Murray, Tushya Mehta
Psychology, Poster Presentation
Section: 5
Presentation Number: 606
Mentor(s): Mitch Carr, Natalie Phillips, Soohyun Cho

The Digital Humanities and Literary Cognition Lab and the Timing, Attention and Perception Lab at MSU conduct a NSF-funded interdisciplinary study, 'The Role of Narrative Listening in Music Perception,' which explores if participants imagine or hear stories when they are exposed to musical stimuli. One of the experiments had participants from across the U.S. and Dimen, China listen to instrumental music and asked them to write a narrative if they heard one; and, a surprising number of people did. Many of the narratives had incredible similarities: the same topics, themes, and even specific words.These similarities show narrative convergence across cultures through the stimuli. One of the similarities, we noticed was that Western listeners often connected instruments they heard with specific cultural events. It was observed that Western listeners tend to associate Chinese instruments with similar Western instruments leading to a narrative depicting traditional Western stories. For example, several Western listeners associated guitar-like Chinese string instruments such as the 'pipa' with Cowboys (C7, C9 etc.). In the same way, many Western listeners tend to write narratives about Native Americans when they heard the flute or flute-like instruments in several music excerpts (C24, W42 etc.). As we investigate these moments of cultural alignment and divergence in music inspired stories, we point toward an innovative model for linking specific structures in music to the kinds of stories people hear. Through this presentation, we attempt to provide a new perspective on when and why instrumental music yields culture-influenced narrative listening.

THE LINK BETWEEN SELF-ESTEEM AND PERCEIVED STRESS AMONG MSU STUDENTS

Bre Lind
Psychology, Poster Presentation
Section: 5
Presentation Number: 607
Mentor(s): Jeewon Oh, Jennifer Neal

Stress has a negative impact on overall health and high self-esteem may be a potential protective factor from stressful episodes. Indeed, previous research finds links between self-esteem and perceived stress among university students. Thus, it would be important to test whether this link also exists in the MSU student population as well. We surveyed 193 Michigan State University undergraduate students during the 2020 fall semester. The age of the students varied from 19 to 37 years old (M = 20.72, SD = 1.81) and gender was heavily female (80.83%). We measured self-esteem and perceived stress using several questions on a scale from 1 (strongly disagree) to 4 (strongly agree) and 0 (never) to 4 (very often), respectively, and scores on all items were summed. On average, people reported having moderate self-esteem (M = 28.11, SD = 5.66) and moderate amounts of perceived stress (M = 29.10, SD = 8.05). We found that self-esteem and perceived stress had a strong negative correlation, $r(187) = -.64$, $p < .001$. Findings suggest that MSU students with higher self-esteem perceive lower levels of stress.

SOCIAL SCIENCE: GENERAL

STEREOTYPED AUTISM SPECTRUM DISORDER IN TELEVISION AND FILM

Taylor Kovach
Social Science: General, Oral Presentation
Section: 1
Presentation Number: 609
Mentor(s): Clifford Broman

This research examines stereotypes with regard to Autism Spectrum Disorder in media and films, and the issues they manufacture and perpetuate. I draw on journals with literature reviews and similar website or news articles, which argues that we need stereotypes and more diversity in autistic characters. Depending on the subjective opinions and objectively extensive research studies on stereotypes, I discuss the varying factors that come with these stereotypes. I lastly explore what solutions would benefit the current portrayals of non-allistic (autistic) characters.

AMPHIBIAN PET TRADE STAKEHOLDERS' OPINIONS, KNOWLEDGE, AND BEHAVIORS SURROUNDING DISEASE SPREAD

Giavanna Haddock
Social Science: General, Oral Presentation
Section: 1
Presentation Number: 610
Mentor(s): Alexa Warwick

Amphibians face a variety of threats causing population decline including the newly identified chytrid fungus, Batrachochytrium salamandrivorans (Bsal). This pathogen caused several massive salamander mortality events in Europe. Though currently not found in North America, the most likely impending pathway of intercontinental spread is through the amphibian pet trade. The lack of documentation and regulation in this industry may allow infected amphibians to unknowingly be transported across large geographic areas. Existing research on this topic is limited, resulting in stakeholders having little to no input in management actions. By conducting semi-structured interviews with amphibian pet trade stakeholders (eg. amphibian pet owners, breeders, and pet store owners), we seek to engage them in

developing safe management strategies to increase the likelihood of a successful implementation. Specifically, we are investigating how participants' behaviors may facilitate the spread of Bsal, opinions and attitudes towards potential management actions, and their pre-existing knowledge of the disease. We predict that behaviors and opinions vary based on the experience of stakeholders, and most stakeholders have little to no knowledge of the disease. To date, I have extensively recruited nationally through online forums and amphibian-related virtual groups as well as snowball sampling. I will use qualitative content analysis of completed interviews to address the research questions. The results will aid in the development of a large-scale survey distributed through the Bsal Task Force and its partners. Ultimately, these findings are crucial for creation and implementation of effective management to combat amphibian population declines through the spread of Bsal.

RUMOR SPREAD MODEL WITH LIFE

Xiaoxu Hong
Social Science: General, Oral Presentation
Section: 1
Presentation Number: 611
Mentor(s): Zachary Neal

In this age of rapid social media development, our lives are filled with all kinds of rumors. In this project, I extend an existing agent-based simulation model that was designed to simulation how rumors spread. These model extensions are designed to investigate the influence of different factors in the process of rumor propagation, including willingness to share a rumor and changes in the rumor as it shared. Experiments conducted in this new model suggest that there is a relationship between the number of times a rumor changes and the number of people who hear the most recent version of the rumor. Specifically, the more times a rumor changes while it spreads, the fewer people hear the most recent version of the rumor. These findings have implications for understanding how to limit the spread of false information in social media, where rumors can easily be shared and change.

HEALTH AND COMMUNITY CAPACITY IN DOWNRIVER, MICHIGAN

Hailey Genaw
Social Science: General, Oral Presentation
Section: 1
Presentation Number: 612
Mentor(s): Louise Jezierski

Downriver, Michigan is a collection of communities sitting on the border of Detroit. Several of these communities are included in an Environmental Protection Agency (EPA) designation known as a 'non-attainment zone,' meaning the EPA is aware that pollutants, specifically sulfur dioxide, are above safe levels for residents. This research will examine a question regarding if Downriver's diversity in terms of both ethnicity and income-levels serve to block community capacity building and a response to excess pollution. In addition, this research will analyze the environmental health disparities Downriver faces, through the usage of years of potential life lost (YPLL), asthma rates, and pollutant data. It will then evaluate government and community response to this issue using a community survey posted on a Downriver Facebook group and interviews with government officials. In the course of this research issues such as race, income, educational attainment and lack of resources will be evaluated as an inhibitor to community capacity. Further, it will find that the tendency to rely on a historical relationship with industry stands in the way of a new future. However, if residents are given the proper resources there are solutions to these issues and assets that Downriver possess that make it a favorable region.

“LIKE A SNAPSHOT OF A BIGGER PICTURE”: ORAL HISTORY AND THE ROLE OF THE INDIVIDUAL

Leah Welch
Social Science: General, Oral Presentation
Section: 1
Presentation Number: 613
Mentor(s): Chantal Tetreault, Kirsten Fermaglich

The presentation focuses on oral history's underutilized potential as a historical source that can improve the discipline's inclusivity and highlight the role of the seemingly ordinary individual in history. My work over the last year with various forms of oral testimony through the life stories of local Jewish academics who built the nearby synagogue, the testimony of prisoners of war in German POW camps during WWII, and with Holocaust survivors' stories memorialized in USC's Shoah Archive have transformed the way I consider historical sources. These sources emphasize that each person has a part to play in the grander scheme of history. Working with oral testimonies forges a connection with the researcher and student in a way that traditional historical sources, namely the occasionally dry documents we tend to associate with historians, can struggle to. Oral history has its own limitations, most commonly issues of memory and ethics, but the source itself emerged as a response to the constraints of traditional documentary sources. History needs to be humanized, lest students mischaracterize the subject as simply the memorization of dates and in untouchable historical figures who are most often men in power. Oral history seeks to illustrate the importance that everyone has in shaping history and in the value of including diverse and forgotten voices as part of that history. Oral history is the ideal source for pursuing history as a means to elevate those individuals who have been sidelined by the conventional historical narrative.

THE CHANGING NATURE OF COLLEGE SOCIALIZATION DUE TO COVID-19

Lexy Valianos
Social Science: General, Oral Presentation
Section: 2
Presentation Number: 616
Mentor(s): Steven Fraiberg

The event of a global pandemic has forced colleges around the country to move their classrooms online, some to send their students home and some to limit the clubs and sports that define socialization in university experiences for many young adults. Within this ethnographically informed research project, I decided to look into in what specific ways the pandemic has affected college life for students at Michigan State, Illinois State, DePaul, Roosevelt and Joliet Junior college to obtain a representative sample of college students from universities, junior colleges, those learning online and in person and those living on and off campus. To explore the question of what ways the pandemic has affected college life for students I engaged in semi-structured interviews, analyzed diction of communications from universities regarding pandemic guidelines and reviewed social media posts and forums for language patterns. The question of how this past school year has changed the college experience is important because it has changed how this generation of college students are able to pursue their education and connect with their universities. I hope to use numerous interviews from students on and off campus and at different universities to draw conclusions about what these changes are and how they differ from pre-COVID-19 college life.

QUEERNESS AS SOCIAL CURRENCY: A STUDY ON THE GLOBALIZATION OF QUEER CULTURE VIA SOCIAL MEDIA

Ashlin Riggs

Social Science: General, Oral Presentation
Section: 2
Presentation Number: 617
Mentor(s): Steven Fraiberg

Ever since its founding in 2017, the video-sharing app TikTok has served as a platform for queer youth to find and form community. LGBTQ+ members of Generation Z in particular have injected uniquely queer concerns and conversations into the mainstream discourse. However, the impact of queer youth on TikTok is not yet contextualized. In this ethnographic study, I describe how I explore this redefining of the queer identity via social media. I will emphasize the importance of TikTok's unique algorithm and its role in the creation of queer subcommunities. Through a combination of semi-structured interviews and observation, I analyze TikTok's influence on queer fashion, slang, and interpersonal relationships.

THE CULTURE OF HYPER-PARTISANSHIP AMONG YOUNG VOTERS AND WITHIN SOCIAL MEDIA

Carly Filion

Social Science: General, Oral Presentation
Section: 2
Presentation Number: 618
Mentor(s): Steven Fraiberg

The COVID-19 pandemic has highlighted the vast extent of hyper-partisanship in the United States. Democrats and Republicans have come together during crises in the past, but the pandemic has seemed to push the parties and people in general further apart. Social media platforms have also become a major mode of political discourse, amplifying the divide even further. This study investigates the culture of this divide, focusing specifically on the college-aged group and social media's impact on the political climate. TikTok is one platform that has gained significant traction among younger generations. As such, TikTok served as a data source to analyze how Democrats and Republicans represent themselves and how they interact with each other. To do this, I examine political statements in TikTok videos and political conversations within comment sections of the videos. I triangulate this TikTok-based data by also incorporating data from interviews and surveys. In particular, I conduct semi-structured interviews with Democratic and Republican MSU students. This process provides thorough explanations surrounding the culture of hyper-partisanship. Surveys focus on the extent to which participants agreed or disagreed with various political statements. This information serves as a quantitative measure of opinion that was helpful in comparing the parties. In this presentation, I will provide an in-depth look at the modern political climate among young people, especially those who use social media as a tool for political discourse. This information has implications to the future of hyper-partisanship and the very fabric of American society.

A SPATIAL ANALYSIS OF THE VULNERABILITY OF HISTORICAL SITES ACROSS THE GREAT LAKES TO HIGH WATER LEVEL.

Ryan Snider

Social Science: General, Oral Presentation
Section: 2
Presentation Number: 619
Mentor(s): Erin Bunting, Ethan Theuerkauf

Fluctuating water levels and associated flooding are common issues along coastlines around the world. Along large lacustrine systems, such as the Great Lakes, decadal fluctuations in

lake level can raise or lower water levels more than a meter. Currently, across almost all of the Great lakes we are witnessing such significant rise in the lake levels leading to increased erosion, and, in some areas, major landscape change and infrastructure loss. One thing that could be impacted greatly is the hundreds of historic sites, both big and small, that dot the coast. Using Google Earth Engine and QGIS, as well as elevation data, an analysis of historic sites within a half a mile of the upper Great Lakes coastline was developed in order to determine those most vulnerable to higher lake levels. Findings suggest that at the record water heights now being experienced, upwards of 60 historic sites being vulnerable to flooding, even without any waves or other disturbances. However, at up to around 2 meters above these high lake levels, a significant chunk of historic sites became vulnerable to flooding, even including some historic residential buildings in Chicago. More than 100 historic sites out of more than 700 are vulnerable to storm surges, potentially leading to the devastation of many local economies build on tourism to these sites.

NORMS AND RISK PERCEPTIONS OF VAPING ON MSU'S CAMPUS

Shweta Adsul
Social Science: General, Oral Presentation
Section: 2
Presentation Number: 620
Mentor(s): Cara Ludlow, Dennis Martell, John Waller

The Centers for Disease Control 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. This study is designed to learn about the use of e-cigarette on MSU campus: its scale, the contexts in which people vape, and the level of knowledge about the potential risks entailed. The two fundamental questions addressed by the study relate to the degree to which perceived 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 will be added to the university's forthcoming Health Promotion survey. The purpose of this study to evaluate whether misperceived peer norms and erroneous risk perceptions of e-cigarettes make students more susceptible to smoking e-cigarettes. Data to address these questions will be collected via a survey which will be made accessible to all MSU undergraduate students in February 2021. The questions will be part of a larger survey on COVID-19, conducted by the MSU's Health Promotion Department.

COMPARING SEXUAL MISCONDUCT PREVENTION METHODS ACROSS AAU SCHOOLS: A FOLLOW-UP STUDY

Emily Saxon
Social Science: General, Oral Presentation
Section: 3
Presentation Number: 624
Mentor(s): John Waller

This study is a follow-up to one conducted in 2018, in which nine colleges in the American Association of Universities were interviewed about their institution's sexual misconduct prevention methods. The interviews utilized a questionnaire that sought to determine if schools were following the recommended best practices for sexual misconduct prevention on college campuses. In 2018, it was found that all of the nine universities were meeting the most basic federal requirements for sexual misconduct prevention programming, but many were not going any further to provide prevention education that aligned with best practices. It was found that schools were failing to do more to reduce sexual misconduct on their campuses because of inhibitory factors such as small budgets and low numbers of staff

working on prevention-focused material. This study revisits the best practices for prevention and utilizes an updated questionnaire to understand how the same universities' sexual misconduct prevention methods may or may not have changed since 2018. The questionnaire also enquires about factors not originally examined during 2018 in order to gather more information on whether best practices are being implemented. The study then concludes with a discussion of how schools can continue improving the strength of their prevention programming.

DISPARITIES IN SEXUAL AND REPRODUCTIVE HEALTH CARE FOR WOMEN WITH DISABILITIES IN THE UNITED STATES

Alison Shereda
Social Science: General, Oral Presentation
Section: 3
Presentation Number: 625
Mentor(s): Rebecca Irvine

The sexual and reproductive rights of women with disabilities in the United States are neglected because of a lack of recognition of their rights and bodily autonomy. Twenty-eight million women in the U.S. have some form of disability and are more likely to experience various forms of violence and abuse due to a lack of accommodations for health services, barriers to access justice, and a lack of funding allocated to addressing these issues. The U.S. has arguably failed to institute substantial protections to ensure women with disabilities have access to adequate sexual and reproductive services, in part due to negative stereotypes and stigmatization. Women with disabilities in the U.S. have encountered unjust treatment and violence regarding sexual and reproductive health, in part because of 'double discrimination,' i.e. discrimination based on gender and disability. This marginalization is present in many realms of our society, including the medical field. Physicians across the United States harbor negative attitudes towards women with disabilities, which inhibits their access to screening and preventative services, contraceptives, reproductive and pregnancy care, as well as their ability to communicate with health care professionals and grant informed consent regarding medical treatment. This paper seeks to reveal that reproductive violence against women with disabilities, combined with damaging stigmas reinforced by medical practitioners, contributes to a plethora of obstacles that hinder their ability to exercise their sexual and reproductive rights and obtain necessary health services.

SHORELINE ANALYSIS OF CHIKAMING TOWNSHIP

Augie Evered
Social Science: General, Oral Presentation
Section: 3
Presentation Number: 626
Mentor(s): Erin Bunting, Ethan Theuerkauf

Shoreline erosion is a pressing issue for coastal communities nationwide. In order to better allocate resources to address these changing shorelines, an analysis of community resources and risk of erosion must be determined to better allocate funding. In order to conduct this analysis, Chikaming Township in Michigan was used a test site for measuring shoreline changes from historic aerial imagery which have been georeferenced to the most recent imagery available from the State of Michigan GIS Open Data. The georeferenced imagery can then be entered into the Digital Shoreline Analysis System in order to measure the changes in the shoreline from one timepoint of images to another. The county can then be categorized by how much erosion is occurring annually and the socioeconomic status of the region as determined by median annual income. This method then allows for comparison by utilizing the Google Earth Engine for shoreline analysis and creates a unique scale for analysis when compared to the larger statewide or multistate analysis of the Great Lakes Coasts while

confirming erosion rates with the available Michigan Department of Environmental Quality data on shoreline erosion.

THE IMPACT OF CUSTOMER DELIGHT ON HOSPITALITY BUSINESS' SUSTAINABILITY

Christina Heydenburg, Vinh Le
Social Science: General, Oral Presentation
Section: 3
Presentation Number: 627
Mentor(s): Bonnie Knutson, Mi Ran Kim

Due to COVID-19, more than 80% of hotel rooms are vacant, and some restaurants are closing indefinitely. Now, more than ever, the hospitality industry needs to focus on its main factor in the business: customers. Customers nowadays are looking for extraordinary services in which their experience will become part of a memory, not just satisfaction. We call this "Customer Delight". The primary goal of this research is to provide a better understanding of the concept of "customer delight" within the context of the hospitality industry. Research of previously published studies relates delight to a guest's emotions rather than logical thinking and comparison. Because of this connection to the heart, delight causes higher loyalty and more motivation to share positive opinions of the company. This study focuses on customer delight and is composed of two primary purposes: (1) To identify how customer service factorsimpact customer delight, and (2) To examine how customer delight affects customer loyalty. This research focuses on six customer service factors: health/safety, innovativeness, employee delight, uniqueness, fun/enjoyment, and complimentary/upgrade. The data has been collected via an online survey from hotel guests in the U.S. since Fall 2020 and will be completed in Spring 2021. So far, about 220 data were collected. The data will then be analyzed using structural equation modeling to test the relationships among customer service factors, customer delight, and loyalty. Findings from this study will provide theoretical contribution on the concept of customer delight and its antecedents for future studies, and insights for the industry to increase the guest delight and provide memorable experiences to guests.

VACANCY AND CRIME IN DETROIT: UNDERSTANDING SPECIFIC ASPECTS OF VACANCY WHICH MAY PROMOTE CRIME

CJ Sivak
Social Science: General, Oral Presentation
Section: 3
Presentation Number: 628
Mentor(s): Amber Pearson, Elizabeth Shewark

The relationship between neighborhood vacancy and crime is well-established in the urban planning and policy literature. However, not all vacant properties may attract crime to the same degree. Thus, understanding the specific aspects of vacant properties associated with crime would benefit urban planners, policy makers, and public space managers in determining what strategies are most effective in deterring or preventing crimes in areas with high levels of vacancy. Specific aspects of vacancy that may affect crime levels include vacant lot type (i.e., residential, commercial), maintenance level (i.e., mowed), or the presence of litter. In this study, we evaluate the relationship between aspects of vacancy on street segments, including ratio of vacant to non-vacant properties by lot type, maintenance of properties, presence of litter across 355 street segments (assessed via Google Street View) and locations of recorded crimes in Detroit, MI (2019). Through these analyses, we aim to better understand the specific aspects of vacancy that promote or hinder crime in a post-industrial city.

ASSESSMENT OF SOCIOCULTURAL AND INSTITUTIONAL FACTORS THAT INFLUENCE THE ADOPTION OF FAMILY PLANNING METHODS IN BURUNDI

Don Iradukunda

Social Science: General, Poster Presentation
Section: 4
Presentation Number: 630
Mentor(s): Felix Yeboah

High fertility rates remain a key threat to sustainable economic development in most African countries, and particularly in countries with fragile and young political institutions like Burundi. As part of the efforts to address this demographical social challenge, multiple programs have been initiated at the national level, and the most popular one is the use of family planning methods. Although this program has been existing for more than 15 years, the population growth rate remains high, estimated at 3.4% in 2018. Using data from in-depth qualitative interviews and a household survey, this study examines the socio-cultural and institutional factors influencing the adoption of contraceptive methods among females in Rumonge and Bururi Provinces, Burundi. Specifically, it explores some of the use-rates, perceptions, preferences, and religious beliefs on various family planning methods and offers useful insights for designing effective, culturally-relevant health promotion campaigns. Results revealed that respondents generally lack knowledge on the array of contraceptive methods available to them, the side effects of these methods, and the risk associated with unprotected sex. Perceived cultural and religious norms around intimacy between couples, lack of female control over their fertility decisions, and misperceptions of the negative impacts of contraceptives significantly influenced female's choice and/or the lack thereof of family planning methods.

2020 PROTESTS: HOW MEDIA BIAS AFFECTS COVERAGE AND SHAPES PUBLIC OPINION

Carly Sandstrom, Caroline Zackerman, Madeline Mitchell, Megan Smejkal, Sydney Hufnagel

Social Science: General, Poster Presentation
Section: 4
Presentation Number: 631
Mentor(s): Rachel Reis Mourao

In 2020, a series of protests erupted and gained national media attention. The beginning of state-wide lockdowns to contain the COVID-19 pandemic gave way to a wave of anti-mask or anti-lockdown protests, and the killing of George Floyd by police officers led to the resurgence of the Black Lives Matter movement. We hypothesize that the variability between how liberally aligned protests, such as the Black Lives Matter and Hong Kong movements, and conservatively aligned protests, such as anti-lockdown and anti-immigration, are presented in news media skews public favor against liberal protests. Additionally, news outlets tend to endorse movements that align with their respective political leaning. In our analysis, the stories are categorized by if and how protestors' demands and actions are portrayed-positively or negatively and peacefully or violently, whether the protest is considered a confrontation between activists and law enforcement, and if the protest is covered in a legitimizing or delegitimizing fashion. Based on a preliminary review of our content analysis, we are able to see that the political leaning of a news outlet has a significant effect on the ways it covers different protests; namely, how legitimizing an outlet is towards a protest varies greatly depending on the political leaning of the movement being covered. These findings are significant in helping consumers understand and address potential biases present in the news media that they consume.

BEYOND NATURAL TALENT: THE MAKINGS OF SUCCESS IN FILM DIRECTORS

Sunawer Aujla

Social Science: General, Poster Presentation
Section: 4
Presentation Number: 632
Mentor(s): Sean Pager

The origins of individual differences in achievement in creative industries is a long-contested issue in the field of social science. The ‘nature’ view defends these achievements as being the result of one's innate ability to be creative, whereas the ‘nurture’ view counters with the claim that creative talent alone cannot produce such achievements without honing one's craft through personal factors and experiences. This nature versus nurture debate as it applies to the talent in the film industry comprises the core of this study. The project represents exploratory research, augmenting an existing body of literature that suggests artistic talent is not evenly distributed across society, and that even innately talented artists do not reach the peak of their careers without years of experience. The study draws on contemporary data, containing rich biographical details so as to enhance the accuracy and applicability of results. The metrics of directorial success and achievement used in this study to demonstrate the trajectory to peak creativity include retrospective rankings, contemporary awards such as the Oscars and Directors Guild of America awards, and market consumption measures reflecting relative commercial success. These measures of achievement will be understood as a function of individual productive experiences such as formal education, training, and early exposure to creativity and other roles in the industry. The results of this research have potential to inform copyright laws and regulations as it supports commercial content economies within which full-time creative professionals can refine and perfect their craft over time. Preliminary results will be presented.

QUALITATIVE ANALYSIS OF YOUTH EXPERIENCES UTILIZING MENTAL HEALTH LITERACY WEB RESOURCES FOR YOUNG PEOPLE WITH A PARENT OR FAMILY MEMBER WITH MENTAL ILLNESS

Carson Biederman, Erin Kramer

Social Science: General, Poster Presentation
Section: 4
Presentation Number: 633
Mentor(s): Jenny Tanis, Joanne Riebschleger

The "Mental Health Info for Teens" (MHIT) website was designed by MSU faculty and students in collaboration with community youth as a mental health literacy (MHL) resource for young people with a parent or a family member with a mental health diagnosis. Increased levels of MHL may promote resilience in young people facing increased levels of risk. This is a qualitative study guided by the following research question: How do youth interpret and react to the Mental Health Info for Teens website? This project utilized methods from dyadic thematic analysis to assess how youth (n=13) described their experiences using MHL content. Semi-structured interviews were used to capture student perceptions of how they felt about mental health and the information presented on the MHIT website. Following data collection, the data was coded and themed into primary and secondary themes. Early emerging themes will center around website strengths, areas of improvement, etc. Findings will be available at the time of the presentation. Possible limitations were participant diversity and inclusion of perspectives from multiple different backgrounds and environmental upbringings. Strengths of the study were the trained interviewers and the inclusion of youth perspective which added to investigators' abilities to effectively assess the website's MHL education effectiveness. Intercoder reliability was calculated to attempt to increase the trustworthiness of the data. Further research could be conducted that interviews others who have used MHL

resources. This research may encourage MHL content developers to analyze the reactions of the populations they are wanting to serve.

THE EXPERIENCE OF STUDENTS OF COLOR WITHIN JAMES MADISON COLLEGE

Abby Frost
Social Science: General, Poster Presentation
Section: 4
Presentation Number: 634
Mentor(s): Steven Fraiberg

James Madison College is a residential public policy school within Michigan State University. The students and faculty share a common goal of addressing and examining the major political, legal, social, and economic issues affecting the world. For this reason, James Madison is frequently thought of as a model for diversity, equity, and inclusion. However, the reality may be more complex as there have been instances of racially charged events that have, in part, motivated this research. Ethnographically informed methods are used which includes interviews with students and administrators. In addition, I will be engaging in participant-observations and the collection of artifacts such as social media posts, news articles, the James Madison website, and policy statements. This presentation will work to explore the experiences of Students of Color within the residential college as well as the university more generally. The information gained from this study has implications to the future racial climate of James Madison College as well as the experience of People of Color within an academic context more broadly.

MEDIA BIAS ON LIBERALISTIC VIEWS

Jason Choi
Social Science: General, Poster Presentation
Section: 4
Presentation Number: 635
Mentor(s): Rachel Reis Mourao

From the start of the COVID-19 pandemic dated back to 2020, we have seen an even greater divide between the two major political parties. One thing that created the big divide was the fact that the liberal side favored lockdown procedures while the conservative sides favored anti-lockdown procedures to take place. What was interesting to look at though, was the media bias that played into the news articles. We hypothesize that the political agenda between liberal ideology and conservative ideology are biased by the media outlet. The presented articles by the media are skewed in favoring liberalism views and ideology, and there was a lot of negative feedback for the conservative sides. The protests based on liberal ideology (lockdown measures) and conservative ideology (Anti-lockdown) are shown in a way that favors the liberalistic side. Additionally, news outlets will side with movements that correlate with their respective political leaning. Media coverage has been portrayed to view the conservative side as negative, while the liberal side has been favored more positively. The major news articles all seem to support lockdown measures and stay at home orders, and a very few, if not at all, of them touch base on the positives of reopening the state and anti-lockdown measurements. Based on a preliminary review of our content analysis, we expect that the political standings and views from the news outlets will have significant bias and impact the way they cover lockdown and stay-at home orders.

THE SOCIOCULTURAL EFFECTS OF IMMIGRATION ON HAITIAN IMMIGRANTS WITH HIV/AIDS IN THE DOMINICAN REPUBLIC

Stephanie Garcia

Social Science: General, Poster Presentation
Section: 4
Presentation Number: 636
Mentor(s): Pilar Horner

To analyze the social and cultural implications of immigration on Haitian immigrants with HIV/AIDS in the Dominican Republic, fifty-four qualitative interviews were conducted, recorded, and transcribed in Spanish. Using Grounded Theory, a thematic analysis was conducted that found immigrants suffered legal, social, and cultural impediments due to their medical and immigratory binary experience. Legally, governmental complexities of the immigration system make procuring documentation difficult, limiting immigrants' systemic opportunities (i.e. work, healthcare) and perpetuating a criminalization of the undocumented. Societally, immigrants then face the collective bigotry that comes along with both their HIV/AIDS diagnosis and illegal status, forcing them to a life of seclusion and reservation. Such a sociopolitical ambience ultimately complicates the lives of an already vulnerable population and leaves behind physiological consequences to endure. Suggestions for humane approaches to migrants with HIV/AIDS diagnosis is presented with recommendations for future research.

"NEURODIVERSITY" AND LANGUAGE CHANGE: EXAMINING MENTAL HEALTH AND DISORDER TERM USAGES ON THE SOCIAL MEDIA PLATFORM TWITTER

Gee Armstrong, Mike Paterala, Sam Miller

Social Science: General, Poster Presentation
Section: 4
Presentation Number: 637
Mentor(s): Laura Dilley

Terms and concepts regarding mental health, illness, and disorder are socially situated and constructed; such terms must therefore be understood with respect to processes of language change in historical context. 'Neurodiversity' is a relatively new term that refers to variation in the human brain regarding sociability, learning, attention, mood and other mental functions. The term 'neurodiversity' is associated with the rise of the autism self-advocacy movement since the 1990s and implies a challenge to prevailing views that certain neurodevelopmental differences and/or disorders are inherently pathological. The present project examined the usage of terms for neurodevelopmental conditions and disorders—including depression, ADHD, OCD, and schizophrenia—on the social media platform Twitter. In addition to considering the contexts and usage of these terms, we examined the frequency with which the term 'neurodiversity' was used to describe these conditions compared to another disorder category, autism. Pilot data suggest that the concept of neurodiversity has been extended to use to describe mental health and disorder terms in contexts broader than autism. The results are interpreted with respect to mental health, difference, and disorder concepts as part of language change within dynamic social environments.

SOCIOLOGY

EVALUATING THE IMPACT OF COVID-19 ON GREATER LANSING'S CAPACITY TO SUPPORT SURVIVORS OF DOMESTIC VIOLENCE AND SEXUAL ASSAULT

Emma Way, Madison Delacy
Sociology, Oral Presentation
Section: 1
Presentation Number: 639
Mentor(s): Louise Jezierski

Experts in gender-based violence have predicted that the COVID-19 pandemic may exacerbate the conditions in which domestic violence and sexual assault take place. The pandemic, and subsequent social distancing measures, place new and unique barriers to accessing and providing support services. In response, the pandemic has forced many organizations to reconsider how they can best support survivors amid these challenging circumstances. This project analyzes how organizations within the Greater Lansing area have adapted to continue providing their services. Primarily relying on ten interviews with community leaders, this project examines the experiences of Greater Lansing's healthcare, legal, and advocacy organizations from March to November of 2020. We hypothesized that COVID-19 had strained Greater Lansing's ability to support survivors of domestic violence and sexual assault; however, we found that many organizations displayed a high level of adaptive capacity in the first nine months of the COVID-19 pandemic in mitigating the challenges to providing their services.

FEMALE INDIAN FOOD BLOGGERS: AN IN-DEPTH ANALYSIS OF THE INTERNET'S CULTURAL STARS

Aditi Kulkarni
Sociology, Oral Presentation
Section: 1
Presentation Number: 640
Mentor(s): Steven Fraiberg

India has been modernizing at an incredible pace for years, but traditional gender roles continue to disrupt India's female society. Despite restricted social mobility and economic disadvantages, female Indians have begun to gain control in this patriarchal society through food blogs. Many of these women have thousands of followers, one having 76.8 thousand followers on Instagram as of early February. My research aims to investigate how these women grew into the bloggers they are today and how their narratives are shifting Indian gender roles. The research looks for patterns amidst their stories using ethnographically informed methods such as semi-structured and elicited interviews. I also triangulated my data by comparing various online artifacts to analyze themes and patterns within the stories. Broadly, the goal of this research is to suggest something new about Indian culture as a whole. What does this research say about the Indian community? Female Indian food bloggers have revolutionized the food blogging world, and my research will share their stories.

INVISIBLE OBSTACLES AND HIDDEN CURRICULUMS: BEHIND RACIAL DISPARITIES IN TIMES TO DOCTORAL DEGREE COMPLETION IN SOCIOLOGY

Jenny Olivarez

Sociology, Oral Presentation
Section: 1
Presentation Number: 641
Mentor(s): Sandra Marquart-Pyatt

Calls for an authentic implementation of 'diversity, inclusion, and equity' have spurred action from academic institutions across the nation. Yet in the midst of forming new committees and training protocols, the ongoing experiences of Black, Indigenous and people of color (BIPOC) in higher education serve as a reminder that new initiatives alone are not enough to ensure an inclusive and equitable environment for BIPOC students to pursue self-actualization and academic excellence. While enrollment in higher education programs are increasing among historically-excluded racial and ethnic groups, these groups are still not accommodated in the context of university life. Even after being admitted into degree programs, Black and Latinx students are still more likely than their white peers to leave before graduating. This finding directly contradicts the reputation of universities as being welcoming and inclusive spaces that, above all, protect students' access to learning and opportunities for personal and professional growth. To better understand these disparities, we are investigating the times to degree completion and rates of attrition experienced by BIPOC students in sociology degree programs in the Big Ten Academic Alliance. Sociology degree programs are of special interest given the discipline's focus on the systems, structures, and processes that uphold social injustices; sociology doctoral programs are of interest because there is strong anecdotal evidence that BIPOC graduate students must continue to fight for acceptance and access to information and opportunities even after program admittance.

SEXUAL VIOLENCE AT AMERICAN UNIVERSITIES: AN EXAMINATION OF THE PERPETUATION OF RAPE CULTURE AT THE INSTITUTIONAL LEVEL

Kameryn Hamilton, Simone Coverly

Sociology, Oral Presentation
Section: 1
Presentation Number: 642
Mentor(s): Sarah Prior

Rape culture is a pervasive facet of American culture that is exemplified through institutional handling of sexual assault. Utilizing a content analysis of asynchronous, unsolicited data from public domain sources, our research examines specific instances of sexual violence on college campuses, focusing on the subsequent response from the university. These include, but are not limited to, sexual assault cases at Michigan State University, Baylor University, Columbia University, Stanford University, and Vanderbilt University. We use Carole Sheffield's conception of sexual terrorism as the guiding lens throughout the research. Sheffield outlines five specific components of sexual terrorism: ideology, propaganda, voluntary compliance, perception of perpetrator, and amorality. When analyzing each case with the guidance of these five components, the prominence of these components becomes readily apparent throughout institutional handling of sexual assault and within rape culture at large. Examples include the treatment of survivor and perpetrator, victim blaming, and the 'bad apple' perception of perpetrators. Understanding rape culture and sexual violence through an institutional lens provides key insight into why sexual assault continues to be so prevalent, despite fervent activism that continues to shed light on this violence.

RACIAL DISCRIMINATION IN THE UNITED STATES

Justice Fowler
Sociology, Oral Presentation
Section: 1
Presentation Number: 643
Mentor(s): Clifford Broman

There is much evidence from the social sciences that people of color in the United States continue to face systematic and individual discrimination due to race in a range of areas, including healthcare experiences, employment opportunities, access to housing, access to education and college, and treatment by police. The harms of this have been well documented over the years. Recently, systemic discrimination has become a focus of discussion throughout the United States and around the world. But who experiences discrimination most broadly and at what level? The objective of this study is to analyze how racial classification affects perceived discrimination on the basis of race in the United States. We will study this using National sample data. This study will also examine and attempt to describe how perceptions of discrimination vary across the different domains of life experience, such as in employment opportunities, access to housing, access to education and college, and treatment by police.

THE INFLUENCE OF CLIMATE CHANGE POLICY APPROACH ON AMERICANS' CLIMATE CHANGE VIEWS: A MESSAGING EXPERIMENT

Carrie Nielsen
Sociology, Oral Presentation
Section: 1
Presentation Number: 644
Mentor(s): Aaron McCright

Despite the strong scientific consensus on the reality and seriousness of anthropogenic climate change, a sizable minority of self-identified conservatives in the US public report disbelief in climate change and even more report opposition to government action on climate change. Much research suggests that these beliefs are driven by conservatives' ideological opposition to the most likely governmental response—economic regulations. We designed and conducted a three-condition, between-subjects experiment to examine whether the climate change views of Americans (especially self-identified conservatives) vary by proposed action to deal with climate change. We randomly assigned 506 adults—293 self-identified liberals (57.9%) and 213 self-identified conservatives (42.1%)—to one of three conditions where they watched a brief video on one proposed response to climate change endorsed by the same conservative messenger. The three videos described three responses (mitigation, adaptation, and geoengineering) as requiring a large, modest, or minimal amount of new governmental regulations and lifestyle changes, respectively. We found no statistically significant difference in climate change disbelief or support for climate change action across the experimental conditions. Yet, compared to the mitigation condition, viewing the geoengineering video increased trust in and shared values with the messenger—but only among conservatives. This suggests that conservative messengers may endorse certain responses to climate change without necessarily losing the support of their like-minded audiences. We also found that free-market fundamentalism and trust in scientists involved in industrial production were associated with higher climate change disbelief and lesser support for climate action.

TOXICOLOGY & PHARMACOLOGY

GNAO1 MUTANT MICE DISPLAY CEREBELLAR DEFECTS WHICH MAY EXPLAIN MOVEMENT DISORDERS AND EPILEPSY

Alex Roy

Toxicology and Pharmacology, Oral Presentation
Section: 1
Presentation Number: 646
Mentor(s): Erika Lisabeth, Jeffrey Leipprandt, Michael Williams, Richard Neubig

Mutations in the gene GNAO1 have been associated with ultra-rare (ca. 200 patients) neurologic abnormalities including movement disorders, epilepsy, and developmental delay. Patients with these mutations often display symptoms at birth or in early childhood. GNAO1 codes for the alpha subunit ($G\alpha_o$) of the G-protein G_o, which is the most abundant membrane protein in the central nervous system. Our lab developed a Gnao1+/- mouse line to mimic symptoms seen in patients with loss of function (LOF) mutations in GNAO1. We observed that these mutant mice had reduced inhibitory signaling in the cerebellum, which is important for movement coordination. My project will determine if there are structural changes in cerebellar neuron architecture to account for the altered inhibitory signaling, providing insights into the mechanism of LOF GNAO1 disorders and potential therapeutic opportunities. I will characterize the number of inhibitory neurons in the cerebellar molecular layer and the structure of their synapses on Purkinje cells. Preliminary studies suggest that although there are similar numbers of inhibitory interneurons in mutants, there are reductions in the size of inhibitory synapses from molecular layer neurons onto Purkinje cells. Future studies will confirm and extend these results to include other markers of cerebellar development. In my presentation, I will provide an introduction to the GNAO1 gene and its expression product G $G\alpha_o$, describe what we have observed in our mouse models, and present my project, including both pilot study results and ongoing research.

REPEATED INHALATION OF LIPOPOLYSACCHARIDE TRIGGERS PULMONARY ECTOPIC LYMPHOID STRUCTURE FORMATION AND DIVERSE SYSTEMIC AUTOANTIBODY EXPRESSION IN LUPUS-PRONE MICE

Ashleigh Tindle, Jenan Shareef

Toxicology and Pharmacology, Oral Presentation
Section: 1
Presentation Number: 647
Mentor(s): Jack Harkema, James Pestka, Lauren Heine, Madduma Hettige Lichchavi Rajasinghe

Systemic lupus erythematosus (lupus) is a debilitating, multisystem, autoimmune disease with recurrent flares that are often triggered by exposure to environmental agents. Lipopolysaccharide (LPS), also known as endotoxin, is a pro-inflammatory agent found in the outer wall of gram-negative bacteria and when inhaled incites pulmonary inflammation triggering autoimmunity and lupus flaring. Here we tested the hypothesis that repeated intranasal instillations of LPS induces pulmonary ectopic lymphoid structures formation and subsequent systemic autoantibody production. Female NZBWF1 mice, at 8 weeks (wks) of age, were fed AIN93A diet for 2 wks and then intranasally instilled with LPS (0.8 μg/g body weight) or saline vehicle alone twice per wk for 5 consecutive weeks, starting at 8 wks of age. Mice were sacrificed 1 wk after the last LPS intranasal instillation. Bronchoalveolar lavage fluid (BALF) and blood was collected and subjected to microarray analysis of 121 autoantibodies. Lungs were formalin fixed and processed for light microscopic examination, immunohistochemistry, and morphometry. Repeated airway LPS exposure triggered subacute bronchopneumonia, with perivascular and peribronchiolar formation of ELS composed of CD3+T and CD45R+B lymphoid cells, as well as numerous IgG+ plasma cells compared to

control mice. BALF and plasma from LPS-treated mice contained significantly elevated levels of systemic IgG autoantibodies including complement C1q, La/SSb, and Ro/SSA which are key biomarkers for human lupus. These results suggest that lupus-prone mice repeatedly exposed to inhaled LPS trigger lung pathology and autoimmunity through the production of systemic autoantibodies likely originating from pulmonary ectopic lymphoid structures.

LOSS OF ALPHA-SYNUCLEIN DISRUPTS COLONIC MOTILITY

Evan Ziehl
Toxicology and Pharmacology, Oral Presentation
Section: 1
Presentation Number: 648
Mentor(s): Krishna Yelleswarapu

Alpha-synuclein (α -syn), a presynaptic terminal protein, has been shown to play an important role in neurotransmission. In Parkinson's disease, an overexpression of α-syn causes aggregation of the protein into neurotoxic lewy bodies that result in cell death of dopaminergic neurons. Patients with Parkinson's disease also have several gastrointestinal symptoms, one of which is constipation. Because α-syn is also found within the nervous system of the gut, the enteric nervous system (ENS), we looked into elucidating its role in neurotransmission within the ENS of the mouse colon by comparing colonic motility in wild-type (WT) and α-syn knock-out (KO) mice. We hypothesize that the loss of α-syn disrupts colonic function. We studied colonic function and motility using fecal pellet output, isometric tension isolated organ bath, and colonic migrating motor complexes (CMMCs). The α-syn KO mice had increased fecal pellet output, decreased CMMC propagation speeds, and decreased proximal colon longitudinal muscle contractions compared to WT mice. Loss of α-syn in the ENS resulted in altered neurotransmission and caused impairments in defecation. We conclude that α-syn is an essential protein for normal neuronal function within the ENS.

DIFFERENCES IN PFAS SERUM CONCENTRATIONS ACROSS JOB OCCUPATION AND INDUSTRY IN THE NHANES

Prakhyat Rohatgi
Toxicology and Pharmacology, Oral Presentation
Section: 1
Presentation Number: 649
Mentor(s): Anthony Oliveri, Ling Wang

Per- and polyfluoroalkyl substances (PFAS), including perfluorooctanoate (PFOA) and perfluorooctanesuflonic acid (PFOS), have numerous industrial applications and are commonly detected in blood, suggesting widespread exposure. However, occupational exposures have only been characterized for a select few jobs. Here, we use data from the National Health and Nutrition Examination Survey (NHANES) to examine trends in serum concentrations of PFAS across occupation and industry. Measurements of PFOS and PFOA in serum from the 2003-2012 NHANES surveys were assessed across industry and occupation groupings for participant's current and longest jobs using multivariate linear regression while controlling for covariates. Mean PFOA serum concentrations were predicted to be 24-32% lower than the overall population mean for those whose current or longest jobs were in the agriculture industry or whose current job was an agricultural occupation. PFOA was conversely 18% higher in those whose current job was in the transportation, warehousing, and utilities industry group, and 11% higher in those whose current job was in the professional occupational group. PFOS serum levels were also higher than the overall mean for those with a current job either in the transportation industry group (20% higher) or the professional occupation group (17%). The higher estimated serum levels for these occupations and industries may be driven by and indicative of specific jobs with particularly high exposures within these broad groupings. These results are therefore a starting point for future targeted

assessments within certain jobs and working environments to better identify and more fully characterize occupational PFAS exposures.

EXPLORING OXYTOCIN AND MELATONIN RECEPTORS AS POTENTIAL DRUG TARGETS TO HALT PRETERM LABOR

Aneesh Cherukuri
Toxicology and Pharmacology, Oral Presentation
Section: 1
Presentation Number: 650
Mentor(s): Hanne Hoffmann

Nearly one in every ten babies are born prematurely, which amounts to nearly fifteen million babies a year worldwide. Of those fifteen million babies, about one million die before they are able to reach the age of five. Often, these babies will have to deal with a variety of issues which include but are not limited to: cerebral palsy, mental retardation, and many other sensory impairments. Sadly, no current treatments efficiently halt preterm labor. Our goal is to identify G-protein coupled receptor (GPCR) signaling complexes which efficiently reduce uterine contractions. Oxytocin activation of its GPCR, OXTR, strongly promotes uterine contractions, and cervical dilation during labor. Although a reduction in oxytocin slows uterine contractions, OXTR antagonists are inefficient in halting premature uterine contractions, and do not prevent preterm labor. On the other hand, uterine contractions are transiently suppressed through light-induced reduction in melatonin. Melatonin is a hormone exclusively released at night, which promotes oxytocin-induced uterine contractions. Melatonin induces uterine contractions through activation of its GPCR, MTR. Using mouse uterine tissue and human derived cell lines from the myometrium (PHM1-41 cells) and the kidney (HEK293 cells) we asked how MTR and OXTR signaling would be impacted by the time of day (chronopharmacology), and what signaling cascade the receptors would regulate as a signaling unit. We first evaluated contractions in pregnant mouse uterine strips and found that baseline uterine contractions of the pregnant uterus changes depending on time of day. To determine if these daily changes in uterine contractions were associated with changed sensitivity of the uterus to oxytocin, we tested the efficacy of oxytocin to induce PHM1-41 cell contraction over a 24h time period. We found that oxytocin doubles its contractile capacity at time point 13-16h as compared to time point 0-10h. This daily change in uterine sensitivity potentially arises at the

VISUAL & PERFORMING ARTS

FORMATIVE MUSIC EXPERIENCES: THE DIFFERENTIAL EFFECT OF EVALUATIVE PRAISE AND ENCOURAGEMENT ON SUSTAINED PARTICIPATION IN MUSIC

Dante Billeci
Visual and Performing Arts, Showcase Presentation
Section: 1
Presentation Number: 654
Mentor(s): Joanna Bosse

The literature in educational psychology suggests that positive feedback and reinforcement can influence learning, motivation, and self-efficacy. This paper, based on survey and interview data with college-age students about formative arts experiences, will argue that the type of positive feedback employed by teachers, studio instructors, parents, and role models plays an important role in whether or not a student sustains their engagement with music and the arts beyond high school. More specifically, this pilot study distinguishes several types of positive feedback, including "evaluative praise" and general "encouragement"—terms based on the work of the psychologist Carol Dweck—and suggests higher encounters of "evaluative

praise" during an individual's formative arts experiences lead to lower rates of participation in the arts, extrinsic motivation, and experiences of anxiety while participating; while higher encounters of "encouragement" lead to higher rates of participation in the arts, intrinsic motivation, and experiences of comfort and enthusiasm while participating. In sum, this paper contributes to conversations within the field of arts education and educational psychology to promote sustained participation and enjoyment within the arts through the way that feedback is communicated to developing students.

THE UMBRELLA ACADEMY: A MUSIC STUDY

Mikayla Warner
Visual and Performing Arts, Showcase Presentation
Section: 1
Presentation Number: 655
Mentor(s): Cara Stroud

“The Umbrella Academy: A Music Study” is a presentation that delves into the different musical components of the Netflix show The Umbrella Academy. It discusses different aspects such as diegetic versus non-diegetic music, the importance of music in a character's development, and the use of a leitmotif throughout the expansion of a romantic relationship. This presentation looks at how each of these musical concepts affects the viewer's perception of the events and the order that they occur in the show. In order to showcase these aspects of the music in The Umbrella Academy, I observed and catalogued the music of each episode in the first season. First, I explore how the music in the show is presented in unconventional ways, resulting in blended music that is both diegetic (music heard by the characters) and non-diegetic (music heard only by the audience). Next, I investigate how the increasing use of music in the scenes with the character Vanya is used to convey her growth throughout the season. Finally, I examine how The Umbrella Academy draws upon the established tradition in film, TV, and opera genres by using a leitmotif (repeated musical theme) to comment on the development of a romantic relationship between the characters Luther and Allison. Audience members will leave with a greater understanding of the impact and utility of music in a contemporary TV show.

PHOTOGRAPH 51: THE INTERMINGLING OF ARTISTRY AND TECHNOLOGY

Jordan House
Visual and Performing Arts, Showcase Presentation
Section: 1
Presentation Number: 656
Mentor(s): Kirk Domer

For Photograph 51, a play by Anna Ziegler, Jordan House served as the assistant scene designer to Professor Kirk Domer, Professor of Scene Design at Michigan State University's Department of Theatre. The show was part of the A.D. Players 2020-2021 Season and celebrated the often-overlooked role of X-ray crystallographer Rosalind Franklin in discovering the double-helix structure of DNA. Gaining valuable experience by collaborating with a professional team of designers and directors, this assistant design opportunity provided a real-world experience for a resident theatre company in Houston, Texas. The research revolved primarily around learning and implementing painting techniques to create the appearance of faux metals exposed to the natural oils in the skin. Incorporating Rosco Scenic Paints, various lettering techniques were explored to recreate the original notations of James Watson and Francis Crick, the scientists credited with discovering and constructing their famous two-strand, or double-helix model for which the scene design was based. While the final implementation of the scenery was not possible as the show was postponed due to the COVID-19 pandemic, professional-quality paint elevations and location/set dressing lists

were finalized for future performance execution and valuable pieces for a student design portfolio.

THE BIAS WITHIN INFOGRAPHICS: PANDEMIC NEWS COVERAGE AND NATIONAL MISINFORMATION

Archer Stuenkel
Visual and Performing Arts, Showcase Presentation
Section: 1
Presentation Number: 657
Mentor(s): Rebecca Cifaldi

Graphic Design influences the ways in which we receive and perceive information. In particular, data visualization has changed the way that information is disseminated, and we see that in the ever-increasing accessibility of digitized media. Historically, we can see these patterns emerging from William Playfair's introduction of the infographic and its capacity to alter the viewer's perspective of perceptibly objective data without their awareness, to Florence Nightingale's infographic-fueled reformation campaigns. This research follows the ways in which the national television networks, CNN and Fox News, both relay organizational bias within the infographics about the coronavirus pandemic through their different applications of formal design elements: color, scale, and hierarchy. Through examining these design elements, we can see how CNN and Fox News make their information accessible to their targeted political audiences while excluding others. The COVID 19 pandemic has revealed the extent and reach of misinformation. Therefore, it is imperative to examine the design elements of public health infographics, the source's veracity, and the pre-existing biases of the organization that delivers the data.

FINDING NARRATIVE SATISFACTION THROUGH INTERACTIVE PERFORMANCE

Mark Zummallen
Visual and Performing Arts, Showcase Presentation
Section: 1
Presentation Number: 659
Mentor(s): Alison Dobbins

The goal of the research is to determine the possibilities of increasing the connection between performer and performance through an improv or narrative story. The performance being studied is a long-form improv which incorporates technological and physical games to increase audience/actor cooperation. Through these two mediums, technology and improvisation, the audience is expected to be less frightened of direct interaction with the show and act more cooperatively with its actors. Qualitative measurements of audio and visual cues such as length and volume of laughter, facial expression, and body language will be taken attempting to measure the effective audience engagement. These parameters will be used to determine the level of cooperation and contribution of the audience at each performance. Surveys will also be used to gather individual and self-reflective data from attendees indicating the extent of each activity in achieving the desired effect. While this performance is still in developmental phases and has yet to be tested, trial and error has provided a clear direction for the growth of this research. This performance will articulate methods for creating a space in which the audience can be incorporated creatively and comfortably as they personally interact with each performer.

THEATRE REFERENCES IN POPULAR CULTURE

Maegan Jankowski

Visual and Performing Arts, Showcase Presentation
Section: 1
Presentation Number: 660
Mentor(s): Laura MacDonald

Theatre is more relevant in popular culture than you might think. While movie adaptions have lead to the popularization of certain performances, overall, theatre continues to be prevelant in our lives. My research will show how theatre show references commonly appear in television and film, and how they are typicallly usually used as a punchline or a joke. My research will specifically look at eight long-running theatre shows, and why these references are used as comedic relief.

I'M STILL HERE (FOR HOW LONG?): EXAMINING THE SUCCESS OF WOMEN-CREATED MUSICALS ON BROADWAY

Cami Hancock

Visual and Performing Arts, Showcase Presentation
Section: 1
Presentation Number: 661
Mentor(s): Laura MacDonald

Women make up more than 2/3 of theatre-going audiences, yet they only make up 17% of positions on Broadway creative teams. This can be chalked up to multiple factors: taste discrimination, statistical discrimination, and the commonly-held belief that women will prioritize their family life over their career, and thus be a detriment to a show in development. However, when women are given the chance to serve in creative positions on Broadway, their shows have a high chance of recouping its initial investments. Women deserve a place on creative teams not only because of the high chance of financial success, but also because of their ability to make great collaborators and to use their ability to tap into emotions to write authentic characters and stories that resonate with audiences.

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.


MICHIGAN STATE UNIVERSITY
SCIENCE FESTIVAL
APRIL 1-30, 2021
200+
VIRTUAL PRESENTATIONS
ALL EVENTS FREE
• Talks with global experts
• Experiment-along activities
• Demonstrations
• Virtual tours
• Citizen science activities
• And so much more!
Visit the virtual Expo Days on 3 Saturdays in April
April 3, 10, and 17 (register for free on the MSU Science Festival website)
1855
21
Sc
44.956
26
Fe
55.845
SCIENCEFESTIVAL.MSU.EDU

ARE YOU A FIRST, SECOND OR THIRD YEAR STUDENT?

Have your research poster displayed in the neighborhoods!

Steps:

1. Email your poster in PDF or PPT format with the poster dimensions of 40x32 and a headshot style photo of yourself to ugrsrch@msu.edu
2. Fill out a short poster survey at: https://bit.ly/3j88EuA

OFFICE OF UNDERGRADUATE RESEARCH AND CREATIVE ACTIVITY

URCA.MSU.EDU

MICHIGAN STATE
UNIVERSITY