UURAF

University Undergraduate Research and Arts Forum

Michigan State University | *April 8, 2016*

WELCOME

Welcome to the 18th annual University Undergraduate Research and Arts Forum at Michigan State University. Throughout the day, undergraduate students from diverse academic disciplines will present their outstanding research and creative endeavors. This forum is the largest in the event's history, with 875 students from 14 different colleges participating today. These students were mentored by more than 525 faculty members.

As one of the nation's leading research institutions, MSU offers a breadth of experiences and opportunities that actively engage students in their education. Through undergraduate research and creative activities, students work closely with leading scholars to gain in-depth knowledge about their fields of study and have opportunities to apply classroom learning to real life situations.

Many have contributed to make this growing event a success. We offer special thanks to the UURAF Team, Aliya Beavers and Candyce Hill, from the Associate Provost for Undergraduate Education's Office, for assisting with the coordination of this event and to the many staff members from across campus who volunteered their time. The cover art was designed by Autumn Hilden, who is pursuing a Bachelor of Fine Arts in Graphic Design. Autumn is a member of the AIGA Detroit MSU student group.

We acknowledge President Lou Anna K. Simon and Provost June Pierce Youatt's continued support of undergraduate education and research at MSU. UURAF received support, guidance, and planning from Associate Provost Douglas Estry; Dean Cynthia Jackson-Elmoore from the Honors College; several undergraduate associate and assistant deans; Dr. Korine Wawrzynski, Assistant Dean, Academic Initiatives, and Director, Undergraduate Research; and Elizabeth King, Assistant Director, Undergraduate Research. We thank the many dedicated mentors who guided the research projects and creative activities presented today, the faculty members serving as judges, and the graduate students providing feedback.

We encourage our student participants, research mentors, and other visitors to walk around the forum and learn about the impressive work of our next generation of scholars, performers, and researchers. Thank you for joining us.

MICHIGAN STATE UNIVERSITY | Undergraduate Research

AWARDS CEREMONY

Please join us at 4:00 PM for the awards presentation in Union Room 50 (located on the Basement Level) during which the prize winners in the various categories will be announced. We encourage all participants to stay for the awards ceremony and to invite their families, friends, mentors, and faculty members to attend.

To recognize exemplary scholarly achievements, monetary prizes will be awarded. One first-place award ($100) will be given in each section. Students working together in groups of four or less will each receive the award money independently. The maximum amount awarded for groups with five or more members will be $400, and the award money will be evenly distributed amongst the group members. Award money will be deposited directly into the student's MSU account.

First-place award recipients will be considered for the grand prize award, which will be announced in early summer. All first-place award recipients will be contacted to submit a brief paper on their UURAF program topic and an electronic version of their poster or oral presentation. The Editorial Board and staff members for the *Red Cedar Undergraduate Research Journal* (*ReCUR*) will review submissions. A total of two grand prizes ($500 each) will be awarded to one program from the science and engineering categories and one program from the humanities, social sciences, and communication arts and sciences categories.

MSU'S BECKMAN SCHOLARS PROGRAM

The Beckman Scholars program cultivates promising research scientists through quality mentoring, unique research experiences, and academic recognition. Beckman mentors and their research teams prepare the scholars for a modern research environment that requires teamwork and multidisciplinary expertise. Each candidate participates in innovative and exceptional training experiences that make them strong candidates for graduate and professional programs. Students' research is conducted in one of four areas: Molecular Metabolism and Disease (MMD), intestinal microbiome and its role in health and diseases (ERIN), evolution and big data sets (BEACON), and Neuroscience. Beckman Scholars are selected through a competitive application process in early February. Dr. Laura McCabe, Professor of Physiology, directs the program. **The Beckman Scholars Program is funded by the Arnold and Mabel Beckman Foundation.**

The current Beckman Scholars are Rebecca Benjamin, Kiera Fisher, Jacob Gibson, and Sarah MacLachlan.

2016 Featured Beckman Scholars

Sarah MacLachlan
RECRUITMENT BEHAVIOR IN SPOTTED HYENAS
Category: Integrative and Organismal Biology
Location: Mosaic Multipurpose Room, 11:15 AM-12:45 PM
Mentor(s): Kenna Lehmann, Tracy Montgomery, Kay Holecamp

Kiera Fisher
THE ROLE OF DIABETES-INDUCED CHANGES IN EXOSOMAL MIRNA IN THE PATHOGENESIS OF DIABETIC RETINOPATHY
Category: Biochemistry and Molecular Biology
Location: Mosaic Multipurpose Room, 1:30 PM – 3:00 PM
Mentor(s): Julia Busik

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SCHEDULE OF EVENTS

All events take place in the MSU Union

TIME	EVENT	LOCATION
ORAL PRESENTATIONS: 9:00 AM – 3:00 PM		
9:00 – 10:30 AM 11:00 – 12:30 PM 1:00 – 3:00 PM	Oral presentations delivered throughout the day	Ground Floor, 3rd Floor and 4th Floor classrooms *(see detailed schedule)*
POSTER PRESENTATIONS: SESSION 1, 9:00 AM – 10:30 AM		
8:30-9:00 AM 9:00-10:30 AM 10:30-10:45 AM	Presenter poster set-up in assigned locations Display and judging time for posters Students take down their posters	Ballroom Engagement Center Lake Huron Room Mosaic Multipurpose Room
POSTER PRESENTATIONS: SESSION 2, 11:15 AM – 12:45 PM		
10:45 – 11:15 AM 11:15 – 12:45 PM 12:45 – 1:00 PM	Presenter poster set-up in assigned locations Display and judging for posters Students take down their posters	Ballroom Engagement Center Lake Huron Room Mosaic Multipurpose Room
POSTER PRESENTATIONS: SESSION 3, 1:30 PM – 3:00 PM		
1:00 – 1:30 PM 1:30 - 3:00 PM 3:00 – 3:15 PM	Presenter poster set-up in assigned locations Display and judging for posters Students take down their posters	Ballroom Engagement Center Lake Huron Room Mosaic Multipurpose Room
AWARDS CEREMONY: 4:00 PM – 5:00 PM		
4:00-5:00 PM	All UURAF participants, faculty, and guests are encouraged to return for the awards ceremony.	Room 50, Ground Floor (Basement)

ORAL PRESENTATION SCHEDULE

9:00 AM – 3:00 PM

CATEGORY	SECTION	TIME	LOCATION
Agriculture & Animal Science	1	9:00 AM – 10:00 AM	Lake Ontario Room
Agriculture & Animal Science	2	1:00 PM – 2:00 PM	Lake Ontario Room
Biochemistry & Molecular Biology	1	10:30 AM – 12:00 PM	Lake Ontario Room
Biochemistry & Molecular Biology	2	1:00 PM – 2:30 PM	Lake Michigan Room
Business	1	11:00 AM – 12:30 PM	Lake Superior Room
Communication Arts & Sciences	1	1:00 PM – 3:00 PM	Lake Erie Room
Digital Media	1	9:00 AM – 10:30 AM	Lake Erie Room
Digital Media	2	11:00 AM – 12:30 PM	Lake Erie Room
Education	1	9:00 AM – 10:30 AM	Lake Superior Room
Education	2	1:00 PM – 3:00 PM	Lake Superior Room
Environmental Sciences & Natural Resources	1	1:30 PM – 2:45 PM	MSU Room
Epidemiology & Public Health	1	9:00 AM – 10:30 AM	Room 36
Global & Area Studies	1	11:00 AM – 12:30 PM	Room 30
Global & Area Studies	2	11:30 AM – 12:30 PM	Lake Michigan Room
History, Political Science, & Economics	1	11:45 AM – 2:00 PM	Tower Room
Humanities & Performing Arts	1	9:00 AM – 11:00 AM	Lake Michigan Room
Humanities & Performing Arts	2	11:00 AM – 12:45 PM	MSU Room
Neuroscience	1	9:00 AM – 10:15 AM	MSU Room
Physical Sciences	1	11:00 AM – 12:45 PM	Room 36
Social Science: General	1	9:00 AM – 11:15 AM	Tower Room

POSTER PRESENTATION SCHEDULE

Session I: 9:00 AM – 10:30 AM

CATEGORY	SECTION	LOCATION
Agriculture & Animal Science	1 & 2	Ballroom
Biochemistry & Molecular Biology	1	Lake Huron Room
Business	1 & 2	Ballroom
Cell Biology, Genetics, & Genomics	1	Lake Huron Room
Communication Arts & Sciences	1 & 2	Ballroom
Education	1 & 2	Ballroom
Engineering, Computer Science, & Mathematics	1 & 2	Engagement Center
Environmental Science & Natural Resources	1	Ballroom
Epidemiology & Public Health	1	Ballroom
Food Science & Human Nutrition	1	Ballroom
History, Political Science, & Economics	1	Lake Huron Room
Humanities & Performing Arts	1	Mosaic Multipurpose Room
Integrative and Organismal Biology	1	Lake Huron Room
Kinesiology	1	Mosaic Multipurpose Room
Linguistics, Languages, & Speech	1 & 2	Mosaic Multipurpose Room
Microbiology, Immunology, & Infectious Disease	1, 2, 3 & 4	Ballroom
Plant Sciences	1	Lake Huron Room
Psychology	1	Lake Huron Room
Social Science: General	1	Lake Huron Room
Social Work	1 & 2	Lake Huron Room

Session 2: 11:15 AM – 12:45 PM

CATEGORY	SECTION	LOCATION
Agriculture & Animal Science	3	Ballroom
Anthropology	1	Ballroom
Biochemistry & Molecular Biology	2 & 3	Ballroom
Cell Biology, Genetics, & Genomics	2	Mosaic Multipurpose Room
Communication Arts & Sciences	3 & 4	Ballroom
Education	3	Mosaic Multipurpose Room
Engineering, Computer Science, & Mathematics	3 & 4	Engagement Center
Environmental Science & Natural Resources	2	Ballroom
Epidemiology & Public Health	2	Ballroom
History, Political Science, & Economics	2	Lake Huron Room
Humanities & Performing Arts	2	Ballroom
Integrative & Organismal Biology	2	Mosaic Multipurpose Room
Kinesiology	2	Ballroom
Microbiology, Immunology, & Infectious Disease	5	Lake Huron Room
Neuroscience	1 & 2	Ballroom
Physical Sciences	1 & 2	Mosaic Multipurpose Room
Psychology	2, 3, 4, 5, & 6	Lake Huron Room
Social Science: General	2 & 3	Lake Huron Room
Plant Sciences	2 & 3	Ballroom

POSTER PRESENTATION SCHEDULE

Session 3: 1:30 PM – 3:00 PM

CATEGORY	SECTION	LOCATION
Agriculture & Animal Science	4 & 5	Mosaic Multipurpose Room
Anthropology	2	Mosaic Multipurpose Room
Biochemistry & Molecular Biology	4	Mosaic Multipurpose Room
Cell Biology, Genetics, & Genomics	3 & 4	Lake Huron Room
Communication Arts & Sciences	5	Lake Huron Room
Education	4	Ballroom
Engineering, Computer Science, & Mathematics	5 & 6	Ballroom
Environmental Science & Natural Resources	3 & 4	Ballroom
Epidemiology & Public Health	3	Ballroom
Food Science & Human Nutrition	2	Ballroom
Humanities & Performing Arts	3	Ballroom
Integrative and Organismal Biology	3	Ballroom
Kinesiology	3	Ballroom
Linguistics, Languages, & Speech	3	Lake Huron Room
Microbiology, Immunology, & Infectious Disease	6 & 7	Ballroom
Neuroscience	3 & 4	Engagement Center
Physical Sciences	3	Lake Huron Room
Plant Sciences	4	Lake Huron Room
Psychology	7	Lake Huron Room
Social Science: General	4	Ballroom
Social Work	3	Lake Huron Room
Toxicology	1	Ballroom

PRESENTATIONS

Presentations are organized by category and then by presentation time or poster number within each category. Oral presentations are listed first, followed by poster presentations. Use the links to view presentation abstracts online. A full, PDF version of the book is posted on our website and is accessible at http://urca.msu.edu/uuraf.

AGRICULTURE & ANIMAL SCIENCE

ORAL PRESENTATIONS, SECTION 1
LAKE ONTARIO ROOM, 9:00 – 10:00 AM

SUSTAINABLE AGRICULTURE IN CUBA
Ellary Marano
Time: 9:00 AM
Mentor(s): Gerald Urquhart (Fisheries and Wildlife)

After its revolution, Cuba's agricultural system was an integrated part of the Soviet Bloc. As a result, Cuba only produced about 20% of its own food at this time. After the Soviet Union's collapse, the country entered its "Special Period" and famine swept across the island. Food was no longer coming due to the American embargo; thus, Cubans moved away from mono-culture farms to grow a larger assortment of crops. Another important shift was in the methods used to grow food. Cuba lacked imports of chemical pesticides and petroleum and was forced to convert to more sustainable farming practices. In the absence of fertilizers, soil health became high priority. As a result, practices such as inter-planting were introduced. Without pesticides, plants that would attract destructive insects and natural pesticides were used and labor was shifted to muscle power. These changes transformed Cuba into an image of sustainable agriculture. However, the embargo that caused the crisis may end soon, and many Cubans are unsure about the future of their sustainable agriculture. With easy access to American imports, it may be more economically beneficial for Cuba to grow sugar and tobacco much like they did before the revolution, or, in the oncoming wave of tourism, Cubans may flee farm labor for a better paying job in a resort. Nevertheless, some Cubans welcome the change in international relations and claim that American imports would not be detrimental to agriculture, while others believe that the end of the sustainable system is in sight.

MECHANICAL PROPERTIES OF BLACK, GREY, AND WHITE HOOF MATERIAL OF SHEEP
Anna Makela
Time: 9:15 AM
Mentor(s): Richard Ehrhardt (Animal Science)

Black, grey, and white sheep hoof samples were tested to determine whether black hoof was less resistant to physical insults. Whole hooves (n=72) were obtained from a slaughter facility, and the hoof horn from both claws was punched with an Instron using a 10mm hollow punch to determine peak force. The difference in mean force per unit thickness required to punch black (182.4 kg/mm) and white hoof (170.2 kg/mm) was significant (P=0.021), whilst the force to punch grey hoof material (177.1 kg/mm) was intermediate but not significantly different from the other two. The circular pieces removed from the punch (n=144) were weighed and measured for thickness and then subjected to wear using a novel abrasion test. During fifteen hours of abrasion testing a large amount of keratin was removed from the hoof samples (25%) but there was no significant difference in abrasion with respect to hoof colour. The results suggest no inherent difference in abrasion resistance between different hoof colours, but that black hoof required more force per unit thickness to cut. White hoof material was thicker than black on average (2.22 vs 1.97mm respectively), and this may precipitate differences in wear during walking and thus predispose white hooves to some hoof disorders.

ACUTE AND PROLONGED EFFECTS OF VIBRATING PLATFORM TREATMENT ON HORSES: A PILOT STUDY
Chelsea Nowlin
Time: 9:30 AM
Mentor(s): Brian Nielsen (Animal Science)

Emerging anecdotal evidence on EquiVibe vibrating platforms healing injuries and improving performance in horses prompted a study hypothesizing that various physiological parameters will be altered due to EquiVibe treatment. Six horses underwent lameness evaluations by a licensed equine practitioner specialized in Sports Medicine, to score any potential lameness, gait deficits, or limited flexibility. Age, gender, total lameness scores, and stride lengths were used to stratify and pair-match horses before placing them on one of two treatments – EquiVibe (EV) or control (CO). The acute phase consisted of one 30-minute treatment, and the prolonged phase lasted 3 weeks, with treatments taking place five days per week. Each pair of one EV horse and one CO horse stood on adjacent platforms for 30 minutes, however the platform was turned on for EV horses and turned off for CO horses. Immediately after each session in the acute phase, horses underwent a second flexion test by the same veterinarian who previously scored them, and who remained blinded to the treatment. Stride length and heart rate were also evaluated. Similar tests were conducted at the completion of the prolonged phase. Findings suggest no significant differences in pre- and post-treatment between EV and CO groups in any of the parameters measured, besides heightened surface temperatures in EV horses at the forearm and hock. However, this was confounded by the higher initial temperatures of the EV horses. A study with more subjects would be necessary to explore the trend toward reduced lameness scores for EV horses.

QUANTIFICATION OF BARREL RACING TIMES AND CUE ANALYSIS
Rhiannon Sehl
Time: 9:45 AM
Mentor(s): Brian Nielsen (Animal Science)

It was hypothesized that there would be a high correlation between the severity of barrel racing cues and the times of those riders. Forty-three rider-horse combinations were videotaped at a barrel race at the Saginaw County Fairgrounds in Chesaning, MI. The rides were later analyzed for the severity of specific behaviors, utilizing continuous models for hand position and crop use, discontinuous models for seat position and spur use, and a categorical model for spur type. The times and any disqualifications were also recorded in order to determine if there is a correlation between the severity scores and the times given on the barrel-racing pattern. A proc-mixed analysis was conducted in SAS 9.4 for all riders as well as an analysis for only riders without disqualifications ("clean runs"). The effects of severity scores on rider times are still being analyzed.

AGRICULTURE & ANIMAL SCIENCE
ORAL PRESENTATIONS, SECTION 2
LAKE ONTARIO ROOM, 1:00 – 2:00 PM

CHARACTERIZING THE EFFECTS OF BOVINE LEUKEMIA VIRUS ON THE IMMUNE RESPONSE OF INFECTED COWS
Hannah Dewald
Time: 1:00 PM
Mentor(s): Paul Coussens (Animal Science), Kelly Sporer (Animal Science)

Bovine leukemia virus (BLV) is found in 83% of dairy herds across the US. This widespread infection is estimated to cost the dairy industry $520 million annually. However, many producers do not actively manage the spread of the disease because infected animals are generally asymptomatic with the exception of 5-10% of positive cows in which the disease progresses to lymphoma. However, our previous research

indicates BLV infection can lead to dysregulated immune responses to a common vaccine. The current study had two aims: to determine whether cows would exhibit an injection site reaction to the novel antigen keyhole limpet hemocyanin (KLH) and to optimize the concentration of KLH required to elicit a measurable immune response. KLH is used as a benign antigen that simulates infection with a previously unknown pathogen, such as foot and mouth disease (FMD). Six BLV-negative and six BLV-positive cows were injected with KLH and dimethyldioctadecyl ammonium bromide (DDA) as an adjuvant. The injection site was visually monitored for seven days. Peripheral blood mononuclear cells (PBMCs) and serum were collected over three weeks to determine which concentration elicited an immune response from BLV-positive and BLV-negative cows. The overall goal of our research is to understand the altered immune regulation in BLV-positive cows that may lead to a poor prognosis with other serious infections, such as FMD. Further research will be done to quantify the primary and secondary immune response of BLV-positive cows to KLH and determine which immune cells are affected by BLV.

THE DETERMINATION OF BONE LOSS RESULTING FROM THE CONFINEMENT OF YEARLING HORSES

Emily Jones

Time: 1:15 PM

Mentor(s): Brian Nielsen (Animal Science)

It was hypothesized that confined horses, lacking high speed exercise, would have a decrease in bone density of the third metacarpal and then regain it upon their re-exposure to high speed exercise in comparison to horses that had continual access to high speed exercise on pasture. Previous research has documented that bone loss upon stalling may precipitate injuries. Twelve yearling Arabian horses were pair-matched, based upon baseline Day0 radiographs, and then randomly striated into two treatment groups. One group (n=6) was kept stalled for 28 days in 3x3m stalls and then put on pasture of at least five acres for days 28-84. The second treatment group (n=6) was kept on the same pasture for the full 84 days as a control. Radiographs were taken weekly through D 56 and bi-weekly after that. During the same data collection points, blood samples were taken for future analysis of osteocalcin and C-teleopeptide, markers for bone development and breakdown respectively. The radiographs were analyzed using Quantity One to get bone aluminum equivalents (RBAE) values for the lateral, medial, dorsal and palmer aspects of the bone, as well as a total bone assessment. The yearlings were also weighed and body condition scored (BCS) bi-weekly. The body weight and BCS data was analyzed using a Proc-MIXED analysis in SAS 9.4 with horse, day and treatment as main effects, with no changes detected. The measures of RBAE and bone metabolites from the blood samples are still being analyzed.

THREAT RECOGNITION IN TOPI (DAMALISCUS LUNATUS)

Daniel Kroth, Hannah Piper, Aaron Stuk

Time: 1:30 PM

Mentor(s): Kenna Lehmann (Zoology)

Though predatory threat recognition in ungulates has been extensively studied, the underlying stimuli for visual threat recognition remain poorly understood. This study aims to ascertain which visual stimuli allow for the differentiation of threatening from non-threatening quadrupeds. Topi (damaliscus lunatus) in the Maasai Mara National Reserve were presented with either a basic quadruped model sporting control or patterned cloths similar to the coats of several native grazers and predators, or corresponding auditory calls. The herds were then observed, and their responses analyzed to determine the time spent in a vigilant state. The topi reacted predictably to visual cues, showing an abundance of vigilant behavior when presented with local predator patterns, and minimal reaction to control or herbivore patterns. These reactions were complemented by episodes of flight or other events common only in the presence of a perceived threat. Auditory stimuli resulted in no significant trend. This suggested a strong preference for visual identification, and a reliance on pattern to distinguish potential threats.

INCENTIVE CONTRAST EFFECT AND BEHAVIORAL FLEXIBILITY IN HONEY BEES

John Kochiss
Time: 1:45 PM
Mentor(s): Fred Dyer (Integrative Biology)

Animals that experience a drop in food quality are reluctant to accept low quality rewards after even a brief experience with a higher quality reward. This phenomenon has been observed in a variety of taxa (rodents, birds, insects etc.), and is called the negative incentive contrast effect. Most studies have taken place in highly artificial laboratory environments, so we have a poor understanding of how it functions in the context of an organism's natural foraging ecology. We studied honey bees (Apis mellifera) in a naturalistic experimental environment to see whether the negative incentive contrast effect generalizes to food sources that a forager bee has never encountered. Specifically, does the reluctance to accept downgraded food hold for novel locations and flower types, or only for familiar resources? To test this we trained individually labeled bees to high-quality sugar water labeled by a salient color in an artificial flower patch. We replaced this with water and then placed feeders with lower concentration food in new locations, labeling them with either the training color or a novel color. Bees were likelier to investigate the familiar color, but did visit the novel color. When they did they were no likelier to accept it. This implies that the incentive contrast phenomenon influences bees' feeding decisions wherever they find food, which suggests it plays a role in evaluating the foraging options of the environment as a whole, not just individual feeding places.

AGRICULTURE & ANIMAL SCIENCE
POSTER PRESENTATIONS, SECTION 1
BALLROOM, 9:00 – 10:30 AM

INFLUENCE OF FRONT OF PACKAGE LABELING ON HEALTHY CHOICES AMONG CHILDREN

Eric Brunk
Poster: 1
Mentor(s): Laura Bix (Packaging)

With the world's obesity rate growing at a rapid pace, there is a global push to adopt a more effective nutritional labeling system that will enable people to easily make healthier decisions. Front of pack (FOP) labels, which generally present a few pieces of critical nutrition information on a package's primary display panel, have garnered significant interest from consumer, groups, regulators and the food industry in recent years; however, many approaches are being debated and applied, with no standard system emerging. The required nutrition labels in the US are complex, using decimal places and percentages, and research has indicated that children have difficulty understanding the existing standard. This is unfortunate as childhood is a critical time for developing long-lasting eating habits. With FOPs currently unregulated in the United States, and regulatory action likely to occur in the near future, there is a timely opportunity to evaluate how these labels can be optimized to be easily understood and thus lead to healthier choices being made by a broad audience.The aim of this research is to evaluate how a variety of different FOP nutritional labels influence comprehension and healthy food selection in children (aged 6-10). To accomplish this, we utilized a video game wherein children feed the healthier of two choices to "Munchy," an animated character. Correct selection and time to correct selection serve as the dependent variables and several design characteristics of the label (e.g. color, facilal icon) are independent variables.

ASSOCIATION OF SINGLE-NUCLEOTIDE POLYMORPHISMS AT THE PRKAG3 LOCUS WITH MEAT QUALITY TRAITS IN PIGS

Matthew Charles
Poster: 2
Mentor(s): Catherine Ernst (Animal Science)

Poor quality has a detrimental impact on the consumer appeal of pork products. Our group has observed that a region on pig chromosome 15 is associated with several meat quality traits. The gene, protein kinase

AMP-activated gamma 3 non-catalytic subunit (PRKAG3), maps to this region and is a candidate gene for controlling these traits. Our objective was to evaluate polymorphisms in the codons for amino acids 30 (T30N) and 199 (I199V) of the porcine PRKAG3 gene for potential associations with meat quality traits in the MSU Pig Resource Population. Genotypes for T30N (alleles A/C) and for I199V (alleles A/G) were called using Taqman® SNP Genotyping Assays. After genotyping, an animal-centric Gaussian linear mixed model was used to relate these genotypes with phenotypic traits. In order to test potential associations, 940 pigs were used for PRKAG3_I199V and 920 pigs were used for PRKAG3_T30N. The specific phenotypic traits evaluated included cook yield, protein percent, Warner-Bratzler shear force, juiciness, tenderness/overall tenderness, driploss, pH measured 45 minutes after slaughter, pH measured 24 hours after slaughter, and the difference between these two pH values. Sex, slaughter group, slaughter age, and carcass weight were controlled in order to avoid confounding. PRKAG3_T30N was found to be associated with cook yield, tenderness/overall tenderness, and protein levels with an additive genetic effect ($P<0.05$). PRKAG3_I199V was found to be associated with driploss with an additive genetic effect ($P<0.005$). These results support PRKAG3 as a gene affecting important pork quality phenotypes.

CALIBRATION AND ACCURACY OF THE RISING PLATE METER IN CHATHAM, MICHIGAN

Maria Cotter
Poster: 3
Mentor(s): Kim Cassida (Plant, Soil, & Microbial Sciences)

Farmers have known for centuries that abundant pasture is the key to raising a healthy herd. However, pasture growth is difficult to measure. It was my objective to calibrate an instrument that will make this information more accessible for Michigan pasture researchers. The Rising Plate Meter (RPM) is used by farmers throughout New Zealand to predict the mass of forage available for grazing by measuring forage height. However, Michigan pasture composition is different from the grasses of the southern hemisphere, and NZ-based calibration equations cannot be used. To develop prediction equations for Michigan conditions, I collected 210 samples of various pasture makeups and environmental conditions including: different forage species, wet vs. dry sampling conditions, tall vs. short forage, two vs. one person sampling, and differing sample space shape (circle vs. square). For each sample, height was measured with the RPM. Then shears were used to cut the herbage to ground level within a 1-ft2 area under the RPM. Herbage was placed into a paper bag, dried in a hot air oven (105 °C) for a week, and dry weight recorded. Then the dry weight was regressed on the RPM height measurement, forming linear calibration equations that can be used for predicting forage availability. Slopes and intercepts of regression equations were compared using SAS (ver. 9.4) to determine which RPM calibration is most appropriate under the specific pasture conditions. This information will be used to support collection of research data, which will ultimately be shared with farmers throughout Michigan.

EVALUATION OF A LEPTIN RECEPTOR GENE POLYMORPHISM FOR POTENTIAL ASSOCIATIONS WITH FAT DEPOSITION TRAITS IN SWINE

Rachel Griffin
Poster: 4
Mentor(s): Catherine Ernst (Animal Science)

It has previously been shown by our group and others that a region on pig chromosome 6 is associated with fat deposition traits in swine. The leptin receptor (LEPR) is a strong functional candidate gene for controlling these traits. Leptin is a protein that is known to be a regulator of body weight and fat deposition. This protein acts through the leptin receptor; therefore, LEPR is considered a candidate gene for leptin-regulated traits. The objective of this research is to evaluate a polymorphism in exon 2 of the pig LEPR gene for potential association with fat traits in the MSU Pig Resource Population. In order to genotype a C/T single nucleotide polymorphism (SNP) in exon 2 of pig LEPR, a Taqman® SNP genotyping assay was used. An animal-centric Gaussian linear mixed model was then used to relate genotypes to the following phenotypic traits: first rib backfat, last rib backfat, last lumbar backfat, tenth rib backfat, loin weight, and marbling. The analysis also controlled for appropriate fixed effects of sex, litter, slaughter group, or carcass weight. It was found that the C allelic frequency was 0.09 and the T allelic frequency was 0.91. Considering a Type I error

rate of 5%, this SNP did not have any additive or dominance effects associated with the traits; therefore there is no association between this SNP and fat deposition traits in this population. A second SNP in exon 14 of LEPR is currently being analyzed for potential associations with similar traits.

DETERMINING THE EFFECTS OF SEA TURTLE NESTING ON THE PROPAGATION OF BEACH DUNE VEGETATION

Cole Hazeltine
Poster: 5
Mentor(s): Amber Peters (Fisheries and Wildlife)

Sea turtle nesting helps provide beaches with a stabilized dune system. Dune vegetation health is propagated by nutrients left behind when sea turtle eggs hatch. As a result, less sediment floods coral reefs and sea grass habitats, making the continued presence and protection of sea turtle nesting essential to the health of marine environments. Two beaches on St. John, USVI were analyzed for their comparative dune health. Lameshur Bay and Salt Pond Bay are both sea turtle nesting beaches. Results showed vegetation at Lameshur to be more dense. The beaches are about 0.5 miles from one another, so both receive relatively the same amount of rainfall. All data were collected while staying at the Virgin Islands Environmental Resource Station compound.

SENSITIVITY OF CLADE 2 FUSARIUM SOLANI SPECIES TO THE FUNGICIDE FLUOPYRAM

Alexander Witte
Poster: 6
Mentor(s): Martin Chilvers (Plant, Soil & Microbial Sciences), Janette Jacobs (Plant, Soil & Microbial Sciences), Zachary Noel (Plant, Soil & Microbial Sciences)

Fungi within clade 2 of the *Fusarium solani* species complex (FSSC) include pathogens causing severe diseases on legume plants worldwide. In North and South America, members of the FSSC clade 2 are the causal agents responsible for significant yield loss in dry beans and soybeans as a result of root rot and sudden death syndrome, respectively. The objective of this study was to evaluate the sensitivity of FSSC clade 2 species to the succinate dehydrogenase inhibitor (SDHI) fungicide fluopyram. Currently, the sensitivity of 36 isolates among *Fusarium tucumaniae, F. crassistipatum, F. cuneirostrum, F. solani, F. phaseoli, F. brasiliense, F. azukicola,* and *F. javanicum* have been evaluated using a poison plate assay. Fluopyram was amended into half-strength potato dextrose agar at a final concentration of 0, 0.5 1.0, 3.0, 5.0, 7.0, 10.0, and 50.0 $\mu g\ mL^{-1}$. Isolates were aseptically transferred to 3 replicate plates for evaluation of fungicide dose responses. Preliminary results show that the effective concentration which reduces mycelia growth by 50% (EC_{50}) for 34 isolates screened was less than 2.5 $\mu g\ mL^{-1}$, indicating that fluopyram inhibits mycelia growth across seven *Fusarium* species. Only one species, *F. javanicum*, was found to be significantly less sensitive to fluopyram ($EC_{50} > 50.00\ \mu g\ mL^{-1}$). This research aims to provide valuable information on *Fusarium* disease management by evaluating mycelia growth inhibition in the presence of fluopyram.

AGRICULTURE & ANIMAL SCIENCE
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 9:00 – 10:30 AM

MICROBIAL ABUNDANCE AND DIVERSITY IN GROUNDWATERS NEAR TRAVERSE CITY, MICHIGAN

Dominic Aluia
Poster: 9
Mentor(s): Matt Schrenk (Geological Sciences)

Microbial activities in groundwaters are known to have important consequences for water quality, the mobility of toxic metals, and the biodegradation of contaminants. However, relatively little is known about the native microflora in Michigan groundwaters and the factors controlling their abundance and diversity. To address these issues we sampled 10 different wells near Traverse City, Michigan as part of an

interdisciplinary team in August 2015 to conduct an initial survey of groundwater microbiology. The wells ranged in depth from 38 to 121 ft below the surface, and in ORP from -98 to 302 mV. Total cell counts were calculated and ranged from 15,400 to 119,948 cells/ml. Standing water from the wells prior to being purged was elevated relative to the natural groundwaters and contained cells on an order of magnitude ten times greater than the water sampled after purging. Total genomic DNA was extracted from cells collected on 0.22 ?m filters obtained from the same wells and is being used to sequence the 16S rRNA gene and generate profiles of microbial community diversity. Both cell counts and sequence data will be compared to environmental variables to determine which physical-chemical factors control microbial community diversity. Information from this study, on native groundwater microflora, may facilitate future research interpreting the effects of climate change, pollution, and agricultural runoff upon subsurface microbial populations.

WATER USE IMPACTS ON CROP YIELDS FOR CORN AND SOYBEAN PRODUCTION

Daniel Buhr
Poster: 10
Mentor(s): Steve Miller (Biosystems Engineering), Steve Safferman (Biosystems Engineering)

One challenge facing the agricultural industry today is producing adequate food to meet the growing global population. With water resources expected to decline, new irrigation methods are being analyzed due to their importance to food security. Deficit irrigation, according to the Food and Agricultural Organization of the United Nations, is the practice of irrigating from a reduced water supply and allowing the crop to be minimally stressed. The purpose of this research was to model the impacts of deficit irrigation on corn and soybean yields in southwestern Michigan over the past decade. Climate and soil data from two locations was entered into three different crop simulators to determine the growing season irrigation requirements for the crop. Three inches of irrigation were allotted for the season, to be applied when soil moisture dropped below 30% in June or 50% in July and August. Deficit irrigation, compared to no irrigation, increased yield by 6.5% across the two corn models and by 6.6% in the soybean model. The overall yields due to deficit irrigation were still 2.7% and 1.8% lower than the maximum yield for corn and soybeans, respectively. These results indicate that, with low water availability, deficit irrigation for crops can be a proper strategy to produce food with minor yield reductions.

LAYING HEN KEEL BONES: THE EFFECTS OF DIFFERENT HOUSING SYSTEMS

Victoria Mutch
Poster: 11
Mentor(s): Darrin Karcher (Animal Science)

Restaurants, grocery stores, food manufacturers and egg producers are moving from conventional caging (CC), where birds have limited room to move, to cage-free systems including aviary systems (AV) where birds move freely. Pullets are young female birds prior to egg production where mineral deposition in bones is extremely valuable prior to the onset of egg production. Once the bird lays her initial egg, 18-20 weeks of age, she is called a laying hen. A robust pullet skeletal system should withstand the bone loss and sequentially the amount of fracture incurred while laying eggs. In the past five years, keel bone fracture has been a focus due to potential welfare and economic implications. There is minimal information about incidence of keel fractures in the US laying hen housing systems. The purpose of the study is to measure keel bone deviations and factures from White Leghorn pullets and laying hens housed in CC and AV. 120 keel bones from 18 week-old pullets housed in each system were collected and measured. Keel deviations were assessed based on how much the bone differed from the midline. Visual observations were made to determine presence and number of fractures. Incidence of keel bone deviations and fractures were compared to 120, 72 week-old laying hen keel bones from both housing systems. Keels were ashed to obtain bone mineral content. In AV pullets, 23% of keel bones were deviated and 3% were fractured. In CC pullets 11%, of keel bones were deviated and 8% were fractured.

EFFECT OF DIETARY FIBER SUPPLEMENTATION ON THE PARTURITION PROCESS, HEALTH AND LACTATION OF GILTS AND SOWS

Rhiannon Pokriefka

Poster: 12

Mentor(s): Jason Knott (Animal Science), Nathalie Trottier (Animal Science)

The purpose of our undergraduate research club study was to look at the possibility to alleviate difficulties in parturition, also known as dystocia, in sows and gilts fed additional sources of fiber. Dystocia is an area of concern in the swine industry due to its impact on sow welfare and lactation. We are testing using the fiber source wheat middlings at either 7 or 14% of the diet to observe if it improves parturition as well as their performances in lactation when compared to a salt-based laxative. Our study is being done in 2 replications of 24 animals; 12 gilts (first pregnancy) and 12 sows (multiple pregnancies). The first replication will be ending February 2016 with the second replication starting late-March and completed by mid-April 2016. For our data collections and observations, we are recording mammary gland skin temperature, core body temperature, stool consistency (fecal scores), feed consumption, litter size at birth, number of piglets born alive and stillborn, and piglet growth at days 7, 14, and 21 of lactation. Other data we will be collecting are number of instances gilts and sows are assisted during delivery and the frequency of oxytocin administration. The study is in progress and concluding results will be provided at the time of presentation to the 2016 University Undergraduate Research and Arts Forum.

GENE EXPRESSION OF INSULIN-LIKE GROWTH FACTOR 1 RECEPTOR AND INSULIN RECEPTOR ISOFORMS IN EQUINE LAMELLAR TISSUE AND THEIR RELATIONSHIP TO THE ACTIVATION OF KEY PROTEINS IN THE INSULIN SIGNALLING PATHWAY.

Emily Sechrist

Poster: 13

Mentor(s): Patty Weber (Large Animal Clinical Sciences)

Hyperinsulinemia is recognized as a metabolic problem in the equid. A pathological outcome of hyperinsulinemia in horses is laminitis, the painful separation of the lamellar tissue (LT) that connects the coffin bone to the inner hoof wall. Often, laminitis results in debilitating lameness and requires euthanasia. Insulin's mode of action in this disease is unknown. Previous research suggests that LT expresses both insulin receptor isoforms (InsR-A and InsR-B) as well as the insulin-like growth factor 1 receptor (IGF-1R). Under supraphysiological concentrations of insulin, two key proteins in the insulin signaling pathway, AKT and RPS6, are continuously phosphorylated in LT. Results from our laboratory suggest that in LT, IGF-1R is more highly expressed than both InsR-isoform and its expression varies widely between animals. Therefore we hypothesize that when challenging healthy LT with supraphysiological concentrations of insulin, phosphorylation of AKT and RPS6 will be proportional to IGF-1R expression. To test this hypothesis, we will measure IGF-1R, InsR-A, and InsR-B expression levels in healthy LT using specific Taqman Gene Expression Assays. The phosphorylation of AKT and RPS6 in the same LT will be analyzed using our LT explant model and western blot analyses. Spearman's rank correlation coefficient will determine associations between these outcomes. Based on previous literature, we expect IGF-1R expression will be greater than both InsR-isoform. Additionally, we believe the phosphorylation of AKT and RPS6 will be strongly correlated with IGF-1R expression. These results will provide additional support that IGF-1R may play a pivotal role in LT dysfunction under hyperinsulinemic conditions.

EFFECT OF DIFFERENT LAYING HEN STRAINS ON DAILY EGG LAYING PATTERNS AND EGG DAMAGE IN AN AVIARY SYSTEM

Silvia Villanueva

Poster: 14

Mentor(s): Ahmed Ali (Animal Science), Dana Campbell (Animal Science), Janice Siegford (Animal Science)

Space management to stimulate natural behaviors in poultry commercial systems is a widely explored issue. One consideration is a nesting site, provided as an artificial nest box. Given at 1 per hen, competition for these sites can result. There is limited research examining nest box use and laying patterns of various strains

of laying hens in commercial-style aviaries. The objectives of the current study were to compare these daily patterns among 4 hen strains (Hy-Line Brown, Bovan Brown, DeKalb White and Hy-Line W36) and to understand if strain influenced egg laying outside the nest box or damaged eggs. Observations of hens were conducted at 36 wk of age over 3 consecutive days. During each observation, the number of hens and the number, location, and condition of eggs were recorded. Hens laid most eggs in the nest box; however brown hens consistently laid more eggs outside the nest box ($P<0.05$). More damaged eggs were found in units with brown hens ($P<0.05$). Higher nest box occupancy in strains of brown hens was correlated with more system laid ($P<0.03$) and damaged eggs ($P<0.02$). Brown hens occupied more nest box space in the morning ($P<0.05$) and also laid more eggs in the nest boxes at this time ($P<0.05$). White hens continued to occupy nest box space at midday, and laid more eggs than brown hens at this time ($P<0.05$). Findings indicate that modifications of facilities tailored to each strain are imperative in order to properly accommodate production and welfare needs of each individual strain.

AGRICULTURE & ANIMAL SCIENCE
POSTER PRESENTATIONS, SECTION 3
BALLROOM, 11:15 AM – 12:45 PM

ANATOMY OF A DEER ANTLER
Samuel Rinke
Poster: 17
Mentor(s): Carl Boehlert (Chemical Engineering & Materials Science)

In this work, I will examine deer antlers and see what I can uncover using the scanning electron microscope. Antlers are interesting in lots of ways. The rapidness at which they grow and then fall off, how they sometimes get deformities, and the medical uses of the velvet that grows on them are all things that our society does not know much about. Deer velvet has been a medical mystery for ages, and the medical effects are still not totally understood. Moreover, the deformities that plague some deer may be better understood and prevented if we are able to look at the structure of the bone and decipher it. By analyzing the structure of a cross section of deer antler we can look at how a deer antler grows. The main goal of this work will be to analyze the anatomy of a deer antler using a scanning electron microscope.

DEVELOPMENT AND PILOT TESTING OF A FOOD PARADIGM SCALE
Leah Desposato, Maria Cotter
Poster: 18
Mentor(s): Matt Raven (Community Sustainability)

People have become more cognizant of what they eat and how it is produced. This has led to an increased awareness of people regarding issues related to their food. Of special interest are the values people hold relevant to their food. The purpose of this research project was to develop a psychometric instrument that could be used to determine a person's food paradigm by measuring the values they hold regarding their food. A literature review was conducted which indicated an association between the marketing of food and consumers' values. However, there is no evidence of an existing instrument that measures consumers' values toward food. Consequently, we've developed a modified Likert scale designed to measure an individual's values relevant to their food. The resulting instrument was designed to produce an overall Food Paradigm score and eventually subscores. The instrument was reviewed by a panel of experts to establish content and face validity, then modified based on their input. The instrument was then pilot tested with 158 MSU students in four classes housed under the CANR and Natural Science colleges. These classes were chosen due to a broad representation of students that we thought would possess a variety of values toward food. SPSS version 22 was used to analyze the data. A Cronbach's Alpha was used to determine reliability by measuring internal consistency. Currently, we are conducting an exploratory factor analysis to determine the underlying constructs of the scale in order to create subscales in addition to the overall Food Paradigm score.

SOCIAL DYNAMICS OF URBAN FOOD PRODUCERS AND SUPPLIERS IN REGARDS TO THE EMBARGO
Amanda Godar
Poster: 19
Mentor(s): Gerald Urquhart (Fisheries and Wildlife)

Cuba is currently the world leader in sustainable agriculture that provides locally sourced food to her citizens. Changing economic relations with the United States and increasing globalization may determine the future of this type of sustainable production. The current time is a critical turning point in Cuba, as citizen support for local markets will give the produce the market value it needs to compete with cheaper imports. Interviews were thus conducted with farmers, urban garden owners, grocery stores, restaurants (government and private owned), bakeries, and butcheries, as well as citizens. This was all centralized in Havana where the tourist industry has had a large influence and can be an indicator of culture change. Prices and nutritional content of market bought food was analyzed for an understanding of the current market. Results reveal that certain measures must be taken to preserve this form of sustainable agriculture and the critical factors affecting the markets in the Cuban markets. This research is highly applicable to other developing areas of the world and should be considered as a model system. By understanding the economics of sustainable production through social dynamics we may improve sustainable agriculture. This has numerous long lasting beneficial effects for the environment, human health, and sound globalization policy.

INSECT MOBILITY
Nathan Maise
Poster: 20
Mentor(s): Carl Boehlert (Chemical Engineering and Materials Science)

The purpose of this research presentation done with a scanning electron microscope (SEM) will be to study the way that worms move through the soil. Worms are long, slender and don't appear to have any appendages yet they can actually move very quickly. This movement can be attributed to microscopic hooks that worms have on their sides called bristles. These bristles are almost invisible to the naked eye. However, they may be felt when touching the worm. The SEM will be used to take close up pictures of these bristles to show what exactly these hooks look like and how its physical characteristics give the worm the ability to move. The advantages of the earth worm's unique form of mobility will be discussed at depth in the presentation.

A NOVEL PROTEIN-BASED NORMALIZATION TECHNIQUE FOR MALLARD CLOACAL SWAB SPECIMENS IN THE CONTEXT OF AVIAN INFLUENZA RESEARCH
Mark Phillips
Poster: 21
Mentor(s): Jen Owen (Fisheries and Wildlife)

For population-based avian influenza research involving cloacal swabbing, the specimens are commonly collected without regard for the amount of fecal matter obtained. On the one hand, viral load is thought to be a function of the concentration of epithelial cells sloughed off onto the swab, as opposed to the amount of fecal matter extracted; on the other hand, given a sample of appropriate size, a statistically useful fecal mass average is produced, dispelling any need there might be to consider the amount of feces drawn from any individual in the sample. For studies that consider viral activity in individuals, however, quantifying the fecal matter of each swabbing might elucidate differences among those individuals in the amount of virus shed. In the context of such research, the present project hypothesized that differences among individual birds in the amount of cloacal material collected contributes significantly to variations in the viral load detected in these individuals. This project attempted to quantify cloacal swab fecal matter in a post hoc fashion using fluorometry by measuring the overall protein content of each cloacal swab specimen collected for a randomized sample of 16 mallards (Anas platyrhynchos). These protein concentrations were then used to adjust viral RNA concentrations of each of the specimens to determine whether there was any significant difference between the non-normalized viral load and the normalized viral load of each mallard.

PATHOGENICITY AND VIRULENCE OF RHIZOCTONIA SOLANI ON FIELD CROPS

Jessica Tippie

Poster: 22

Mentor(s): Martin Chilvers (Plant Soil), Janette Jacobs (Plant Soil)

Rhizoctonia root and seed rot is a chronic problem associated with dry bean plant stand establishment. In 2015, it was estimated that 10% of the dry bean acreage in Michigan was replanted due to plant stand establishment issues. The objectives of this study were to determine incidence of Rhizoctonia solani in diseased dry bean fields in Michigan, identify R. solani anastomosis groups associated with dry bean, and establish the pathogenicity and virulence of anastomosis groups found on select field crops. From surveys conducted in 2014 (9 dry bean fields) and 2015 (14 dry bean fields), 58 and 121 R. solani isolates were recovered at an incidence of 41.4% and 25.9%, respectively. Isolates were initially identified based on morphology in pure culture. Anastomosis groups were determined based on restriction fragment length polymorphism of a 500 bp ITS rDNA amplified PCR product using four restriction enzymes (MseI, AvaII, HincII, and MunI). Five anastomosis groups were identified: AG2-2, AG2-3, AG4, AG5 and AG11 were identified. A panel of isolates were screened in seed and seedling rot assays against black bean 'Zorro', red kidney bean 'Red Hawk', soybean 'Sloan' and corn 'DK52-61'. In the seed rot assay, Rhizoctonia solani anastomosis groups were similar in virulence across hosts screened. In the seedling assay, isolates within AG2-2 and AG4 were significantly more virulent.

USING SOUND RECORDINGS TO OBTAIN INSTANTANEOUS HABITAT-SPECIFIC ESTIMATES OF BIRD SPECIES DIVERSITY IN INDONESIA AND MALAYSIAN BORNEO

Elizabeth Lytle

Poster: 23

Mentor(s): Pamela Rasmussen (Zoology)

Long-term studies using a variety of sampling methods (visual, auditory, and netting) are required to determine the full species composition of bird communities in the tropics. Given the massive effort this entails, I attempted to evaluate how accurately bird species diversity data obtained from the short-term data collection method of audio recording correlate with established patterns of diversity based on habitat type and area size. During the 2015 "Wild Borneo: Exploring the Biodiversity of Southeast Asia" study abroad program, I and the other students made sound-recordings of bird species in montane rainforest in Java, Lombok, and Sabah; hill forest in Flores; lowland rainforest in Sarawak; and dry forest in Komodo and Flores. These recordings were processed and made available publicly on avocet.zoology.msu.edu. I then analyzed the recordings from each of these areas to estimate species richness in our sample and to determine how these levels correlate with island size and habitat type. These recordings represent an instantaneous or snapshot estimate of the species located in these regions. Despite its limitations, this type of data collection can be very efficient in poorly documented areas such as many of the smaller islands of Indonesia. I discuss my results in comparison with studies on the effects of local and regional spatial variation that show that while habitat size matters, the productivity of that habitat is correlated with species diversity, and that bird species richness on islands is largely explained by vegetation type and, to a lesser extent, by island area.

AGRICULTURE & ANIMAL SCIENCE
POSTER PRESENTATIONS, SECTION 4
MOSAIC MULTIPURPOSE ROOM, 1:30 – 3:00 PM

THE ROLE OF INSULIN IN ENERGY PARTITIONING OF MID-LACTATION DAIRY COWS

Danielle Andreen

Poster: 25

Mentor(s): Michael VandeHaar (Animal Science)

Energy partitioning and feed efficiency are major considerations for dairy producers. Cows with high feed efficiency capture more energy from the feed they consume, decreasing both the cost of milk production and environmental impact. Energy partitioning is an important component of feed efficiency because energy utilized for milk is most important to a farmer. The insulin response to dietary starch likely alters energy partitioning in dairy cows. The objective of this study was to evaluate the relationship between plasma insulin concentration and energy partitioning in mid-lactation dairy cows. Our null hypothesis was that blood insulin does not correlate with partitioning in mid-lactation dairy cows. Sixty-four mid-lactation Holstein cows were fed one of two dietary treatments, a low starch or high starch diet, in a crossover design with two treatment periods. Milk and blood samples were taken in the last 5 days of each period, and body weight and feed intake were recorded throughout. Plasma insulin was analyzed using ELISA and energy partitioning among milk, body maintenance, and body tissues was determined for each cow in each treatment period. There was a negative correlation between plasma insulin concentration and energy partitioned toward milk production (r=-0.21). While not significant, there was a strong trend between plasma insulin concentration and partitioning toward body tissue (r=0.16). There was not a significant correlation between plasma insulin and energy partitioned towards maintenance. Increased plasma insulin directly correlates with energy partitioning toward body tissue and away from milk production in mid-lactation dairy cows.

SOIL MOISTURE CONTENT SENSORS

Matt Benson

Poster: 26

Mentor(s): Steven Safferman (Biosystems and Agriculture)

Soil moisture content is an important aspect in agriculture. The amount of water in the soil directly affects the crops being grown. Farmers use different types of sensors to record the amount of water in the soil in order to be able to have the most effective crop yield. Many of the sensors can be expensive, while others aren't very accurate. This study tests 4 different types of these sensors and compares them with respect to accuracy, cost and ease of use. This information can be very helpful to farmers trying to determine the most cost effective way to record moisture content.

INVESTIGATION OF BRCA1 MUTATIONS IN A JAGUAR (PANTHERA ONCA) OVARIAN ADENOCARCINOMA CELL LINE

Olivia Child

Poster: 27

Mentor(s): Dalen Agnew (Pathobiology & Diagnostic Investigation), Sarah Corner (Pathobiology), Vilma Yuzbasiyan-Gurkan (Veterinary Medicine)

Epithelial tumors of the ovary (ovarian adenocarcinoma) have been frequently detected in captive female jaguars in North American zoos. Ovarian tumors can shorten lifespan, impair reproduction, and negatively impact captive breeding, an important tool in the preservation of endangered species. In humans, some ovarian and breast cancers are caused by inherited mutations in BRCA1, BRCA2, or other cancer genes. The BRCA genes are tumor suppressor genes that normally function in DNA repair pathways, and if mutated, can predispose an individual to develop cancer. Since this tumor occurs in the relatively small population of captive jaguars, a possible mechanism of carcinogenesis is an inherited mutation of one of these cancer

genes. A cell line has been established from one jaguar tumor to preserve tumor tissue for future genetic studies. To investigate potential BRCA1 mutations in this cell line, we plan to sequence the exon regions of this gene from cDNA of both the cell line and normal ovary from this case. Primers for exon sequencing will be designed using the domestic cat genome as a reference, as there is no reference genome for the jaguar at this time. Our sequencing will be performed using PCR and Sanger sequencing. If BRCA1 can be successfully sequenced, we can use this technique in multiple additional jaguars to look for inherited mutations, somatic mutations, and variation in the BRCA1 jaguar sequences compared to the domestic cat. In the future, we plan to investigate additional candidate genes, such as BRCA2, if these efforts are successful.

DETERMINE GENETIC DIVERSITY AND FUNGICIDE SENSITIVITY OF MONILINIA VACCINII-CORYMBOSI ISOLATES FROM BLUEBERRIES IN MICHIGAN

Kevin FitzGerald

Poster: 28

Mentor(s): Jerri Gillett (Plant Soil And Microbial Sciences), Annemiek Schilder (Plant Soil And Microbial Sciences)

Michigan is one of the top-producing states of blueberries in the US. Mummy berry is a serious disease of blueberries, caused by the fungus Monilinia vaccinii-corymbosi, resulting in death of young shoots and mummification of berries. The disease is usually controlled with fungicides. This project aims to determine the genetic diversity and fungicide sensitivity of M. vaccinii-corymbosi across Michigan. Isolates were collected from varied locations in Michigan and grown in pure culture. A total of 72 isolates were tested for fungicide sensitivity in poison agar assays against four to six concentrations of four commonly used fungicides in the sterol inhibitor (fenbuconazole, metconazole, and prothioconazole) and succinate dehydrogenase inhibitor (penthiopyrad) classes. Colony diameter was measured after an incubation of 14 days at 22?C in the dark and compared to growth on non-amended full strength PDA. Using a four-parameter logistical curve fit in the program R, EC50 values were calculated for all isolates. A slight shift towards fungicide resistance was detected in fields where fungicides were used more frequently. DNA sequencing and morphological groupings are in progress to characterize differences among the isolates. So far, sequencing of the ITS region of the ribosomal DNA has shown that all isolates are nearly identical. The elongation factor and beta tubulin genes will also be sequenced. This research will help identify the genetic diversity that is present within M. vaccinii-corymbosi and will determine the risk of fungicide resistance in Michigan.

ROLE OF RNA-BINDING LOTUS DOMAINS IN TUDOR DOMAIN CONTAINING 7 (TDRD7) FUNCTION

Catherine Kelly

Poster: 29

Mentor(s): Chen Chen (Animal Science)

Tudor domain containing 7 (Tdrd7) is a member of the Tudor domain protein family that is essential for spermatogenesis. Tdrd7 is expressed in the testis and Tdrd7 deficiency causes reduction in testis size and male sterility. Despite the pivotal role of TDRD7 in fertility, the molecular mechanism by which TDRD7 exert its function is unknown. In addition to three Tudor domains, TDRD7 protein contains three LOTUS domains at its N-terminus. The LOTUS domain is a novel protein domain of unknown function. We show that LOTUS domain is an RNA binding domain and all three individual LOTUS domains (LOTUS 1, LOTUS 2 and LOTUS3) of TDRD7 have RNA binding capacity. We hypothesize that tandem LOTUS domains may have higher binding affinity to RNA binding targets than that of individual LOTUS domains. To test this hypothesis, we cloned, expressed, and purified the fusion protein of TDRD7 LOTUS domain 2 and 3 (LOTUS 2-3). We will next use the purified protein to perform RNA-binding assay. The result from this experiment will demonstrate that tandem LOTUS domains are an important functional component of Tdrd7 and provide insight into the mechanism whereby TDRD7 functions as essential regulator of spermatogenesis and fertility.

CONTROL OF BOVINE VIRAL DIARRHEA VIRUS (BVDV): DETECTION OF PERSISTENTLY INFECTED ANIMALS BY REAL-TIME RT-PCR
Vittoria Miller
Poster: 30
Mentor(s): Roger Maes (Virology)

The objective of this study is to change aspects of the DCPAH virology section BVD test for PI animals to a more convenient method that does not compromise the quality of the result.

QUANTIFYING HEPATIC GENE EXPRESSION WITH EXPOSURE TO CADMIUM AND MERCURY
Alexandra Baughan
Poster: 31
Mentor(s): Joseph Folger (Animal Science)

Increased prevalence of chronic diseases influence the lifestyles of many humans and stands as a threat to both the individual independence and financial expenditures to their regimes. Recent findings point to susceptibility of many chronic diseases in utero to be passed onto offspring. Contaminated food and water, cosmetic and pharmaceutical products, tobacco smoke, and batteries are all sources of everyday exposure to heavy metals, Cadmium and Mercury. Indication of association between the periconception environment and potential exposure to these toxic chemicals. Studies concerning periconceptive development are crucial, as many as 50% of pregnancies in the United States are unplanned. This variable risk can increase utero exposure to unfavorable conditions in this vulnerable state. In a previous study, cadmium and mercury were shown to increase insulin and adipose resistance. Now, in present study we hypothesized that exposure during periconception, to cadmium and mercury, will interfere with physiological processes dealing with hepatic glucose metabolism.

AGRICULTURE & ANIMAL SCIENCE
POSTER PRESENTATIONS, SECTION 5
MOSAIC MULTIPURPOSE ROOM, 1:30 – 3:00 PM

THE EFFECTS OF INCREASING SURFACE AREA ON THE GROWTH OF MICROORGANISMS AS A FOOD SOURCE FOR MOSQUITO LARVAE
Kimberly Christie
Poster: 34
Mentor(s): Michael Kaufman (Entomology)

This experiment investigated if increasing the surface area in mosquito larvae nanocosms would effect the growth of microorganisms as a feed source and increase the efficiency of the larvae to obtain nutrients within their environment. A set of 60 nanocosms was set up with 35mg of leaf matter, 100 uL of tree hole inoculum, and 11 mL of DI water in each. 3x1 cm plastric strips from milk jugs were placed into half of the nanocosms to increase the surface area. The growth stages and feeding of the larvae was monitored and recorded. No difference was seen in the growth and feeding habits of the larvae between the nanocosms containing the plastic strips and the ones without plastic strips.

ANATOMICAL DIFFERENCES THAT GIVE RISE TO PREDATION IN HYMENOPTERANS
Nicholas Cowles
Poster: 35
Mentor(s): Per Askeland (Composite Materials & Structures Center), Carl Boehlert (Chemical Engineering & Materials Science)

This research project is aimed at analyzing the anatomical characteristics that favor predation in Hymenopterans. The principle sources of comparison for this are common wasps of the species Vespula Vulgaris and common honeybees of the species Apis Mellifera. These two species in particular were chosen

because they are the most common members of the order Hymenoptera in North America. In addition, despite being somewhat similar in appearance they are extremely different in how they behave. Specifically, Vespula Vulgaris as a species are predatory foragers that subsist on other insects as food, whereas Apis Mellifera primarily subsists on the nectar of flowering plants. The purpose of performing this research is to highlight important anatomical differences that may contribute to the differences in behavior between the two species. This will be done by imaging samples of common wasps and honeybees under a scanning electron microscope. In order to do this, each specimen must be coated in a microscopic layer of conductive gold so that they will respond to the microscope and produce an image.

FOOD ANTICIPATION IN DOMESTIC HORSES – ANTICIPATING SOMETHING GOOD OR FRUSTRATED WITH WAITING FOR A DESIRED RESOURCE?

Katelyn Gutwein
Poster: 36
Mentor(s): Camie Heleski (Animal Behavior and Welfare)

During several pilot observations, we noted the possibility of different interpretations of horse behavior close to feeding time. Though our original hypothesis was that heart rate variability (HRV) and behavioral indicators of horses pre-feeding would show they were anticipating something 'good' about to happen, actual pilot data suggested that horses were frustrated by having to wait for feed. A follow up study with a more controlled protocol was conducted. Eight Arabian horses (3-10 years of age) were fitted with Polar heart rate monitors ~40 min prior to their afternoon meal of pellets and alfalfa/grass mix. Ten minutes of baseline heart rate (HR), HRV, and behavioral data were collected before any feeding cues were presented. Approximately 10 min before the afternoon feeding (16:00 hrs), barn staff turned stall feeders outward in a locked position and filled them with hay and pellets. During this time, an additional 10 min of HR, HRV and behavioral data were collected (feed anticipation/FA). Behavioral data were videotaped and a post-trial ethogram was developed. Baseline behaviors included slight head shake; FA behaviors included vocalization. In analyzing the HRV data via Kubios methodology, the LF (low frequency) to HF (high frequency) ratio went from 1.52±.31 to 4.91±1.39 during feed anticipation. This indicates that horses were more likely experiencing frustration/stress versus perceiving that something positive was about to happen. A problem in the protocol was that some horses were able to reach over the turned feeder and access small amounts of hay, which made behavioral data inconsistent.

GENETIC ENGINEERING FOR ENHANCED DROUGHT TOLERANCE IN POTATO

Carly Hendershot
Poster: 37
Mentor(s): David Douches (Plant, Soil and Microbial Sciences)

Drought is a common abiotic stress that continuously impacts the potential growth, yield and overall quality of agricultural crops. Reducing loss from these stress factors will improve yield as well as overall crop quality, which is necessary with the growing need for high output agriculture. One method to increase abiotic stress tolerance that cannot be achieved via conventional breeding is by use of genetic engineering. Aquaporin proteins control and facilitate water transport across membranes and are some of the first targets to be signaled under stress conditions. The long term goal is to transform at least one line of potato that will grow and develop under less favorable conditions, specifically conditions of low water and high saline. This line will have maximum yield and maintain other agronomically desirable traits such as ideal size, chip quality and disease resistance. The specific objective is to examine the effects of the Aquaporin gene in vitro. This will be accomplished by analyzing the growth of transgenic potato plants on polyethylene glycol compared to traditional media. Any promising events will be further evaluated in a greenhouse setting, to confirm to be phenotype equivalents to conventional counterparts. With the completion of the project it is to be expected that a select number of transgenic lines will have high levels of Aquaporin expression and tolerate drought conditions well. This project will have a significant positive impact on the agricultural world as potato is an important food crop that does not perform well under water stress conditions.

PROGESTERONE LEVELS IN CATTLE
Chelsea Kronemeyer
Poster: 38
Mentor(s): Janet Ireland (Animal Science)

Response of cattle to superovulation to maximize number of ovulations for embryo transfer is highly variable (0 to 100 eggs) among individuals. Cattle with small ovarian reserves (total number of healthy follicles/eggs) exhibit high endogenous secretion of luteinizing hormone (LH) during estrous cycles and they respond poorly to FSH/LH injections during superovulation. The hypothesis for the present study is that suppression of high endogenous LH secretion before superovulation treatments begin will improve response to superovulation and ultimately success of embryo transfer in cattle with small ovarian reserves. Acyline is an antagonist that suppresses LH secretion. Fifteen cycling crossbred beef heifers were injected daily for 25 d with vehicle, or 25 or 50 µg Acyline (n = 5 animals per treatment). Blood samples were collected at 8-hour intervals. Concentration of LH was determined by immunoassay and results show both doses of Acyline lowered LH secretion compared with controls. My objective is to measure concentration of progesterone, an ovarian hormone and marker for corpus luteum function, to determine if ovarian function is also suppressed during Acyline treatment. I will analyze blood samples with use of a commercial Enzyme-Linked Immunosorbent Assay taken during the 25-day Acyline treatment period. Results will establish if Acyline not only lowers LH secretion but also inhibits ovarian function. A successful outcome will justify use of Acyline pretreatment prior to superovulation protocols in cattle to test our hypothesis that suppression of high endogenous LH secretion before superovulation treatments begin will improve response to superovulation.

INFLUENCE OF SOIL TYPE AND NEWLY INTRODUCED FORAGES ON TRACE MINERAL NUTRITION OF BUFFALO IN NEPAL
Kellie Rizzolo
Poster: 39
Mentor(s): Thomas Herdt (Large Animal Clinical Sciences), Nanda Joshi (Animal Science)

Nepalese farmers depend on buffalo for milk as a nutrient source year-round, despite the severe decline in milk yield during the drought season. With the increasing climate temperatures due to global warming, the drought season is growing longer, causing widespread concerns about the future of the buffalo dependents. In an effort between Michigan State University and USAID, new, more drought resistant forages have been introduced to the Tanahun, Chitwan and Gohrka districts of Nepal with the hope of improving buffalo nutrition, and therefore, productivity. The affects of these crops on buffalo nutrition, as well as the affects the different soil types will have on the crops, is currently unknown. Through trace nutrient analysis of blood samples taken from 5 buffalo in each of these Nepal districts, the mean whole-blood selenium concentration was 14566 ng/mL, cobalt was 0.290.14 ng/mL, copper was 0.650.08 ug/mL, iron was 19474 ug/dL, manganese was 3.83.2 ng/mL, and Zinc was 0.740.09 ug/mL. Based on reference values for domestic cattle in the United States, all buffaloes had adequate whole-blood selenium concentrations as well as adequate concentrations of serum copper and iron, however, some animals were deficient in cobalt and manganese. Zinc appeared marginal across most buffaloes. Differences in serum concentrations among regions were detected for cobalt and manganese. We are in the process of evaluating forage and soil mineral concentrations to determine the effects of these factors on buffalo nutrition.

DETERMINATION OF BONE LOSS ASSOCIATED WITH DISUSE IN MATURE HORSES
Rhiannon Sehl
Poster: 40
Mentor(s): Brian Nielsen (Animal Science)

It was hypothesized that confinement without access to high speed exercise would cause a decrease in the bone density of the third metacarpal compared to those housed on pasture. This theory was tested with twelve mature (5 to 15 years) horses. The horses were split into two pair-matched groups, Pasture (P, 5 mares and 1 gelding) or Stall (S, 6 5 mares and 1 gelding) with radiographs taken on day 0 for baseline

readings and to pair-match the horses. The P horses remained on pasture for the 84 days of the study, while the S horses will spend the first 28 days in 3 x 3 m stalls and the remaining time on a pasture of at least 5 acres. Blood samples were collected at every sample point for later analysis of osteocalcin and ctx-1. Radiographs were taken every week for the first eight weeks, then every other week for the remaining four weeks. All data was analyzed using a proc-mixed analysis in SAS 9.4 with horse, day and treatment as main effects. There was no change in body weight or body condition score by treatment or by day. Measures of bone mineral content and bone metabolism are still being analyzed.

ANTHROPOLOGY

POSTER PRESENTATIONS, SECTION 1
BALLROOM, 11:15 AM – 12:45 PM

CAN YOU BE IDENTIFIED BASED ON YOUR TEETH?

Blake Bass
Poster: 44
Mentor(s): Gabriel Wrobel (Anthropology)

The main goal of this research project was to compare samples from the regional group Bedouins to the regional groups Indigenous Australians, San, and Western Europeans to see how frequently 10 non-metric dental morphological traits appeared (ie. Carabelli's Cusps, Groove Pattern, and Deflecting Wrinkle etc.) The Bedouin remains were collected in Caesarea, Israel in 1979-1980, of all the remains that were collected only 18 dentitions (not always matching mandibular and maxillary) were used in the final comparison. This was a combination of many things ranging from there being little enamel left of the tooth, or the morphology was so worn down that you couldn't identify it anymore. The data from the Indigenous Australians, San, and Western Europeans had on average hundreds of samples where as the Bedouin would only have samples of 80. Of the 10 dental morphologies that were being compared, all of the groups had in common at least two traits. The San had two traits in common, those being Cusps 6 and Cusps 7. Of the 10 traits that were compared Indigenous Australians had 4 traits in common with the Bedouin's those being Carabelli's Cusps, Groove Pattern, Upper Molar Root Number, and Lower Molar Root Number. The traits that are in common between the regional groups are interesting because of their geographical locations in comparison to each other.

POSSIBLE OSTEOARTHRITIS IN BEDOUIN REMAINS FROM THE CAESAREA MARITIMA

Jessica Greathouse
Poster: 45
Mentor(s): Gabriel Wrobel (Anthropology)

This project serves to critically analyze the remains of a male excavated at the Caesarea Maritima site on the coast of Israel. Dated from 640 to 1500 AD, the remains of a male aged at approximately 30 to 48 years of age, were excavated in 1979, located 36 cm below ground in a grave lined with stones. The distal humerus and proximal radius and ulna of the right side exhibited signs of osteophytic development, erosion of the subchondral bone, and reactive bone formation. There are some signs of eburnation in these areas as well. The phalanges and metacarpals of the right side also exhibit signs of erosion of the subchondral bone and reactive bone formation. No signs of eburnation in the phalanges and metacarpals. The fact these morphological changes are not present in the rest of the skeletal remains, as well as the location indicates that the individual suffered from osteoarthritis caused by trauma.

MAKING SCENTS OF THE PAST: AN ARCHAEOLOGICAL LOOK INTO MSU'S GENDERED PAST
Alissa Lyon
Poster: 46
Mentor(s): Lynne Goldstein (Anthropology)

The Campus Archaeology Program's (CAP) 2015 summer field school revealed a concentration of gendered objects; this was a particularly important find since CAP had previously found few gendered artifacts, and nothing indicating the presence of women. These artifacts, found behind the Hannah Administration Building, date from the early twentieth century and are most likely refuse from a faculty house that had been nearby. My research presented in this poster focuses on perfume bottles and various other toiletries found in this assemblage. By researching this subject, we gain a better understanding of the hygiene habits of early Michigan State women. We have learned that during this era, the perfume and cosmetics industry was rapidly evolving in terms of the scope of the consumer base, marketing and distribution. We also can put together a more varied and diverse picture of life on campus at this time.

GOING DIGITAL: THE 3D DIGITIZATION OF BIOARCHAEOLOGICAL SKELETAL COLLECTIONS AND GEOMETRIC MORPHOMETRIC 3D SHAPE ANALYSIS
Joshua Schnell
Poster: 47
Mentor(s): Gabriel Wrobel (Anthropology)

Over the past decade, the field of archaeology has experienced a shift in attention towards 3D modeling and its applications both in the field and in the lab. Access to archaeological collections can be constrained by the cost of travel or other restrictions, but the digitization of collections has the potential to allow researchers access to otherwise inaccessible collections. 3D modeling is both a powerful illustrative tool and a bottomless source of analytical potential. This shift in attention is due primarily to a recent proliferation of commercially available 3D technologies as well as the declining costs of these technologies, making them more accessible to researchers. The intent of this project is to develop an intuitive, straightforward, and accessible model for undergraduate students to acquire the skills necessary to construct 3D models of human skeletal remains using photogrammetry while simultaneously developing a digital repository of the MSU Bioarchaeology Lab's collections that will enable long term and sustainable digital research. The initial phase of this ongoing work is to digitize crania from various Maya sites in Belize. Data collection trips to digitize crania from skeletal collections from ancient Maya sites in Belize the University of Indiana at Bloomington and Western Ontario University have contributed to the breadth of this database. The 3D models produced by students in the lab through this project are being used to answer questions of social organization and identity among ancient Maya groups utilizing rockshelters and caves for burial via 3D shape analysis using geometric morphometrics.

THE IMPORTANCE OF DIETARY IRON AND VITAMIN C AMONG BREASTFEEDING ARIAAL MOTHERS IN NORTHERN KENYA: ANALYSIS OF SERUM TRANSFERRIN RECEPTOR PROTEIN IN RELATION TO 24-HOUR DIETARY RECALLS
Jonah Stone
Poster: 48
Mentor(s): Masako Fujita (Anthropology)

Dietary iron sources are divided into two categories: heme and non-heme iron. Heme iron from animal based foods is highly bioavailable (easily absorbable), while non-heme iron from plant based sources is less bioavailable. Vitamin C in diet enhances the bioavailability of non-heme iron. Vitamin C is likely a positive contributor to an individual's iron status in populations primarily consuming plant-based diets. We hypothesized that the combination of dietary vitamin C and iron intake will correlate positively with iron status. Dried-blood spots (DBS) and dietary recall data from 182 breastfeeding Ariaal mothers of northern Kenya were used to test this hypothesis. Serum concentrations of transferrin receptor protein (sTfR), an indicator of iron status, were determined using an ELISA procedure adapted for DBS samples. Dietary vitamin C and iron intake were determined by 24-hr dietary recalls with food weight estimates. Preliminary

analysis indicated that overall iron status was not correlated with vitamin C or dietary iron intake. However, iron intake had a significant positive correlation with iron status among iron deficient mothers (TfR>8.3 ug/ml; n=18, p=0.018), and there was a marginally positive correlation between iron intake and iron status in first-time mothers (n=32, p=0.083). The lack of significance for vitamin C overall may be due to all mothers in the sample consuming levels of vitamin C below the recommended daily intake for women (90mg/d). An increase in intake of vitamin C in conjunction with higher dietary iron intake may be especially important to the iron status of primiparous and iron deficient mothers.

MAKING MY MARK AT MSU: MAKER'S MARK
Pa Vang
Poster: 49
Mentor(s): Lynne Goldstein (Anthropology)

During the summer of 2015 the MSU Campus Archaeology Field School excavated a historic trash pit located behind the Hannah Administration Building. One of the most important parts of researching these artifacts is assigning date ranges. To aid in the process I examined over 50 fragments of ceramic fragments that have complete and partial makers marks. By analyzing and identifying the dishware maker's marks, using online sources and books, they are able to tell us the manufacturing company that made them and how when the dishware was manufactured. This information is important because we can determine the approximate time range during which MSU ordered from the different manufacturing companies. However, the analysis must also take into account that MSU may have continued using the dishware even after the manufacturing companies stopped producing them. My poster will examine how I determined the dates and what sorts of constraints we must take into account in our interpretations.

ANTHROPOLOGY
POSTER PRESENTATIONS, SECTION 2
MOSAIC MULTIPURPOSE ROOM, 1:30 – 3:00 PM

THE EARLIEST ZEA MAYS (CORN) IN THE UPPER GREAT LAKES: A MICROBOTANICAL ANALYSIS OF THE WINTER SITE
Rebecca Albert
Poster: 53
Mentor(s): William Lovis (Anthropology)

The timing of introduction and domestication of corn by Native Americans remains a topic extremely relevant to archaeological study. Traditionally, the topic is approached through macrobotanical analysis because these larger ecofacts, kernels and cobs, are easily identified, categorized, and quantified. Increasingly, however, microbotanical analysis of starches and phytoliths has become more widely used because it can give different insights into diet than macrobotanical analyses. Macrobotanicals generally don't preserve well, so corn may be absent from a site as carbonized kernels or cobs, but could be present as a phytolith or starch, particularly in carbonized food residue on ceramics. For this reason, the two kinds of analyses are independent, and conclusions from each should be considered as such. Recent microbotanical research in New York, Quebec, and southern Michigan has demonstrated the presence of maize as early as 400-600 BC. Here, microbotanical analysis of carbonized food residue is employed to determine the plant diet of native populations occupying the ca. 2050-1820 calBP Winter site in Michigan's Upper Peninsula. Split samples of charred material from 16 ceramic jar fragments were processed by two analysts for a variety of wild and domesticated plant species. Results were positive for Zea mays, various non-diagnostic starches and phytoliths, calcium oxalate, diatoms, and silicified plant tissue. The implications of these results are important for understanding of Middle Woodland subsistence and the early role of maize in Upper Great Lakes diet.

A NEW METHOD FOR SUBADULT AGE ESTIMATION OF SKELETAL REMAINS IN A MEDIEVAL NUBIAN POPULATION
Leah Auchter
Poster: 54
Mentor(s): Todd Fenton (Anthropology)

This research project focuses on subadult skeletal age estimation based on diaphyseal length. Skeletal development is affected by environmental stressors, therefore, standards for subadult aging must be population specific. The Mis Island Nubian Bioarchaeology Collection, excavated byt the British Museum from three medieval Christian cemeteries, is currently housed in the MSU Department of Anthropology. The collection includes the skeletal remains of 183 subadults ranging in age from birth to 15 years old. Dental age, which was previously assessed for each individual, was used as a proxy for chronological age. The maximum diaphyseal lengths were measured for each long bone (humerus, ulna, radius, femur, tibia and fibula) using digital calipers or an osteometric board. Linear regression equations were then developed to correlate diaphyseal length and dental age. The strongest correlations were found to be with the ulna (r^2 = 0.911, n=170), tibia (r^2 =0.903, n=168), and fibula (r^2 =0.902, n=145). Cross-validation was explored to determine the accuracy of the newly developed regression equations. These results demonstrate a strong correlation between dental age and diaphyseal length in the Mis Island sample, permitting accurate age estimation of subadults in other Nubian collections.

THE HUMAN RACE IS THE ONLY RACE THAT WE NEED
Blake Bass
Poster: 55
Mentor(s): Tamara Butler (African American and African Studies)

Scholars in the field of Forensic Anthropology believe that racial categories are a social construct, but these same anthropologists continue to use race as a way to identify human remains (Sauer, 1992). This contradiction led to great disparities within the Forensic Anthropology world a while ago but such disparities have been resolved since then. Therefore, the research question that guides this project is as follows: If race is not biological, how do we as academics and researchers continue to use it as a biological system to categorize people within? For this project, I will use scholarly articles published by professionals in the field and explore possible ways to debunk the ideology that the use of these racial categories is the only way to identify human remains. The scholarly articles that I reference throughout this research will not only talk about Forensic Anthropology now, they will also explain the "origin" of these racial categories and how they began to be used within the field. I will argue that races don't exist biologically and that Forensic Anthropologists should stop using them as categories to identify human remains. This research is vital to the field of Forensic Anthropology because it can build upon what has already been accepted within the field and provide solutions to this social categorization.

POSTCRANIAL SEX ESTIMATION OF A MEDIEVAL NUBIAN POPULATION
Elaine Chu
Poster: 56
Mentor(s): Todd Fenton (Anthropology)

In the analysis of human skeletons, long bone measurements can be used to estimate sex in the absence of the pelvis or skull. Current methods have been developed on many populations but cannot be accurately applied to other groups, since sexually dimorphic characteristics are population-specific. The Mis Island Nubian Bioarchaeology Collection represents over 400 medieval (500-1500AD) human skeletons, excavated in modern Sudan by the British Museum and currently housed in the MSU Department of Anthropology. In this study, long bones of Mis Island adults were measured to create a sex estimation method for application in Nubian samples. Eleven measurements were collected from the long bones (humerus, radius, ulna, femur, tibia, and fibula) of 157 adult skeletons of known sex. These data were used to establish univariate sectioning points for sex estimation. These were determined by finding the midway point between the mean for each sex. Measurements above the sectioning point are classified as male, and those below are classified as

female. Accuracy was determined by dividing the number of correct classifications by the number of individuals. Accuracy for individual metrics ranges from 70.15% to 87.97% overall. An accuracy of 80% or better is typically acceptable for sex estimation methods. The most accurate measurements were the epicondylar breadth of the femur (n=106, 87.97%), the antero-posterior diameter of the radius (n=132, 87.91%), and the proximal epiphyseal breadth of the tibia (n=101, 84.99%). This study provides future researchers with accurate methods of estimating the sex of incomplete or fragmentary Nubian skeletal remains.

HAPPINESS IN CUBA
Naomi Dawood
Poster: 57
Mentor(s): Rene Hinojosa (Urban & Regional Planning), James Lucas (Undergraduate Education)

This research depicts an analysis of the happiness and well-being of the Cuban people based on materialistic goods, economic success and the increase in tourism. It also attempts to define the concept of happiness through the lens of the Cubans. This has been done by interviewing Cubans and asking their definition of happiness, along with a multitude of other questions regarding the cause of their happiness. Along with a baseline analysis of the happiness of the Cuban people, this research provides a look into the effects of the increase in the tourism sector on the happiness.

THE EFFECTS OF MATERNAL NUTRITIONAL STATUS ON BREAST MILK SECRETORY IMMUNOGLOBULIN A ANTIBODY IN RURAL KENYA
Alexis Rife
Poster: 58
Mentor(s): Masako Fujita (Anthropology)

Breast milk secretory immunoglobulin A (sIgA) is an important antibody that acts in the protection of an infant's digestive system from disease-causing organisms. Higher sIgA concentration in breast milk is likely to increase an infant's protection against infectious diseases. Maternal acute infection or inflammation is known to elevate sIgA concentrations in milk. Previous studies have mixed findings on how maternal nutrition, parity, and postpartum time affect levels of sIgA in breast milk. We hypothesized that breast milk sIgA would have a positive correlation with mother's nutritional status and parity, but the mother's postpartum time would have a negative correlation with breast milk sIgA among exclusively breastfeeding women. We used data from 59 exclusively breastfeeding women of northern Kenya excluding those who had signs of acute infection or inflammation. Maternal nutritional status was assessed by Arm Fat Area (AFA) based on triceps skinfold thickness and upper mid-arm circumference to indicate overall body fatness. Regression models were used to evaluate any possible associations between the variables (AFA, postpartum time, parity) and breast milk sIgA. Women in this sample had low to normal nutritional status. Breast milk sIgA was not significantly correlated with the mother's postpartum time or parity. There was a significant positive correlation between breast milk sIgA and AFA (n=59, p=.029). Among exclusively breastfeeding mothers with marginal nutritional status, increased body fatness appears to have positive implications for milk sIgA levels and therefore for their infant's health.

CAMPUS ARCHAEOLGY
Jasmine Smith
Poster: 59
Mentor(s): Lynne Goldstein (Anthropology)

The Campus Archaeology Program 2015 Field School excavated a historic trash pit located behind the administration building. A wide variety of artifacts were found, including many different types of laboratory glass. This year CAP interns are studying this laboratory glass to identify the different types found and to understand the reasons for its inclusion in the trash pit. By researching this laboratory equipment CAP hopes to find out what it was used for and where it came from. As the cataloguing process continues, CAP interns have identified equipment such as beakers, stir sticks, syringe stoppers, microscope slides, and a wide

assortment of test tubes. My poster looks specifically at glass laboratory equipment, which at first glance seems odd to be found with general house debris. Exploring former Horticulture Professor, Thomas Gunson, and his time at MSU will help to explain why the laboratory glass is logical.

BIOCHEMISTRY & MOLECULAR BIOLOGY

ORAL PRESENTATIONS, SECTION 1
LAKE ONTARIO ROOM, 10:30 AM – 12:00 PM

NOTCH WHAT WE EXPECTED: THE ROLE OF P38-MAPK MEDIATED ACTIVATION OF NOTCH3 AND ITS CORRESPONDING EFFECT IN PROSTATE CANCER CELLS

Corbin Jensen
Time: 10:30 AM
Mentor(s): John Lapres (Biochemistry), Cindy Miranti (Physiology)

One of the hallmarks of the normal prostate is the presence of layer specific markers. In Prostate Cancer (PrCa) the normally mutually exclusive expression of these layer markers disappears. This has led to the belief that the co-expression of layer markers may in fact be a result of improper differentiation. p38-Mitogen Activated Protein Kinase (p38) and the cell-to-cell signaling protein family Notch proved important to the differentiation process. Activation of MAPK kinase-6 (MKK6) in vitro led to a robust phosphorylation and activation of p38 and in turn activation of Notch3. This p38-to-Notch3 pathway is vital to successful differentiation and thus leads us to hypothesize that this pathway is altered in PrCa where differentiation does not occur successfully. We hypothesize that induction of p38 will lead to a less proliferative, less invasive and more differentiated phenotype. Western Blot analysis indicated that MKK6 phosphorylation of p38 does indeed activate full length Notch3 in the PrCa cells. However, unlike in the normal cells, this does not appear to have an effect on migration in the PrCa cells when a Scratch assay is performed. In addition to the effect on migration MKK6 induction also leads to differences in proliferation and differentiation status between the PrCa and normal cells indicating that while the pathway exists in the PrCa cells it is functioning in a manner different than that of the normal cells.

HOMOLOGY MODELS OF MULTI-SUBUNIT RNA POLYMERASES

Harrison Morgan, Gursimran Singh
Time: 10:45 AM
Mentor(s): Zachary Burton (Biochemistry & Molecular Biology)

Atomic resolution structures are essential to analyze the structure, function and dynamics of complex biological systems. Multi-subunit RNA polymerases of the 2-double-psi-beta-barrel type are among the largest and most dynamic proteins known, and these essential enzymes participate in very large complexes of proteins, DNA, RNA and nucleoside triphosphates. Cryo-electron microscopy is an emerging tool to solve large biological assemblies, but this technique has not yet been applied to many relevant RNA polymerase structures. Until atomic resolution data becomes more available, homology modeling can provide adequate structures to support most research projects. Homology models, therefore, were constructed of human RNA polymerase II and Helicobacter pylori RNA polymerase. The purpose of the human model was to better understand mutations in RNA polymerase II that arise in human cancers. Cancer mutations are identified within the core catalytic apparatus and around the RNA polymerase periphery. Mutations in the sandwich barrel hybrid motif (an insert within a double-psi-beta-barrel) are identified that may affect initiation and elongation of RNA chains. A mutation in the bridge helix is also likely to affect RNA synthesis. Because cancers are associated with altered patterns of gene expression, peripheral mutations may indicate interaction points for transcriptional regulators. The Helicobacter pylori model was constructed as an aid to understand stomach ulcers and related human cancers. In future work, homology models will be constructed of human RNA polymerase I and III to analyze human leukodystrophy and Treacher-Collins mutations and Mycobacterium tuberculosis to analyze rifampicin-resistant RNA polymerase mutations.

FORCE/SPECTROSCOPY MEASUREMENTS OF PROTEIN FOLDING DYNAMICS
Aditya Savanur
Time: 11:00 AM
Mentor(s): Matthew Comstock (Physics)

We present high-resolution force/spectroscopy measurements of the protein folding dynamics of a single WW domain protein. WW domains allow effective characterization of the folding and stability of ?-sheets. Since protein folding is still poorly understood, different denaturants have been used to better elucidate the folding processes of various proteins. Applying force is one technique used for protein denaturation in order to observe the process of refolding in detail, but the time resolution of standard instruments typically precludes investigation of fast-folding model proteins in this way. Another technique is to label the protein termini with donor and acceptor fluorophores; this allows intramolecular distances, and therefore protein refolding, to be measured accurately. In this study, cysteine residues were added to both N- and C-termini of the human Yes-associated protein (hYAP), which typically folds in less than 1 ms at 298 K and pH 7.0. The resulting peptide was connected to two thiol-modified double stranded DNA handles and labeled with fluorophores. The protein-DNA chimera was then suspended between a pair of polystyrene beads held in high-resolution dual optical traps. This arrangement allowed simultaneous FRET and force measurements of the observed reversible folding and unfolding to be performed using combined high-resolution trapping and single molecule fluorescence spectroscopy.

ECOLOGICAL TRAP MECHANISMS IN ESCHERICHIA COLI AS A METHOD TO PARASITE EXTINCTION
Rachel Sullivan
Time: 11:15 AM
Mentor(s): Alita Burmeister (Microbiology & Molecular Genetics)

Extinction events mark not only major historical events, but also have significant effects on the microbiological world. In a coevolutionary environment, one competitor may drive the other to extinction and this has been seen in the experimental evolution of Escherichia coli and phage Lambda. Host isolated from these extinctions often reveal a triple knock-out mutation in the inner membrane transport ManXYZ. We believe that this phage extinction may be due to an ecological trap mechanisms evolved in the host, where an internal membrane protein ManXYZ is truncated while external membrane channels remain open. Through this, phage may attach and inject their DNA while the host remains impervious, driving phage to extinction. Over 24 hours, we measured the decay of phage to environments with either ancestral host, ManXYZ mutant host, or without host. We hypothesize that phage will increase in concentration as they replicate on the permissible ancestral host, while populations without host should remain constant as no binding or replication occurs. If the ManXYZ mutation acts as an ecological trap, in these populations, we anticipate non replicative phage binding and trapping, decreasing the overall concentration of viable phage. Preliminary data revealed that while growth is seen on ancestral host, concentrations of Lambda on ManXYZ mutant remained almost constant, and a loss of growth was seen in populations without host. This suggests that while the mutations are a certain detriment to phage growth, the ecological trap model may be leaky, perhaps facilitated by an alternative route into the cell.

COMPLICATIONS IN DIABETIC RETINOPATHY
Meesum Syed
Mentor(s): Julia Busik (Physiology)

Currently not a complete abstract. But the research is about the confirmation of long chain ceramides in the tight junctions found in the membranes of the retina. The permeability of the those membranes depends on the long chain ceramides and the enzymes involved in producing or manufacturing these ceramides are inadequate in persons effected by diabetes.

UNRAVELING PANCREATIC CANCER METABOLISM
Che Yang
Time: 11:45 AM
Mentor(s): Sophia Lunt (Biochemistry and Molecular Biology)

Pancreatic cancer is an aggressive form of cancer that leaves patients with limited treatment options, and 94% of patients die within five years of diagnosis. The goal of my research project is to work toward improving pancreatic cancer treatment by elucidating metabolic pathways that support growth of pancreatic cancer cells. Unlike normal adult cells that metabolize glucose mainly to carbon dioxide using oxygen, pancreatic cancer cells ferment glucose to lactic acid even in an oxygen-rich environment. This difference in metabolism is known as the Warburg effect. However, how cancer cells benefit from the Warburg effect is unknown, and we have yet to take full advantage of altered metabolism for therapy. The Warburg effect is partly supported by specific isoform expression of pyruvate kinase (PK), an enzyme that catalyzes the final reaction in glycolysis. While many differentiated normal cells express the M1 isoform of PK (PKM1), proliferating cells, including all cancer cells, express the M2 isoform (PKM2). Normal proliferating cells that depend on PKM2 stop proliferating when forced to express PKM1, but pancreatic cancer cells proliferate just as rapidly with forced PKM1 expression. Preliminary data shows that pancreatic cancer cells upregulate the serine biosynthesis pathway during forced PKM1 expression; thus, we have deleted genes in the serine biosynthesis pathway (PHGHD, PSAT, and PSPH) in pancreatic cancer cells using the CRISPR/Cas9 system. We aim to understand how the serine biosynthesis pathway supports pancreatic cancer proliferation during PKM1 or PKM2 expression by characterizing our CRISPR knockout cell lines.

BIOCHEMISTRY & MOLECULAR BIOLOGY
ORAL PRESENTATIONS, SECTION 2
LAKE MICHIGAN ROOM, 1:00 – 2:30 PM

APPLICATION OF HDGB IMPLICIT MEMBRANE FORMALISM FOR MODELING CELL MEMBRANE PERMEABILITY
Stephanie Brocke
Time: 1:00 PM
Mentor(s): Bercem Dutagaci (Biochemistry & Molecular Biology), Michael Feig (Biochemistry & Molecular Biology)

Improvement of the accuracy and reliability of biophysical and mathematical models of passive membrane transport is crucial for understanding the dynamics of drug molecule insertion into a lipid bilayer membrane. In this study, Heterogeneous Dielectric Generalized Born (HDGB) method is applied to a set of drug molecules to develop a reliable and efficient method for drug permeability calculations. HDGB method allows for the energetics of drug partitioning into the lipid membrane environment to be obtained. The transition free energy term ($\Delta G_{transfer}$) obtained by the application of HDGB model will be further used to calculate parallel artificial membrane permeability assays (PAMPA) based on the solubility diffusion model. The results of this work will be compared with experimentally obtained values of aspects of membrane transport as well as with computational results based on molecular mechanics models reported by the group of Jacobson (2012). By attaining a higher level of correlation against the experimentally obtained permeation coefficients, an increasingly accurate method of modeling membrane permeation can be achieved.

MICROINJECTING DROSOPHILA EMBRYOS
Yi Zhang
Time: 1:15 PM
Mentor(s): David Arnosti (Biochemistry & Molecular Biology)

The Drosophila embryo develops a robust epidermal layer that serves both to protect the internal cells from a harsh external environment as well as to maintain cellular homeostasis. Puncture injury with glass needles

provides a direct method to trigger a rapid epidermal wound response that activates wound transcriptional reporters, which can be visualized by a localized reporter signal in living embryos or larvae. Puncture or laser injury also provides signals that promote the recruitment of hemocytes to the wound site. So far I have practiced lining up embryos and counted for survivals with the highest one 67%. Others doing similar research have noted that protein from a plasmid chromosome can cause the fruit fly's eyes glow red. My findings will show the fact that protein regulates phenotypes. In my presentation, I will conclude with gene regulation of phenotypes with molecular cloning. Some possible titles possible are drosophila microinjection or gene regulation of drosophila's eye color.

SUPPLEMENTATION WITH DIETARY EPA/DHA INFLUENCES RED BLOOD CELL FATTY ACID DESATURASE ESTIMATES AND REFLECTS TISSUE CHANGES IN FATTY ACIDS IN SYSTEMIC ORGANS

Emily Davidson

Time: 1:30 PM

Mentor(s): Jenifer Fenton (Food Science & Human Nutrition)

Delta-5-desaturase (D5D) and delta-6-desaturase (D6D) are critical in polyunsaturated fatty acid (PUFA) metabolism. Altered desaturase activity is associated with obesity and type-2 diabetes. We sought to determine whether increasing dietary EPA+DHA alters D5D and D6D enzyme activity estimates (EAEs) in RBCs (red blood cells) and systemic tissues. Mice were fed diets with increasing percent of energy (0.0%en – 1.8%en) from EPA+DHA. Phospholipid (PL) fatty acids (FAs) were isolated from RBCs and tissues, converted to FA methyl esters, and analyzed using gas chromatography. D5D and D6D EAEs were calculated using ratios of arachidonic/dihomo-gamma linolenic acid (DGLA) and DGLA/linoleic acid. We observed a positive correlation between RBC and all tissue D5D EAEs. RBC D6D EAEs were positively correlated with muscle and negatively correlated with adipose D6D EAEs. D5D and D6D EAEs varied with supplementation. A significant decrease in D5D EAE was observed in heart, lung, spleen, and adipose when comparing control vs. 1.8%en diets. D6D EAE significantly decreased in muscle but, increased significantly in adipose tissue compared to control. RBC desaturase EAEs remained reflective of tissue desaturase EAEs despite changes in mean D5D and D6D EAEs after supplementation. High correlation between RBC and tissue desaturase EAEs indicates RBC D5D and D6D EAEs are accurate non-invasive methods to assess tissue PUFA metabolism. Future studies should investigate the feasibility of RBC desaturases in assessing tissue desaturases in disease models and the influence of EPA+DHA on FA metabolism.

METABOLIC RESPONSES DURING RECOVERY FROM NITROGEN DEPRIVATION IN CHLAMYDOMONAS REINHARDTII

Bradley Disbrow

Time: 1:45 PM

Mentor(s): Yair Shachar-Hill (Plant Biology)

Microalgae have the potential to serve as a key feedstock for transportation biofuel. When deprived of nitrogen, many species of microalgae accumulate large amounts of lipid and starch while entering a low-growth, low-photosynthetic state. Chief among the accumulated lipids is triacylglycerol, which can be extracted and converted to biodiesel via transesterification. When microalgae are placed into nitrogen-replete media after nitrogen deprivation (i.e., during nitrogen recovery), storage compounds rapidly dissipate as the cell returns to normal growth and photosynthetic function. TAG and starch accumulated during deprivation are believed to be "overflow" products, but little is known about whether or how they are utilized during recovery. We hypothesize that TAG and/or starch are actually storage reserves that used for recovery. *Chlamydomonas reinhardtii* will be incubated in ^{14}C-acetate during nitrogen deprivation and in unlabeled acetate in nitrogen-replete media. Quantifying the ^{14}C label present in TAG, membrane lipid, polar lipid, starch, and amino acid pools will demonstrate whether *Chlamydomonas* uses the degraded TAG and starch to aid it in recovering from the nitrogen-deprived state. Preliminary data have also suggested that large amounts of turnover in all lipid fractions occurs in nitrogen recovery; an experiment in which *Chlamydomonas* is incubated in ^{13}C-acetate during nitrogen recovery will demonstrate whether lipids are constructed de novo or merely recycled from storage TAG. Understanding these processes will help identify

the metabolic and physiological drivers of TAG production, aiding microalgae's development as a biofuel producer of the future.

UNDERSTANDING THE ROLE OF THE RETINOBLASTOMA-LIKE FAMILY PROTEIN IN REGULATION OF THE INSULIN RECEPTOR IN DROSOPHILA USING CRISPR-CAS9 MUTAGENESIS

Andrew Ingersoll
Time: 2:00 PM
Mentor(s): David Arnosti (Biochemistry and Molecular Biology)

The Insulin/Insulin-like peptide Signaling (IIS) pathway is a central regulator of nutrient dependent growth in metazoans. In Drosophila melanogaster, the Insulin Receptor (Inr) protein binds to Insulin-like peptides and signals through the Insulin signaling pathway. Expression of Inr is crucial to signaling and is regulated by cis-regulatory elements (CRE) associated with the gene. The Retinoblastoma-like family protein (Rbf) has been shown to be associated with CREs upstream of Inr. In order to identify whether Rbf directly regulates Inr expression in vivo, we are using CRISPR-Cas9 technology and Homology Directed Repair (HDR) to generate transgenic flies with an Rbf binding site that has been removed and replaced with a red fluorescent protein called DsRed that produces an eye phenotype. In my research project, I have constructed plasmids for expression of targeting RNAs, and learned how to carry out embryo injections under a microscope. I injected two plasmids containing different guide sequences targeting the Rbf binding region near the Inr gene and one plasmid containing DsRed to be used for HDR into embryos expressing Cas9. Screening of progeny will be carried out by using the DsRed phenotype to identify mutant flies with mutations in the Rbf binding region. My future studies will be focused on using these transgenic flies to study the phenotypic effect of a lack of Rbf regulation on Inr expression.

STRUCUTAL DETERMINANTS OF HOST SPECIFICITY OF COMPLEMENT FACTOR H RECRUITMENT BY ESCHERICHIA COLI CONTAINS A LARGE CSPA FAMILY

Yizhou Huang
Time: 2:15 PM
Mentor(s): Honggao Yan (Biochemistry)

Many human pathogens have strict host specificity, which affects not only their epidemiology but also the development of animal models and vaccines. Complement factor H (FH) is recruited to Escherichia coli cell surface in a human-specific manner via the bacteria protein virulence factor called CspA family protein. In the present study, we show that a single human FH (hFH) domain is sufficient for tight binding of CspA, present the crystal structure of the complex and identify the critical structural determinants for host-specific FH recruitment. The results offer new approaches to the development of better animal models for Escherichia coli infection.

BIOCHEMISTRY & MOLECULAR BIOLOGY
POSTER PRESENTATIONS, SECTION 1
LAKE HURON ROOM, 9:00 – 10:30 AM

ANALYSIS OF MORTIERELLA SP. FATTY ACID PRODUCTION UNDER VARIED GROWTH AND STRESS CONDITIONS

Nils Benning
Poster: 62
Mentor(s): Gregory Bonito (Plant & Soil sciences)

Mortierella is a species of plant-associated fungi of the Zygomycota division that are found globally and ubiquitous in soil. These coenocytic fungi are of biological interest due to their tendency to harbor bacterial endosymbionts as well as promote symbiosis among Mortierella and plants, and have unique oleaginous properties involving these symbioses as well as other environmental conditions. To better understand the fungi, we explore the metabolic diversity of the genus Mortierella and the effect that certain environmental

stresses have on the metabolism of these fungi and how their metabolic composition changes based on changes in the environment. Mortierella is known to produce AA and GLA under normal growth conditions with the added production of EPA and DHA when under stress. Metabolic analysis is done using Gas Chromatography on the fatty acid methyl esters (FAMEs) to compare the presence of omega-3 and omega-6 fatty acids such as GLA, AA, EPA, and DHA; which vary under stress conditions. Environmental factors and stress conditions include exposure to light, extreme temperature (relative to the fungi), and nutrient deficiency which eventually leads to the exploration of the effects of hyphal symbionts on the metabolites of the fungi.

BULK SPECTROSCOPY USING THICK-LAYER SPECTROELECTROCHEMICAL CELL

Dawei Chen, Grant LeVasseur

Poster: 63

Mentor(s): Denis Proshlyakov (Physical Chemistry)

Thin-layer spectroelectrochemical cells have limitations in their lack of user interaction during the middle of the experiment and their short optical pathlengths. The small volume of the sample chamber makes it difficult to examine compounds with weak chromophores such as Tyrosine Hydroxylase and the cell cannot be opened during the middle of the experiment to modify the analyte. We introduce a novel thick-layer spectroelectrochemical cell with a 1 cm pathlength and a sample chamber that can be accessed during the middle of the experiment. We 3D-printed a standard 12.5x12.5 mm cuvette to house the electrodes and optimize the dimensions of the sample chamber to improve the redox performance. The sample chamber design minimizes the distance between the working electrode and the stir bar. We utilized a carbon fiber "brush" electrode as the working electrode to further increase the surface area to analyte ratio. A 3-mm micro stir bar served to circulate analyte through the working electrode. The conical sample chamber improves diffusion of analyte through the working electrode by facilitating vortex flow. We tested the performance of the cell by performing spectroelectrochemistry of Hexachloroiridate and Horseradish Peroxidase (HRP) and monitoring the changes of absorbance over time. We observed high-performance reversible redox cycles in both Hexachloroiridate and HRP and clear spectral changes with changing oxidation states. The thick-layer cell is a promising complement to the thin-layer cell as it confers advantages in both convenience and spectral signal strength.

GENETIC MAPPING OF PLANTS' ANTI-INSECT DEFENSE TRAITS IN WILD AND DOMESTICATED SPECIES OF TOMATO

Michael Das

Poster: 64

Mentor(s): Gregg Howe (Biochemistry and Molecular Biology), Koichi Sugimoto (Biochemistry and Molecular Biology)

Plants use both constitutive and inducible defense strategies to deploy complex suites of chemical defensive traits against herbivores. Little is known, however, about how induced vs. constitutive defense responses evolved, and how these two primary modes of defense differ at the transcriptional level. We are addressing these questions through comparative analysis of cultivated and wild species of tomato that express distinct anti-insect defenses in leaves. For example, the wild species Solanum pennellii invests heavily in constitutive production of glandular trichome-borne acyl sugars for defense. Cultivated tomato (S. lycopersicum), however, produces only trace amounts of acyl sugars and is characterized by strong wound-induced expression of anti-nutritional proteins that act in the insect gut, including proteinase inhibitors (PIs) and the amino acid-degrading enzyme arginase2 (ARG2). Genome-wide transcript profiling experiments identified a robust set of genes whose wound-induced expression in leaves of S. lycopersicum is strictly dependent on the defense hormone jasmonate (JA). Interestingly, the majority (88%) of these JA-dependent genes, including those encoding PIs and ARG2, were either not expressed or weakly expressed in wounded leaves of S. pennellii. We used genetic mapping to show that the polymorphic wound-induced expression pattern of PIs and ARG2 is tightly associated with the genes encoding these defense proteins. These results suggest that changes in the DNA sequence of regulatory elements within these genes are responsible for the

expression polymorphism between cultivated and wild tomato species. We conclude that genetic diversity in tomato can be used to study the evolutionary and ecological underpinnings of anti-insect defense.

CRBPII BINDING
Natalie Harnsakunatai
Poster: 65
Mentor(s): Babak Borhan (Bioorganic)

With the project I am working on we are proposing a different angle on the His-tag system. In this affinity chromatography, Nickel is immobilized to the column by NTA-chelation chemistry. A His-tagged protein has high affinity for this nickel and will bind to the resin. Through the use of an elution buffer (typically high imidazole concentration) the protein can be eluted from the resin. We are seeking to develop a new type of affinity chromatography for protein purification based on the light induced cis-trans isomerization of a protein bound azobenzene derivative. These azobenzene compounds have a nitrogen-nitrogen double bond that can isomerize between cis and trans. We are proposing this transformation via UV and visible light. We will be measuring the binding affinity, or Kd, of our different protein mutants with both the cis and trans formation by florescence quenching. We will seek to optimize the binding of the trans substrate, while decreasing the affinity of the cis substrate. In this way we can immobilize the trans azobenzene (higher affinity for the protein) on resin, and with light irradiation we can induce the isomerization of the trans to cis azobenzene (lower affinity for the protein), which should release the protein from the resin.

VARIATION OF ACYLSUGAR ACYLTRANSFERASE FUNCTION IN THE SYNTHESIS OF AN INSECT DEFENSE COMPOUND: ACYLSUGARS
Abigail Miller
Poster: 66
Mentor(s): Pengxiang Fan (Biochemistry and Molecular Biology), Robert Last (Biochemistry and Molecular Biology, Plant Biology)

In the Solanaceae family, specialized metabolites are secreted from apical tip cells of glandular trichomes on the leaves and stems of the plant. These specialized compounds are known as acylsugars, and they serve as an insect defense mechanism. Acylsugars have been found to vary in composition across wild relative species, originating from the variance of the acylsucrose-biosynthesis pathway. This variation in the pathway is due to the activity of the four BAHD enzymes: Acylsucrose-Acyltransferase 1-4 (ASAT), to use certain substrates to create acylsugars. The evolutionary process of how this variation took place is still unknown. The enzyme activity of ASAT2 and ASAT3 were compared through multiple sequence alignment, assays, and phylogenetic tree modeling across species in order to find evolutionary correlation of substrate specificity changes. Through site-directed mutagenesis of ASAT2 and ASAT3 in S. lycopersicum, the cultivated tomato, and S. pennellii, multiple amino acids were found to alter the substrate specificity of the enzyme. Comparing these amino acid changes to the geographical location of the S. pennellii plants in South America, a potential evolutionary divergence of enzyme function is explained. Furthermore, novel activity was found in relatives of the cultivated tomato, which contributes to the acylsugar diversity in the Solanaceae family. This study aids in the explanation of evolutionary divergence in a plant defense pathway and the manipulation of enzyme activity through structural changes.

HOMOLOGY MODEL OF HUMAN RNA POLYMERASE II
Harrison Morgan
Poster: 67
Mentor(s): Zachary Burton (Biochemistry & Molecular Biology)

Atomic resolution structures are essential to analyze the structure, function and dynamics of complex biological systems. Multi-subunit RNA polymerases of the 2-double-psi-beta-barrel type are among the largest and most dynamic proteins known, and these essential enzymes participate in very large complexes of proteins, DNA, RNA and nucleoside triphosphates. Cryo-electron microscopy is an emerging tool to solve large biological assemblies, but this technique has not yet been applied to many relevant RNA polymerase

structures. Until atomic resolution data becomes more available, homology modeling can provide adequate structures to support most research projects. A homology model, therefore, was constructed of human RNA polymerase II. The purpose of the human model was to better understand mutations in RNA polymerase II that arise in human cancers. Cancer mutations are identified within the core catalytic apparatus and around the RNA polymerase periphery. Mutations in the sandwich barrel hybrid motif (an insert within a double-psi-beta-barrel) are identified that may affect initiation and elongation of RNA chains. A mutation in the bridge helix is also likely to affect RNA synthesis. Because cancers are associated with altered patterns of gene expression, peripheral mutations may indicate interaction points for transcriptional regulators. Models were generated using various 3-D molecular imaging programs and alignment software such as Pymol, UCSF Chimera, Yasara, Wincoot and Phyre 2. In future work, homology models will be constructed of human RNA polymerase I and III to analyze human leukodystrophy and Treacher-Collins mutations and Mycobacterium tuberculosis to analyze rifampicin-resistant RNA polymerase mutations.

BIOCHEMISTRY & MOLECULAR BIOLOGY
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 11:15 AM – 12:45 PM

A COMPARATIVE STUDY OF LIPID ANALYSIS IN VARIOUS CORN STOVER BIOMASS HYDROLYSATES
Bana Abolibdeh
Poster: 70
Mentor(s): Shi-You Ding (Plant Biology)

Diminishing fuel sources has intensified interest in developing alternative fuel sources. An alternative source that is currently under study involves the study of bacteria, yeasts, fungi as they can naturally synthesize natural energy stores like fatty acids and isoprenoids because such organisms have the ability to convert substrates like CO2, sugars, and organic acids to single cell oils. In this study, the aim to is to understand how different corn stover biomass hydrolysates affects lipid production is Rhodosprordium toruloides Yeast strain. The pretreatments are alkaline, dilute acid, and AFEX (Ammonia Fiber Expansion); washed and unwashed sampled. There are three different hydrolysates obtained from enzymatic hydrolysis of pretreated corn stover biomass. Corn stover is an abundant raw material that is composed of cellulose, hemicellulose, and lignin, which after enzymatic hydroysis get converted to simple sugars including glucose and xylose as well as some inhibitors such as furfural and HMF. Each of these hydrolysates has diverse amounts and types of sugars and inhibitors as well as various carbon/nitrogen ratios which provides the yeast cells different components to produce lipids which can then be used as feedstock for fuel production. The strain is grown in the different hydrolysates, then the cells are isolated, and the lipids are extracted and analyzed.

DO OPIATE RECEPTORS HAVE ADRENERGIC BINDING SITES?
Elizabeth Churchill
Poster: 71
Mentor(s): Robert Root-Bernstein (Physiology)

Root-Bernstein and Dillon have demonstrated that adrenergic receptors in the human body have opiate binding sites that enhance adrenergic receptor activity (Root-Bernstein et al. 2014). They reasoned that perhaps, since the adrenergic receptors had opiate binding sites, the opiate receptors had adrenergic binding sites as well. We are studying whether opiate receptors also possess binding sites to which epinephrine is able to bind. The first step is to determine whether the regions that are known to bind epinephrine in the adrenergic receptor also appear in the opiate receptors. We used homology searching to compare the amino acid sequences of different receptors found in the human body. The epinephrine biding sites on the human mu-opioid receptor and alpha-1a adrenergic receptor exhibit strong sequence similarity. Our second step is to determine whether these homologies are conserved across the evolution of this pair of receptors. I am therefore using the Lalign system to see if the similarities between the human mu opioid receptor and the human alpha-1a receptor were also present in other species such as zebrafish (danio rario), stickleback (gasterosteus aculeatus), african clawed toad (xenopus leavis), sea lamprey (petromyzon

marinus), and mallard duck (anas platyrhynchos). After these binding sites are identified, we will have the appropriate opiate receptor regions synthesized and determine whether adrenalin binds to these regions using UV spectroscopy.

THE EFFECT OF CHANGING CATION CONCENTRATION OF THE FUNCTION OF THE HAIRPIN RIBOZYME

Ben Miller
Poster: 73
Mentor(s): Charles Hoogstraten (Biochemistry)

The hairpin ribozyme is a small self cleaving catalytic RNA. Self cleaving ribozymes are functional sequences of RNA that can undergo and perform catalysis. These ribozymes function in virusal satellite RNAs to generate monomeric genomes without the help of host factor proteins. We study the hairpin ribozyme in the junctionless (two separate molecules) state. Surface Plasmon Resonance is a way to study the kinetics of the docking and cleaving of the hairpin ribozyme. By using Surface Plasmon Resonance (SPR) we can effectively discern the association and dissociation rates of RNA-RNA interactions. My specific study deals with how the presence of metallic cations affects the kinetics of the reaction. Cobalt Hexamine is the metal cation used in my study. The negatively charged backbone of RNA takes advantage of the these metal ions to change its structure in response to changes in the ionic microenvironment. As RNA is limited to only four similar base pairs it must utilize slight differences in charge to perform catalytically. In theory an increase in metal ion concentration should increase binding affinity, but our results have shown that over a certain threshold increasing ion concentration may actually decrease affinity. SPR allows us to vary metal concentration and observe the resultant changes to binding affinity.

ENGINEERING CYANOBACTERIA FOR SHORT CHAIN ALKANE PRODUCTION

Daniel O'Hagan
Poster: 74
Mentor(s): Danny Ducat (Biochemisry and Molecular Biology)

Genetically-modified microbes provide one potential way towards the sustainable production of biofuels that could be compatible with existing infrastructure. Recently, it was demonstrated that E. *coli* could be modified to produce strains capable of synthesizing short chain alkanes (SCAs) by converting externally supplied carbon sources [1]. These microbes were altered to express a mutant thioesterase which terminates fatty acid elongation early, used in conjunction with an exogenous 2 enzyme pathway, consisting of a fatty acyl-CoA reductase and an aldehyde decarbonylase, which convert newly synthesized fatty acid to alkane. We wished to translate these results into a cyanobacterial chassis, so as to take advantage of their capacity to utilize solar energy and fix atmospheric carbon for chemical synthesis. We modified the fatty acid biosynthesis pathway (FAB) in Synechocystis sp. PCC 6803 by the addition of two exogenous thioesterase genes; AAC49179 and EEI82564 from Cuphea *palustris* and Anareococcus *tetradius* respectively. These thioesterases were selected because of their C8 specificities reported by Reilly [2]. We also inserted the alkane synthesis pathway used by Lee [1]. This pathway consists of the genes acr from Clostridium *acetobutylicum* and CER1 from Arabidopsis *thaliana.* Here, we describe our methodology, the resulting changes in cellular fitness, lipid profiles, and alkane productivity in our modified cyanobacterial lines.

THE INFLUENCE OF YM-1 DERIVATIVES ON THE DEGRADATION OF MISFOLDED POLYGLUTAMINE ANDROGEN RECEPTOR IN MODELS OF SPINAL AND BULBAR MUSCULAR ATROPHY

Char Panek
Poster: 75
Mentor(s): Andrew Lieberman (Pathology, University of Michigan School of Medicine)

Spinal Bulbar Muscular Atrophy (SBMA) is an adult onset neurodegenerative disorder that solely affects men, causing weakness and atrophy in extremities and bulbar muscles. SBMA is caused by CAG/-polyglutamine (polyQ) expansion in the androgen receptor (AR) that results in the production of a toxic a-protein that misfolds in a hormone-dependent manner. These proteins are poorly degraded, therefore

accumulating and disrupting cellular processes. There are currently no treatments for SBMA that can modify disease progression. The purpose of this study was to analyze a derivative of YM-1, JG294, which could potentially degrade the toxic protein aggregates that cause SBMA. Studies have indicated that YM-1 promotes the ubiquitination of polyQ AR aggregates, alleviating toxicity in disease models, making YM-1 a suitable chemical scaffold for developing therapies for SBMA. These compounds work by stabilizing the ADP-bound form of Hsp70, favoring ubiquitination and degradation of the mutant protein through the proteasome. A previous study involving JG98, another YM-1 derivative, supports this hypothesis. Because JG98 is structurally similar to JG294, results suggest that JG294 may also have the same effect.

BIOCHEMISTRY & MOLECULAR BIOLOGY
POSTER PRESENTATIONS, SECTION 3
BALLROOM, 11:15 AM – 12:45 PM

THE ABILITY OF RE-LOCALIZED CCME TO MATURE CYTOCHROMES IN THE CYTOPLASM OF E. COLI

Donna Liebelt

Poster: 78

Mentor(s): Danny Ducat (Biochemistry)

Cytochromes are heme containing electron carriers that are typically matured outside of the bacterial cytoplasm. The CcmE protein has been established as a critical factor in the maturation pathway of cytochromes and is localized to the periplasm of E. coli. Therefore, relocalization of CcmE to the cytosol may be expected to permit the cytosolic maturation of cytochromes. To test this hypothesis, I removed the periplasmic-targeting signal peptide and transmembrane helix from cytochromes and CcmE respectively to target them to the cytoplasm of E. coli. I then constructed a collection of expression plasmids each encoding a cytochrome c from cyanobacteria or thermophiles. Cytosolic CcmE and target cytochromes were co-expressed in E. coli and the resulting proteins were examined by gel electrophoresis, Western blots, heme-staining, protein purification and/or spectroscopic techniques. Through comparison to negative controls, we intend to determine if CcmE is able to transfer heme to, and therefore mature, a cytochrome in the cytosol of E. coli. Successful maturation of cytochromes in the cytosol could provide an alternative, orthogonal electron carrier that could be applied to an artificial cytoplasmic electron transport pathway. These electron carriers would be available to receive reductant from cytoplasmic sources (e.g. photosystems) to enable novel approaches for metabolic engineering inside bacterial systems.

ELECTROCHEMICAL POTENTIAL IN MICROFLUIDIC DEVICES

Matthew Murphy

Poster: 79

Mentor(s): Denis Proshlyakov (Chemistry)

Using a microfluidic device we are able to replicate the electron transport chain that occurs in the mitochondria of a cell. A thin film that is placed in the microfluidic device quenches the fluorophore placed in the center. The oxidizing of various compounds generate electrons that can form a current between a working and counter electrode through means of a electrolytic solution. This is the main point of the research being done this semester by me, is to find the potential of the electron current through the microfluidic device thus simulation of the electron transport chain.

STRUCTURAL BASIS OF HOST SPECIFICITY OF COMPLEMENT FACTOR H RECRUITMENT BY NEISSERIA MENINGITIDES

Yufeng Nai, Yucheng Wu

Poster: 80

Mentor(s): Honggao Yan (Biochemsitry)

Many human pathogens have strict host specificity, which affects not only their epidemiology but also development of animal models and vaccines. Neisseria meningitidis is a human-specific pathogen, and

causes deadly diseases such as meningitis and pneumonia in humans but not animals. The strict host specificity of this deadly pathogen is correlated with the host specificity of complement factor H recruitment by the factor H binding protein on its surface. Although the structure of the complex of the bacterial protein with the human protein has been reported, the structural basis of host specificity of factor H recruitment is not known and is investigated in this work by molecular dynamics simulations followed by binding energy analysis. Molecular dynamics simulations are performed on the complex of the human and bacterial proteins. Binding energies are calculated from the simulation data for individual residues. Then a structural model is built by homology modeling for the complex of the mouse and bacterial proteins. The same computational analysis is performed on the complex of the mouse and bacterial proteins. The comparison of the results of the two computational analyses allows us to identify the structural determinants of host specificity of complement factor H recruitment by the meningococcal protein. Then two sets of computational mutagenesis are performed, one set on human factor H and the other on mouse factor H. Computational analysis of the complexes of the mutant proteins is used to confirm the structural basis of host specificity of complement factor H recruitment by the meningococcal protein.

CLONING AND CHARACTERIZATION OF THREE TAUD-LIKE PROTEINS FROM MYCOBACTERIUM GOODII X7B

Anastasia Ritchie
Poster: 81
Mentor(s): Robert Hausinger (Microbiology and Molecular Genetics)

Mycobacterium goodii X7B is a thermophilic, gram-positive bacterium used in the desulfurization of gasoline, diesel, and crude oils. Recently, its genome was sequenced and annotated revealing three open reading frames (AKS31794.1, AKS31881.1, and AKS36633.1) predicted to encode gene products with 41, 39, and 30% sequence identity to TauD from Escherichia coli. TauD is an enzyme that catalyzes hydroxylation of the sulfur-containing species aminoethanesulfonate (taurine) to an intermediate that decomposes to sulfite and an aminoacetaldehyde. The enzyme couples the hydroxylation of taurine with the oxidative decarboxylation of ?-ketoglutarate to produce carbon dioxide and succinate. The tauD-like genes from M. goodii were each cloned into a pET28a+ plasmid vector for overexpression in E. coli. Expression from the three plasmids resulted in soluble proteins that were purified using affinity chromatography. Preliminary characterization of the proteins using taurine as a substrate with an assay that measures the release of the sulfite indicated no product formation. The results demonstrate that none of the proteins were authentic TauD enzymes. An alternative possibility is that the M. goodii proteins catalyze hydroxylation of still-to-be identified substrates similar to taurine in containing sulfur. Herein we present our attempts to identify the substrate for each of the three proteins by analyzing various taurine related compounds.

NOVEL MODES OF GENOME TARGETING BY THE RETINOBLASTOMA TUMOR SUPPRESSOR FAMILY

Julianne Streukens
Poster: 82
Mentor(s): R William Henry (Biochemistry and Molecular Biology)

The Retinoblastoma (RB) tumor suppressor family is frequently inactivated in a broad range of cancers and regulates key pathways in cell cycle, differentiation, and apoptosis. I have been studying the Drosphila melanogaster RB tumor suppressor protein homologues Rbf1 and Rbf2 because this system allows me to determine the impact of the RB system on development. Rbf proteins function as transcriptional repressors that bind E2F activators governing genes involved in cellular life and death choices. Rbf1 and Rbf2 are structurally similar to their human counterparts and possess functionally conserved activities. Whereas Rbf1 has a dominant regulatory role in cell cycle control and its mutants exhibit a lethal phenotype, Rbf2 mutants exhibit a mild phenotype and it was proposed that Rbf2 plays only a minor role in gene regulation. Our data from genome-wide ChIP-sequence studies, however, shows there are more Rbf2-bound genes than Rbf1-bound genes, indicating a strong presence for Rbf2 in genomic governance. I hypothesize that Rbf2 interacts with its E2F partners employing a distinct mechanism from that of Rbf1. To determine this mechanism, I will perform binding assays using Rbf constructs that contain specific domains to study their interaction with wild-type E2F proteins. Our studies have shown a unique interaction via the N-terminal

domain of Rbf2 with its E2F partners. These studies reveal a novel mode of genomic targeting for Rbf2 during embryonic development. These developmental programs are frequently disrupted in cancer progression and our studies provide new insights into the mechanisms of deregulated gene expression during tumorigenesis.

ALTERING THE ACTIVE SITE OF TYROSINE AMINOMUTASE FROM ORYZA SATIVA (OSTAM)

Devinda Wijewardena
Poster: 83
Mentor(s): Kevin D Walker (Chemistry)

A unique class of enzymes uses a 4-methylideneimidazol-5-one (MIO) prosthetic group in the active site to isomerize aryl-?- to -?-amino acids. Recently, an MIO-tyrosine aminomutase (TAM) was isolated from rice, Oryza sativa (OsTAM), the first MIO-TAM isolated from plants. This MIO-TAM activity might be crucial to discovering a human health benefit of ?-tyrosine production in rice. Earlier studies showed 1)the OsTAM mechanism retains the configuration at the prochiral and stereogenic centers of ?-tyrosine, and 2)OsTAM is the first TAM with phenylalanine aminomutase (PAM) activity. The active sites of OsTAM and TcPAM from Taxus canadensis plants differ by only two residues (Y125 and N446 in OsTAM; C107 and K427 in TcPAM) similarly positioned near the phenyl ring of their substrates. To study the effects these residues have on substrate selectivity, two single-(Y125C- and N446K-OsTAM) and one double-mutants (Y125C/N446K-OsTAM) were made. Each single-mutant showed decreased activity towards isomerizing the natural ?-tyrosine substrate compared to that of wild-type (wt)-OsTAM. The Y125C/N446K-OsTAM double-mutant did not produce ?-tyrosine or p-coumarate. Interestingly, all three mutants bound ?-phenylalanine better (estimated by KM=0.7-1.0 mM) than wt-OsTAM ("K"_"M"^"app"=9mM), and had similar turnover (4×10-5-2×10-4 s-1) for ?- to ?-phenylalanine compared to wt-OsTAM ("K"_"cat"^"app"=2×10-4 s-1). However, for each mutant, the turnover of ?-phenylalanine to cinnamate was increased significantly (~10-3 s-1) over that for wt-OsTAM, which was not productive with phenylalanine. This switch from MIO-TAM to MIO-PAL activity opens a new avenue to further explore which active site residues affect substrate selectivity and switch the intrinsic aminomutase and ammonia lyase activities.

BIOCHEMISTRY & MOLECULAR BIOLOGY
POSTER PRESENTATIONS, SECTION 4
MOSAIC MULTIPURPOSE ROOM, 1:30 – 3:00 PM

THE ROLE OF DIABETES-INDUCED CHANGES IN EXOSOMAL MIRNA IN THE PATHOGENESIS OF DIABETIC RETINOPATHY

Kiera Fisher
Poster: 86
Mentor(s): Julia Busik (Physiology)

Diabetic retinopathy is a leading cause of blindness in working age adults. This diabetic eye disease causes damage by producing chronic low-grade inflammation in the retina, which leads to endothelial cell dysfunction caused by retinal micro-vascular injury. There are very few effective therapeutic options available to those affected with diabetic retinopathy, presenting a need for novel research concerning pathogenesis of the disease. Understanding the mechanisms responsible for this chronic inflammation of the retina is critical to identifying new therapies and therapeutic targets for diabetic retinopathy treatment. Exosomes are very small (40-200nm) cell-derived vesicles that are secreted into the extracellular environment and have a special role in transportation of signaling molecules such as lipids, proteins, and miRNA. A novel method for exosome quantification was developed in this study, utilizing dynamic and static light scattering technologies to determine an approximate number of exosomal vesicles based on residual intensity. This quantification method determined that there are greater numbers of exosomes present in diabetic mouse serum vs control mouse serum, using an STZ diabetic mouse model. This study also further analyzed the effect of diabetes on exosomal miRNA using ExoQuick exosome precipitation, Mirvana miRNA isolation, and analysis by miScript miRNA Mouse miRNome PCR array. Our results demonstrated that

diabetic serum exosomes have an altered miRNA content from control exosomes, including lower levels of anti-angiogenic and anti-inflammatory miRNA. This diabetes-induced increase in exosomal vesicles but decrease in anti-inflammatory and anti-angiogenic exosomal miRNA, could provide a novel mechanism contributing to the development of diabetic retinopathy.

BIOINFORMATIC ANALYSIS OF GENE REGULATION BY RETINOBLASTOMA IN DROSOPHILA MELANOGASTER DURING DEVELOPMENT

Allison Genety
Poster: 87
Mentor(s): David Arnosti (Biochemistry and Molecular Biology)

Retinoblastoma (Rb) is a tumor corepressor which plays important roles in various cellular processes including proliferation, differentiation and apoptosis. Rb mutations have been associated with various human cancers. Previous studies have identified a region in the C-terminus of RBF1, the drosophila Rb homolog, termed the “instability element” (IE) which is important for RBF1 stability as well as repression activity. Misexpression of RBF1- ?IE in wing imaginal discs of flies results in increased adult wing size and inhibition of apoptosis, whereas misexpression of K774A-RBF1 (point mutation within the IE) results in very small distorted wings with abnormal morphology and increased apoptosis. RNA-seq was performed to study gene regulation after overexpression of RBF1-WT, RBF1- ?IE and K774A-RBF1 in wing imaginal discs. Results show significant differences in gene regulation by the three RBF1 isoforms. Bioinformatic analysis is being conducted to identify motif enrichments in differentially regulated genes which aims to understand the function of RBF1 and the instability element at a molecular level.

ANALYSIS OF MICROBIAL STRAIN GROWTH IN MEDIA COMPLEMENTARY TO CSCB-EXPRESSING CYANOBACTERIA

Marie-Louise Henry
Poster: 88
Mentor(s): Danny Ducat (Biochemistry and Molecular Biology)

Cyanobacteria are photosynthetic prokaryotes which fix carbon into biomolecules by converting energy from sunlight, (van de Meene et al., 2006) an abundant, renewable resource. Cyanobacteria are potentially ideal organisms for photobiological production due to relatively tractable genetics (Koksharova and Wolk, 2002) and cultivation not requiring arable land (Rittmann, 2008). Previous work in the lab has taken advantage of endogenous osmotic-stress pathways (Hagemann, 2011) to create a genetically-modified cyanobacterial strain that exports sucrose by heterologously expressing a sucrose transporter (cscB). This extracellular sucrose may be consumed by neighboring organisms (Ducat et al., 2012) to generate artificial, light-driven bacterial consortia. Characterization of microbial strains exhibiting a symbiotic relationship with *cscB*-expressing cyanobacteria would provide a more comprehensive understanding as to how *cscB* could sustain such organisms. My research focused on analyzing the growth of numerous microbes in *cscB*-expressing cyanobacterial-complimentary media. The growth of bacterial and eukaryotic microbial strains were visually observed in media of varying salinity, sucrose concentration, nutritive ion availability, and oxygen content. Strains *B. cereus*, *C. violaceum*, *H. boliviensis*, and *H. elongata* successfully grew, while little or no growth was observed for *P. syringae*, *S. pombe*, and *C. metallidurans*. These results, as yet, do not indicate a broad phylogenetic pattern of *cscB*-cyanobacteria/microbial compatibility beyond isolated genera; however, additional compatible firmicutes and γ-proteobacteria were identified along with the first successful β-proteobacteria. Because this suggests that the *cscB*-cyanobacteria sucrose-cultivation platform may be compatible with a much wider phylogenetic range of microbes, future research would further explore compatible strains, focusing on biocommodity-producing microbes.

EPIGENETICS IN CELLULAR DIFFERENTIATION

Tyler Miksanek
Poster: 89
Mentor(s): Monique Floer (Biochemistry)

All somatic cells of an organism carry the same genetic code, but different cells in the body have vastly different functions. The secret behind our multipurpose genome is epigenetics, which allows the body to change what genes are actually expressed from cell to cell. Epigenetics is also crucial as cells differentiate from stem cells into more specialized cell types. Gene expression within a differentiating cell is largely controlled by nucleosomes, which are balls of protein that DNA is wrapped around. Nucleosome occupancy is increased as DNA is more tightly wrapped around nucleosomes, preventing its expression. My research employs a micrococcal nuclease (MNase) assay to determine the nucleosome occupancy, and by extension the level of DNA accessibility and gene expression, at various genetic loci. By comparing nucleosome occupancy at the same genes in both stem cells and differentiated cells, it is possible to develop an idea of which genes are upregulated and downregulated at various points in cellular differentiation. In our model of differentiating mouse immune system cells, we find that nucleosome occupancy increases on average across the genome as cells differentiate, suggesting differentiated cells more tightly regulate gene expression than progenitor cells. However, many sites maintain low nucleosome occupancy in differentiated cells, signifying continued importance for expression at these sites in differentiated cells. Further analysis of these regions could lead to new insights on mechanisms of cellular differentiation.

CLONING OF TFDA-LIKE GENE FROM BORDETELLA PERTUSSIS AND PRELIMINARY CHARACTERIZATION

Niklas Peters
Poster: 90
Mentor(s): Robert Hausinger (Microbiology and Molecular Genetics), Salette Martinez (Microbiology and Molecular Genetics)

Pertussis (also known as whooping cough) is a severe disease that is transmitted by a gram negative bacterium called Bordetella pertussis. Genome sequencing revealed an open reading frame predicted to encode a gene product with 42.7 % sequence identity to Cupriavidus necator TfdA, an enzyme that catalyzes the degradation of the plant herbicide 2,4 dichlorophenoxyacetic acid (2,4-D). TfdA couples the hydroxylation of 2,4-D with the oxidative decarboxylation of ?-ketoglutarate to release succinate, carbon dioxide, and a hemiacetal. The tfdA-like gene from B. pertussis was cloned into two plasmid vectors for overexpression in Escherichia coli. The expression plasmids encoded an N-terminal hexa-histidine (pMCSG7-TfdA) tagged protein and an N-terminal maltose-binding protein (MBP) fusion protein (pMCSG9-TfdA). Overexpression of pMCSG7-TfdA resulted in insoluble protein, while pMCSG9-TfdA yielded high proportions of soluble fused protein (MBP-TfdA). The MBP-TfdA protein was purified by affinity chromatography and its enzymatic activity was assessed with various 2,4-D related compounds. Preliminary characterization of the enzymatic reaction via derivatization of the 2,4-dichlorophenol product with 4-aminoantipyrene and high performance liquid chromatography to detect succinate, showed no product formation. Based on our results, we propose that the protein was not properly folded or substrate was not accessible to the active site due to the MBP fusion protein; therefore, the purified protein showed no enzymatic activity. Future studies to test for and perhaps overcome the protein misfolding, to remove the MBP tag to allow substrate accessibility, and examination of alternative potential substrates would help in the biochemical characterization of the B. pertussis TfdA-like protein.

A UNIVERSAL ASSAY FOR PROTEIN GLYCATION

Tyler Rhinesmith
Poster: 91
Mentor(s): Robert Root-Bernstein (Physiology)

Glycation, the non-enzymatic reaction of reducing sugars with proteins, is of growing physiological interest. It has been known for many years that serum proteins become highly glycated in patients with uncontrolled

diabetes and hyperglycemia. Recently, this process has been implicated in the development of many diabetic complications. It is therefore important to characterize the extent to which glycation occurs under pathological conditions. However, the detection of glycated proteins by traditional means–such as high-powered liquid chromatography and mass spectrometry–is complicated and limited by instrumentation. Furthermore, the biological source of many analytes means purity is impossible to achieve, making direct quantitative analysis very difficult. It is necessary to standardize the means by which researchers study glycation to ensure their results are reproducible and representative of true physiology. Here, we propose simple means to detect glycated peptides that may open new avenues of study. One method chemically crosslinks glycated protein with peroxidase. The crosslinked protein pair can then be detected by ligand or antibody bound to the glycated protein. This method may have utility as a means to quantify total glycation burden in a complex physiological sample, or to manufacture serum protein-enzyme conjugates for use in immunoassays. The other detection method takes advantage of the saccharide binding behavior of lectins to create a rapid and widely applicable glycation assay. We also evaluate our success in developing and implementing each of these detection methods. We hope our efforts will aid the ongoing expansion of research into the importance of protein glycation.

HOMOLOGY MODEL OF HELICOBACTER PYLORI RNA POLYMERASE

Gursimran Singh
Poster: 92
Mentor(s): Zachary Burton (Biochemistry)

Helicobacter pylori is a human pathogen associated with ulcers and stomach cancers. Because Mycobacterium tuberculosis RNA polymerase is a target of the antibiotic rifampicin, Helicobacter pylori RNA polymerase is under consideration as a potential antibiotic target. To pursue this idea, a homology model of Helicobacter pylori RNA polymerase was constructed based on the Protein Data Bank (PDB) 3IYD Escherichia coli RNA polymerase structure. PDB 3IYD shows an interesting aspect of transcription initiation and regulation involving the Catabolite-Activator Protein (CAP) complexed with the second messenger cAMP (CAP-cAMP complex). Under conditions of glucose limitation, bacteria generate cAMP, which binds to CAP and activates genes to degrade alternate sugar and carbon sources. In the homology model, the alpha CTD (the Carboxy Terminal Domain of the alpha subunit of RNA polymerase) binds CAP-cAMP. The alpha CTD interacts with helix-turn-helix 4 of the sigma transcription factor to improve otherwise weak -35 region promoter DNA contacts to stimulate naturally weak Helicobacter pylori promoters.

BUSINESS

ORAL PRESENTATIONS, SECTION 1
LAKE SUPERIOR ROOM, 11:00 AM – 12:30 PM

I HAVE A SUGGESTION: RESEARCHING VOICE BEHAVIORS

Aileen Acuna
Time: 11:00 AM
Mentor(s): Linn Van Dyne (Management)

Within a workplace environment, it is generally conceptualized that a high level of communication between managers and employees will improve an organization's functionality as expectations, updates, and issues on various projects are expressed. In particular, well-intended suggestions for change, similar to constructive criticism and referenced here as voicing behaviors, should improve organizational processes in the long run. Recent study in the field has examined the extent to which this is the case, as well as the situations and individuals that conspire to produce this kind of behavior. Drawing from existing literature provides a nominal framework for various aspects of voice behavior, but leaves some gaps in understanding the circumstances and results of the action. In this presentation, I will explain some current research understandings of the process of voice, as well as conceptualize potential relationships in un- or under-

developed sections of knowledge in the hopes of providing direction for future areas of study. In understanding how, when, and why employees feel compelled to make suggestions to their managers, the field can think about how to best utilize these instances for improvement in both employee situation and the organization as a whole.

EXAMINING THE DIFFERENCES BETWEEN GENERATION Y U.S. HOTEL EMPLOYEES VS. CHINESE GENERATION Y HOTEL EMPLOYEES

Caitlyn Kuskowski, Di Wang
Time: 11:15 AM
Mentor(s): Mi Ran Kim (Hospitality Business)

As business becomes more global, cultural issues increasingly challenge management. Employees in Eastern countries differ significantly in cultural characteristics from their counterparts in Western countries (El Kahal, 2001; Hofstede, 1980, 1993). For instance, American employees are often characterized as valuing individual achievement, self-worth, separation of power, and personal freedom (Becton & Field, 2009); employees in China are often characterized as valuing cooperativeness, team efforts, and harmony and humility (Scarborough, 1998). Magnini et al. (2013) argued that hospitality employees in individualistic and low power-distance cultures are more likely to desire empowerment than hospitality employees in collectivistic and high power-distance cultures. In the hospitality industry, the understanding of work attitudes and behaviors of Gen Y employees is crucial in developing effective managerial strategies to increase their productivity, morale, and retention. Taking into account cultural and generational factors, this study aims to compare employee vocie, job satisfaction, and commitment to an organization and customer service of hotel Gen Y employees across two different cultures (U.S. vs. China).

SOCIAL MEDIA MARKETING AND ITS IMPACT ON CORPORATE BRAND TRUST AND IMAGING

Namratha Mallya
Time: 11:45 AM
Mentor(s): Hang Nguyen (Marketing)

The purpose of this research is to determine if Corporate Imaging, in the modern world, is impacted by the principles of social media marketing during its development stage. The principles of social media marketing include, but are not limited to: channels of communication (what social media platforms are used and how), valence (psychological significance of a brand), and overall sentiment (overall measurement of consumer emotions pertaining to a specific brand). As companies strive to maintain a solid corporate reputation via Corporate Imaging in the face of consumers, the emergence of Social Media and the increasing importance of it in today's society may impact the company's image and therefore may increase or decrease consumer trust in the brand depending on the nature of the social media post. As Corporate Brand Trust in regards to corporate imaging and social media have not been studied together, the research findings found in this research may help to revolutionize how companies use social media when developing their corporate images. Using the Survey method as well as carefully analyzing social media posts, it will be determined whether social media marketing and corporate imaging do indeed affect each other.

NOVICES IN THE STOCK MARKET: AN EMOTION FREE APPROACH TO MANAGING STOCK INVESTMENT

Garrett Chamberlain, Taylor Norris
Time: 12:00 PM
Mentor(s): Kirt Butler (Finance), Antoinette Tessmer (Finance)

Investing in the stock market is a complicated "game" that is intimidating to new investors. Novice stock investors can be mesmerized by large gains and kept hopeful by huge losses. The problem our research is addressing is how young, novice stockholders can be negatively affected by emotions. We are interested in how emotion truly plays a role in the stock market. Our research analyzes the effects of emotion free strategies in stock investment. To do this we compare our diversified portfolios with strict buy/sell

disciplines to un-diversified portfolios, market averages, and professionally managed funds. We will present the results of our analysis on how emotion free disciplines perform in stock investment and explore the ways in which novice stockholders can achieve the success of professionally managed funds. This analysis will tell not only how emotion can effect stockholders, but how an investor with virtually no experience can manage risk as effectively as experts.

E-COMMERCE: THE EFFECTS OF FREE SHIPPING AND MINIMUM ORDER AMOUNT ON PURCHASING DECISIONS OF YOUNG ADULTS

Linh Dao
Time: 12:15 PM
Mentor(s): Hang Nguyen (Marketing)

E-commerce is growing at a rapid rate and it is increasingly prevalent among teenagers and young adults. Many e-commerce websites offer free shipping services for customers with order exceeding a minimum amount. This can be seen as an incentive for customers to spend more on actual products to save shipping cost. This research is designed to survey MSU students regarding their e-commerce purchasing behavior to identify whether there is a quantifiable cut-off range such that if exceeded, shoppers would be willing to buy more to qualify for free shipping. To the extent that the minimum order amount and shipping fee work in conjunction to create buying incentives, this research also attempts to study how changes in minimum shopping amount and/or shipping fee would affect purchasing decisions of young adults. In this presentation, I will present the results regarding online shopping frequency, the perceived importance of free shipping services, as well as the effects and implications of free shipping structure on purchasing habits of college students. Results from this research will benefit e-commerce businesses in designing online shopping offerings as well as young adults who would like to be aware of their online shopping habits for personal finance management purposes.

BUSINESS
POSTER PRESENTATIONS, SECTION 1
BALLROOM, 9:00 – 10:30 AM

PROFILING THE POTENTIAL BOUTIQUE HOTEL GUEST

Alexandrea Ball
Poster: 95
Mentor(s): Seung Hyun Kim (Hospitality Business)

In hospitality industry, customers have begun to prefer unique experiences. As hotel customers seek hotels that fit their personal characteristics rather than simply places to spend the night, the demand for boutique hotels has increased worldwide. The primary purpose of this study is to develop a boutique hotel market profile based on attitude. To this, we examined whether there are differences in attitude toward boutique hotels by demographics (gender, age, and income) and lifestyle-related variables (luxury consumption and fashion-oriented lifestyle). Data was collected from hotel consumers through online survey (n=506). This study suggests marketing strategies that arise from an improved understanding of the profile of this segment of hotel customers.

STOCK INVESTMENTS: THE EMOTIONAL PROCESS OF TRYING TO BEAT THE MARKET

Matthew Baas, Dan Iancio, Benjamin Jonker
Poster: 96
Mentor(s): Kirt Butler (Finance), Antoinette Tessmer (Finance)

The stock market undoubtedly plays a large role in the global economy and has an unprecedented impact on business operations. Through the market, businesses can gain large amounts of capital fairly easily which causes expansion and job creation. Individually, investors contribute to these companies to enhance their wealth and see a favored company succeed. As such, investing has become a critical part to many

individuals for retirement and financial success just as it is a critical part of the economy. The recent volatility that we have seen in markets has left investors very emotional. Our portfolios show the impact of what emotion will do in face of volatility. The impact is shown through our decision making, which often times leads to greed. Our greed would occasionally benefit our portfolio and other times lead to decisions that lowered the value of our portfolio. Our poster will compare our strategies, including our emotional approach, to a more systematic approach by two of the members in our group.

CREATING A SUCCESSFUL STOCK PORTFOLIO WHEN INVESTING INTERNATIONALLY

Lauren Fish, Abigail Andrejek, Kelsey Cross, Max Spampinato
Poster: 97
Mentor(s): Kirt Butler (Finance), Antoinette Tessmer (Finance)

This research addresses the importance of a well-diversified stock portfolio when investing only in non-American stocks. As inexperienced investors, it is even more difficult to invest in non-domestic companies, as the United States has such a strong influence on world markets. By flooding a one million dollar portfolio with all international stocks, we made sure to invest in 15-20 different companies in order to maintain diversity. However, as time passed and the market fluctuated, we realized that it is important to invest in 15-20 different currencies rather than different companies.

META CASE ANALYSIS FOCUSED ON SUPPLY CHAIN CASE STUDIES

Jason Heitzeg
Poster: 98
Mentor(s): Tobias Schoenherr (Supply Chain Management)

While case study research is becoming increasingly popular, calls for more rigor and consistency have recently been made (Barratt et al., 2010). In order to examine and assess the rigor and consistency that has been applied in logistics and supply chain management case studies, I have assisted Dr. Schoenherr and Dr. Bolumole in researching relevant articles to provide a state of current practice, trends, and practices. We compared current research practice with guidelines provided by case research methodologists, and thus identify the gap that needs to be bridged. As such, the project intends to make the following two contributions: (1) a review of the current state of case study research in logistics and supply chain management, and (2) an identification of the gaps and research needs, yielding methodological recommendations enhancing rigor and relevance for future research.

GENERATION Y HOTEL EMPLOYEES' JOB SATISFACTION, VOICE, COMMITMENT TO AN ORGANIZATION AND CUSTOMER SERVICE

Caitlyn Kuskowski
Poster: 99
Mentor(s): Mi Ran Kim (Hospitality Business)

The hotel industry is one of the fastest growing industries in the U.S. In order to effectively grow, the need for better understanding of the differences between the generations entering the company and the generation that has stayed with the company is becoming vital for the success of the hospitality industry. About 28 percent of the total U.S. workforce consists of Generation Y, which is the highest percentage of all generations (United States Census Bureau, 2011). Moreover, Gen Y employees have gradually taken over management positions from Baby Boomers and Generation Xers (Lyons, Quinn, & Sumsion, 2005). The shifting generational demographics of the workforce requires better understanding Gen Y employees for the growth and success of the hospitality industry (Barron, 2008). The purpose of this study is to examine the similarities and differences of employee job voice, satisfaction, commitment to an organization and customer service between Gen Y employees and older employees within a hospitality business environment. All these factors make a huge impact on ones company brand, delivery of service, and culture. The findings of this study can provide new and valuable insights into the understanding of Gen Y employees and will be useful for managers as it provides timely implications to develop management strategies and practices.

BUSINESS
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 9:00 – 10:30 AM

BRAND DAMAGE AND CONSUMER TRENDS CAUSED FROM FOODBORNE ILLNESSES
Theodora McKinney
Poster: 100
Mentor(s): Jaemin Cha (Hospitality Business)

The popular restaurant chain, Chipotle Mexican Grill, recently suffered from two E. coli outbreaks. News of the strain boomed across media with 60 cases in 14 states, causing 22 hospitalizations and zero deaths. Though the initial outbreak is over, the side effect of the damage done to the brand name continues to grow. The stock value stood at a high of $741.89 in September (before the outbreak) and dropped to the low of $399.14 in January. It is important to understand how the impact of events such as foodborne illness outbreaks can affect brand loyalty and consumer purchasing behaviors amid media, misinformation, and word of mouth. Thus, I propose to conduct an online survey from general consumers and college students to understand the effect of such a widely publicized outbreak of foodborne illness on individuals' affective and behavioral loyalty. During this research, I will also investigate the roles of social-demographic variables and prior knowledge of this event to understand differences in brand loyalty.

RISK DIVERSIFICATION WITHIN RELATED SECTORS
Jaren Scoggins, Cameron Gugel, Pamela Himadewi, Marc Maldaver, Paul Soma
Poster: 101
Mentor(s): Kirt Butler (Finance), Antoinette Tessmer (Finance)

Our research addresses the question of whether or not a diversified portfolio must have stocks from a multitude of sectors. The most common and practical strategy in investing is to put money into as many different sectors as possible in order to reduce risk and thus have a diversified portfolio. Because the stock market tends to grow or decline based on sectors and not as a whole, this allows a portfolio to limit its damage if the stock market starts to do poorly. In our UGS 200H class, our group created simulated portfolios with the intent of staying within closely related sectors while also maintaining minimal risk. We then aggregated our data to find our total risk as a group and whether or not it was acceptable. In our presentation, we will show that it is possible to maintain low risk by way of diversification without investing in too many sectors. We will also discuss how this can be used as an effective investing strategy for any portfolio.

GENERATION Y EMPLOYEES IN HOSPITALITY BUSINESS INDUSTRY IN CHINA
Di Wang
Poster: 102
Mentor(s): Miran Kim (Hospitality Business)

In today's world, Generation Y is becoming the main source of talents in the workspace. In China, a growing number of young Chinese workers are asserting themselves more and demanding their voices be heard in the society. A report issued earlier by human-resources consultancy Aon Hewitt found that members of Generation Y, which the findings of this survey describe as people born in the 1980s and mid-90s, became the main age component in China's talent market in 2012. For hospitality industry, it is well known that hospitality work is physically demanding and involved a big amount of metal stress, which has resulted in a high employee turnover rate in hospitality industry in recent years. Knowing how to retain employees in hospitality industry is becoming a hot topic nowadays, and this is also becoming a challenging task for hoteliers, especially when dealing with employees from Generation Y.
Therefore, the purpose of this research is to 1) compare job satisfaction, voice, commitment to customer service, and commitment to an organization between Generation Y employees and older employees within a

hotel business context in China, and 2) examine the relationships among employee voice, job satisfaction, commitment to customer service, and commitment to an organization between two groups.

POTENTIAL DEATH OF BLOCK HOLDERS
Tong Xu, Runzhi Chen
Poster: 103
Mentor(s): Miriam Schwartz-Ziv (Finance)

We searched online and coded the data to find the block holders' information, such as age, the death year of the person is already dead, if the individual is the founder of the corporation, or if he/she is an executive. Most of our data were coming from Bloomberg.com. We are collecting this data for a study that looks at whether individual blockholders add value to the company by looking at the abnormal returns at the death dates (i.e., surprise events) of shareholders.

ORGANIZATION EVOLUTION
Xinyu Yang
Poster: 104
Mentor(s): Yemisi Bolumole (Supply chain management)

This research is analyzing the third party logistics services data from the past 20 years to learn about the evolution of organizations. It is to see how the organizations have changed to respond to the environment and their interactions and influence with each other and to answer the questions of how the constrained growth of incumbent organizations favor the emergence of new entrants and how the emergence of change from seemingly innocuous occurrences at the periphery of organization and/or environment and their manifestation as major strategic considerations, investigating various modes of development in multi-causal strategic change processes and how they are dispositionally structured overtime.

CELL BIOLOGY, GENETICS, & GENOMICS

POSTER PRESENTATIONS, SECTION 1
LAKE HURON ROOM, 9:00 – 10:30 AM

EQUUS CABALLUS DNA FINGERPRINTING USING TETRA STRS
Tyler Carpenter
Poster: 106
Mentor(s): Pat Venta (Microbiology and Molecular Genetics)

It is commonly thought that the Equus caballus, otherwise known as the Horse, has very few Tetra nucleotide Short Tandem Repeats (STR), that have a high amount of variability. DNA fingerprinting in Horses has been done before, but never with tetra STRs. Tetra STRs have properties that make them more appealing over the more commonly used Di nucleotide STRs, such as minimal stutter banding, allowing for an easier and more accurate read of the DNA fragment. Using SW score and the number of STRs in repeat, referred to as repeat length, we have been able to find at least 10 tetra STRs that are variable enough to be used in DNA fingerprinting.

PCR AND GEL ELECTROPHORETIC ANALYSIS OF CANINE CELLS TO REVEAL R812W AND R1456W MISSENSE MUTATION ON THE CFTR GENE
Caleigh Griffin
Poster: 107
Mentor(s): Doug Luckie (Physiology)

Mutations within the cystic fibrosis transmembrane conductance regulator (CFTR) are commonly associated with cystic fibrosis (CF) (Welsh and Smith, 1995). The purpose of this experiment is to identify mutations within the CFTR gene in the Canis familiaris species. Through the attempt to identify the presence of the R812W or R1456W mutations, it was hypothesized that mutant-seeking forward primers will anneal to only the mutant DNA during PCR because of the intentional mismatch in the primer design and will thus reveal a band via gel electrophoresis (Spadafora et al, 2010; Yaku et al, 2008). In order to ensure the accuracy of the equipment and protocol, primers designed for the Lambda virus Rz gene were tested prior to testing the designed primers. Successful amplification of the forward and reverse primers for the Rz gene amplified a 495 bp band. Published control primers were also obtained from Spadafora and his research group for the amplification of exon 27 of the CFTR gene (320bp), which resulted in a successful amplification of 322bp (Spadafora et al, 2010). For the experimental primers, two forward primers were designed (a mutant and wild-type) to reveal the presence or absence of either the R812W or R1456W mutation. DNA was amplified using PCR and evaluated using gel electrophoresis. The R1456W resulted in successful amplification of 972bp, while the R812W primer resulted in successful amplification of 949bp during the experiment. The experimental results from this research provide an attempt to further the research in discovering non-human models for CF.

ALTERNATIVE EDITING OF RPS12 IN TRYPANOSOMA BRUCEI

Jennifer Hackler
Poster: 108
Mentor(s): Donna Koslowsky (Microbiology and Molecular Genetics)

Trypanosoma brucei is a parasitic protozoan endemic to West and Central Africa. It infects a mammalian host via tsetse fly bite transmission. *T. brucei* causes African sleeping sickness in humans and nagana in livestock, which cause great concern for human health and the cattle industry, respectively. *T. brucei* and its close relatives are unique in that they utilize post-transcriptional uridine insertions and deletions in mitochondrial mRNA. These edits are facilitated by a set of small RNAs called guide RNAs (gRNA). The genetic information located in the mitochondria for trypanosomes is encoded on two types of circular chromosomes, called maxicircles and minicircles. Maxicircles encode mitochondrial mRNAs and rRNAs and minicircles encode gRNAs. Novel sets of gRNAs facilitate alternative edits in the primary transcripts which generate multiple different mRNA sequences that may affect protein diversity. Ribosomal Protein S12 (RPS12) is a pan-edited transcript, which encodes a protein component of the ribosomal complex and is involved in the translation of the other edited and unedited transcripts. After cloning and sequencing RPS12 cDNA amplicons, alternatively edited transcripts were identified that encode non-canonical open reading frames. Our overall project aims to elucidate the process of alternative RNA editing.

IMPACT OF HIGH FAT DIET ON BREAST TUMOR FORMATION IN MICE

Julianna Joseph
Poster: 109
Mentor(s): Richard Schwartz (Microbiology and Molecular Genetics)

Recent epidemiological research on cancer has shown that diet, particularly those high in saturated animal fat content, can influence breast cancer risk. Mice in which p53, an important tumor suppressor, is knocked out in the mammary gland have an increased rate of breast tumors when fed a high fat diet (HFD). In the tumors from mice fed a HFD, there is increased angiogenesis – the formation of new blood vessels – which is one of several hallmarks of cancer formation. Our hypothesis was that a HFD will cause an increase in angiogenesis prior to tumor formation. In the study, BALB/c mice with p53 knockout mammary glands were fed a low fat diet (LFD) (10% kCal from animal fat), a HFD (60% kCal from animal fat), or a switch diet, which included switching from a LFD to a HFD, or vice versa after puberty. In the experiment we stained sections of mammary gland tissue from 19 week old mice prior to tumor formation with CD31, an endothelial marker used to recognize blood vessels. CD31 level was measured from captured images by overlaying a grid and then counting how many grid squares contained positive staining for CD31. Across all diet groups, the percentage of CD31 positive grids was similar, indicating that angiogenesis was not impacted by diet at

19 weeks of age and prior to tumor formation. Thus, a high fat diet is unlikely to have an early effect on tumor formation through increasing blood vessel formation.

MLK3 REGULATION OF INVASION-ASSOCIATED GENES IN TRIPLE NEGATIVE BREAST CANCER

Brandon Llewellyn

Poster: 110

Mentor(s): Kathleen Gallo (Physiology), Chotirat Rattanasinchai (Physiology)

Breast cancer is the most common cancer among US women with an estimated incidence of over 200,000 new cases each year. Despite a good prognosis in patients diagnosed with localized breast cancer, patients diagnosed with metastatic disease have a high mortality rate. Of the different subtypes of breast cancer, triple-negative breast cancers, which lack expression of both the estrogen and progesterone receptors and HER2, have the worst prognosis; no targeted therapies are currently available. This subtype of breast cancer disproportionately affects younger women and African American women. In order to reduce mortality and improve therapeutic options for patients with triple-negative breast cancer, it is important to identify signaling pathways and genes that are important for invasion and metastasis in triple-negative breast cancer. Our lab has shown that MLK3 is required for metastasis in triple-negative breast cancer models. I have extended these studies to examine the impact of MLK3 in the regulation of invasion genes in additional triple-negative models using quantitative RT-PCR to assess mRNA levels and immunoblotting to assess protein levels. In this presentation I will discuss the MLK3-mediated gene regulation and implications for new therapies in triple-negative breast cancer.

ELUCIDATING THE REGULATORY NETWORK OF THE NOVEL SECOND MESSENGER CGAMP IN VIBRIO CHOLERAE

Morgan Miller

Poster: 111

Mentor(s): Christopher Waters (Microbiology And Molecular Genetics Com)

Bacteria commonly utilize cyclic dinucleotide (cdN) second messengers to appropriately respond to changing environments. The recognition of external stimuli regulates cdNs, leading to an adaptive change in gene expression and bacterial behavior. The Gram-negative bacterium Vibrio cholerae, the causative agent of the disease cholera, utilizes two cdNs, cyclic di-GMP (c-di-GMP) and cyclic-GMP-AMP (cGAMP). The dinucleotide synthase DncV is responsible for synthesizing cGAMP, but our understanding of cGAMP is in its infancy. A high intracellular concentration of cGAMP has been shown to down regulate chemotactic genes in the V. cholerae biotype El Tor, a critical process during initial host colonization. In addition to inhibiting chemotaxis, we have observed that induced overexpression of DncV in El Tor prompts a small colony variant phenotype when grown on solid agar. Interestingly, I found that overexpression of an enzymatically inactive DncV (DncV*) also leads to atypical colony morphology, suggesting the cyclase plays both enzymatic and non-enzymatic roles in V. cholerae. In order to elucidate the pathways involved in mediating these colony phenotypes, I am screening colonies of V. cholerae overexpressing either DncV or DncV* for suppressor mutations that result in a restoration of wild-type colony morphology. I will utilize whole genome sequencing to identify mutations that shed light onto the molecular mechanisms controlled by and responding to DncV. Knowledge gained from this research will lead to a greater understanding of V. cholerae pathogenicity and more broadly provide valuable information about the role of cGAMP signaling in bacteria.

THE EFFECT OF HIGH FAT DIET ON MAMMARY GLAND TUMORIGENESIS IN A MOUSE MODEL

Lindsay Schichtel

Poster: 112

Mentor(s): Mark Aupperlee (Physiology), Richard Schwartz (Microbiology)

There is a growing body of research indicating that diet influences breast cancer risk. Previous research in adult Balb/c mice (13weeks of age) showed that a high fat diet (HFD) increased macrophage recruitment. In these mouse studies, the primary impact of a HFD restricted to puberty or during the entire life of the

mouse was on inflammatory cell recruitment in the breast. Mice on the HFD did not become obese. In p53 knockout (ko) mice fed a HFD, mammary tumors have increased macrophage recruitment. We hypothesized that macrophage recruitment would increase in the p53 ko mice prior to tumor formation.We thus examined the impact of diet on macrophage recruitment at a pre-tumor time point in p53 ko mice. P53 ko mice were fed a particular diet starting at 3 weeks old: a continuous diet that was high in fat (HFD), a continuous low fat diet that served as the control diet (CD), started on a high fat diet and switched to the control diet in adulthood (HFD-CD), or started on the control diet and switched to the high fat diet (CD-HFD). Analysis of macrophages in the mammary gland indicate a trend toward increased macrophage recruitment in the HFD diet alone, as well as in the HFD-CD. these results further support the hypothesis that HFD increases tumorigeneis through increased macrophage recruitment, even in non-obese mice.

CELL BIOLOGY, GENETICS, & GENOMICS
POSTER PRESENTATIONS, SECTION 2
MOSAIC MULTIPURPOSE ROOM, 11:15 AM – 12:45 PM

UTILIZING SCHIZOSACCHAROMYCES POMBE TO DETERMINE WHETHER ESCHERICHIA COLI MINC HAS ANY EFFECT ON ARABIDOPSIS THALIANA FTSZ MORPHOLOGY

Akua Acheampong
Poster: 113
Mentor(s): Katherine Osteryoung (Plant Biology), Katie Porter (Plant Biology)

Chloroplasts, the photosynthetic organelle of land plants and algae, arose from an endosymbiotic event in which a heterotrophic eukaryote engulfed an ancient cyanobacterium. FtsZ is a cytoskeletal protein that plays a key role in the division of chloroplasts as well as bacteria. FtsZ assembles the FtsZ ring (Z ring) in the middle of the cell or chloroplast and recruits other proteins to carry out the division process. Previous research has demonstrated that the Arabidopsis thaliana protein Accumulation and Replication of Chloroplasts 3 (ARC3) interacts with FtsZ and aids in the positioning of the Z ring at the chloroplast center, also known as the division site. Similarly, Escherichia coli MinC, one of three min proteins known as the Min System, functions as a negative regulator of FtsZ ring assembly at the cell poles and therefore restricts Z-ring formation to the midcell. ARC3 and MinC may exhibit analogous functions in view of the fact that they are both involved in the placement of the Z ring at the division site; they do so by directly inhibiting FtsZ assembly. Previous data have demonstrated that A. thaliana ARC3 negatively affects the morphology of E. coli FtsZ filaments in the model yeast organism Schizosaccharomyces pombe. Therefore, the specific aim of this project is to determine whether E. coli MinC has any effect on A. thaliana FtsZ morphology in S. pombe.

AN ANALYSIS OF DNA YIELD VARIATION WITHIN THE MID-SHAFT DIAPHYSIS AND EPIPHYSES OF BOVINE FEMORA

Dominic Bazzano
Poster: 114
Mentor(s): David Foran (Integrative Biology)

The recovery of DNA from bone is a widely used process in the field of forensic science in order to identify severely decomposed remains. A long bone, such as the femur, is typically analyzed by law enforcement due to its durability in the extremely harsh conditions of burial. In this thesis, the variations in DNA yields were examined in the mid-shaft diaphysis and epiphyses of fresh Bos taurus femora. Three sets of eight holes were drilled along the circumference of the mid-shaft diaphysis to determine the variations in DNA yields along the proximal to distal and anterior to posterior axes. In addition to this four additional holes were drilled around specifically determined points to analyze micro-variations in DNA yields. This strategy was echoed in the distal and proximal epiphyses of the same bone to compare the degree of variation across the entire femur. The nuclear Melanocortin 1 Receptor (MC1R) and mitochondrial ATPase 8 genes were used to quantify the amount of DNA in each region using real-time PCR. In the mid-shaft diaphysis, DNA yields

spiked close to the muscle attachment site located on the posterior-lateral axis. It was also noted that micro-variation increased greatly at this region.

LOSS OF HOMEOSTATIC CELLULAR TENSION IN RAT TAIL TENDONS INCREASES PROSTAGLANDIN-E2 AND SUBSTANCE-P PRODUCTION

Jacqueline Brooks
Poster: 115
Mentor(s): Steven Arnoczky (Small Animal Clinical Sciences), Keri Gardner (Small Animal Clinical Sciences)

Tendinopathy is defined as a non-inflammatory disease process. However, the clinical signs of pain and localized tenderness have not been reflected by histopathologic changes. Production of inflammatory cytokines (prostaglandin E_2 [PGE_2]) and neuropeptides (substance P [SubP]), by tendon cells have been implicated as potential mechanisms behind these clinical symptoms. Studies from our lab have suggested that loss of tensional homeostasis in tendon cells secondary to repetitive, loading-induced creep, can induce many of the pathological manifestations of tendinopathy. The purpose of this study was to examine the effect of tensional homeostasis loss on PGE_2 and SubP production by tendon cells. *We hypothesize that loss of cellular tensional homeostasis due to stress-deprivation will significantly increase PGE_2 and SubP synthesis.* Following IACUC approval, rat tail tendon fascicles (RTTFs) were obtained from adult Sprague-Dawley rats and maintained under tissue culture conditions. The RTTFs were separated into three groups: 0 day, 1 day stress-deprived (SD), and 3 day stress-deprived. At each time periods the RTTFs were processed for immunohistochemistry (SubP) or an ELISA (PGE_2). Stress-deprivation for 1 and 3 days produced an immediate and significant increase in both PGE_2 and SubP protein synthesis when compared to 0 day controls. The current study demonstrates that loss of tensional homeostasis results in a rapid and significant increase in PGE_2 and SubP production by tendon cells *in situ.* Understanding the interactions between tendon cells and their extracellular matrix and the resultant effect on the physiologic response of these cells may provide significant insight into the etiopathogenesis of tendinopathy.

EFFECT OF DIETARY FAT ON REGULATORY T CELL RECRUITMENT IN BALB/C TIP30-/- MICE

Frances Greathouse
Poster: 116
Mentor(s): Mark Aupperlee (Microbiology), Richard Schwartz (Microbiology)

Previous research showed that a high fat diet (HFD) increased tumor formation in BALB/c mouse models of mammary cancer. Tip30 is a transcription factor that, when knocked out in mice, produces hormone receptor positive mammary tumors. We examined HFD-fed Tip30-/- mouse mammary glands prior to tumor formation and found mammary hyperplasias associated with large numbers of immune cells. The purpose of this study was to examine the effect of HFD on immunosuppressive regulatory T cells (Tregs) in this model, prior to tumor development. We hypothesized increased Tregs in hyperplasias and that HFD would increase Treg recruitment to the mammary epithelium, promoting tumorigenesis. BALB/c mice transplanted with Tip 30-/- mammary epithelium were fed a low fat diet (LFD) (10% kcal from fat) or HFD (60% kcal from fat), and examined at 13 and 26-weeks-old for Tregs. FOXP3, a Treg marker, was detected by immunofluorescence. At 13 and 26 weeks, FOXP3 expression was increased in hyperplasias versus normal tissue. There was no difference in Treg levels between diets at 13 weeks, but there was increased expression of FOXP3 in LFD versus HFD hyperplasias at 26 weeks. The impact of HFD on Tregs in tumor formation remains to be determined, but these data provide evidence that dietary fat may influence Treg levels. Increased Tregs with LFD may be consistent with immunosuppression and tumor promotion, counter to our hypothesis.

GLUCOSE MODULATES PLASMA MEMBRANE FLUIDITY IN RETINAL EPITHELIAL CELLS

Cameron Meyer

Poster: 117

Mentor(s): Gary Blanchard (Chemistry), Julia Busik (Human Physiology)

Plasma membrane fluidity and structure are fundamental properties involved in cellular functions including proliferation, migration, cell signaling, and cell metabolism. Retinal Pigment Epithelium (RPEs) cells were used because of their sensitivity to diabetic conditions. The composition of the plasma membrane and the distribution of constituents within in it are determining factors for membrane fluidity. However the contribution of specific lipids to membrane fluidity and structure are not known due to the lack of ability to evaluate these properties in real time and over a variety of length scales. The methodology we use combines established technologies; fluorescence anisotropy decay imaging (FADI) and fluorescence recovery after photobleaching (FRAP). This approach allows us the ability to obtain complementary dynamic information (rotational and translational diffusion dynamics) on very different length scales for the same plasma membrane and to use this information to evaluate the structure and fluidity of the membrane as a function of exposure to disease state conditions. Evaluating plasma membrane structure is not readily achievable by other means. Changes in membrane structure as a function of conditions to which the cell is exposed form the basis for the diagnosis of disease state. The high sensitivity and imaging capabilities of the state-of-the-art fluorescence instrumentation enables the direct evaluation of plasma membrane fluidity and structure at the single cell level. We demonstrate the sensitivity of this diagnostic to have a factor of two change in plasma membrane dynamics upon exposure of RPEs to high levels of glucose.

THE ROLE OF TGF-BETA IN F-ACTIN STRESS FIBER FORMATION AND RHO-KINASE DEPENDENT TRANSCRIPTION OF PROFIBROTIC GENES

Samuel Olson

Poster: 118

Mentor(s): Erika Mathes Lisabeth (Pharmacology & Toxicology), Richard Neubig (Pharmacology & Toxicology)

Diseases of fibrosis, such as scleroderma, are characterized by the thickening of connective tissue, which may lead to organ complications or failure. The lack of current treatments creates a demand for new therapeutics for scleroderma and other diseases of fibrosis. Tissue fibrosis is driven by a number of factors, including transforming growth factor beta (TGFβ). TGFβ leads to changes in gene expression by activating SMAD family transcription factors. By stimulating these transcription factors, TGFβ promotes the expression of profibrotic genes; however the specific mechanism of action of TGFβ has not been fully elucidated. Here, we examine F-actin stress fiber formation, MRTF activation, and gene expression, driven by TGFβ, in NIH-3T3 mouse fibroblasts and primary human dermal fibroblasts. TGFβ stimulates F-actin stress fiber formation in NIH-3T3 fibroblasts most strongly after 3 hours, and maintains stress fibers out to 24 hours following treatment. Both SMAD and MRTF target genes increase after TGFβ stimulation in a time dependent manner. Connective tissue growth factor (CTGF) and endothelin-1 (ET-1) may also be involved in intermediary signaling in TGFβ activation of the Rho/MRTF pathway; a neutralizing antibody for CTGF as well as an ET-1 receptor antagonist were able to partially block TGFβ stimulated stress fiber formation. These data suggest a model in which TGFβ signaling leads to transcription of CTGF and ET-1 that both stimulate Rho-mediated F-actin stress fiber formation and gene expression in an MRTF dependent manner to promote tissue fibrosis. Supported by NIH/NIAMS 5R01AR066049.

THE ROLE OF MIXED LINEAGE KINASE 3 IN BREAST CANCER METASTASIS

Tasneem Sannah

Poster: 119

Mentor(s): Kathleen Gallo (Physiology), Chotirat Rattanasinchai (Physiology)

Breast cancer is the most common cancer among women in the United States. In the US mortality rates have declined over the past decade, but still, approximately 40,000 US women die from breast cancer each year,

largely due to distant metastasis. Therefore, understanding the metastatic process at a molecular level is urgently needed to identify potential targets for drug development against breast cancer metastasis. To form distant metastases, cancer cells must disseminate out from primary tumors. During this process the tumor cells are believed to undergo an epithelial-to-mesenchymal transition (EMT), through which cells lose epithelial characteristics such as strong cell-cell interactions, and acquire mesenchymal characteristics such as increased migratory ability (leading to invasiveness). Our lab has shown that Mixed-lineage kinase 3 (MLK3), a protein in mitogen-activating protein kinase (MAPK) cascade is critical for migration, invasion and metastasis of breast cancer cells. Our lab has previously engineered non-migratory, non-invasive, epithelial-like MCF7 breast cancer cells to inducibly express MLK3. In this system, induced expression of MLK3 upregulates the AP-1 transcription factor which is known to regulate genes involved in EMT. The purpose of this study is to understand the potential role of MLK3 in EMT using this model. The impact of MLK3 expression on EMT morphology will be evaluated. In addition, MLK3 regulation of EMT-associated genes will be determined by quantitative RT-PCR analysis. These studies will provide insight into the mechanisms by which MLK3 may contribute to EMT and metastasis.

DETERMINING THE CLASSICAL NEUROTRANSMITTER CONTENT OF LATERAL HYPOTHALAMIC AREA NEUROTENSIN NEURONS

Anna Wright
Poster: 120
Mentor(s): Juliette Brown (Pharmacology & Toxicology), Gina Leinninger (Physiology)

Neurotensin (Nts) neurons in the lateral hypothalamic area (LHA) of the brain regulate feeding, drinking and physical activity, but the synaptic mechanisms by which they promote these behaviors have yet to be understood. In general, neurons regulate the activity of postsynaptic targets via releasing either the classical neurotransmitter GABA (inhibitory) or glutamate (excitatory). Our goal is to determine whether LHA Nts neurons contain the GABA or glutamate, and thus whether they inhibit or excite downstream target neurons to control behavior. Previously the lack of reagents to simultaneously identify Nts, GABA and glutamate prevented this analysis. To overcome this obstacle we designed a dual genetic recombinase approach to simultaneously label Nts and GABA or glutamate-containing neurons. First, we generated mice that express FlpO recombinase specifically in Nts neurons (NtsFlpO mice). Injecting NtsFlpO mice in the LHA with a vector for FlpO-inducible green fluorescent protein (GFP) or crossing them to a Flp-inducible reporter line causes GFP expression only within LHA Nts neurons. Next, we crossed NtsFlpO mice with mice that express Cre recombinase-induced Tomato (a red fluorescent protein) in GABA or glutamate neurons. These compound genetic mouse models enable the simultaneous detection of Nts (GFP expressing neurons) and GABA and/or glutamate containing neurons (Tomato-expressing neurons) via fluorescent microscopy. Our studies will, for the first time, define the classical neurotransmitter content of LHA Nts neurons and suggest how they control neuronal targets to mediate ingestive behavior.

CELL BIOLOGY, GENETICS, & GENOMICS
POSTER PRESENTATIONS, SECTION 3
LAKE HURON ROOM, 1:30 – 3:00 PM

THE CHARACTERIZATION OF THE 28S GENE IN LEPIDOPTERA

Keegan Calnan
Poster: 123
Mentor(s): Peter White (Lyman Briggs)

With as many as 130,000 different moth species the importance of conducting Lepidoptera research is on the rise. In this research experiment, the nucleotide base sequences of the 28s gene in different moth species were found, and then, in this case the Geometridae family, the similarities and differences were compared across species of the same family or genus. The 28s gene codes for the structural RNA of the large subunit of the ribosome. The question we sought to answer was: is the 28s gene an accurate representation of the differences between the selected different moth species? Through PCR, gel

electrophoresis, and Sanger sequencing we sought to successfully replicated DNA and collect gene sequences from the fifteen moth species, all of the family Geometridae. The Geometridae family, or by their common name Geometer moths, are a very large family consisting of approximately 35,000 species, and over 1,400 here in North America.

NITROGEN STABLE ISOTOPE PROBING
Madalyn Gildea
Poster: 124
Mentor(s): Maren Friesen (Plant Biology)

Stable Isotope Probing (or SIP) is an experimental tool used to identify fixers of certain elements in an environment genetically. It is becoming more widely used in carbon fixers, and has had little exercise for nitrogen fixers. The Nitrogenase project, a multi-university project, works to find novel nitrogen fixers through various methods. This project focuses on the first steps to using nitrogen SIP to search for novel nitrogen fixers in different environments.

HOW DOES ESTROGEN PLUS PROGESTIN HORMONAL THERAPY INCREASE BREAST CANCER RISK?
Ryan Hook
Poster: 125
Mentor(s): Mark Aupperlee (Physiology), Richard Schwartz (Microbiology and Molecular Genetics)

Synthetic progestins, when used in postmenopausal hormone replacement therapy (HRT), have been found to increase breast cell proliferation and are associated with an increase in breast cancer risk. Progestins are compounds that have similar effects to those of natural progesterone. The purpose of my study is to further elucidate the role of progestins in proliferation in breast cancer by examining markers of cell cycle progression. Our hypothesis is that estrogen + progestin (E+P) HRT will show increased cellular proliferation, marked by increased Ki-67 and PCNA and decreased p27 expression. Breast cancer samples from postmenopausal women that had received estrogen (E) only or estrogen + progestin (E+P) HRT were analyzed by immunofluorescence. Levels of nuclear p27, a cell cycle inhibitor, were decreased in the E+P treatment group compared to E only. Percentages of proliferating cell nuclear antigen (PCNA) positive cells between the HRT treatments were not significantly different. Ki-67, an additional proliferation marker, that provides a staining pattern more specific to mitosis, was also used because PCNA can be expressed beyond the S phase of the cell cycle and high levels of it were detected in our samples. Thus far, there was no difference in Ki-67 expression between E and E+P treated tumors. These results suggest that while decreasing p27, the addition of progestin in HRT does not increase breast cancer proliferation in postmenopausal women. Further analysis will be required to explore the potential impact of differences in p27 level between breast cancers from women receiving E or E+P HRT.

ROLE OF FRA-1 IN CONTROLLING METASTASIS IN AGGRESSIVE BREAST CANCER
Eugenia Johnson
Poster: 126
Mentor(s): Michele Fluck (Microbiology and Molecular Genetics)

The spread of cancer to secondary locations within the body (metastasis) is responsible for 90% of cancer related deaths. Our ultimate goal is to find a novel target for controlling the spread of cancer. Fra-1 (Fos-related antigen 1) is a member of the AP-1 (activator protein-1) family of transcription factors that plays an important role in cancer metastasis. Fra-1 is highly increased in metastatic breast cancer cell lines (MDA-MB-231) as compared to non-metastatic types (MDA-MB-468). We hypothesize that Fra-1 plays a role in mediating metastasis of breast cancer by enhancing proliferation, migration, and transformation utilizing an autocrine loop. To test our hypothesis we used a doxycycline inducible dominant negative A-Fos system in MDA-231 cells to suppress the function of AP-1 including, that of Fra-1. We tested A-Fos effect using soft agar and wound healing assay. Our results showed that A-Fos inhibits anchorage-independent growth and cell migration, suppresses cell proliferation and causes cells to go into crisis. Additionally, migration of MDA-468 cells was enhanced by co-culture with MDA-231 cells, an effect that was alleviated by A-fos, suggesting

a rule of autocrine factors that are potentially regulated by Fra-1. The work in our lab suggests this role of Fra-1 is not restricted to breast cancer. Our in vitro results showed that Fra-1 plays a critical role in regulating breast and possibly other types of cancer progression. Further work is needed to demonstrate the mechanisms through which Fra-1 enhances these malignant properties.

T-TYPE VOLTAGE-GATED CA2+ CHANNELS DO NOT CONTRIBUTE TO THE NEGATIVE FEEDBACK REGULATION OF MYOGENIC TONE IN MURINE SUPERIOR EPIGASTRIC ARTERIES.

Brendan Mullan

Poster: 127

Mentor(s): William Jackson (Pharmacology & Toxicology)

T-type voltage gated Ca^{2+} channels (VGCC) have been hypothesized to control spontaneous transient outward currents (STOCs) through large-conductance Ca^{2+}-activated K^+ channels (BK_{Ca}) and contribute to the negative-feedback regulation of myogenic tone. We tested this hypothesis in superior epigastric arteries (SEAs) isolated from male C57BL-6 mice. SEAs were isolated and enzymatically dissociated to obtain single smooth muscle cells for whole-cell recording of paxilline-sensitive (PAX, 1 μM) STOCs at -30 mV, or cannulated and studied by pressure myography (80 cm H_2O, 37°C). The T-type blocker Ni^{2+} (30 μM) had no effect on STOC amplitude (20.1±1.7 pA vs. 20.6±1.7 pA; n = 12, p > 0.05), but increased STOC frequency (0.79±0.15 Hz vs. 1.21±0.22 Hz; n = 12, p < 0.05). While Ni^{2+} produced concentration-dependent constriction of isolated, pressurized SEAs ($logEC_{50}$ = -5.6±0.1; Emax = 40±3% constriction), block of BK_{Ca} with PAX had no effect on vasoconstriction induced by 30 μM Ni^{2+} (before PAX = 44±11% constriction vs. in the presence of 1μM PAX = 47±11% constriction; n = 6, p > 0.05). In contrast to Ni^{2+}, the non-selective T-type blocker, mibefradil, produced vasodilation ($logEC_{50}$ = -6.9±0.2; Emax = 74±8% dilation), whereas the putative T-type blocker, ML218, had no significant effect on myogenic tone between 10nM and 10μM (n=6-7, p > 0.05). Our data do not support a role for T-type VGCC in the negative-feedback regulation of myogenic tone and suggest that Ni^{2+} may constrict murine SEAs by means other than block of T-type VGCC. Supported by PO1-HL070687 and ASPET-SURF to B. Mullan.

HYPOXIA INHIBITS PRIMARY CILIA FORMATION AND REDUCES CELL-MEDIATED CONTRACTION IN STRESS-DEPRIVED RAT TAIL TENDON FASCICLES

Anna Oslapas

Poster: 128

Mentor(s): Steven Arnoczky (Small Animal Clinical Sciences)

Hypoxia has been implicated in the progression of chronic tendinopathy. Hypoxia has also been shown to negatively regulate skeletal mechanotransduction by decreasing the sensitivity of bone cells to mechanical signals. The inability of chronic tendinopathy patients to respond to therapies designed to stimulate a mechanotransduction response (i.e. eccentric loading) may reflect a decrease in the mechanosensitivity of tendon cells secondary to a hypoxic environment. Therefore, the purpose of this study was to examine the effect of hypoxia on primary cilia (a mechanosensing organelle of tendon cells) and on cell-mediated tendon contraction. We hypothesize that hypoxia will decrease the number of tendon cells expressing elongated primary cilia *in vitro* and will decrease the rate of cell-induced tendon contraction. Tendon cells isolated from of adult rat tail tendons (RTTs) were cultured under normoxic (21% O_2) or hypoxic (1% O_2) conditions for 24 hours and the number of elongated cilia counted. RTTs from 1-month-old rats were cultured under similar conditions for three days and tendon length measured daily. A significant (p=0.002) decrease in the percent of elongated cilia was found in cells maintained in hypoxic conditions (54.1%±12.2) compared to cells in normoxic conditions (71.7%±6.32). Hypoxia significantly decreased the amount of contraction compared to RTTs in normoxia after two (p=0.007) and three (p=0.001) days. The decreased incidence of elongated primary cilia in a hypoxic environment, as well as the decreased mechanoresponsiveness of tendon cells under these conditions may relate to the inability of chronic tendinopathy patients to respond to strain-based rehabilitation modalities.

TRANSCRIPT ABUNDANCE OF ADAR IS DIFFERENTIALLY EXPRESSED ACROSS SWINE TISSUES CONSISTENT WITH TISSUE VARIATION IN NUMBERS OF RNA EDITED LOCI
Darius Schenk
Poster: 129
Mentor(s): Cathy Ernst (Animal Science)

RNA editing encompasses post-transcriptional enzymatic modification of RNA transcripts, excluding the processes of splicing and polyadenylation and can lead to conversion, insertion or deletion of nucleotides from the original DNA sequence. In mammals, one of the primary enzymes involved in RNA editing is adenosine deaminase acting on RNA (ADAR), which converts adenosine into inosine. Evident from mouse and primate models, ADAR-catalyzed RNA editing is likely to occur at thousands of loci genome-wide, and in some cases is required to maintain optimal protein and cellular function. A previous study in our lab evaluated the presence of RNA editing in subcutaneous fat, liver, and longissimus dorsi muscle tissue in swine using next-generation sequencing technology. Genome-wide, more evidence for ADAR RNA editing was observed in liver and fat as compared to muscle tissue. Our hypothesis is that ADAR is differentially expressed across these tissues, and that such expression differences may contribute to the observed differences in RNA editing patterns in swine. To test this hypothesis, a qPCR experiment was conducted to measure relative ADAR transcript abundance between liver, fat and muscle tissue from thirty-four female pigs. Our results reveal that ADAR mRNA abundance is significantly impacted by tissue type ($n = 33$-34 per tissue; one-way ANOVA; p-value < 0.0001) and that ADAR expression in muscle tissue is significantly different than in liver and fat (Tukey post-hoc tests; $p < 0.001$). This work indicates that differential ADAR expression may be involved in differences of RNA editing patterns across swine tissues.

FLUX BALANCE MODELING IN METHYLOBACTERIUM EXTORQUENS AM1
Mario Swaidan
Poster: 130
Mentor(s): Cecillia Martinez (Microbiology and Molecular Genetics)

Methylobacterium extorquens AM1 is a methylotroph that is used to study one-carbon compounds metabolism. By using a flux balance model (FBA) we can compute simulations that allows us to see how carbon can be redistributed based on defined parameters. By deleting or adding new pathways into the model we can run simulations and define theoretically how will carbon distribution occur. There has been evidence that lanthanides, or rare earth elements, allow the upregulation of pathways previously not described or included in our FBA methylotrophic model. My goal is to include the pathways that we already know are important for lanthanide-dependent methylotrophy into the model. I will also learn how to run simulations to be able to make predictions about mutant strains that we are interested in testing experimentally to ask questions about toxicity, energy and reducing power production.

CELL BIOLOGY, GENETICS, & GENOMICS POSTER PRESENTATIONS, SECTION 4 LAKE HURON ROOM, 1:30 – 3:00 PM

CELL BIOLOGY, GENETICS, GENOMICS (TYPE-1 DIABETES)
Damian Costello
Poster: 133
Mentor(s): Sharifa Love-Rutledge (Physiology), Lawrence Olson (Physiology)

Type 1 diabetes (T1D) is an autoimmune disease characterized by immune cell mediated destruction of pancreatic beta cells. The mechanism of why beta cells are targeted is unclear. Our lab utilizes a virus inducible model of T1D, the LEW.1WR1 (LEW) rat. When LEW rats were injected with polyinosinic:polycytidylic acid (poly IC) to mimic viral infection, it leads to T1D. The immune responses that precede insulinitis (immune cell invasion of the islet) in our animal model appear to be localized to the pancreas and not global immune cell related events. Our data suggests that, during diabetes, development

immune cells are recruited by the expression of pro-inflammatory genes by the islets of Langerhans, and/or invading monocytes. To identify an inflammatory signature related to the stages of insulinitis development, pancreatic lymph nodes, lymphocytes and islet were isolated from LEW rats at day 6, day 8, and day 12. In day 12 animals, 55% of the treated population had developed diabetes. In day 8 treated animals, immunohistochemistry revealed monocytes recruited to islet cell periphery. However, both T-cells and monocytes were present in the day 12 treated animals and some islet cell destruction was observed. Quantitative real-time PCR revealed that several cytokine-responsive genes were enhanced in isolated islets, but not pancreatic lymph nodes and lymphocytes. These data suggest that, in this model, monocyte recruitment to pancreatic islet cells is activated by local pro-inflammatory cytokine signaling, implying that beta cells are possibly responsible for signaling autoimmune targeting in response to a viral trigger.

INSIGHTS INTO THE GENOME OF THE NOVEL HYPERTHERMOPHILIC ARCHAEON "GEOGEMMA HYDROGENOPHILA", AN IRON REDUCER CAPABLE OF SULFATE AND NITRATE REDUCTION

Lucas Demey
Poster: 134
Mentor(s): Kazem Kashefi (Microbiology & Molecular Genetics)

A novel hyperthermophilic, strictly anaerobic, Fe(III)- and sulfate-reducing archaeon, was isolated from chimney samples collected from a sulfide mound, named Hulk, located on the main Endeavour Segment of the Juan de Fuca Ridge (47.9501 latitude, −129.0970 longitude, depth 2200 m) in the Northeast Pacific Ocean. The new isolate, designated strain 4021, was capable of growth by coupling the reduction of Fe(III) [both soluble Fe(III) & insoluble Fe(III) oxides], sulfur-containing compounds and nitrate as electron acceptors to the oxidation of a handful of electron donors at 90°C (T^{opt}). Detailed analysis of 16S rDNA sequence of strain 4021 placed it within the genus *Geogemma*, in the Pyrodicitaceae family of the Desulfurococcale order. The name proposed for the strain 4021 is "*Geogemma hydrogenophila*" sp. nov. All members of the family Pyrodicitaceae are hyperthermophilies, and species belonging to the *Geogemma* genus are obligate Fe(III) reducers. To our knowledge "*G. hydrogenophila*" is the first organism known to gain energy for growth by reduction of Fe(III), nitrate, or sulfate. Thus, *G. hydrogenophila* serves as a paradigm for hyperthermophilic iron reducers that can also utilize sulfur and nitrogen-compounds as electron acceptors while further expanding our knowledge of genome properties of hyperthermophiles and Fe(III) reduction within the Desulfurococcales. In this work, I describe the sequencing and annotation of *G. hydrogenophila*. I also discuss the observed and predicted metabolic abilities in comparison to the Desulfurococcales. The draft genome sequence presented contains 2.04 megabase pairs in 9 contigs containing 2,163 protein-coding genes, 50 RNA genes, and 1,094 hypothetical genes.

HEXASTRS PRODUCE LESS STUTTER ARTIFACT THAN TETRASTRS: IMPLICATIONS FOR DNA IDENTIFICATION

Brenna Kizer
Poster: 135
Mentor(s): Patrick Venta (Microbiology and Molecular Genetics)

Simple tandem repeats (STRs) are used as variable genetic markers, and have applications in forensics, transplantation, and canine paternity testing. These applications sometimes require analysis of samples containing DNA from multiple individuals. The most commonly used STRs are dinucleotide STRs (diSTRs) and tetraSTRs. When utilizing high resolution genotyping, these STRs tend to create extraneous signals called stutter bands. Stutter bands complicate interpretation of data from multiple individuals by interfering with the main peaks in the genotype. PentaSTRs have been shown to create smaller stutter bands than tetraSTRs, and we wished to test the hypothesis that hexaSTRs would show further reduction of these signals. We used the UCSC Genome Browser to identify canine hexaSTRs. Primers were designed for these repeats and fluorescently labeled using a universal primer method. The hexaSTRs were amplified via PCR and submitted for high resolution genotyping. Peak area ratios between the main peaks and the stutter bands were analyzed using Peak Scanner. Stutter peaks for hexaSTRs were shown to be significantly smaller than those for tetraSTRs ($p=0.001$), but could not be shown to be significantly smaller than pentaSTRs ($p=0.34$). The sample sizes of the pentaSTRs and hexaSTRs ($n=2$ and $n=3$ respectively) were small, and we

predict that analysis of a larger data set would result in a significant difference between their peak area ratios. These results could show that hexaSTRs are superior to shorter STRs in terms of their suitability for use as variable genetic markers in applications requiring analysis of DNA from multiple individuals.

ASSOCIATION BETWEEN ELEVATED SHIGA-TOXIN PRODUCTION AND PRESENCE OF A LAMBDOID-PROPHAGE IN ESCHERICHIA COLI 0157:H7

David Knupp
Poster: 136
Mentor(s): Shannon Manning (Microbiology & Molecular Genetics)

According to the CDC, Escherichia coli 0157, an important foodborne pathogen, is responsible for 73,000 illnesses, 2,200 hospilization, and 60 deaths annually in the United States. Patients who develop hemolytic uremic syndrome (HUS) regularly require hospilization, kidney dialysis and long-term follow up. E. coli 0157 strains have been genetically characterized into 9 distinct clades based on single nucleotide polymorphisms (SNP) wherein clade 8 was associated with more sever symptoms and HUS. Disease severity has been linked to production of the Shiga toxin, encoded by the stx genes (stx1 and stx2) carried by lambdoid-prophages. We previously found that a clade 8 strain, TW14313, with elevated stx2 gene expression contained a non-stx encoding lambdoid-prophage inserted in yehV in the bacterial genome. We hypothesize that enhanced stx2 expression is directly linked to the presence of this prophage. Using site-directed mutagenesis targeting the 19.4 kb prophage, we are investigating whether deleting the prophage has an impact on stx2 expression. Identifying factors that impact toxin production are needed to develop new ways to combat E. coli 0157 infections.

INTESTINAL HEALTH PREVENTS TYPE 1 DIABETIC INDUCED BONE LOSS

Heather Mallin
Poster: 137
Mentor(s): Laura McCabe (Physiology)

Type 1 diabetes (T1D) is characterized by low insulin levels and has been linked to bone density. Our lab has shown that probiotic treatment prevents T1D-induced bone loss, indicating the importance of the bone-gut axis. In order to further examine this, T1D mice were treated with a high molecular weight polymer (MDY) which is neither absorbed nor metabolized by the gut. Interestingly, MDY treatment also prevents bone loss in T1D animals. However, its mechanism is unknown. To further understand the role of MDY in preventing bone loss, intestinal segments (duodenum, jejunum, ileum, and colon) from control and diabetic animals were collected for mRNA analysis, protein expression, and histology. I have extracted RNA from all four sections of the intestine and prepared cDNA for real-time PCR analysis. I am examining epithelial barrier integrity by measuring mRNA expression of tight junction proteins such as claudins, occludin, and junction adhesion molecules. I am also measuring pro- and anti-inflammatory cytokine expression levels. Protein analysis using western blotting and histology will be performed after identifying genes that are altered by either diabetes or MDY treatment. Results from this study will yield important information to further understand the relationship between gut and bone health in type 1 diabetes.

INFLUENCE OF VOLCANIC GAS FLUX ON EXTREMOPHILE MICROBIAL COMMUNITIES

Jacob Roush
Poster: 138
Mentor(s): Matt Schrenk (Geological Sciences)

Extremophiles are microorganisms that live in extreme environments such as volcanoes or undersea hydrothermal vents. They could have potential use in biotechnology and medicine because of their unique properties. I have access to a unique set of volcanic soils from Ethiopia, Alaska, and Italy. The Alaskan samples come from 4 different volcanoes in the Western Aleutians and the Italian samples come from 3 different locations near Sicily. I am particularly interested if microorganisms in these habitats use volcanic gases like CO, CO2, and CH4 as a source of carbon and energy. In order to identify the microorganisms, I am extracting DNA from the soil samples, screening the samples for Archaea and Bacteria using the polymerase

chain reaction, and sequencing 16S ribosomal RNA genes. Once the 16S rRNA genes are sequenced, I will compare the sequences to databases to see if they match any known organisms. In the future, I hope to use the data I've collected to study the organisms in much greater detail - for example to guide the cultivation of organisms from these locations. The DNA extracts that I generate could also be used to examine the diversity of genes associated with a specific metabolism, such as carbon dioxide fixation.

BONE CHANGES IN TYPE 1 DIABETES AFTER INTESTINAL TREATMENT WITH HIGH MOLECULAR WEIGHT POLYMER

Daniel Schoenherr
Poster: 139
Mentor(s): Laura McCabe (Physiology)

Type 1 diabetes (T1D), characterized by hypoinsulinemia and hyperglycemia, is associated with osteoporosis. To study mechanisms of bone loss, our lab uses 2 models of T1D: pharmacologic induced pancreatic beta cell death (STZ) and spontaneous T1D (Akita-Ins2), a genetic model where a mutated insulin gene is misfolded. Both models were treated with MDY for four weeks, beginning at the onset of diabetes. MDY is a high molecular weight polymer that lines the intestinal tract but is not absorbed or metabolized. We found that MDY prevents T1D bone loss; however, the mechanism is unknown. Here, we wanted to determine if osteoblast bone formation increased and/or if osteoclast bone resorption decreased. Therefore, control and T1D mouse femur and vertebrae bones were fixed, processed, embedded in paraffin, sectioned and examined histologically. Histomorphometric analysis, using fluorescent microscopy and imagePro Plus software, was used to measure the mineral apposition rate and bone formation rate in the control, STZ and Akita-Ins2 +/- MDY. These rates were quantified by measuring a calcein label that incorporates into the bone matrix as bone is being built. A tartrate resistant acid phosphatase/hematoxylin stain was used to identify and count osteoclasts as well as osteoblasts and osteocytes in the bone. I have taken 5 photos per bone section, counted more than 100 cells per section, and am pulling together data from more than 80 mice/sections. Once the data is compiled, I will be able to establish the effect of MDY on bone remodeling in the T1D mouse model.

KARS AS A MARKER FOR TUMOR METASTASIS

Patrick Stillson
Poster: 140
Mentor(s): Eran Andrechek (Physiology)

KARS is a gene used in various systems throughout the cell, and is typically considered useful in both protein synthesis and immunity, but one of its normal functions can have dangerous properties. When KARS is upregulated, the protein product will associate with membrane-bound protein, 67LR. This interaction is normal, but when it occurs at an increased rate, the odds of tumor metastasis greatly increase. Tumor metastasis occurs when part of a tumor divides from the rest of the tumor and migrates to different tissues, making it malignant. A researcher in our lab identified a mutation in KARS in a non-metastatic mouse model; the goal of my research is to identify whether or not this mutation can be found in other tumor samples which are also non-metastatic and can be used as allelic markers. Tumors were collected from non-metastatic MMTV-Neu E2F2 knockout mice. PCR and targeted sequencing were performed on tumor sample DNA around the genomic region that the original mutation was found in our previous mouse samples. To identify mutations in other regions of the gene, tumor RNA was extracted as well. Using reverse transcriptase, cDNA was made from the RNA and then PCR was performed to sequence the samples. Our goal is to find a mutation in KARS that decreases metastasis and can be used as an allelic marker to understand critical aspects of the KARS protein for tumor metastasis. This will help in understanding the function of KARS and may lead to potential therapies.

COMMUNICATION ARTS & SCIENCES

ORAL PRESENTATIONS, SECTION 1
LAKE ERIE ROOM, 1:00 – 3:00 PM

TO THE MOON AND BACK, A DECADE OF WONDER
Mia Swanton, Chelsea Dickens
Time: 1:00 PM
Mentor(s): Howard Bossen (Journalism)

The exhibition, "Achieving the Impossible: To the Moon and Back, a Decade of Wonder " is being developed to commemorate the 50th anniversary of man landing on the moon on July 20, 1969, one the greatest achievements in human history. We were brought into the project to create a database for over 1,000 images that relate to the moon. While the earliest image dates to 1852, most were made after World War II. After scanning images into the database, we research and describe each image. We are also doing background research on the Lunar Orbiter mission, one of NASA's many projects. We will be discussing the imaging and transmission technology used to make the photographs for this project that was operational from 1965 through 1967. We will also explain the scientific notes found on each image and the uses of these images by the geologists, astronauts and related NASA personnel in their efforts to find areas on the moon in which to land the astronauts for the Apollo program, and we will discuss their use in public relations and education. Howard Bossen, a professor in the School of Journalism and the MSU Museum's adjunct curator of photography, and Kathy Bossen are co-curating the exhibit, which is tentatively scheduled to debut at the Michigan State University Museum in March 2019.

A SHERLOCKIAN METHOD: USING A DIGITAL LANDSCAPE ANALYSIS TO DETECT BEST PRACTICES FOR RECRUITING NEW MEMBERS
Elizabeth Oderkirk
Time: 1:15 PM
Mentor(s): Liza Potts (Writing, Rhetoric, and American Cultures)

This presentation proposes to discuss using a digital landscape analysis to research best practices to recruit new members into a group of Sherlock Holmes fans. A scion (traditional style of fan group tracing back to the 1930s) affiliated with Michigan State University called The Greek Interpreters of East Lansing, the first academic scion in the United States, hoped to attract younger members and wanted to redesign their website to refocus on its history and new member recruitment. Using the landscape analysis as a tool to conduct and record my research, I reviewed websites managed by other traditional scions and recently formed fan groups to determine best practices in these areas that will help The Greek Interpreters stay relevant and interesting to a wider variety of fans. To complete the analysis, I narrowed my research down to look at only how the other websites told their histories, announced events, and recruited new members. With this scope, I was able to note places of improvement for The Greek Interpreters' website, as well as places where its content was strong but reorganizing it would allow potential members to locate the desired information more easily. I completed the landscape analysis by creating a summary presentation of my findings and recommendations for the redesigned website.

VOICES OF STEEL
Marisa Hamel, Jordan Jennings
Time: 1:30 PM
Mentor(s): Howard Bossen (Journalism)

Under the direction of Professors Howard Bossen and Eric Freedman, we researched a photographic project rooted in the global history of the steel industry and its social and environmental effects from the mid 19th century through today. Molten Light: Photography, Steel and the Modern World consists of an exhibition, a

book with the same title and a companion book, Voices of Steel. In collaboration with The Westmoreland Museum of American Art, Greensburg, PA and the Musée de la photographie in Belgium and—places with strong history of steel communities—Professor Bossen is organizing the exhibition to open in early 2018. Molten Light includes photographs from the exhibition as well as essays that document steel workers throughout the world. Voices of Steel expounds on the same themes with quotes, commentaries and contributing essays by Bossen, Freedman, former research assistants, outside scholars and ourselves. We will be presenting on two essays we are writing for Voices of Steel. The first chapter, The Imaginators, written by Jordan Jennings, concerns the visual relationship between steel and art in sculpture, film and painting. Marisa Hamel's chapter called The Writers focuses on the written word through poetry, drama, novels and songs. Our research includes searching for and interpreting artists' and authors' commentary on their steel-relevant work and connecting it to broader Voices themes.

CONSUMER PERCEPTIONS OF WINE LABELS: FINDINGS FROM AN EYE-TRACKING STUDY

Adam Carbeck

Time: 1:45 PM

Mentor(s): Patricia Huddleston (Advertising & Public Relations)

The purpose of the study was to learn how different consumers use wine labels to make a wine selection. We showed participants 16 wine labels on a computer screen and used a Tobii X-1 eye-tracking device to collect data. Participants looked at a randomly placed bulls-eye on a corner of the screen before each label was shown. We found that wine labels with graphics had a higher fixation count compared to labels without graphics, Time to First Fixation (TTFF), or visual capture was faster on graphics compared to other visual elements, and plant graphics had a faster TTFF than animal graphics. The study included a limited number of wine. Additionally, the labels were presented in isolation, as opposed to on a shelf, where customers will see them in a store. Other limitations included a small sample size from a limited geographic area. Future research could focus on other aspects of wine labels, such as color or glossiness, or could add a back label as only the front label was shown in this study. This study provides insights into ways for label designers to attract attention quickly, and disproves a positive relationship between lower fixation count and higher purchase intention. Our study is one of the first to examine wine labels using eye-tracking technology. We authors are able to determine which label aspects were fixated on first and for how long, paving the way for future research.

ADVERTISING IN CUBA: PRIVATE BUSINESS IN A SOCIALIST SOCIETY

Miranda Tolsma

Time: 2:00 PM

Mentor(s): Rene Hinojosa (Urban and Regional Planning), James Lucas (Undergraduate Education)

In Cuba, most businesses are owned by the state or as a joint venture between the government and a foreign company. However, private enterprise has expanded rapidly recently, though it is restricted to specific sectors. So far it is unclear what the impact will be upon the economy. My research explores the advertising industry in Cuba with a focus on private enterprise. It aims to determine what means these businesses use to promote themselves, since commercial advertisement is restricted. My research was conducted through observations and interviews with private business employees and owners. In my presentation, I will discuss the principal advertising and promotion methods used by Cuban private businesses and their effects. Private enterprises are growing in Cuba, and this research may be important to new businesses looking to expand into Cuba.

BIAS BUSTERS

Madeline Carino

Time: 2:15 PM

Mentor(s): Joe Grimm (Journalism)

Data and video tell stories with precise accuracy and a shared knowledge base can bring people together. For this project, I showed data in graphic form to tell the stories of African Americans and U.S. immigrants. I

also shot and produced videos. These demographic groups were chosen because of interest elevated by campaigns like #BlackLivesMatter and #BlackOnCampus and the presidential debates. These groups were subjects in the School of Journalism's Bias Busters series, which aims to increase cross-cultural competence and understanding. I had previously worked on the series for about a year. Last spring, I helped compose "100 Questions and Answers About Veterans" and "100 Questions and Answers About American Jews." In the fall of 2015, I took a step up by reporting, researching and designing these multimedia projects. I made print graphics for the paperback, two video packages and a motion graphic for the online versions. All the work has been published in the guides, which are for sale on Amazon and other booksellers in either print or digital format. My motion graphics were a first for the series and have also been used online to promote the guides.Bias Busters is an incredible opportunity for students to learn about new developments in flexible book publishing, interviewing on sensitive topics and ultimately become more culturally aware.

A NEW OPPORTUNITY: MMORPGS
Adam Jacobs, Stefani Taskas
Time: 2:30 PM
Mentor(s): Taiwoo Park (Media and Information)

There are little to no courses on the topic of MMORPGs, Massively Multiplayer Online Role Playing Games, in most colleges, even though it is a very popular genre of games. We are developing an MMORPG under the supervision of Dr. Park, and we would like to push classes like this to emerge for college students to take. We will present our creative process, and the steps taken up to this point, while showing excerpts from what we have created so far. We will also go over what we will finish in the future. We used research, along with personal experience, to design and develop a fully functioning MMORPG. We wish to set a guideline or a base for universities to develop a MMORPG course that students can take.

ENVIRONMENTAL REPORTING TACTICS
Colleen Otte
Time: 2:45 PM
Mentor(s): David Poulson (Journalism)

This research honed environmental reporting techniques based on trial and error producing stories for the Great Lakes Echo, a nonprofit environmental news source operated by MSU's Knight Center for Environmental Journalism. Determining which stories and formats generated the most successful response on greatlakesecho.org helped develop a sounder understanding of environmental issues and a stronger foundation of reporting tactics.

COMMUNICATION ARTS & SCIENCES
POSTER PRESENTATIONS, SECTION 1
BALLROOM, 9:00 – 10:30 AM

CRACKING DIGITAL AGGRESSION- BIOLOGICAL, ENVIRONMENTAL, AND TECHNOLOGICAL INFLUENCES
Maddie Barnes
Poster: 144
Mentor(s): Saleem Alhabash (Advertising and Public Relations)

In a world so dependent on social networking, little is known about the causal influencers of digital aggression, despite the highly common negative effects it may instill, including depression, anxiety, and suicide. As digital aggression is correlated to both physical and social aggression, it varies in some keys ways, including the presence of anonymity and the innate psychological processes involved with both aggressive behaviors and victimization. This study will observe digital aggression through a traditionally accepted model, the Taylor Aggression Paradigm (TAP), with an added chat function. Using a 2 (TAP modality: traditional vs. digital) x 3 (severity: low vs. moderate vs. high) x 30 (trials), participants are

engaged in 30 different trials in each of the TAP modality treatments. In the traditional TAP treatment, each participant will play against a fictitious opponent, where he/she will be determined to lose 50% of the time. If the participant wins, s/he can administer a noise blast (ranging in frequency and duration) to the opponent; and vice versa, if the participant loses, a noise blast is given to him/her. The digital TAP modality treatment replaces the noise blast opportunity with the chance to chat with the opponent. Levels of aggression are measured by the noise blast variation and their replies in the chat function, as the computer opponent sends preset, aggressive messages. Participants will also complete a Stroop task to measure inhibition function, as well as report their social media use, digital aggression experiences, and demographic information.

EFFECTS OF GENDER ON COOPERATIVE LANGUAGE DURING GAME PLAY, SELF-EFFICACY, AND ATTITUDES TOWARD STEM.

Billal Hammoud, Nicolas Dronchi, Sannah More, Chanon Sethabutra

Poster: 145

Mentor(s): Julia DeCook (Media & Information), Rabindra Ratan (Media & Information)

The purpose of this study was to determine whether or not gender stereotypes or stereotype threat affect the feelings of self-efficacy and attitudes toward STEM among women after playing a cooperative video game. The participants played against either a female or a male game partner and were audio recorded to capture the language use between them. We hypothesized that women, when playing with other women, will be more likely to report feelings of self-efficacy as opposed to when they are playing with a male player. We used a 2 x 2 experiment design to measure language use when females play with other females compared to when females play with a male, as well as measuring feelings of self efficacy and attitudes toward STEM before and after the experiment.

DETROIT TREES: AN EFFORT TO UNDERSTAND COMMUNITY PERCEPTIONS OF URBAN FORESTRY AND COMMUNITY ENGAGEMENT

Quinton Merrill

Poster: 146

Mentor(s): Maureen McDonough (Forestry)

The Greening of Detroit, a non-profit organization, plants trees in urban residential areas with the goal of increasing the city's canopy. Between 2011 and 2014, an average of 25% of residents in areas of tree-planting events submitted a "no-tree request" to the organization. The goal of this study is to examine the knowledge gap between community perceptions of urban forestry practices and tree planting. Phase one of data collection involves audio-recorded interviews of residents who live in tree-planting areas. Data was subsequently transcribed into text using software to determine the dominant themes present in the interview sessions. The research questions examined in phase one were: (1) how do participants frame the current problem(s) with urban tree-planting programs? (2) What are the historical, cultural, political, and ecological factors that contribute to differing frames regarding tree planting? Focus groups carried out in phase two will involve residents who either accepted or declined trees, and those who were not offered trees but live in the studied neighborhood. Study areas include submissions of low (10%), average (25%), and high (45%) proportions of "no-tree request". Consequently, phase two sets out to answer the following: (1) what are participants' perspectives on appropriate solutions to policy problems? (2) What are the key model elements for sustained community engagement in the urban greening decision-making process? Results can aid in strategic communication efforts such as the content of messages, specific audiences to deliver the message to, and communicating articulate responses to general urban forestry.

REPORTING UNCERTAINTY: A CASE STUDY ON THE "WHAT IFS" OF EL NIñO
Jack Nissen
Poster: 147
Mentor(s): Bruno Takahashi (Journalism)

Uncertainty is a perplexing concept, not only in name and statement containing it, but also as a sentiment being studied. How does one study a theme that's used when something isn't known? That's the goal of this case study. Tackling uncertainty is an important undertaking because of how prevalent it is in the world of journalism; especially environmental journalism. Transparency is key in a journalistic field and making sure the audience isn't just being told the story in a quick fashion but also a clear one remains at the heart of good reporting practices. So what better way to attempt the study than to look at articles about something the world doesn't quite understand. Enter: El Niño. Using articles related to this weather phenomenon and coding them for different points of uncertainty will be expressed in this study.

THINK FAST AND SLOW IN THE VIRTUAL REALITY
Justin Ralph, Zachary Argo, Kevin Nickolai
Poster: 148
Mentor(s): Tom Day (Media and Information Studies), Matthias Hofer (Communication), Kuo-Ting Huang (Media and Information Studies)

The purpose of this experiment is to see if the sense of spatial presence are influenced by two modes of thought and how real players experience in the virtual environment. Participants will be asked to first complete a survey about their familiarity with games and their self-perceived skill level. Afterwards, participants will be randomly assigned to either a TV or a Virtual Reality Condition. In both conditions, participants will be assigned tasks requiring one of the following modes of thought: fast thinking or slow thinking. The subjective feelings of realness and unrealness will also be manipulated in the experiments when participants are being asked to perform a task. Their experience and feelings will be measured with a well-established measure of spatial presence questionnaire. We expect that participants' feelings of spatial presence will be affected by modes of thought and subjective experience of realness/unrealness while being in a virtual environment.

CRISIS COMMUNCATION
Rachel Beard
Poster: 149
Mentor(s): Manuel Chavez (Journalism)

This study seeks to explore the ways countries communicate during a crisis. Methods include the analysis of Tweets before, during, and after the Paris Attacks and Hurricane Patricia, as well as analysis of government run social media accounts.

COMMUNICATION ARTS & SCIENCES
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 9:00 – 10:30 AM

BARRIERS TO ONLINE TRAINING OF COMMUNITY HEALTH WORKERS
Lauren Bernhardt, Roberta Dankyi, Joyce Goodluck, Alisha Horan, Lauren Lowes, Tasneem Sannah, Erin Vitale
Poster: 152
Mentor(s): Costellia Talley (Nursing), Karen Williams (Nursing)

Community health workers require training in order to be effective in their health education programs. Converting an in-person training into an online course could possibly save money and increase the ease with which community health workers (CHWs) can be trained. As part of a National Institutes of Health research

project, African-American, Latina and Arab CHWs in Metro-Detroit experienced 24-hour training in breast and cervical cancer education prevention and early screening detection. To update training key informant interviews were conducted with 16 CHWs in which they were asked a set a questions regarding their views on converting their in-person training experience into an online training system. The ultimate goal of the research is to develop an online system which will effectively train CHWs. The focus of this particular project is to assess perceived barriers with online learning systems and accessibility of computers. Based on the results of the interviews and on previous literature, common themes observed include concerns about social barriers to an online system, administrative barriers, and motivation barriers.

FOURTH GENRE VIDA COUNT
Brittany Boza, Cailin Ashbaugh
Poster: 153
Mentor(s): Laura Julier (Professional Writing)

Our project was to analyze the gender ratios of the literary journal that we work on, Fourth Genre. We used VIDA Count's method but expanded on it to include a wider array of gender identification and a write-in to self identify with. We intend to present our results from our journal and what it means for VIDA and gendering in literary circles as a whole.

IMPACT OF AVATAR ARCHETYPES ON MOTIVATION THROUGH THE SCIENCE GAME CREW WEBSITE
Rachel Stacey, Samantha Oldenburg, Harrison Sanders
Poster: 154
Mentor(s): Rabindra Ratan (Media Information)

The internet houses many resources that are used in nearly every aspect of day-to-day life, including education. There are plenty of educational games on the internet, many of which are used to reinforce classroom teaching. At the same time, avatars have become more common in most forms of media. The idea of avatarification says that one can feel connected to the created avatar, and their behavior can be affected by the avatar's behavior and appearance. This concept is related to the Proteus Effect (Yee and Bailenson 2007). Our study explores avatarification within the Science Games Crew website. Our goal is to observe how motivation to play STEM games in this website will be affected by avatar self-relevancy and STEM self-relevancy. These constructs likely will be affected by avatar customization and avatar type respectively. We hypothesize that, within the website, 1) having science-related avatars will increase the motivation to play STEM games, and 2) the ability to customize an avatar will increase the motivation to play STEM games.

ANALYZING MEDIA IN EGYPT AND ETHIOPIA
Meg Dedyne
Poster: 155
Mentor(s): Folu Ogundimu (Journalism)

Our group will examine and analyze the differences and similarities of news organizations in Egypt, Ethiopia and the United States. We will contemplate and share the findings with our audience on how different biases and propaganda plays a factor in the media. This varies from country to country and from outlet to outlet. This research is important to understand how other nations perceive their media and the relationships between the United States media and the rest of the world.

GENERATING GENERATIVITY: A DATA SCIENCE REVELATION OF THE PARADOXICAL IMPACT OF HIERARCHY

Kelley Fitzpatrick, Alexa Baylis , Aleksandra Salic
Poster: 156
Mentor(s): Wietske Van Osch Coursaris (Communications Arts & Sciences)

Enterprise Social Media (ESM) is a set of emerging Web-based platforms that allow individuals in corporate settings to interact and collaborate with their fellow co-workers in the context of ongoing projects. These emergent groups reflect diverse group compositions, specifically with respect to hierarchy, so that we can distinguish hierarchically diverse groups from lateral groups. Hierarchically diverse groups would be present if a group is composed of a general employee, a manager, and a director. Alternatively, a lateral group would be present if all employees occupy the same hierarchical level within the company. We focus specifically on the effects that the hierarchical diversity of a group has on the type and amount of generativity produced by workgroups. The two types of Generativity analyzed are Reframing-focused Generativity, and Expansion-focused Generativity. Reframing Generativity takes place when radically disruptive ideas are created and developed, whereas Expansion Generativity involves expanding and synthesizing existing ideas into novel configurations. Our data for assessing the impact of hierarchical diversity comes from Steelcase Inc., a global office solutions manufacturer, and specifically 656 project teams that use the company's Enterprise Social Media platform entitled Spark. Using RStudio and zero-inflated poisson regression, our analyses reveal that groups with greater hierarchical diversity display greater amounts of Reframing-focused Generativity. Alternatively, lateral workgroups display higher rates of Expansion-focused Generativity. Implications for theory, research, and future research will be presented.

AGNèS FILMS AND THE #FAVWOMANFILMMAKER CAMPAIGN

Sabrina Hirsch, Shell Little, Sarah Shaw, Lindsey Spitzley
Poster: 157
Mentor(s): Alexandra Hidalgo (Writing, Rhetoric, and American Culture)

This presentation looks at the work of four undergraduate students in developing content, redesigning, and carrying out the social media for agnès films, a website that supports women and feminist filmmakers through interviews, reviews, articles, featured-member narratives, and original video content. The presentation examines collaboration between students, faculty, and filmmakers and academics from the United States, England, Spain, Argentina, and Australia, among others, to generate interest in moving-image content produced by women. The presentation argues for the value of feminist ethics in engaging with coworkers and developing our social media practices. The principles that guide these interactions are collaboration, non-competitiveness, reciprocity, respect, community building, and patience. Besides providing analytics of agnès films's website visits and our Twitter reach, the presentation analyzes the affordances of working for an international audience of connected activists and trying to meet the needs of culturally diverse audiences from the countries that are the most engaged with the work of agnès films: the United States, Great Britain, Canada, France, and Brazil. The presentation also discusses the #FavWomanFilmmaker Campaign, which ran from November 9-12, 2015 and consisted of videos, Twitter chats, and Twitter interviews with dozens of women filmmakers and scholars from around the world. The campaign was featured on IndieWire, NPR, and MSU Today, among others.

QUALITY AND CREDIBILITY OF HEALTH RELATED APPS VS. GENERAL APPS

Angela Pellillo
Poster: 158
Mentor(s): Anastasia Kononova (Advertising)

The number of health-related mobile apps has increased over the past years along with the increase in smartphone use. The trend in using mobile applications affected the field of health care. Today, mobile apps are widely used to help individuals in different aspects of health monitoring and healthy lifestyle maintenance from fitness and pregnancy to monitoring disease progress and medicine intake. The goal of the present research project was to explore how and why smartphone users search for and evaluate quality

and credibility of mobile apps and what are the specifics of health-related app usage in terms of search strategies, quality and credibility evaluation, and making download decisions. Twenty students at Michigan State University and 21 non-student members of the Greater Lansing community were interviewed with regard to their general and health-related mobile app uses. Using the interview data, we will do thematic analysis and create a list of health-related mobile app search strategies and criteria to evaluate quality and credibility of health-related mobile apps. Differences between students and non-student community members will be also discussed.

THE ENVIRONMENTAL IMPACTS OF GLOBAL WARMING IN TANZANIA

John Lavaccare
Poster: 159
Mentor(s): Sue Carter (Journalism)

Climate change has caused massive upheaval in the social structures of Tanzania. My task in my undergraduate research was to gather information about the nation, its former economic and social structures, and how those structures have changed in the wake of the nation's increase in average temperature. This includes socioeconomic, cultural, and political changes. Of special interest is the move away from an agriculturally based society.

COMMUNICATION ARTS & SCIENCES
POSTER PRESENTATIONS, SECTION 3
BALLROOM, 11:15 AM – 12:45 PM

SPEECH CHARACTERISTICS OF STORYBOOK READING TO INFANTS WITH AND WITHOUT HEARING IMPAIRMENT

Danielle Maclean, Talia Magoon, Jaime Titus, Alicia Webb
Poster: 162
Mentor(s): Laura Dilley (Communication Sciences & Disorders)

The characteristics of speech directed to infants is an essential component of language acquisition. Previous literature has revealed that early auditory and audiovisual experiences have substantial effects on a normal hearing infant's development of speech, but not many studies have investigated these effects on infants with hearing impairment. In this study we looked at mothers' speech when talking to their infants with normal hearing or with cochlear implants. A previous study investigated the pitch, pause duration, and utterance duration of nine mothers who had children with cochlear implants and 18 mothers with infants who had normal hearing matched on age or hearing experience. Our study expands this work by including more mothers and by investigating additional characteristics of the speech's pitch and rhythm (i.e., syllable boundaries and prominences). In this study, mothers read a storybook to their infant and also as if they were reading to an adult. Previous results showed that mothers spoke with similar speech to the infant groups regardless of hearing status, but differently to an adult compared with an infant. However, the question still remains whether a difference exists between how mothers speak to hearing impaired and normal hearing infants on additional prosodic measures. Overall, it appears that mothers are sensitive to the hearing and language abilities of normal hearing children as well as children with hearing deficits. Knowing how to speak to a child can be used in therapeutic ways to help those who are disabled by manipulating their utterances for optimal learning.

INDIVIDUAL DIFFERENCES IN PERCEPTION OF TEMPORAL INFORMATION IN SPEECH

Megan Cutting, Ben Baldwin, Nikki Losievski, Jayme Shepard
Poster: 163
Mentor(s): Laura Dilley (Communicative Sciences and Disorders)

Speech perception is a complex process in which temporal information such as timing, rhythm, intonation play an important role in perceiving speech sound both in sentence and word level. Previous studies have

revealed that proximal prosodic cues such as speech rhythm and speech rate can impact the listener's perception of the presence of a function word. Other studies have shown that the pitch patterns of speech can also impact whether or not the listener hears a word as monosyllabic or disyllabic. However, even within these findings there was a degree of variability between the perceptions of the individual listeners, presumably because each individual has a different sensitivity to incoming acoustic information, and this will affect what they hear given a certain stimulus. However, there is a degree of variability between the perceptions of the individual listeners (individual difference). This study aims to investigate both the extent of the variability among individuals in perceiving speech rate and rhythm and whether sensitivity to speech rate and speech rhythm are related to each other or to sensitivity in non-speech auditory contexts. The expectation is that the results support the idea that sensitivity to speech rate is connected to sensitivity of speech rhythm, even though there can be a large range of variability between individuals. This could indicate that there is a connection in the brain between these two domains, leading to further expand on the connections between language and music.

A RESEARCH-BASED RECRUITING STRATEGY FOR THE NEW MSU JOURNALISM OUTREACH IN DETROIT HIGH SCHOOLS

Stephanie McGavin
Poster: 164
Mentor(s): Joe Grimm (Journalism), Jeremy Steele (Journalism)

This is part of a new Journalism School initiative involving more than a dozen Detroit high schools is creation of a talent pipeline to college and into the workplace. Data on schools and their journalism programs will help us target our efforts. This project will generate profiles of each school and suggest outreach priorities and strategies. Data will be presented at UURAF in graphs, as a map and a narrative.

CATA REDESIGN

Will Mianecki, Malarie French
Poster: 165
Mentor(s): Kelly Salchow MacArthur (Art, Art History, and Design)

In this project, we investigated how graphic systems and information design could be leveraged to improve public transportation in the greater Lansing community. We focused on CATA, a bus transportation system, and explored how students and other community members interacted with the graphic collateral used by the service. We discovered that the existing identity and environmental system for CATA was confusing, inconsistent, and dated. We also discovered that students struggled to understand the complex map and system of bus routes. With these insights in mind, we redesigned CATA's identity, environmental system, and wayfinding system with the hopes of creating a more intuitive and practical alternative.

PATIENT-CENTERED CODING SCHEME

Madalyn Mulroy
Poster: 166
Mentor(s): Sandi Smith (Communication)

Patient-centered interviewing creates a friendly environment, where the patient feels comfortable disclosing sensitive information to his or her doctor. This is achieved through the use of open-ended skills on the physical, personal and emotional story. The goal of HRSA's Patient-Centered Interviewing Research is to create a friendly environment, where the patient feels comfortable disclosing sensitive information to his or her doctor. This is achieved through the use of open-ended skills on the physical, personal and emotional aspects of the patient's story. The goal of HRSA's Patient-Centered Interviewing Research is to attain rating reliability between two trained raters (myself and my coworker) on a standardized coding sheet, based on Smith's Patient-Centered Interviewing Method. Trained raters received a codebook explaining each item in Smith's Patient-Centered Interviewing Method, and went to weekly training sessions for three months where 100 practice videos were reviewed, rated, and discussed. The tapes featured residents equipped with different levels of patient-centered training, visiting with standardized patients for a "first-time" interview.

Together, the team consolidated the "simple" coding sheet into thirty-three dichotomous coding items and six variables. The inter-rater agreement for the coding scheme between the six sections spanned from 84-100% across 136 video tapes, with a Cohen's Kappa of 24% (n=28) for each variable. The reliability ratings support the construct validity of Smith's Patient Centered Coding Scheme. Establishing reliability on a newly created coding scheme will allow for greater confidence in the use of the coding scheme in the future, and will provide an efficient way for institutions to rate and train healthcare professionals.

RELATIONSHIPS BETWEEN COGNITIVE PROFICIENCIES IN TYPICALLY DEVELOPING PRESCHOOL-AGE CHILDREN

Alexis Nedanis, Emily Chen
Poster: 167
Mentor(s): Amanda Hampton Wray (Communicative Science and Disorders)

Previous studies have investigated relationships between specific aspects of cognition, such as language comprehension and verbal working memory, in children (e.g., Alloway & Alloway, 2010; Alloway et al., 2004; Adams et al., 1999; Bates et al., 1995 Dempster, 1981; Johnson et al., 1999; Leonard et al., 2007; Miles et al., 1996; Young et al., 2002) and revealed that language and working memory skills are strong predictors of academic and long-term success. However, to date, limited information exists regarding relationships between broad sets of cognitive abilities in young children. Understanding relationships between numerous cognitive domains in young children is fundamental to understanding developmental disorders and being able to develop successful treatment protocols. The aim of the current study is to assess the relationship between several domains of cognition that support language development and use in typically-developing preschool children, 4 to 5 years of age. Each child will complete a large battery of verbal and nonverbal tasks designed to evaluate nonverbal IQ, receptive language, expressive language, phonological abilities, and verbal and nonverbal working memory. Relationships between tasks will be evaluated to see which tasks are stronger predictors of language abilities. The current findings will enhance our understanding of the relationships between domains of cognition and they ways in which these domains impact language in young children.

VERBAL WORKING MEMORY AND SEMANTIC PROCESSING IN YOUNG CHILDREN

Katelan Saunders, Valerie Rose
Poster: 168
Mentor(s): Amanda Hampton Wray (Communicative Sciences and Disorders)

Verbal working memory involves maintaining verbal information in the brain for a short time period and manipulating it in order to achieve a goal or solve a problem. The verbal information is obtained through attention to immediate stimuli and retrieval of knowledge from long-term memory. This ability is fundamental for strong language skills. In children, verbal working memory is the strongest predictor of language performance across a range of verbal and nonverbal cognitive abilities. Previous studies in adults and school-age children have revealed strong relationships between verbal working memory and the neural processes underlying language. However, our understanding of these relationships in young children is limited. The current study evaluates relationships between verbal working memory and neural processes underlying semantics in typically developing preschool-age children. In order to evaluate this relationship, we will compare subject performance on the Dollaghan Non-Word Repetition Task and the Test of Auditory Perceptual Skills (TAPS-3) Word Recall test to neural responses evoked by semantic violations, which are measured with using event-related brain potentials (ERPs). In adults and children, semantic deviations elicit an N400 component, thought to index ease of lexical access and/or integration. Better language proficiency is associated with smaller N400 amplitudes. We hypothesize that children with stronger verbal working memory abilities will demonstrate more mature, i.e., smaller amplitude, N400s. These findings have implications for our understanding of typical language development as well as language development in children with communication disorders.

VIRTUAL REALITY AND PEDAGOGY
Tommy Truong, Eric Martin
Poster: 169
Mentor(s): Jon Frey (Art, Art History and Design)

"No matter how enlightened any one of us may be, we are fundamentally limited to our own points of view--but it is human nature to try to broaden our perspective" (Danfung Dennis, New York Times). Education, in response, is one of society's most effective methods of achieving this task. Over the past decade, advancements in technology has enhanced educational methodologies to be both more effective and more available to a wider range of communities. Virtual reality is one of the most recent technological revolutions that education can benefit from. Conceptually, this technology is content that allows participants to engage in a more tangible and interactive context through the act of placing them within environments from either the real world or computer-replicated simulations. This content is comprised of two major parts--the physical hardware and the multimedia. Hardware typically utilizes a head-mounted device that contains a single or multiple displays that isolate the users' vision from the outside world by placing a computer display within inches of the eyes and disallowing use of peripheral vision. Media for these devices range from 360-degree YouTube videos, to stereoscopic images and 3-dimensional games. Through virtual reality, educators can enhance their existing pedagogy by tapping into this interest to further engage students with the content. While the current use of immersive multimedia within academia have been relatively basic, continued practice and support for these new methods could lead to far greater content being developed to help the academic community prosper.

COMMUNICATION ARTS & SCIENCES
POSTER PRESENTATIONS, SECTION 4
BALLROOM, 11:15 AM – 12:45 PM

APPLE WATCH: A STUDY OF CREDIBILITY OF BRANDS VERSUS VLOGGERS
Catherine McPeak, Morgan Bayne, Natalie Orcutt, Emily Sing, Madison Wertz
Poster: 172
Mentor(s): Constantinos Coursaris (Media and Information)

Within the past few years, YouTube has seen a large increase in usage among many different types of video creators. According to YouTube's own statistics, the number of people watching YouTube per day has increased 40% since March 2014. The most popular creators on YouTube are video bloggers, "vloggers," and brand channels. Technology is a popular YouTube video topic; both popular technology brands, e.g. Apple, and technology vloggers produce videos in which they review or demonstrate use various products. Despite YouTube's growing popularity, there are very few studies analyzing video content or purpose in today's social media. This study aims to establish the difference in credibility between brands and bloggers on YouTube as influenced by their Apple Watch related videos. The research model developed and tested establishes the link between the credibility of the content creators and the viewers' perceived information quality. The study also validated the link between personal innovativeness and information quality, as well as personal innovativeness and user satisfaction. The correlation between information quality and user satisfaction is also confirmed. A convenient sample of 200 undergraduate students at a large Midwestern university was used in this 2x2 between-subject research study. Study stimuli involved four videos from brands and vloggers Apple Watch product presentations and tutorials respectively. Implications to theory and practice will be discussed at UURAF.

TALKER VARIABILITY IN ACOUSTIC DETAIL OF FUNCTION WORDS IN SENTENCES

Zachary Ireland, Paige Girdley, Molly Griffin, Rachel Jansen, Sarah Keenan, Steven Maier

Poster: 173

Mentor(s): Laura Dilley (Communicative Sciences), Meisam Khalil Arjmandi (Communicative Sciences)

Recent studies have shown that certain prosodic attributes such as intonation, stress, and speech rate are crucial in speech perception. Speech rate has been widely investigated as an influential factor among other factors in human sound perception. Previous research has shown that prosody prior to hearing a function word – especially global and distal speech rate – matter in understanding the function word so that it influences appearance or disappearance of a word. On the other hand, words in spontaneous speech may attribute weaker segments, fewer sounds, and even reduced syllables. The phenomenon of reduced pronunciation can affect the characteristics, production and also comprehension of produced speech. The goal of this study is to investigate how listeners adapt to global speech rate as an indicator of the rate of conversation over a longer period of time. Considering this effect, this study also aims to characterize and evaluate variability in speeches of talkers - which are influenced by indexical information (talker effects) surrounding the function words - in a set of utterances by using four measures. This analysis will allow us to determine the extent to which the utterances are varied among talkers, and the impact of this variability in joint with global speech rate on listeners' understanding. It is expected that results will support the hypothesis of listeners' adaption to global speech rate, and give insight into the means by which listeners interpret speech while also taking into account various traits of the talker, including his or her identity.

A CONTENT ANALYSIS OF MORAL AND EGOISTIC INTUITIONS IN CHILDREN'S MEDIA

Brandon Walling

Poster: 174

Mentor(s): Ron Tamborini (Communication)

Past research on questions of morality within media has accumulated into a model of intuitive morality and exemplars (MIME). Building on moral foundations theory, this model proposes that there are innate cognitive processes within viewers that lead to evaluative responses to different media on the basis of five moral domains (care, fairness, loyalty, authority and purity) and six egoistic domains (competence, autonomy, relatedness, hedonism, power and security). The MIME predicts that repeated exposure to content containing moral intuitions (these pieces of content are called exemplars) leaves viewers with a feeling that the moral intuition was either upheld or negated. The MIME also predicts that different patterns of response lead to different patterns of media selection, and subsequently, media content is produced to fit these selection patterns. The current study explored the salience of moral and egoistic intuitions embedded within children's media. The coordinating presenter of this study conducted content analysis research on over 30 popular children's movies, analyzing each scene for the presence of any of the moral and egoistic domains. This research has contributed to the body of research that attempts to understand how people judge moral violations and frame moral events in the media. Findings will be presented discussing the results of the moral make up of the movies analyzed by the researcher.

FORMAL AND INFORMAL INFLUENCE IN ENTERPRISE SOCIAL MEDIA: THE IMPACT OF REAL VERSUS PERCEIVED POWER ON PROJECT SUCCESS

Anastasiya Risukhina, Shayna Evans

Poster: 175

Mentor(s): Wietske Van Osch (Media and Information)

At a rapid pace, business and organizations around the world are adopting Enterprise Social Media (ESM) technologies in the hope of breaking down knowledge silos and creating novel opportunities for serendipitous interactions, collaboration and co-creation. ESM allow people to connect with distant and unknown others in the organization, giving rise to informal network structures that may or may not overlap with the formal organizational structure. In this study, we aim to compare the formal hierarchical structures of project teams operating in ESM to informal network measures of authority and influence in an attempt to understand their respective impacts on group success. Using data science and network analytic approaches,

we study 417 project teams and assess whether teams characterized by strong hierarchical structures of informal patterns of authority are more successful at completing their projects on time and within budget. Specifically, we find that groups that have strong hierarchical structures show significantly lower rates of project success compared to groups that are well-connected inside the ESM; i.e., groups that display strong informal influence within the organization. Implications for theory, practice, and future research are presented.

BIRDS OF A FEATHER PERFORM TOGETHER: A DATA SCIENCE STUDY OF THE INHIBITING ROLE OF TEAM DIVERSITY ON PROJECT SUCCESS

Nygel Sejismundo, Amar Amin

Poster: 176

Mentor(s): Wietske Van Osch (Media and Information)

Enterprise Social Media (ESM) are web-based platforms that allow people in a specific business to communicate, post, view, edit, and sort text and files with anyone else who is also a part of that specific organization. Businesses, such as SteelCase, are taking advantage of the seamlessly easy communication to boost the creative potential and overall success rate of team projects. Within ESM, smaller groups or teams may form that share common interests or work toward specific goals. Using data from 417 such project teams in Steelcase, we examine how team diversity affects team project success. Specifically, we focus on three types of team diversity, namely geographical, functional, and gender diversity. In our analysis, we used data science and network analytic approach to assess the effect of diversification on operational me assures of project success, including whether or not projects were completed on time and within budget. Our results reveal that groups with more geographical diversity outperform groups that are fully co-located. We also found that gender homogeneous groups were more successful than gender diverse groups. We discovered a common pattern that as diversity increased in terms of geographical location, functional or departmental affiliation, with the exception of gender, then the success rate of group projects increased revealing that diversity may inhibit the timely and within-budget completion of project goals.

THE INTERPLAY OF CONSUMER PERSONALITY AND TWEET CONTENT ON THE PURCHASE INTENTION OF MUSIC FROM EMERGING AMERICAN ARTISTS

Kathy Sem, Sarah Jamgotch, Ashish Tripathi, Anna Waldron

Poster: 177

Mentor(s): Constantinos Coursaris (Media and Information)

This research aims to understand how consumer Personality, Perceived Artist Personality, and Message Content of the artist's Tweets affect consumer's Engagement Intention and Purchase Intention. Additionally, this study aims to develop a framework of what drives consumers' Engagement Intention and subsequent Purchase Intention on Twitter. This study utilizes the content by three emerging American artists on Twitter: Ryn Weaver, Anderson Paak, and Valentino Khan. The selected Tweets were categorized into four content types: Engagement, Brand Awareness, Seasonal, and Promotional, keeping the richness of the Tweets (videos, images, text, etc.) consistent. In this 3x4 (3 artist genres; 4 content types) between-subject research, an analysis of 24 original Tweets will be conducted to determine a consumer's Engagement Intention and his/her Purchase Intention with the artist as an outcome of Tweet content. First, both consumer and artist personality will be measured using a seven-point bipolar semantic differential scale. Consumers' Purchase and Engagement Intention will be measured via a five-point semantic differential scale, and linked to the consumer's own and perceived artist personality. Results highlighted that extraverted, neurotic, and agreeable consumers are more likely to engage with emerging American artists on Twitter, Engagement intention levels differ according to messaging content type, where Engagement content leads to greater levels of consumer Engagement Intention than the other three content types; also, greater congruity between Perceived Artist Personality and Consumer Personality leads to higher engagement intention. Detailed findings and implications to theory and practice will be presented at UURAF in April.

AVATARS OF SELF AND THE INFLUENCE OF STEREOTYPES
Kyle Silva, Madison Ozdych, Luke Sienko, Whitney Weini Zhou
Poster: 178
Mentor(s): Joseph Fordham (Media and Information), Rabindra Ratan (Media and Information)

The purpose of this experiment is to see if avatar identity characteristics influence self-perception in ways that enhance self-efficacy and attitudes towards traditional gender roles relating to gaming, science, and technology. Participants will be asked to create an ingame avatar based on one of three prompts. They will then play a game either under a competitive scenario or a leisurely scenario; afterwards, their performance will be evaluated and compared with a post-game survey of self-efficacy and attitudes towards gender roles.

WHO'S THE BOSS? CONSUMER OR CULTURE
Rashad Timmons
Poster: 179
Mentor(s): Saleem Alhabash (Advertising and Public Relations)

With increasing reliance of marketers and advertisers to appeal to various demographic, ethnic, and cultural groups, the current study investigates the effect of cultural adaptation in advertising domestic and foreign alcohol beverages using a 2 (country of origin: United States vs. Mexico) x 2 (cultural symbols: American vs. Mexican) x 3 (ad repetition) mixed factorial design. The study also investigates the moderating effect of implicit bias against Hispanics on visual attention and persuasive outcomes in culturally adaptive and non-adaptive ads. Implicit bias against Hispanics is measured using an adaptation of the affect misattribution procedure (Payne et al., 2005). Participants (N=120) were recruited from Michigan State University and rewarded with course credit for their participation. Participants randomly assigned to one of four conditions where they saw three Facebook advertisement for beers that were produced in the United States or Mexico; wherein the ads included American or Mexican cultural symbols. During their exposure to the ads, participants' eye movement was tracked using the Tobiix TX300 to measure gaze, fixation, visit count and duration. Additionally, upon viewing the ads, participants answered questions related to their attitudes toward the ad, attitudes toward the brand, viral behavioral intentions, intentions to consume alcohol, and purchase intent. Data collection will be concluded early March, and data analysis and reporting is scheduled to take place late March to early April.

COMMUNICATION ARTS & SCIENCES
POSTER PRESENTATIONS, SECTION 5
LAKE HURON ROOM, 1:30 – 3:00 PM

EVALUATING SPONSORSHIP, LITERACY AND PERSONAL INFORMATION DISCLOSURE OF HEALTH-RELATED APPS
Ashley Maynard
Poster: 182
Mentor(s): Anastasia Kononova (Advertising and Public Relations)

Using mobile apps has become a widespread trend among smartphone owners. In response to this emerging trend, different types of companies and organizations discovered multiple opportunities to market their brand names to smartphone users through health app sponsorships. Companies and organizations can also use health mobile apps to collect information about individuals who download such apps. For example, smartphone users may provide some of their personal information (name, weight, age, etc.) to sign up for a sponsored app. While it is a great opportunity for companies and organizations to advertise their brand names, mobile app sponsorships raise important questions about privacy as well as advertising literacy, especially when it comes to such sensitive topics as health. The aim of this research project was to investigate this issue in a series of interviews with Michigan State University students (N=20) as well as non-student members of Greater Lansing community (N=21). We explored the differences in perceptions of

different types of health mobile app sponsors: commercial, non-profit, and government, and how each sponsorship type affects expectations of health mobile app interfaces and content. We also asked about participants' levels of literacy with regard to sponsored health mobile apps and compared students' and community members' responses. Finally, we analyzed the differences in the willingness to provide personal information to different types of organizations. In particular, we looked at criteria for providing personal information and differences in types of personal information that respondents agreed to provide to health app sponsors.

FRAMING ISIS: HOW AMERICAN NEWS MEDIA APPEALS TO MORAL VALUES

Savannah Jenuwine, Pooja Dandamudi, Abigail Johnson, William Marchetti

Poster: 183

Mentor(s): Ron Tamborini (Communication)

Previous research has shown that when an idea is salient in media it can become more salient in the minds of audience members. The model of intuitive morality and exemplars (MIME) suggests that this also holds true for the salience of moral values. The MIME holds that when certain moral values are peppered throughout the presentation of news events, those moral values may become more important to audience members. A content analysis was conducted to examine the frequency with which different moral values were represented in four of the most widely read American online news outlets (The New York Times, Washington Post, Reuters, and CBS News) and how these representations vary over time. Specifically, we examined articles regarding the coverage of ISIS between the dates of July 25th, 2014 (when ISIS was a known threat overseas) and September, 22nd, 2014 (when ISIS became a known US threat.) A content schema was created to code the representation of five unique moral intuitions (i.e., values) outlined in Moral Foundations Theory (MFT). Nine trained coders applied the scheme to 150 news articles sampled from the population of articles pertaining to ISIS mobilization. Findings are discussed in terms of how the values presented in news may help to shape the audience's attitudes towards the content.

NURSING DURING WORK: PERCEPTIONS OF COMMUNICATION AND SUPPORT

Theresa Quaderer

Poster: 184

Mentor(s): Kami Silk (Communication Arts and Sciences)

Under the Patient Protection and Affordable Care Act, employers must provide women with time and space so they may nurse their infants or pump breast milk during the workday. In effect, this law requires employers to provide a space other than a bathroom for nursing mothers to use, and to not penalize them for taking time during the day to pump. While the implementation of this policy protects a woman's choice to breastfeed, it does not eliminate all barriers that women face. Based on the memorable message framework developed by Knapp, Stohl & Reardon (1981), this research seeks to identify how messages concerning breastfeeding are communicated between employer and employee, how women perceive the appropriateness of their pumping environment at work, and how women perceive communication and support towards pumping from employers. The memorable message framework states that memorable messages are often personally involving, usually occur at a time when a person is seeking help, messages come from a respected other, and messages have features that make it easy to remember. Using this framework, a survey was developed and completed by 150 women who are working full-time, and are either currently or have breastfed their infant in the past three years during their full time employment. The main outcome of this project is recommendations and guidelines for employers on how they can effectively communicate this health topic to their employees, with the intent to improve the effectiveness of the new policy.

THE VISIBLE, THE INVISIBLE, AND THE GENERATIVE: UNDERSTANDING THE IMPACT OF GROUP PRIVACY SETTINGS ON GROUP CREATIVITY AND INNOVATION
John Stathakios, Ryan Chorazyczewski
Poster: 185
Mentor(s): Wietske Van Osch (Media & Information)

Enterprise Social Media (ESM) can be described as Web-based platforms that allow employees within an organization to communicate and broadcast messages; build and maintain relationships with other coworkers; and discover new opportunities for collaborative interactions with previously unknown others. In the context of these ESM, employees with similar interests or common goals can establish group spaces for collaboration that can be either visible or invisible to the rest of the organization, based on the privacy settings selected. Visible groups allow anyone to join the group and to read and edit conversations that are ongoing within the group. Invisible groups allow only members to read and write content, so that the group itself is unknown to others outside the group, until one is invited to join the group. Within the literature on group creativity, there is widespread controversy about the impact of group visibility on the ability for producing breakthrough innovations; some studies show that visibility encourages generativity, while others emphasize it's harmed by visibility. For this study, we compare the generativity (the ability to create radically new ideas or improve existing ones) of visible to invisible groups. Using data science and algorithmic approaches to the analysis of 656 project teams in Steelcase Inc., we provide a meticulous assessment of the impact of visibility on generativity. We reveal that different forms of generativity may emerge from different visibility settings of groups, so that visible groups display higher levels of expansion-focused generativity and invisible groups are more successful at producing reframing-focused generativity.

VIDEO GAME A11Y
Tommy Truong, Chris Frey
Poster: 186
Mentor(s): Kate Sonka (Arts & Letters)

As defined by GameAccessibilityGuidelines.com, "accessibility means avoiding unnecessary barriers that prevent people with a range of impairments from accessing or enjoying your output." Accessibility in gaming is the inclusion of any person, regardless of ability or disability, to use and enjoy a game. A few organizations, such as GameAccessibilityGuidelines.com and Includification.com, have produced varied sets of best practices recommended to accommodate a wide variety of abilities. Individual game development companies have also created their own set of practices to implement in-house. To address the effectiveness of these guidelines and the prevalence of accessibility in gaming, this research is an audit of the most purchased video games of 2015 for their correspondence to those best practices. Like any entertainment medium, video games offer shared experiences to audiences through a unified common message. Fans fall in love with characters, themes and motifs, and connect with others within the gaming community in unique ways unlike other industries. However, similar to other communities, some sub-groups are marginalized due to their differences from the majority. For the video game community, this underrepresented group comprises of users who may experience mobility, hearing, vision or cognitive disabilities. By conducting an audit of the current games on the market for their accessibility, we can both evaluate how the industry accommodates the disabled and better understand how developers can create more accessible content.

MORAL FRAMES IN NEWS COVERAGE OF EBOLA
Sierra Richards, Allison Aigner, Riley Hoffman, Elizabeth Paulson
Poster: 187
Mentor(s): Ron Tamborini (Communication)

Previous research has shown that the way news events are framed by media affects the public's judgement of the event. The current study examines moral frames applied by American media coverage of Ebola. Our study focused on how these frames developed from July 23rd, 2014, when the first American contracted Ebola in West Africa, through October 24th, 2014, when the final American nurse was cured of the disease. To understand how coverage of this international health crisis changed over time, a sample of 150 news

articles obtained by the Media Neuroscience Lab at the University of California, Santa Barbara was examined. Nine coders were trained to content analyze these 150 articles from popular American news sources. A coding scheme based on the Model of Intuitive Morality and Exemplars (MIME) served to guide this content analysis. These articles were coded for six moral domains identified by Moral Foundations Theory. These included care, fairness, loyalty, authority, purity and liberty. The results of this study add to our understanding of how media coverage changes over the course of a news event. The implications of how this may affect public perception of major news events is discussed.

THE ROLE OF PITCH ALIGNMENT AND INDIVIDUAL DIFFERENCES IN DISTINGUISHING INTONATION CATEGORIES

Riley George, Ryan Gerhardt, Weed Jenna
Poster: 188
Mentor(s): Laura Dilley (Communication Sciences & Disorders)

What causes individual differences in a person's ability to process speech? Previous studies have attempted to explain how the perception of prosody (i.e., rhythm and pitch of speech) can signal different meanings by changing the alignment of the highs and lows of the speech's pitch. These results revealed that participants either had a higher or a lower sensitivity to intonation discrimination and they also showed substantial individual variability on the task. Our study builds upon this literature by investigating how individual differences can affect this sensitivity of the alignment in distinguishing intonation categories of pitch accents and prominences. This study investigated the location and number of category boundaries for each stimulus series by having participants listen to pairs of stimuli with ambiguous stress patterns to determine if they were the same or different. Results showed statistically significant differences between sensitivity (d' score) to changes in the prosody alignment of highs and lows, which solidified the interpretation of these pitch locations as intonation category boundaries. Our investigation of these data will help us better understand individual differences in how we process language, and how we can apply this knowledge to different methods of speech therapy and voice recognition software.

MEDIA MULTISELFING: EXAMINING HOW THE PERSONAL ECOLOGY OF SELF-PRESENTATION ONLINE PREDICTS RELIANCE ON AND SUSCEPTIBILITY TO STEREOTYPING

Whitney Weini Zhou
Poster: 189
Mentor(s): Rabindra Ratan (Media and Information)

In different situations, people present different facets of their total personality, e.g., one's work personality differs greatly from one's party personality. Like linguistic code-switching, a different self-presentation arises to suit any specific situation. The current research focuses on this phenomenon in regards to online media. Specifically, we examine the causes and consequences of differences in such online self-presentations, which we refer to as "media multiselfing." Three things indicate a strong media multiselfer: a large number of social media accounts, frequent, deep usage of all accounts, and a distinct self-presentation on each (number/frequency/distinction). For this project, we have created a survey measure of media multiselfing. The survey asks for a list of social media platforms used (number), time spent on each (frequency), and a description of their personalities and social circles on each platform (distinction). Participants code their own responses by comparing their written descriptions. Using the Media Multiselfing Index we have created, we will test whether multiselfing predicts responses to psychological stimuli. Because a strong media multiselfer easily adapts to situations by switching which self they outwardly present, we expect that multiselfing is associated with less reliance on and susceptibility to stereotype-related heuristics. We test this by using the survey to conduct a question order-controlled experiment, with responses to stereotype-related information measured either before or after elements of media multiselfing are primed. We expect that high multiselfers rely less on stereotypes in their decision-making and are less susceptible to the influence of primed stereotype on their behaviors.

DIGITAL MEDIA

ORAL PRESENTATIONS, SECTION 1
LAKE ERIE ROOM, 9:00 – 10:30 AM

BEYOND BOLLYWOOD: BEHIND THE SCENES
Archit Batra, Jonah Lang, Aaron Snyder
Time: 9:00 AM
Mentor(s): Amol Pavangadkar (Media and Information)

In order to tell a good truthful story, one should live through it, especially when it comes to telling the story of a culture. This is the strategy that a group of students undertook in order to produce a Bollywood-style short film. As part of their study abroad trip to India to learn about that film genre, the students underwent a full cultural immersion, ranging from visits to touristic sites to attending a traditional Indian wedding, riding rickshaws and interacting with women filmmakers from the lowest social caste in India. The production of the Bollywood-style short film was a process that was different for most of us. For some of us, this experience presented the first time we have ever set foot on a set, let alone ones that were professional sets used in Bollywood movies. Since it was one of the most important aspects of our study abroad trip to India, reflecting on it and documenting it was important for us in order to look back on the progress that we made and examine it in a more reflective way. The video examines the pre-production period, the production and the post-production of the short film, in addition to post-trip interviews reflecting back on the process.

FOOD STORIES: WILD RICING STICKS
Sage Miller
Time: 9:15 AM
Mentor(s): Serena Carpenter (Journalism)

The Food Stories Project aims to document food customs unique to the Anishinabek tribes before Elders who hold these teachings have passed away. Historically, they gathered their food from forests, lakes, marshes, and rivers. These food practices hold much of the cultural and spiritual identity for the Indigenous People of this land. Wild Rice (Manoomin) is a sacred plant to the Anishinabek and is a critical component of their migration story and traditional diet. The traditions associated with wild rice harvesting, processing, and teachings are quickly disappearing. This short animation will overview one important component of this tradition – a tutorial and story of the making of wild ricing sticks. Wild rice cannot be harvested without the use of ricing sticks. The sticks are used to gently tap the fragile wild rice plant in order to gather its grains. In just one day, two people can harvest enough wild rice to feed their family for a year. The goal of this web animation is to create a resource for local indigenous people in the Michigan area to assist them in passing on their traditions for future generations.

FROM FLINT
Olivia Larsen, Jenna Ange, Elise Conklin, Izak Gracy , Lauren Selewski
Time: 9:30 AM
Mentor(s): Bob Albers (Media And Information)

From Flint is a documentary that aims to tell the story of the Flint Water Crisis from the perspectives of those who have experienced this tragedy first hand and from activists on the ground working through grass-root organizations to make a difference. While the national news media has been covering this event through the governmental point of view; From Flint takes you inside the city to uncover this incident first hand by hearing the stories of those dealing with this crisis as a result of the government failing to do it's job. The documentary focuses on themes of power, race, class, education, humanity and activism to help bring to light some if the issues that are involved in this ongoing crisis.

GROWING SPARTAN NETWORKS
Rachel Tang
Time: 9:45 AM
Mentor(s): Andy Corner (Advertising and Public Relations)

MSU's College of Communication Arts & Sciences has over 3,000 undergraduate students and over 50,000 alumni worldwide. This short documentary explores just one of the many out-of-classroom experiences that the college offers to students, and how the college continually strives to expand its networks.

FIRST RESPONDER TRAINING IN INDIA
Josh Wisbang, Archit Batra
Time: 10:00 AM
Mentor(s): Amol Pavangadkar (Media and Information)

A training program to improve pre-hospital trauma management is being piloted in India in early January 2016. My team intends to tape the training sessions and get interviews of the participants, doctors and the other stakeholders. This footage will be used to produce a pilot video on one of the training modules. Trauma is one of the leading causes of mortality in India and we are focusing on improving pre-hospital trauma services.

FLINTH2O
Maria Braganini, Kelley Waterfall
Time: 10:15 AM
Mentor(s): Geri Zeldes (Journalism)

National and local news organizations have looked into the infrastructure concerns and political missteps on city and state levels, providing a timeline that explains the genesis of the Flint water issue. We are at a point in the news cycle to focus on "What's next?" for Flint residents, and this series "Five Families in Flint" promises to address that question. This series will allow the College of Communication Arts & Sciences faculty, employees and students to cover the Flint Water Crisis in real-time, offering the MSU audience stories on a quick turnaround a deeper look into how individuals in Flint are mitigating daily the lack of safe water, a basic human right. Braganini and Waterfall will present their radio and TV news stories created for the series. Each story in the series focuses on how one family is coping with the Flint water crisis. Each story profiles an individual who is angry, hopeful or both. The project is an example of how the WKAR Network and the School of Journalism are working together to tell stories about a community located only 40 miles away; the initiative also demonstrates how WKAR provides professional opportunities for students to build their portfolios.

DIGITAL MEDIA
ORAL PRESENTATIONS, SECTION 2
LAKE ERIE ROOM, 11:00 AM – 12:30 PM

BEYOND BOLLYWOOD: TASTE OF INDIAN MEDIA
Michelai Graham, Elise Conklin
Time: 11:00 AM
Mentor(s): Amol Pavangadkar (Media and Information)

While on this study abroad to India for seven weeks, a group of students and I, with guidance from our mentor, created a film called Beyond the Banyon Tree. This film is centered around a female character who is a stressed out workaholic. She is diagnosed with congested heart failure. Her doctor sends her to India to see another doctor who instructs her to do some interesting activities to heal herself. Throughout her time in India, she runs into a lot of obstacles and people who impact her. During this presentation I will say a few brief words then present the short film.

HUBERT: HIS STORY
Dakota Johnston
Time: 11:15 AM
Mentor(s): Geri Alumit-Zeldes (Journalism)

Flint, Michigan is a city nationally known as home to poverty and crime. One resident, Hubert Roberts, is no stranger to Flint's social injustice issues. Roberts uses his past as a former inmate, as well as Black history, to teach and inform students. Hubert mentors all ages, but focuses primarily on young adults and is a prominent community member in Flint. "Hubert, His Story," a documentary, covers three histories: Roberts' personal history, his use of Black history to teach social injustice issues and the history of Flint. The film displays how Flint youth may be set up for failure and how one individual helps these young adults down the right path.

HELPING TO BETTER UNDERSTAND PTSD
Archit Batra, Trevor Ferla, Ben Webber
Time: 11:30 AM
Mentor(s): Amol Pavangadkar (Media and Information)

Many veterans when they return home from war face a war within themselves known as post-traumatic stress disorder (PTSD). With between 10 and 20 percent of all veterans having PTSD, according to the U.S. Department of Veterans Affairs, there have been an increasing number of confrontations between law enforcement officials and veterans with the disorder. To better understand PTSD and what to do when encountering a veteran showing signs of post-traumatic stress (PTS), we created a training video for law enforcement agencies to serve as a guide for how they can have a positive impact on veterans in their community who may be struggling with PTSD.

IN THE MOMENT
Peter O'Connor, Elise Conklin
Time: 11:45 AM
Mentor(s): Bob Albers (Media and Information)

In the Moment is a feature length documentary about peak experiences in music, dance sports, combat…really everything including everyday life. When in the moment, an individual's performance is at its most focused, effortless, effective, and beautiful, whether it is in art or music or sports, combat, or even everyday tasks like cooking or cleaning. Everyone has these experiences, but, for most of us, being in the moment is a rare and fleeting experience. In this documentary, we open the door to these precious and private experiences and provide the viewer with a deeper appreciation for what it means and what it takes to be in the moment.

FOCAL POINT
Madeline Carino
Time: 12:00 PM
Mentor(s): Bob Gould (Journalism)

Focal Point is an Emmy award winning student newscast that informs the MSU community while giving students an opportunity for hands-on experience with broadcast journalism. This is my second semester working with Focal Point. Primarily I am the show's producer. My responsibilities include delegating assignments to reporters, suggesting show content, stacking rundowns and editing scripts. Last semester I was also the floor director during tapings. On occasion, I shoot and edit video. Students learn about reporting, writing, shooting and editing. This is an MSU Registered Student Organization and a 400-level journalism class. Students work together to create 12 newscasts per school year within the College of Communication Arts and Sciences. Broadcasts are recorded and posted online via the Focal Point YouTube channel or website. Focal Point has made significant strides this past year. The show was recently awarded

First Runner-Up in the News Magazine category of the BEA awards. Senior reporter Daniel Hamburg was awarded the "Best of Festival" in the news category for a package. Last semester the show adopted a new computer system, ROSS Inception News, for organizing show content. Ross's XPression was also implemented to create show graphics. Soon a new studio and control room will be added to the college. This will further advance broadcasts to simulate real-world newsroom experiences. This is a huge opportunity for students to gain experience working with a news team, practice reporting skills and ultimately become better journalists.

MINDS WIDE OPEN
Daniel Hamburg
Time: 12:15 PM
Mentor(s): Henry Brimmer (Advertising)

In September, more than 50 students and faculty from all across China travelled to Michigan State for a week-long intensive advertising competition. World class mentors from the advertising industry, from Singapore to South Africa joined in to guide each group of Chinese and American students as they created an advertising campaign in just a few days. I was there from start to finish, documenting their creative process. I shot and edited a mini-documentary that was even shown before a crowd in Beijing, China in November at a similar international advertising competition. This presentation will include a screening of the mini-documentary, and a discussion about what it takes to produce a video like this.

EDUCATION

ORAL PRESENTATIONS, SECTION 1
LAKE SUPERIOR ROOM, 9:00 – 10:30 AM

EXPLORATIONS IN THE SUCCESS OF INTERDISIPLINARY COLLABORATION
Ryan Duda
Time: 9:00 AM
Mentor(s): Deric McNish (Theatre), Carmela Romano-Gillette (English Language Center)

The theory of 'two heads are better than one' proves extraordinarily relevant when put in the context of education. Two educators, collaborating to create an interdisciplinary curriculum, can allow students the opportunity to be immersed in an education encompassing multiple perspectives. Approaching a topic from multiple perspectives forces the students to think creatively and develop divergent thinking habits when solving problems, ultimately leading to a fuller comprehension of the subject. In this study, a team collaboration between the English Language Center (ELC) and the Theatre department at Michigan State University, engages international students in the ELC in an interdisciplinary curriculum in order to more effectively immerse the students in the English language. This presentation highlights the successes of the collaboration, as evidenced by anonymous student response data, professor evaluations of the students, and peer-educator feedback from our panel discussion at the Mid-American Theatre Conference in March. A vision for the future will be outlined both in terms of this MSU collaboration, but also for the future of interdisciplinary collaboration as an educational concept.

THE INFLUENCE OF EXPLICIT TEACHING ON THE ACQUISITION OF FRENCH LIAISONS
Emma Dunn
Time: 9:15 AM
Mentor(s): Anne Violin-Wigent (Romance and Classical Studies)

The current study seeks to determine to what extent the explicit teaching of the French liaison affects students' ability to appropriately use this phenomenon while reading a text in French. This study was conducted using recordings from four different semesters of the French 330 Phonetics course during which

students learn about different features of French pronunciation including the liaison (a process by which a normally-silent consonant becomes pronounced when the following word starts with a vowel). Each recording contains environments where liaisons should and should not be used, and are optionally found. The recordings span the course of the semester to include some recorded before the liaison was explicitly taught, during the explicit teaching, and after the explicit instruction of liaison. In order to test statistical significance of these data, the coding for the correct or incorrect usage of the liaison were run using a multivariate analysis. Preliminary results show that after the explicit teaching, errors appear less random and some patterns seem be acquired to some extent. However, many mistakes still remain at the end of the semester.

INSTRUCTOR STRATEGIES IN GENERATING STUDENT DISCUSSION

Sonny Ly
Time: 9:30 AM
Mentor(s): James Laverty (CREATE for STEM), Rebecca Matz (CREATE for STEM)

Generating student discussion is a well-established teaching technique for teachers of any subject to help students learn. Here at Michigan State, we are currently engaged in a transformation to improve the introductory courses in biology, chemistry, and physics. We recorded instructors teaching these classes to investigate different facets of the way these courses are being taught. One area that we are looking into is the usage of clicker questions and group tasks given during class. This presentation will focus on the strategies instructors employ during clicker questions and tasks, as well as the difference in usage of these teaching techniques in biology, chemistry, and physics courses. For example, we track whether or not the instructor walks around the classroom and interacts with students during a clicker question or task, or if the instructor allows students to work in groups. By tracking this information, we have a way to characterize pedagogical changes that are happening in these introductory classes across the disciplines.

FIRST YEAR WRITING

Rebecca Rohde
Time: 9:45 AM
Mentor(s): Joyce Meier (Writing Rhetoric and American Culture)

A community has been created and maintained in which First Year Writing (FYW) students can produce, analyze and share their creative works via the FYW conference and fall symposium. Through anonymous student surveys, reflection pieces, and Eli Review responses, data has been collected and studied to improve the pedagogy of the WRAC department and further allow the exploration of writing and it's purpose/importance in the educational experience.

QUESTIONING THE ACHIEVEMENT GAP

Rae Chaloult
Time: 10:00 AM
Mentor(s): John Aerni-Flessner (Residential College in the Arts and Humanities)

The research conducted looks to analyze how the dominant perspective in academia in analyzing the "achievement gap" ignores the intersectionality of race, class, and gender and exclusively limits the complexity on this issue. However, by analyzing the definition of the achievement gap, it allows for a better understanding of how to approach and find a solution. Currently, the main issue at hand regarding the achievement gap is "how can we solve it"? Yet, there does not seem to be a comprehensive and clear definition of the "it" and who is the "we". Both of these aspects need to be better understood before getting to the "how". Therefore, researchers are better equipped to see the achievement gap as a multidimensional problem when they accept the intersectionalities at play in structural inequality. The multidimensional aspects are not only the intersectionality of race, class, and gender but also the understanding of how the viewpoint of the achievement gap often fails to incorporate perspectives and identities of minority groups. Thus, when looking at a multidimensional problem from only the dominant perspective, these views remain limited and will only continue to perpetuate the achievement gap and ignore minority struggles. However,

by looking at the achievement gap as a multidimensional issue, from a minority perspective, and considering the structural inequalities through intersectionality, then the "solution" of the achievement gap will begin to illustrate and recognize these complexities.

ACCESSIBILITY IN EDUCATION
Ryan Schroeder
Time: 10:15 AM
Mentor(s): Kate Sonka (Center for Integrated Studies in Arts and Humanities)

Accessibility in education isn't a new topic but it is often one that is hard to understand. How do you make digital and even physical education content accessible to any number of students? With federal laws mandating universities have accessible content to each and every student, colleges are doing their best to remediate existing courses and ensure that they are fully accessible in the future. At the College of Arts and Letters, I have developed and researched numerous methodologies for reviewing and remediating course and college content. Each course is vastly different than any other and each website, while it follows the main MSU brand standards, is slightly different as well. This prevents a challenge to those that have to make sure the content is accessible. How do you develop a methodology that can change much like the courses and websites do? That can be solved with picking review content particular to that course or website and reviewing the elements that best represent that website. The course may be different but the approach, if done right, will always be the same. Over the last year, I have worked through making this approach as seamless and effective as possible.

EDUCATION
ORAL PRESENTATIONS, SECTION 2
LAKE SUPERIOR ROOM, 1:00 – 2:45 PM

CODING SYLLABI FOR 3D LEARNING
Claire Morrison
Time: 1:00 PM
Mentor(s): Rebecca Matz (CREATE for STEM)

In 2012, the National Research Council released A Framework for K-12 Science Education. The three dimensions of learning outlined in this framework are Science Practices (SPs), Crosscutting Concepts (CCs), and Core Ideas (CIs). Science Practices describe how scientists conceptualize, carry out, and present their research; Crosscutting Concepts are ideas that exist across disciplines in science and engineering; Core Ideas are central to specific disciplines and can help explain new disciplinary phenomena. The concept of three dimensional (3D) learning has outlined a new direction for science curriculum development. We have developed a rubric to identify evidence for 3D learning in biology postsecondary course syllabi, which aligns with a larger effort to identify 3D learning in postsecondary science courses. Although different instructors will include different types and amounts of information, and syllabi may not fully represent the concepts highlighted in class, they can be a valuable data set. Syllabi are especially useful because they tend to be more easily accessible than observation and exam data and because they are often archived from courses that have ended. The syllabus rubric we have developed will allow us to identify changes in syllabi over time and to compare evidence of 3D learning found in syllabi with classroom observation and exam data.

EXPLORATIONS IN CHEMISTRY: A FIRST LOOK
Benjamin Brandicourt
Time: 1:15 PM
Mentor(s): Lynmarie Posey (Chemistry)

In Fall 2015, we piloted an introductory chemistry course, Explorations in Chemistry (CEM 121), as one of the academic components of Michigan State's Dow STEM Scholars Program, which aims to improve retention and persistence of underprepared students in STEM. Incoming freshmen with a STEM-related major

preference who had placed into Intermediate Algebra (MTH 1825) were invited to participate in this program. Program participants took a mathematics course with online and face-to-face components during the summer before entering MSU; successful completion allowed students to enroll in College Algebra (MTH 103) in Fall 2015. Explorations in Chemistry was developed to engage these students in a science course while they continued to build the necessary mathematics background for General Chemistry (CEM 141). A cohort of 34 students (28 female, 6 male) participated in the pilot offering of CEM 121. Ten were concurrently enrolled in MTH 1825, and 24 were concurrently enrolled in MTH 103. Despite taking a novel approach to introductory chemistry for underprepared students, deemphasizing algorithmic problem-solving in favor of focusing on the structure of matter and science practices, student performance in CEM 121 correlated strongly with mathematics background. In order to better understand the relationship between mathematics background and student performance in CEM 121 in order to improve instruction, we have classified the mathematics found on summative assessments and determined the percentage of points for each mathematics category. We have also identified pre-test questions that correlate with course performance.

SCHOOL CHOICE AND THE LANSING SCHOOL DISTRICT: POLITICS, MARKETS, AND MICHIGAN'S SCHOOLS

Tanner Delpier
Time: 1:30 PM
Mentor(s): Julia Grant (Social Relations and Policy)

In 1993, the Michigan legislature cut over $6.5 billion from its education budget. What came to follow was a radical shift in state education policy resulting in a complete overhaul of educational finance and the emergence of School Choice in the state. This research approaches the issue of School Choice from the perspective of the locality allowing for an in depth review of how this complex set of policies play out on the local level. Centering around the Lansing School District, this work examines the impact and subsequent response to School Choice by the district. Understanding that each locality presents complex, multidimensional environments of study, this work uses both qualitative and quantitative methods including interviews, a review of media, as well as data on demographics, enrollment, and finances, to present a comprehensive case study of how School Choice functions in this mid sized Michigan city. Results of this study have shown that the Lansing School District has borne a large costs due to School Choice despite persistent, pragmatic, and inventive innovation aiming to improve educational quality and stabilize enrollment in the district. This presentation compares the intended purpose and theoretical foundations of School Choice to its practice in the Lansing School District. Moreover, the result of this study has wide ranging implication surrounding the theory, expectations, and practice of School Choice in Michigan and throughout the country.

RACIAL, ETHNIC AND ECONOMIC DISCRIMINATION IN STANDARDIZED TESTING

Emily Cervone
Time: 1:45 PM
Mentor(s): Kristen Mapes (Digital Humanities)

Growing resistance to standardized testing comes not only from the money, time and energy spent on what is often regarded as ineffective and useless information, but from the fundamentally discriminatory nature of the exams. Due to the fact most standardized tests are written by white or otherwise privileged people, the questions and disposition of the tests test life experiences instead of intelligence. In turn, the way these tests are written in terms of questions based outside of the current curriculum undermine the success of low-income and minority students. Low test scores that stem from this discrimination result in reduced funds for school districts that need them as well as higher drop out rates for students. Data from Smith and Rottenberg (1991) shows less quality instruction during the testing period, especially in high-minority and low-income classes, as teachers abandon the curriculum to cram for exams. These tests have supposedly been scanned for biases, yet a study by Jay Rosner in 2002 showed that questions which more African-Americans answered incorrectly on pre-tests were still included on national standardized tests. As a whole, standardized testing continues to discriminate on multiple levels: racial, ethnic and economic. The goal of my presentation is to bring together published research data with real-world experiences gathered from

interviews to more fully understand the discrimination behind standardized testing. I will show not only that it occurs, but will focus on the impact this discrimination has on the lives of individuals.

INTERVIEWS PROVIDE INSIGHT ABOUT BIOLOGY STUDENT LEARNING CHALLENGES UNDERSTANDING TRANSCRIPTION

Alexandria Mazur
Time: 2:00 PM
Mentor(s): Anne-Marie Hoskinson (Center for Engineering Education Research), John Merrill (Microbiology and Molecular Genetics), Rosa Moscarella (Center for Engineering Education Research), Mark Urban-Lurain (Center for Engineering Education Research)

Understanding genetics is fundamental for biology literacy. Yet, many undergraduate students have difficulty understanding genetic concepts, particularly the central dogma of molecular biology (i.e. “DNA codes for RNA which codes for proteins”). Student understanding may be revealed when asked to provide explanations using their own words, like in constructed (open) response (CR) questions. The Automated Analysis of Constructed Response (AACR) research group investigates automated analysis of students’ writing by creating computerized scoring models that combine lexical and statistical analyses to predict human scoring, making CR questions accessible to instructors of large undergraduate classes. AACR has developed CR questions to assess students’ understanding of how mutations affect the processes of the central dogma. These questions were administered to introductory biology students. Preliminary text analysis of responses collected pre- and post-instruction revealed no learning gain for transcription, the process of DNA coding for RNA, leading to the question, why do students struggle understanding transcription? We conducted exploratory interviews in spring of 2015 of introductory biology students. We analyzed interview transcripts using qualitative, grounded-theory methods, which revealed that students have difficulty understanding mRNA synthesis. Results from these interviews provided a framework for a second round of interviews to better understand mental models about mRNA of students across different levels of competency. Here, we report the findings of this round of student interviews. We believe instructors will find the results from the interviews useful for designing instructional interventions to help students better understand transcription in lower division courses.

IWRITE THEREFORE IAM

Victor Ruiz
Time: 2:15 PM
Mentor(s): Marini Lee (Education Dean)

Asserting “that identities may be defined as collections of stories about persons,” the research of Sfard & Prusak (2005) offer teacher educators and teacher candidates a dynamic space in which to simultaneously witness and potentially develop the necessary knowledge, dispositions and skills of effective educators. As such, preservice teacher candidates in this project will engage in a participatory research space across a variety of digital platforms in which they will construct and deconstruct their own and their peers’ learning-to-teach experiences as storied identities.

EXACT NUMBER OR JUST MORE: WHAT DO PRESCHOOLERS KNOW ABOUT WRITTEN NUMERAL MEANINGS?

Garret Zuk, Katie Knapp
Time: 2:30 PM
Mentor(s): Kelly Mix (Counseling, Educational Psychology, and Special Education)

We want to understand how much preschool children know about large number meanings. We already know from previous experiments that preschoolers can say which of two written numerals is more (e.g., 21 vs. 201), and they can also say which of two displays of dots has more using the same number, but children this age cannot map the numerals to the dots. For example, if you show them two dot displays and show them a numeral, they can't tell you which display matches. In this experiment, we are asking whether they can use their sense of "more" to map numerals to dot displays. We showed preschool children pairs of dot

displays and pairs of cards, and asked them to match them, pair-to-pair. We also gave them the option to say that the numbers did not match the dot displays. On some trials, the exact number of dots matched the numbers on the cards. On other trials, the exact numbers were not the same, but the relations were. In our presentation, we will share the results of this study comparing children's performance to chance, to see whether they perform better than when they just have one numeral and must match it exactly. We will also compare children's performance across age (i.e., 3 vs. 4 years old) to see if they get better or worse with age. It's possible they will get worse if they prefer matches that are exact.

EDUCATION
POSTER PRESENTATIONS, SECTION 1
BALLROOM, 9:00 – 10:30 AM

EQUIP: AN OBSERVATIONAL TOOL FOR QUANTIFYING EQUITY IN THE MATH CLASSROOM
Shannon Low
Poster: 193
Mentor(s): Niral Shah (Teacher Education)

A major concern for teachers is maintaining an equitable classroom environment. Inequity in the classroom has been shown to affect student participation, and therefore affect individual learning. This presentation focuses on an observational tool, EQUIP, which takes a quantitative approach to highlight inequalities in student participation in whole-class discussions. It compares the relationship between different dimensions of a classroom's interactions and different demographics (such as race or gender) in order to illuminate possible inequity. My team's research during the 2015-16 school year revolved around analyzing the quantitative data gathered by the tool and applying qualitative analysis to video data from the classroom in order to bring possible inequity to attention. Our data came from a 30-hour summer mathematics program for students entering the 5th grade taught by an experienced teacher widely acclaimed for her commitment to equity. Our findings show that in most dimensions, participation was distributed equally by gender and by race. However, an intersectional analysis revealed statistically significant inequities in Latin@ male student participation. With further development, the observational tool, EQUIP will help teachers become aware of significant inequity in the classroom and improve instruction.

WHAT DEFINES SUCCESS IN SEX EDUCATION?
Emily Garman, Beth Hendrickson
Poster: 194
Mentor(s): Mark Largent (Lyman Briggs-History, Philosophy, and Sociology of Science)

Our topic deals with the issues surrounding what type of sexual education is most effective in properly educating youth. However, as we got further into the topic we quickly realized that it is nearly impossible to measure “effectiveness”, simply because there are so many different definitions of what effectiveness in. There is also not a clear “right” or “wrong” stance on this topic which is what led us to decide to look more in depth into the thoughts behind each side. It is very interesting to look at different views on what is considered a success which leads to more questions involving religion and what role government should be allowed to play in these sensitive topics. For example, one side might define success by no teenage pregnancies or STD diagnoses while another side might define it as the absence of all premarital sex. These two sides then get into heated arguments over which way is better, even though they are arguing different things. If an agreement is ever going to be reached, then both sides need to be fighting for the same outcome.

TOWARDS UNDERSTANDING STUDENT'S DEVELOPMENT OF COMPUTATIONAL MODELING IDEAS IN AN INTRODUCTORY MECHANICS COURSE
Nathaniel Hawkins
Poster: 195
Mentor(s): Danny Caballero (Physics Education Research)

Computational modeling provides an alternative route of experience for a student in physics as compared to traditional analytic problem solving. In a transformed introductory calculus-based physics course called Projects and Practices in Physics (P³), students worked a suite of computational modeling problems using the programming language VPython. Each of the 3 computational problems presented a different form of the net force (i.e. zero net force, constant net force, position dependent net force). In our study, students were interviewed individually after their group solved each problem in order to understand what ideas and concepts each student deemed critical to model the particular phenomenon. Through these interviews, we aim to observe developmental differences in their approach to understanding elements of computational modeling in a force and motion context.

CONTEXT DEPENDENT MINDSET: BUILDING NEW FRAMEWORKS AND MEASUREMENT METHODOLOGIES
Bridget Humphrey
Poster: 196
Mentor(s): Angela Little (Physics), Vashti Sawtelle (Physics)

Mindset is a long-standing area of the psychology literature that focuses on students' beliefs about whether intelligence can grow and improve. Much of the mindset research involves Likert scale survey items such as, "Your intelligence is something about you that you can't change very much." People are often characterized as having either a growth or fixed mindset, however, Dweck recently noted the importance of "portraying people as mixtures," in various contexts (Dweck, 2015). Yet, methodologically, it is not possible to examine these "mixtures" with current broad survey tools. We draw from lessons learned from the science beliefs literature that similarly shifted to studying the context-dependent nature of beliefs through, "naturalistic case studies, including open-format interviews" (Hammer & Elby, 2002). In this presentation we examine preliminary interview data as a way of moving forward in studying issues of mindset.

USING DRAWINGS TO CHARACTERIZE HOW STUDENTS' REPRESENT GENETICS CONCEPTS.
Noah Julyk
Poster: 197
Mentor(s): Tammy Long (Plant Biology)

Despite having a clear mental model, students often face difficulty when asked to represent their conceptions of biology in writing. They may struggle to produce words to describe the ideas that they can easily visualize in their mind. Thus, written assessments commonly used in undergraduate biology may underestimate students' actual understanding of biological concepts. Since students report being able to visualize concepts they are unable to express in writing, we asked: How do students use drawings to represent their ideas about fundamental genetics concepts? We collected responses to a midterm exam in a large-enrollment introductory biology class (n=196) in which students were asked to use both drawings and written explanations to model the origin and expression of genetic variation. Specifically, students were required to represent seven genetics concepts: gene, allele, DNA, protein, chromosome, phenotype, and nucleotides. Students' drawings of each of the seven concepts were binned according to visual similarities. Results of this project may help instructors assess the diversity of students' conceptions and adapt their instruction to reach students where they are in their current understanding of foundational biology concepts.

AN INTRODUCTORY SCIENCE TEXTBOOK ANALYSIS OF MULTI-DISCIPLINARY CONCEPTS

Nikita Kumar, Justin Gambrell

Poster: 198

Mentor(s): Vashti Sawtelle (Physics)

Numerous calls and reports emphasize the importance of students at the university level developing a coherent understanding of science across the disciplines. In this presentation, we characterized disciplinary ideas by analyzing introductory science textbooks in physics, biology, and chemistry for how they presented the concepts of entropy and conservation of energy and matter. These concepts were selected from interviews of undergraduate students who were asked to reason about several interdisciplinary phenomena. Each disciplinary text was evaluated for their presentation of these concepts by the context in which each concept was presented, whether or not it was presented qualitatively or quantitatively (i.e., was an equation present or not), depth of explanation and the way these are explained. These examinations are used to tag when students are invoking disciplinary ideas which would further help us understand and relate concepts from these three disciplines better and understand the interviews better.

IMPROVING STUDENTS UNDERSTANDING OF LONDON DISPERSION FORCES

Keenan Noyes

Poster: 199

Mentor(s): Melanie Cooper (Chemistry)

Understanding intermolecular forces (IMFs) is necessary to understand macroscopic phenomena such as phase changes, and how molecules interact to undergo reactions. IMFs are also important to phenomenon like protein folding and DNA replication. Unfortunately, previous research has shown that IMFs are not well understood by students, even after undergraduate-level instruction. In an effort to improve students understanding of IMFs, the CLUE curriculum, a transformed chemistry curriculum developed by Dr. Melanie Cooper, places a strong emphasis on understanding both how and why IMFs form. In order to better understand how students' reason about IMFs and how we can further improve the CLUE curriculum, we used interview and homework data to characterize the sophistication of students' written and drawn explanations of London Dispersion Forces (LDFs), the most basic type of IMF. We identified five levels of sophistication and used our findings to refine the following years homework and exam activities as well as to analyze the responses of a matched cohort of students throughout the first two semesters of general chemistry. In the second year of data collection, we asked students to explain phase changes, a task that calls upon students understanding of LDFs. Using this kind of analysis we are able to monitor changes in student understanding over the course of the two semester sequence, and from year to year. The process of using student output to iteratively refine the course provides a good example of how course improvement can occur.

EDUCATION
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 9:00 – 10:30 AM

"CAN YOU…?" OR "WILL YOU…?": COMMUNICATING AGENCY AND ABILITY IN MATHEMATICS CLASSROOMS

Kayla Cotter

Poster: 203

Mentor(s): Kristen Bieda (Teacher Education)

The TEAM research project aims to provide prospective secondary mathematics teachers taking a teaching methods course (TE407) with valuable teaching experience through a microteaching lab, which includes teaching a developmental mathematics course MTH100E, a face-to-face support seminar for MTH1825. The class sessions taught by the TE407 students were video recorded and selectively transcribed, and discourse was analyzed to investigate how specific words in teacher questions and the associated student responses in the classroom positioned MTH100E students as having mathematical ability and/or agency. During the

video analysis, we assigned codes to all teacher questions containing modal verbs (e.g. can, could, will, would) paired with non-specific pronouns (e.g. anyone, somebody, who), as well as the associated student responses. We looked for patterns among the codes and attended to the frequency of using certain modal verbs as well as the complications related to the use of those verbs. Findings from this analysis have implications for the nature of classroom discourse, students' experiences, and teacher-student interactions to create a more productive environment for both teaching and student learning.

TURNING PEDAGOGY INTO PRACTICE: USING CHILDREN'S LITERATURE TO ENGAGE MULTILINGUAL COLLEGE WRITERS
Erin Prim
Poster: 204
Mentor(s): Sonja Wang (Writing Rhetoric And American Culture)

This study seeks to re-imagine writing pedagogy in light of the unique linguistic, cultural, and educational experiences of college level international students. Through pre- and post-surveys, interviews, and student artifacts, we survey the broad range of literacy experiences of international students. Drawing upon culturally relevant (Ladson-Billings, 1995) and culturally sustaining (Paris, 2012) pedagogies, we work to build theory-informed curriculum that promotes student success. By focusing our research around a writing assignment where students are asked to translate and remix cultural stories into children's literature, we help students develop multimodal skills and a translingual stance towards multiple languages.

GET CITY
Jennifer Diemert
Poster: 204
Mentor(s): Angela Calabrese Barton (Education)

GET City (green energy technology) is a research program that focuses on the low percentage of engineers coming from urban demographics. GET City holds an after school program at the South Lansing Boys and Girls Club, that encourages Urban youth (sixth to eighth graders) to become invested in science and engineering. At this program the youth identify a problem in their community and engineer and design something to solve that problem. My project pertains to GET City because I am interested in the long term effects, if youth are going into high school and beyond interested in pursuing science and engineering for a life long career or passion. I will interview GET City graduates and analyze data from previous years of the program to determine it's lasting effect on engineers in Urban areas.

INDIGENOUS YOUTH EMPOWERMENT PROGRAM
Maggie Pilath
Poster: 206
Mentor(s): Estrella Torrez (Residential College in the Arts and Humanities)

The Indigenous Youth Empowerment Program (IYEP) is a non profit program through Lansing School District (LSD), Lansing Community College (LCC), and Michigan State University (MSU) serving Indigenous youth and their families. Lansing Public School District is an underserved school district and the Native students in the Lansing are a diverse and vibrant group in need of support from the local community. This project set out to imagine and put into practice a student centered, culturally responsive, empowering curriculum in response to the general public school curriculum not prioritizing the history and culture of Indigenous people. The main goal of this project is to engage students with activities and lessons that allow them to explore Indigenous stories and traditions, while providing academic support through homework help and literacy activities. Community based participatory research practices informed this project, experienced through mentorship, curriculum development, and organizational support for events through an undergraduate research assistant position. The support of the local Native community is vital to the success of this project, therefore learning about traditions, hearing stories, and attending events have been important experiences when learning background information for lessons and activities. This project envisions what a culturally responsive curriculum looks like in an after-school program, and possibly a future

classroom. By learning about their culture, students can grow to be empowered leaders in their community, and this potential is the most important outcome of this project.

EQUITY IN COMPUTER SCIENCE EDUCATION
Emily Pearce, Declan McClintock
Poster: 207
Mentor(s): Niral Shah (Education)

This poster delves into the interactions of pair programming students to observe the equality or inequality across three modes of discussion and the total talk time between partners. These three modes are coding, designing and logistics. Coding being when students are discussing code, designing being the discussion of aesthetic aspects, and logistics being the discussion of saving or manipulating files. The students whose interactions are reviewed and assessed in this poster are participants in a three-week elementary computer science program taking place in Northern California in the years 2009, 2012, and 2013. The students ages range between ten and eleven years old. The poster will also present tables to aid in the explanation of how one mode in an interaction can be equitable while the other two modes are not and how total talk time a student has can show the inequity of the two students understanding.

APPABROAD: SOCIALLY CURATING THE STUDY ABROAD EXPERIENCE
Tommy Truong, Tylor Hoekstra, Elizabeth Oderkirk
Poster: 208
Mentor(s): Ben Lauren (Writing Rhetoric and American Cultures)

"Michigan State University (MSU) has a long history of international engagement and has led the nation in study abroad participation among public universities for the last six years… Each year, close to 3,000 students are transformed by their educational experiences outside of the United States and can be found in classrooms, research labs, field stations, and internships sites throughout the world." (Office of Study Abroad, Michigan State University) While study abroad has impacted the lives of many students and faculty, sharing these experiences via multimedia in a manner to reflect and learn from have been largely unregulated and informal, leaving the potential to navigate this content untapped. In response to this issue, AppAbroad, a mobile application currently in development, aims to become a single, multipurpose tool for MSU students and faculty to record and share their study abroad experiences in a guided, inclusive network. By utilizing a single platform to act as a "collective experience" of content sharing, those in study abroad programs can learn from not only their perspective but from the perspectives of others, fostering greater intercultural competence.

EDUCATION
POSTER PRESENTATIONS, SECTION 3
MOSAIC MULTIPURPOSE ROOM, 11:15 AM – 12:45 PM

SCHOOL-MUSEUM COLLABORATION PROJECT
Anna Esenther
Poster: 212
Mentor(s): Denice Blair (Teacher Education)

Many scholarly articles have been written about collaborations between museums and K-12 schools, and virtually all concur that such collaborations are beneficial to students. A large percentage of the articles are descriptive in nature and limited in scope. There is a dearth of research going beyond case studies to consider more broadly which aspects of collaborations contribute to positive outcomes for students. This project seeks to identify the characteristics of successful school-museum collaborations by analyzing empirical studies and extracting the key themes. At this point, we have reviewed literature about inter-organizational relationships and completed an initial screening of the studies found through the databases ProQuest and JSTOR. We are now extracting more detailed data from the empirical studies, so that we will

able to identify research-based examples of successful collaborations and continue our data analysis from there. Ultimately, we hope to create a model that will inform classroom teachers, school administrators, museum educators, and other relevant parties about research-based strategies for conducting school-museum collaborations.

STUDENT ENGAGEMENT AND DESIRE TO COMPLETE ACTIVITIES IN SCIENCE CLASSES

Jacob Herwaldt

Poster: 213

Mentor(s): Barbara Schneider (Education Dean)

This study explores the relationship between students' affective states and their desire to complete academic tasks. Sampling 318 students in 4 Mid-Michigan high schools, we collected over 6,000 momentary responses over a course of a total of 6 weeks between two years using the Experience Sampling Method (ESM). We examined engagement within classes compared to the desire the student reported to do certain activities. Specifically we analyzed: (i) the components of optimal learning; (ii) the relationship between the desire a student had for a certain activity and the effect on optimal learning moments; (iii) how optimal learning moments and desire to do an activity in one science discipline compares to classes of another science discipline. Using hierarchical linear models, results show that when a student indicated they "wanted" to do an activity, engagement and positive outcomes increased, and negative outcomes decreased.

THE EFFECTS OF THE FLIPPED CLASSROOM MODEL ON STUDENT ATTENTION AND ENGAGEMENT IN THE CLASSROOM

Cassandra LaMarche, Navreet Bhangu , Alan Chen, Mackenzie Topolski

Poster: 214

Mentor(s): Emily Bovee (Counseling, Educational Psychology, and Special Education), Lisa Linnenbrink-Garcia (Counseling, Educational Psychology, and Special Education), Kristy Robinson (Counseling, Educational Psychology, and Special Education)

Studies have shown that the use of a flipped classroom model may improve student performance when compared to a tradition style classroom. The flipped classroom reverses the format of lecture and homework – students watch the lectures online before class and are engaged in group learning exercises during class time. It is possible that the flipped model will engage students in more active learning techniques and subsequently improve student engagement and attentional control. However, there may also be adverse effects on student's behavioral engagement and attentional control due to the flipped model. Since students are watching lectures online before class, it is possible that they may not value the time spent in class and therefore disengage during class time. To examine the effects on engagement and attentional control behaviors in the flipped classroom, we have conducted a multi-semester study in an anatomy and physiology course. Baseline data collection was performed during the Fall 2014 semester and treatments were conducted during the Spring 2015 and Fall 2016 semesters. We are currently running statistical analyses on our data set in the hopes of discovering the roles that the flipped classroom plays in student attention and engagement.

DIFFERENCES IN MOTOR LEARNING BETWEEN CHILDREN AND ADULTS PERSIST REGARDLESS OF TASK DIFFICULTY

Emily Matthews, Hannah Moote

Poster: 216

Mentor(s): Mei-Hua Lee (Kinesiology)

Do children really learn motor tasks better than adults? The common belief is that children learn faster than adults, which is why some people advocate starting sports at a young age. However, previous research has been inconsistent with this belief. This study investigated the learning differences between children (9 and 12 years) and adults (21 years) on a virtual motor task with two levels of difficulty: easy and difficult. Both tasks involved participants moving a cursor to different targets on a computer screen via four lightweight

inertial measurement unit sensors on their shoulders. In the easy task, participants learned to move the cursor in one dimension (horizontal). In the difficult task, participants learned to move the cursor in two dimensions (horizontal and vertical). Performance was measured by path length and time spent moving to the targets. Regardless of task difficulty, children performed worse than adults (longer path length and movement time) . The results also showed that children and young adults employed different movement pattern strategies. This suggests that therapy should be tailored to account for these age differences in learning motor tasks.

STUDENT REASONING ON HUMAN EVOLUTION

Mitch Distin
Poster: 217
Mentor(s): Tammy Long (Plant Biology)

Nothing in biology makes sense, except in light of evolution—because of this, evolutionary theory has been prioritized in education. Prior biology education research has elucidated inconsistencies in student reasoning about evolution across seemingly similar tasks and assessments. For example, assessment prompts varying in contexts—evolutionary scale, taxon of organism, and type of trait—have been shown to impact students' reasoning about natural selection. However, little research has examined whether students are similarly influenced when reasoning about human evolution. To address this gap, my research asks: do prompts, varying in taxon (human vs. a non-human animal), elicit different student reasoning about evolution? We asked students in a large (n=164) introductory biology course how might a biologist explain the evolution of a trait in humans and in cheetahs. Students' responses were then coded for the presence of 6 key concepts (variation, heritability, competition, limited resources, differential survival, and non-adaptive) and three naïve concepts (adapt, need, and use/disuse) using an online assessment tool entitled Evograder. Our results concluded that student reasoning about human evolution contrasted with cheetah evolution; students provided fewer key concepts and more naive concepts when reasoning about human evolution, relative to cheetah evolution. Overall, these results provide evidence that students are reaching a more biocentric philosophy on human evolution after instruction, rather than an anthropocentric perspective of natural reality.

EDUCATION
POSTER PRESENTATIONS, SECTION 4
BALLROOM, 1:30 – 3:00 PM

COMPARING IMAGE MATCH TO SAMPLING WITH VIDEO MATCH TO SAMPLING TO CHILDREN WITH AUTISM SPECTRUM DISORDERS

Hannah Goodell
Poster: 220
Mentor(s): Joshua Plavnick (Counseling, Educational Psychology, and Special Education), Julie Thompson (Counseling, Educational Psychology, and Special Education)

In a child's vocabulary acquisition, verbs are learned after nouns. This is because adults model nouns more predominately during early language acquisition years. Children with Autism Spectrum Disorders (ASD) can have language impairments that range in severity that contribute to the delayed acquisition of verbs in their vocabulary. Verbs are less concrete than nouns making it more difficult to teach due to the inaccurate portrayals of actions through static images. This study examines the teaching of verbs through video-based match to sample (MTS) training and static image-based match to sample training. Using a computer program, the children match visual stimuli to an auditory sample when presented. The study examines acquisition rates for three students between the ages of 3 and 5 years old with ASD in an early intervention classroom environment. The children complete one session each of video MTS and static image MTS each day. After all trials are complete, it is hypothesized that the children will learn verbs more quickly through the video stimuli versus the static image stimuli.

TEACHERS' ACTIVE ENGAGEMENT IN SOCIAL MEDIA: A COMPARISON OF NETWORK INTERACTIONS ACROSS PHYSICAL AND VIRTUAL SPACES

Andrew Jurasek

Poster: 221

Mentor(s): Kristen Bieda (Teacher Education), Kaitlin Torphy (Education Policy)

The interactions that teachers engage in with their colleagues have a dramatic effect on their teaching. This research seeks to understand the nature of the interactions between early career teachers (ECTs) and their mentors and colleagues, and how those interactions inform ECTs mathematics teaching. We examine differences in ECT's physical and virtual social networks and identify how ECTs and colleagues conceptualize mathematics virtually and if virtual connections exist between ECTs and their colleagues. Connections may not be reciprocal, therefore we identify the directionality of the network, illustrating how fully an ECT has been incorporated into existing virtual networks. Thirty nine ECTs were surveyed to find the colleagues they interact with most frequently. These colleagues form an ECT's physical social network. To locate an ECT's virtual social network, we use Pinterest, a social media site. Pinterest allows users to organize ideas, worksheets, and other resources in the form of "pins," post them on "boards," and follow other users' pinning activity. The Pinterest users that an ECT follows make up an ECT's virtual social network. Out of the 39 ECTs, 25 ECTs have active Pinterest accounts. The mathematics and teaching pins of both the ECTs and the colleagues were analyzed. Initial findings show that the physical links between ECTs and their colleagues mostly did not extend into the virtual realm. Yet, after examining 80 colleagues, virtual interactions between colleagues in the same school were prevalent. ECTs, for the most part, remained outside or on the outer edge of an existing virtual network.

THE APPLICATION OF DEMOGRAPHICS IN RESEARCH SAMPLING

Maggie Keech

Poster: 222

Mentor(s): Kristen Bieda (Teacher Education), Shannon Sweeny (Counseling, Educational Psychology, and Special Education), Kaitlin Torphy (Education Policy)

This project focuses on the Study of Elementary Mathematics Instruction (SEMI); a research project that is directed at analyzing both how early career elementary teachers plan and enact mathematics lessons and how their colleagues provide mentorship related to mathematics teaching. This individual project will investigate the demographics of participating schools in Indiana, Illinois, and Michigan with demographics from a randomized sample of schools within those states. The data collected will include the students' race, gender, and eligibility for free and reduced price lunch. By comparing the demographics of the samples to those of the states, it can be determined whether the choice of schools in the study sample provides an accurate representation of the characteristics of schools in each state. A significant difference in demographics may influence the results of SEMI, such as shifting the focus of teachers' interactions with colleagues or changing the pace of the curriculum. Thus, the individual project addresses the ability of SEMI to generalize about the practices of teachers for each state.

COLLATERAL EFFECTS OF TACT ACQUISITION

Anjana Nair, Erica Lydey

Poster: 223

Mentor(s): Joshua Plavnick (Counseling, Educational Psychology, and Special Education)

Teaching children with ASD to label items is an essential skill needed in order to interact socially with others. One approach to teaching children to label items in their environment is called discrete trial training (DTT). In DTT, the child is seated at a table across from the instructor and is taught to label an object or picture when presented. In contrast, the naturalistic setting allows the child to explore a variety of toys in a play-based setting that includes the objects that the child is being taught to label. The purpose of the present study is to examine differences in a variety of social interaction behaviors of children with ASD when exposed to the two instructional procedures. The study will examine the differences in collateral effects of tact training probes, both before the training and after, under the two conditions: naturalistic and discrete

trial (DTT) for three children with autism spectrum disorder ages 3 to 4 years old. Existing pre-probe and post-probe videos under the two conditions will be coded for the following behaviors: children's attention to researcher, imitation with objects, latency to respond, initiating and/or responding to joint attention, vocal/motor stereotypy, and problem behavior. The data will be analyzed for differences in these behaviors across these settings and the outcomes will produce novel information about the differences between two types of instructional approaches commonly used with children with ASD.

REVEALING STUDENTS' MENTAL MODELS OF GENETICS CONCEPTS THROUGH DRAWINGS AND REPRESENTATIONS

Hannah Rose
Poster: 224
Mentor(s): Tammy Long (Plant Biology), Caleb Trujillo (Plant Biology)

For some students, drawings embody better representations of their mental models than written explanations. When drawings are used in classroom assessments, changes in students' representation of concepts can indicate modification of their mental models in response to instruction. However, large-enrollment science courses typically depend on multiple choice assessments, which can limit instructors' insight into student thinking. Understanding students' mental models is key to tailoring instruction to meet the needs of all students. My research question asks how students' drawn representations of genetics concepts change after instruction. Undergraduate biology students completed an assessment on the first and last days of Introductory Biology. Students provided a function, definition, and drawing for seven core genetic concepts: chromosome, allele, gene, protein, phenotype, mutation and DNA. De-identified drawings were binned according to visually similar characteristics. Students' paired responses were analyzed for change pre-post. Our results will inform us about features in representations that persist despite instruction, as well as changes made that may reflect adjustments in students' mental models.

DETERMINING DIFFERENCES IN STUDENT LEARNING USING SIMULATIONS AND SCREENCASTS

Alec Shrode
Poster: 225
Mentor(s): Ryan Sweeder (Chemistry)

Visuals and online materials are becoming more prevalent in today's classrooms, especially in chemistry as they provide a way for students to see representations of molecular-level interactions. To understand how students use these resources both a guided activity and a screencast were developed to accompany an existing online simulation that highlights atomic interactions. Students in general chemistry classes at both Michigan State University and Grand Valley State University were then split into two groups and each was given one of the two learning treatments. Students who used the simulation were provided with a set of guiding questions and instructions, which they used on their own along with an online simulation that they controlled. Students who used the screencast watched a short video of the simulation being narrated to them. Pre- and post-tests were used to identify learning gains and understand the relative impacts of the two interventions. Initial pilot studies show little difference in learning between the students who were given the two treatments and neither treatment appears to have notable impact. These initial findings have led to a refinement of the screencast for further study. This study is important in the effort to determine how to most effective use online materials to their full potential.

ENGINEERING, COMPUTER SCIENCE, & MATHEMATICS

POSTER PRESENTATIONS, SECTION 1
ENGAGEMENT CENTER, 9:00 – 10:30 AM

FRACTURE ANALYSIS OF FRACTURE TOUGHENED CARBON FIBER/EPOXY COMPOSITES USING A SCANNING ELECTRON MICROSCOPE

Sydney Boeberitz

Poster: 228

Mentor(s): Per Askeland (Composite Materials and Structure Center), Carl Boehlert (Chemical Engineering and Materials Science)

A polymer composite contains two parts, a polymer matrix and a reinforcement. Polymer composites with an epoxy resin matrix and carbon fiber reinforcements are used in automotive and aerospace applications due to their high strength and low weight. The matrix in this type of polymer composite is a thermoset which is strong and stiff, making it useful for structural components. The problem with these matrices is that they are brittle and have a low fracture toughness or resistance to crack propagation. A method to increase the fracture toughness of the composites was investigated. A triblock copolymer, namely poly(styrene)-block-poly(butadiene)-block-poly(methylmethacrylate) (SBM) was added to the epoxy resin in order to increase the fracture toughness of the composite. SBM was added to the epoxy resin at 5 and 15 phr loadings. The fracture surfaces of these composites were observed using a scanning electron microscope in order to study the failure and identify the toughening mechanism.

ANATOMY OF A GUITAR STRING

William Briggs

Poster: 229

Mentor(s): Per Askeland (Composite Materials and Structures Center), Carl Boehlert (Chemical Engineering and Materials Science)

The purpose of this research was to explore the chemical and physical makeup of metal guitar strings. This was done using a Scanning Electron Microscope (SEM) to produce an image and using the technique of Energy Dispersive X-Ray Spectroscopy (EDS) to analyze the materials. The strings used were made by three different companies, and supposedly had three different compositions. The D'Addrio strings were labeled 80/20 Bronze, the Martin strings were labeled Phosphor Bronze, and the Elixir's were also labeled 80/20 Bronze along with having a special "Nanoweb" coating, advertised to make the strings last longer. The research done attempts to give an overall view on what makes up guitars' strings and how the different compositions affect sound and lifespan.

DEVELOPING DOSE RESPONSE MODELS FOR OPPORTUNISTIC PATHOGENS: KEY TO ASSESSING RISK

Kara Dean

Poster: 230

Mentor(s): Jade Mitchell (Biosystems and Agricultural Engineering)

An opportunistic pathogen may lie dormant until a set of conditions allows it to take advantage of a less resistive host. One example is Legionella spp., an opportunistic pathogen that is newsworthy as its risk is being determined in the water of Flint, MI and following an outbreak related to a cooling tower in New York City in the Fall of 2015. The objective of a quantitative microbial risk assessment (QMRA) is to quantify the risk posed by exposure to a pathogen. Through a step-by-step process, the pathogen is characterized, a dose response relationship is evaluated, the exposure to the hazard is quantified and risk is determined for a management plan. The dose-response model characterizes the pathogen's adverse health effects at given dosages by determining this relationship through model fitting. Data can be fit to dose-response models

using the method of maximum likelihood estimation (MLE) described in Haas et. al and with the statistical programming language, "R" (1999). Opportunistic pathogens present a critical need for dose-response relationships to assist risk managers with understanding the risks in areas where contamination may be present. Thus far, work by Tamrakar et. al collected data from studies that exposed guinea pigs to Legionella and determined that the exponential model was the best fit. Determining dose-response models for different strains of Legionella is the critical next step for the researchers, as it is the most informative way to quantify risk. This study presents an evaluation of the dose-response relationships of Legionella and other opportunistic pathogens.

INVESTIGATING HIGH VELOCITY IMPACT ON FAN CASINGS

Andrew Stamm
Poster: 231
Mentor(s): Xinran Xiao (Mechanical Engineering)

Fan blade release, otherwise known as fan blade out (FBO), caused by fatigue or bird ingestion in jet engines can cause catastrophic damage to flight critical components if not properly contained. Traditional containment methods are heavy, which reduces aircraft payload, range and overall fuel efficiency. This drives the use of composite materials to be used in the fan case containment region. However, little to no information is available in open literature for high speed damage mechanics on composite materials from an FBO. A simplified testing procedure using a horizontal impactor that simulates an FBO was constructed. The procedure includes a proposed projectile shape utilizing a discretized energy method and specialized boundary conditions to mimic a circular fan case. A flat composite plate is placed at an oblique angle relative to the projectile trajectory at the end of the impactor. A high speed camera trained on the event provides detailed footage, which can be viewed frame-by-frame. Real time out of plane displacement will be analyzed to provide impact measurements. This test method is investigated versus actual experimental FBO tests and LS-DYNA simulations for validation.

ALGORITHM DEVELOPMENT FOR HIGH THROUGHPUT QUANTITATIVE HISTOLOGICAL IMAGE ANALYSIS

Daria Tarasova
Poster: 232
Mentor(s): Dirk Colbry (Computational Math Sciences and Engineering), Rance Nault (Biochemistry and Molecular Biology), Tim Zacharewski (Biochemistry and Molecular Biology)

The manual quantitation of histological features by pathologists is an onerous and time consuming process. The Quantitative Histological Analysis Tool (QuHAnT) is a computational approach developed to automatically gather quantitative data from digitized histological images allowing faster and more accurate image analysis by pathologists. This project described the translation and validation of the code from a MATLAB implementation to C++ for integration in a high throughput image analysis system. The translation of the image processing algorithm was conducted in two steps. The first step used iPython notebook and OpenCV. The iPython Notebooks allow for rapid testing and validation of the OpenCV Libraries. The second step used what was learned in Python and implemented into a production system using C++ and OpenCV. Testing and validation of the algorithms was performed by comparing the quantitative output of matched images in all three versions of the code (MATLAB, Python, and C++). Indicial validation revealed poor correlation of feature detection by the connected components functions in MATLAB and C++ due to MATLAB using an 8-pixel neighborhood to determine contours while OpenCV used a 4-pixel neighborhood. As the algorithm results did not match, an 8-pixel neighborhood connected components function was developed in C++ and also validated to MATLAB output using matched images. The validation of these translated algorithms ensures that results produced by the high throughput tool are consistent with the accepted gold standard established by the original MATLAB version of the code.

DENGUE VIRUS DETECTION USING A BIOSENSOR

Matthew Vasher
Poster: 233

Mentor(s): Evangelyn Alocilja (Biosystems and Agricultural Engineering)

Dengue fever is a serious global problem that endangers an estimated 2.5 billion people (Whitehorn & Farrar, 2010). The dengue virus is spread by mosquitoes, and while it is most prevalent in tropical regions, it is becoming more common in the United States (Samir et al., 2013). Infection by the virus can lead to a life-threatening illness, and there is no vaccine or cure for the disease. The development of a biosensor for the rapid and economical detection of trace amounts of the dengue virus has the potential to save many lives. In this project, a quantitative method of dengue virus detection using an electrochemical immunosensor was developed. Magnetic nanoparticles were used to capture the dengue virus, which were then tagged with antibodies with attached gold nanoparticles. Differential pulse voltammetry was used to detect the gold nanoparticles on the surface of a screen printed carbon electrode. The biosensor was able to detect the dengue virus at concentrations as low as 1.5 ug/mL. The biosensor also proved to be quantitative, showing a linear correlation between dengue virus concentration and signal-to-noise ratio, meaning it has the potential to determine the level of infection in the patient. The detection takes less than one hour to perform and is very inexpensive. The sensitivity, speed, and low cost of this biosensor make it a promising means of diagnosing dengue fever in developing countries.

ENGINEERING, COMPUTER SCIENCE, & MATHEMATICS
POSTER PRESENTATIONS, SECTION 2
ENGAGEMENT CENTER, 9:00 – 10:30 AM

UTILIZATION OF ALTERNATE ENVIRONMENTS TO OPTIMIZE SOLUTIONS
Riley Annis
Poster: 235
Mentor(s): Charles Ofria (Computer Science and Engineering)

A common tool used in evolutionary computation is the genetic algorithm: an algorithm that changes a population over time in order to optimize solutions to a problem. The general use of genetic algorithms to study evolution in a digital setting has proven productive, both in improving understanding of the evolutionary process and in discovering methods to achieve a better fitness through evolution. However, a majority of the research done involving genetic algorithms utilize one constant environment as the driver of evolution. As an alternative to a constant environment, changing environments can also be used to encourage evolution out of potentially sub-maximal peaks in a an attempt to improve overall fitness of a population. Previous studies have been done observing a population's adaptation to changing environments; herein we explore the use of an alternate environment as the driving force to optimize solutions. By changing the direction of evolution, we suggest an alternative method of optimization for potential use in engineering applications.

PHARMACEUTICAL TABLET COATING
Samuel Daniels
Poster: 236
Mentor(s): Carl Boehlert (Chemical Engineering and Material Science)

Tablet coating is a significant phase involved in the manufacturing of tablets that have controlled and/or delayed released times. Coating is the process by which an outer layer of coating material is applied to the surface of the tablet in order to meet specific requirements the tablet is designed for. Specific requirements for tablet coating include modified release time and mechanism in the digestive tract, color coating to provide insulation, providing a moisture barrier and to harden the tablet surface, and to improve the look of the tablet by use of coloration and contrast printing for marketing purposes. Three methods are generally used in the coating process to accomplish the requirements: sugar coating, film-coating, and enteric coating. Different polymers and materials are used during the coating process depending on the specifications the tablet is being made for. With the use of an SEM, the surfaces of the different coatings will be pictured and

used to analyze how the microscopic structure of the different coatings vary depending on the polymer/material used during the coating process.

DEVELOPMENT OF DUAL ENERGY ACQUISITION AND DATA PROCESSING SCHEME FOR PERFORMING MOLECULAR IMAGING BY MICRO CT

Ali Ghorbanpour
Poster: 237
Mentor(s): Erik Shapiro (Radiology)

Computed Tomography (CT) is a non-invasive clinical diagnostic tool, which allows for 3D reconstruction and segmentation of tissues to diagnose different diseases. A new imaging modality called dual energy CT uses two X-ray tubes with two detectors, in which the second tube's energy is less than the first one, creating an image with high quality. As each material has different X-ray attenuation properties across the X-ray spectrum, dual energy CT can potentially distinguish between tissues and various materials, such as bismuth, gadolinium and iodine. Thus, our goal is to develop a dual energy acquisition and data processing scheme for performing molecular imaging by CT. For our experiment we utilized a Micro CT Scanner and a Dual Energy Clinical CT. We imaged various materials including Bismuth, Gadolinium, Iodine, Zinc and Zirconium at different concentrations ranging from 15mM to 100mM. These contrast agents were scanned with the two different CT machines. The results obtained by CT were processed by ImageJ software to calculate image ratios for each material as well as Hounsfield Unit (HU)/mM for all contrast agents. By comparing the image ratios of different materials we will be able to differentiate between contrast agents in tissue by employing micro CT technology in a way similar to dual energy CT capabilities. The experiment gives us the ability to visualize contrast agents, which are targeted in cells, or tissues to diagnose and treat the disease like cancer.

STIFFNESS OF SOFT TISSUE IN THE GLUTEUS AND THIGH REGIONS

Lindsay Nault
Poster: 238
Mentor(s): Tamara Bush (Mechanical Engineering), Wu Pan (Mechanical Engineering)

The mechanical properties of human soft tissue are different throughout the thigh and gluteus regions and vary from male to female. The study of these regions is important in the design and evaluation of automobile seats, office chairs, wheelchairs and other seating as applications. It is also beneficial in the modeling of the human body. Tissue stiffness test was performed on ten male participants and ten female participants. Load was applied and measured in six different regions within the thigh and gluteus range using a load cell, and the tissue deformation was measured with a motion capture system. The stiffness data were analyzed in the sense of the relation between the force and the displacement. The goal of this study is to study the in vivo deformability of soft tissue in the thigh and gluteus region and discover the stiffness of these tissues. Results have shown that the displacement increases as the force of the load cell increases from sacral region to the thigh region. This indicates that the tissue is stiffest in the sacral region. It was also found that the tissue is stiffer in males, especially along the sacral region.

COMPARISON OF COTTON HATS USING SCANNING ELECTRON MICROSCOPE

Isaac Rais
Poster: 239
Mentor(s): Carl Boehlert (Chemical Engineering & Materials Science)

Cotton is the most commonly used fabric in clothing. It is also very often combined with other polymers such as polyester, nylon, and wool. Especially in colder climates wearing clothing that keeps the wearer warmer is important. A 3 cm*3cm will be cut out of each and cleaned with detergent and then washed with DI water to remove any imperfections on the materials. This study will look at the morphology of the 100% cotton hats along with hats with cotton and other material blends by the scanning electron microscope (SEM). The structural properties of the hat types will also be compared through the analysis of the SEM.

MICROBIAL PERSISTENCE OF FECAL INDICATOR BACTERIA (FIB) IN FRESHWATER AND MARINE WATER: A META-ANALYSIS

Austin Wissler

Poster: 240

Mentor(s): Jade Mitchell (Biosystems and Agricultural Engineering)

Persistence modeling of microbial pathogens and pathogenic markers in water is an important tool in human risk analysis. It can forecast major outbreaks of disease, predict when a water source is safe for human contact, and quantify anthropogenic impacts on water quality. In this study, a meta-analysis was conducted on data collected from 7 peer reviewed journal articles pertaining to the inactivation of Fecal Indicator Bacteria (FIB) in freshwater and marine water microcosms. Samples were tested and concentrations were quantified over time. For the analyzed data, decay occurred under natural conditions. Using a Maximum Likelihood Estimation (MLE), a statistical modeling program in R (The R Foundation; Vienna, Austria), 17 mathematical models were fit to each dataset. The models varied by the number of parameters, so Bayesian Information Criterion (BIC) was used to compare the model fits. Most data sets could not be defined by just one model due to a lack of statistical significance; in this case more than one model defined a good fit. A comparative analysis of the results obtained through this modeling effort will be presented. Conclusions about the differences in microbial persistence of freshwater and marine water microcosms seeded with FIB from this study help address data gaps concerning the use of DNA markers over indicator bacteria, which have been traditionally used for microbial water quality.

ENGINEERING, COMPUTER SCIENCE, & MATHEMATICS
POSTER PRESENTATIONS, SECTION 3
ENGAGEMENT CENTER, 11:15 AM – 12:45 PM

IDENTIFYING BEST MANURE APPLICATION TECHNIQUES

Matthew Baker

Poster: 243

Mentor(s): Steven Safferman (Agricultural Engineering)

My project compares methods of applying manure to fields and the resulting runoff and absorption into the soil. During the winter season farmers apply manure to their fields in an attempt to fertilize the soil but may do this either before or after snow has fallen. My project determines how much of this manure is getting into the soil for each scenario. Each scenario is also tested at different saturation levels of the soil, specifically 0% saturation, fully saturated, and field capacity (oversaturated). The testing involves boxes to be filled with soil, the appropriate saturation, and put in the freezer for three days. This is to simulate how the soil would be in the winter when it is applied. After they are frozen manure and snow will be applied and the boxes move from the freezer to the fridge. Each box has two drains at both the soil level (to simulate runoff) and the bottom (to simulate absorption) of the box, and are tilted at 6 degrees to allow runoff. After the snow has melted and the manure has either been absorbed or runoff, the drainage from top and bottom undergo total phosphorous, soluble phosphorous, total nitrogen, and nitrate testing to see where the nutrients from the manure ended up. The manure itself will also be tested for these beforehand as well as the soil and the tap water being used to saturate the soil.

COMPOSITION AND PERFORMANCE OF FISHING LINE: A COMPARISON OF BRAND NAME AND OFF BRAND FISHING LINE

Melissa Schneider

Poster: 244

Mentor(s): Per Askeland (Composite Materials and Structures Center), Carl Boehlert (Chemical Engineering and Material Science)

There are many different brands of fishing line on the market with a range of prices. This research project explores the composition differences of various brands and their effect on the performance of the line. The

research is relevant and important to fisherman so they know which lines are more durable, and if it is worth the extra money for name brand lines. It is also useful to companies selling fishing line because they could use the information to promote their product. Tests were conducted to examine the different fishing lines' strength and abrasion resistance. Examination of the compositions and structures of the fishing lines was done by using a scanning electron microscope. Further online research was conducted to connect the composition differences with performance differences. After conducting the experiment and gathering the information, the data was analyzed to figure out which brand of line performed better and why. This presentation will include my findings as well as reasons and methods on how I came to that conclusion.

SCANNING ELECTRON MICROSCOPE IMAGING, OPTICAL MICROSCOPE IMAGING, AND ELECTRON DIFFRACTION SCANNING OF PETOSKEY STONES

Alexander Bonn

Poster: 245

Mentor(s): Per Askeland (Composite Materials and Structure Center), Carl Boehlert (Chemical Engineering and Materials Science)

The Petoskey stone is a stone containing hexagonal fossilized coral dating back to 350 million years ago. The Petoskey stone is also the state stone of Michigan. Scanning Electron Microscope (SEM) images, standard optical microscope images, and Electron Diffraction Scanning (EDS) will be used to investigate and observe the chemical properties and observe the coral formations on polished and unpolished Petoskey stones. Research into the history of the Petoskey stone will be done on how it forms and why it is unique to northern Michigan. This information will be used to analyze the images and chemical analysis and provide greater understanding of the Petoskey stone. The SEM images, optical images, and EDS data will help spread understanding of what Petoskey stones are and share another thing that makes the state of Michigan unique.

PRECIPITATION HARDENING OF ALUMINUM

Zachary Brokaw

Poster: 246

Mentor(s): Per Askeland (Composite Materials and Structures Center), Carl Boehlert (Chemical Engineering and Materials Science)

Four initial samples of aluminum will be used: two samples of 6061 aluminum alloy and two samples of 2024 aluminum alloy. Of the two different alloys one sample will be heat treated and the other sample will be left alone. A length of time will be waited until the precipitates have grown completely. Then, a scanning electron microscope will be use to compare the two alloys' microstructure and, in the case of the heat treated alloys, the precipitates to further find out about the effects of precipitation hardening and why the aluminum alloy will strengthen over time. Change in malleability and ductility will also be noted and explained through the comparison of the two samples due to the process of age hardening.

PRELIMINARY ENGINEERING REPORT OF ZOOLOGICAL WASTE MANAGEMENT PRACTICES

Jill Check, Sarah Kramer

Poster: 247

Mentor(s): Steve Marquie (Biosystems Engineering)

With a growing global consciousness of our environmental impacts, more sustainable waste management practices are being implemented in agricultural and zoological settings, including anaerobic digestion and composting. These practices have the ability to capture methane from the decomposition of organic wastes, preventing it from being released into the atmosphere. Methane is a greenhouse gas 23 times more potent than carbon dioxide and is released in large quantities during biological waste decay. The captured methane can be used as a clean energy alternative and the biomass byproduct is often sold and used as a natural alternative to chemical fertilizers. In the past, these methods have been proven to reduce the environmental impact of an institution by reducing greenhouse gas emissions, diverting waste from landfills and increasing the use of alternative energy. Recently, Detroit Zoo has begun constructing an on-site anaerobic digester to

process their food and animal waste, and similar operations are being implemented in the zoos of Denver, Toronto and San Francisco. Working with Potter Park Zoo, different methods of responsible waste management practices will be assessed based on the capacity, resources, and budget available. This presentation will share the findings on possible methods of waste management practices and present a conclusive suggestion on which of these methods would be the most practical to implement.

LEG SPLAY IN SEATED DRIVER'S POSITIONS

Lindsay Hoard
Poster: 248
Mentor(s): Tamara Reid Bush (Mechanical Engineering)

Posture and pressure interface between the seatpan and driver are often studied to better understand seated comfort in automobiles, however little research has been conducted on leg splay and bolster interference in a seated driving position. Leg splay occurs when the knees drop and rotate, causing thigh interaction with the seat bolsters. The aim of this work is to determine the maximum of leg splay a driver experiences while in a driving posture and how leg splay affects the pressure interface, focusing on the seat bolsters. Each participant was asked to assume 3 positions, no leg splay, maximum leg splay, and comfortable leg splay in three different driver seats with varying bolster sizes. Pressure and motion capture data were taken at each position. The results of this experiment will be beneficial in seat design and better understanding the range of leg movement while seated.

ENGINEERING, COMPUTER SCIENCE, & MATHEMATICS POSTER PRESENTATIONS, SECTION 4 ENGAGEMENT CENTER, 11:15 AM – 12:45 PM

WRINKLING PATTERN FORMATION IN STRETCHABLE LUMINESCENT FILMS OF SILICON NANOCRYSTALS

Naomi Carlisle, Duncan Kroll
Poster: 251
Mentor(s): Rebecca Anthony (Mechanical Engineering)

Nanocrystalline silicon is an efficient and tunable optical emitter and has many applications including light-emitting devices. To date luminescent silicon nanocrystals are only used in traditional rigid devices and there is a need to explore whether these nanocrystals can be used in flexible and stretchable devices. In this study the optical and structural/morphological properties of plasma-synthesized silicon nanocrystals (Si NCs) change when they are deposited on stretchable substrates of polydimethylsiloxane (PDMS). The silicon nanocrystals were synthesized in a nonthermal, low-pressure gas phase plasma reactor. Silicon nanocrystals were deposited directly from the plasma into thin-film layers using inertial impaction through a slit-shaped orifice. The PDMS substrates were pre-stretched to several different percentages of their original length or left in their relaxed state prior to deposition. The morphologies of the thin films deposited on to both PDMS and rigid silicon wafer substrates were studied using SEM and are found to be significantly different due to the varied elastic properties of the PDMS and silicon wafer. From the photoluminescence (PL) measurement, the PL peak is adjusted by 80 nm between unstretched PDMS and PDMS stretched at 40% beyond its original length. The reason for this shift in PL peaks is hypothesized to be due to different oxidation rates for the different stretching ratio films.

CATALYZING SI NANORODS IN THE GAS PHASE

Abby McQuade, Brian Mulvihill
Poster: 252
Mentor(s): Rebecca Anthony (Mechanical Engineering)

Nanoparticles and Nanotechnology is a growing field for research and development. From biosensors to nanoscale semiconductors for electronics, there are many opportunities for exploration on the nanoscale. In

our lab, we are attempting to create silicon nanorods - rod-shaped nanostructures - strictly from the gas-phase, using gold nanoparticles as catalysts. This new technique for creating nanorods can potentially reduce hazardous waste as well as expedite their production. We are synthesizing gold nanoparticles using a hot-wire reactor, and then entraining them directly into a plasma reactor for growing silicon nanorods. The ultimate goal for this project is to create a flexible, reliable method for creating these nanorods and to apply them in device technologies such as light-emitting devices and as optical metamaterials.

TESTING FOR FERRI/FERROCYANIDE DIFFUSIVITY USING RDE
Fiona Nanney
Poster: 253
Mentor(s): Scott Barton (Chemical Engineering and Material Science)

The rotating disk electrode (RDE) is commonly used by chemical engineers to measure mass transport in a flowing solution. The diffusion coefficient is the amount of mass of a substance that diffuses through a surface during a certain amount of time. This is used to define physical properties of the substance being tested. In this experiment the RDE was used to determine the diffusion coefficients of ferri/ferrocyanide ($[Fe(CN)_6]^{4-}$/$[Fe(CN)_6]^{3-}$), which can be derived from measurements taken from the RDE by using the Levich equation. A solution of potassium ferri/ferrocyanide ($[K_4Fe(CN)_6]$/$[K_3Fe(CN)^6]$) and potassium chloride (KCl) was prepared and the current was measured at different rotation speeds using the RDE. This data was used in the Levich equation to determine the diffusion coefficients for $[Fe(CN)_6]^{4-}$/$[Fe(CN)_6]^{3-}$. Two very similar coefficients were found, one for ferricyanide and ferrocyanide. The determined diffusion coefficients were then compared to previous research on this topic to determine its validity.

MODELING SKIN BLOOD PERFUSION: A STUDY FOR VENOUS ULCERS
Kelly Patterson
Poster: 254
Mentor(s): Wu Pan (Mechanical Engineering), Tamara Reid Bush (Mechanical Engineering)

Venous ulcers are the result of chronic venous insufficiency in the lower leg that affects approximately 2.5 million individuals in the United States. These wounds are painful, hard to heal, and there is no way to predict the formation of an ulcer. The goal of this study was to model the blood perfusion of healthy individuals and those with venous ulcers by employing a Windkessel based approach. The long-term goal of this work is to identify parameters associated with venous ulcers that can be used to predict whether individuals are at increased risk for formation. 38 participants were tested, 20 of which were healthy and 18 of which had venous ulcers in one or both legs. The data collected were grouped into three categories: healthy (legs with no ulcers), non-wounded (legs without visible ulcers but from patients with venous ulcers on the other leg), and wounded (legs with ulcer present). Using our model, we iterated the values of three parameters until the output of the model best matched the experimental data, replicating each participant's blood perfusion curve. The model represented the global and local vessel resistance, and the local vessel compliance. These three parameters were then compared between the three groups tested. Statistical significant differences were found between healthy and wounded legs for local vessel resistance and compliance, showing promise of this model for prediction.

DETERMINING SOFT TISSUE PROPERTIES FOR HUMAN BODY MODELING AND DESIGN
Zachary Sadler
Poster: 255
Mentor(s): Tamara Reid Bush (Mechanical Engineering)

The different components of human tissue yield unique mechanical characteristics that when understood as a whole can aid in the modeling and analysis of soft tissue. The medical, automotive, and ergonomic seating industries are especially interested in the force deflection of the human gluteal and thigh regions. With a better understanding of this area, seating in all three environments can be improved to aid in comfort and support. The purpose of this study is to further understand the characteristics of these regions through the collection of force deflection data on ten male and ten female subjects. These data are obtained using a load

cell and motion capture system. Reflective markers are placed on an indenter with a load cell attached to it, as well as on the hip and knee to reference the femur line. The human subject is placed in a specialized chair to allow areas along the thigh and buttocks to be reached. Six different regions represent the changing soft tissue, and this is where the load cell is pressed. Force is applied until a physiological barrier is reached, which is characterized as full compression of the tissue or the presence of a bony prominence. The force and motion data are then plotted to analyze the stiffness of the tissue. These data are then used to run a Finite Element Analysis of the soft tissue. This will enhance the understanding of the mechanical properties of these regions, aiding multiple industries in the design of new products.

FIBERS INCORPORATED IN CONCRETE

Lauren Woods
Poster: 256
Mentor(s): Venkatesh Kodur (Civil and Environmental Engineering)

After the disaster of 9/11, many were concerned with the integrity of concrete structures and how they react under large amount of unforeseen stress and heat. My research focuses on the stresses of concrete and how the addition of different fibers can affect the structural integrity when put into the mix design. Others have been conducting similar research since the 1960s when steel reinforcement was first introduced to concrete design. Once the research is completed, the expectation is the data will show that the steel and polymer fibers do not affect the structural integrity of the concrete. Instead, the fibers will increase the toughness, resistance to cracking, and increase the strain at ultimate load. These findings will be presented in the presentation through graphs to compare the stress-strain curves of the different concrete mixtures. Pictures will also show how the concrete is affected by the compression tests and how the concrete cylinders fracture. The methods in which these test are conducted will be briefly explained on the poster. The purpose of this research is to take the steel polymer fibers and place them in to larger concrete structures such as beams or columns. These fibers will hopefully be used in future construction projects to prevent major cracks. This will hopefully reduce the spread of concrete debris when hit by a large object or demolished using TNT.

ENGINEERING, COMPUTER SCIENCE, & MATHEMATICS
POSTER PRESENTATIONS, SECTION 5
BALLROOM, 1:30 – 3:00 PM

ANALYZING THE DEFORMATION OF A SYNTHETIC RUBBER WITH A SCANNING ELECTRON MICROSCOPE

Scott Randall
Poster: 259
Mentor(s): Per Askeland (Composite Materials and Structures Center), Carl Boehlert (Chemical Engineering and Materials Science)

Viton GF is a synthetic rubber that is used widely in the manufacturing industry. The material has a great tolerance for varying heat and friction, so it is often used in-between moving metal pieces. This material is used very frequently in seals, valves, o-rings, and gaskets. This material performs at its peak when it is under compression and heat, and when used in a different way, this material is failing in some mechanical systems. This material is failing quite frequently in a new process, where it is being used as a circulating seal that moves back and forth to let hot steam escape from a chamber in a painting application system. What I am aiming to research is whether the failure of the Viton GF is from the steam, the tension, or another factor altogether. I will discover this by using an SEM microscope to observe the structure of the Viton GF in its normal state as well as its failed state and compare these images with those of the Viton GF under extreme tension, compression and extreme heat. The sample where the structure is drastically different should point to the condition in the new system where this piece is failing. Hypothetically, this discovery will allow for the process engineers to redesign their system to accommodate for this issue.

GAS PHASE SYNTHESIS OF GALLIUM NITRIDE NANOCRYSTALS

Michael Bigelow, Branton Toback

Poster: 260

Mentor(s): Rebecca Anthony (Mechanical Engineering)

Bulk Gallium Nitride (GaN) is the standard light-emitting material, very efficient for Light Emitting Diodes (LEDs) and has been in use for many years. This material is very attractive due to its high-brightness and thermal stability. GaN is a direct band gap semiconductor with 3.4 eV band gap energy enabling its use in ultraviolet/blue light emission technologies. Relative non-toxicity of GaN compared to other popular semiconductors such as Cadmium selenide (CdSe) gives it distinct advantage. The applicability of GaN nanoparticles lies in high-brightness sloid-state lighting devices. Here we present a study on synthesis of high-quality GaN nanocrystals using a fully gas-phase process. We have used a low-pressure nonthermal plasma reactor for the synthesis of GaN directly from gaseous precursors and deposited onto the glass substrate without any additional steps. The plasma reactor has some advantages over other available methods, namely, size monodispersity, easy control on nanocrystal size and the ability to deposit the NCs from the gas phase without removal from the reactor. It is also inexpensive and can be processed rapidly. Some studies have been performed with microwave plasma but it is very complex in nature. Thus, radiofrequency (RF) plasma could be an attractive alternative. An RF nonthermal plasma reactor is comprised of a borosilicate glass tube with dual ring electrodes encircling the tube externally. Vapor-phase precursors and carrier gases were flown through at relatively low pressure (typically 5-15 Torr) with RF power ranging from 60W-100W.

EFFECT OF DOSE RATE AND ENERGY LEVEL ON X-RAY INACTIVATION OF SALMONELLA IN FOOD PRODUCTS

Philip Steinbrunner

Poster: 261

Mentor(s): Sanghyup Jeong (Biosystems Engineering), Bradley Marks (Biosystems Engineering)

Inactivation of pathogenic bacteria, such as Salmonella, is a key part of food safety. The inactivation process can be accomplished by methods such as thermal, chemical, or irradiation treatment. Thermal inactivation of foods can often have significant impacts on food quality and can decrease the value of the product. Using X-ray irradiation technologies is a less invasive process that can eliminate bacteria with less impact on food quality. While total dosage required for proper elimination of bacteria is known for many foods, there is a knowledge gap on the impact of the photon energy level and the rate dosage is applied. Therefore, the purpose of this experiment is to investigate the impact of dose rate and photon energy level on X-ray inactivation of Salmonella in low moisture food products. This will be done by inoculating almonds with Salmonella and conditioning them to a target water activity. Once conditioned, the samples will be exposed to X-ray irradiation in a food irradiator using varying dose rates and energy levels, and enumerated for survivors. This data will be analyzed to determine if dose rate and energy level have a significant impact on the efficacy of X-ray irradiation in eliminating Salmonella in food products. The outcome of this experiment will be a lethality model of irradiation in food products as a function of dose rate and energy level. The understanding of factors involved in irradiation inactivation will allow for optimized processing in industrial settings.

STUDIES OF DIFFUSION THROUGH ALGINATE BEADS

Megan Sullivan

Poster: 262

Mentor(s): Maddalena Fanelli (Chemical Engineering and Material Science)

Colloidal hydrogels in the form of alginate beads are widely used in the environmental, pharmaceutical, and biomedical fields. Their lack of toxicity and applicability for the removal of harmful pollutants from the environment, tissue engineering, and drug and protein delivery make them a popular topic of research. Understanding their synthesis and diffusion, absorption, adsorption, and coagulation behavior is key to engineering alginates to meet the specific performance criteria associated with these applications. The

current study concentrates on evaluating diffusion through alginate beads as a first step towards expanding our understanding.

FRACTURE INITIATION: A MATHEMATICAL INTERPRETATION OF THE FORCE-TIME DATA COLLECTED FROM IMMATURE PORCINE CRANIAL IMPACTS IN CONJUNCTION WITH A COMPUTATIONAL ANALYSIS

Patrick Vaughan
Poster: 263
Mentor(s): Roger Haut (Radiology)

Similar to how a fingerprint can be used to identify an individual person, it seems that cranial fracture patterns can be associated with a particular impacting interface, as shown in a recent study by Vaughan et al. using the immature porcine model. To date however, there has been little if anything done to provide context in the way of why fractures appear the way that they do under a blunt cranial impact of the right parietal bone. In this investigation, a script has been written in MATLAB to perform a dynamic analysis of the force-time data collected in Vaughan et al. for the 6 different interfaces tested in the study. Using this script, the total number of fractures in a given specimen could be predicted accurately, and first fracture energy levels could be statistically compared between impacting interfaces. Furthermore, a non-subject specific porcine head model was created in ABAQUS CAE and was tested under the 6 loading conditions. After matching contact area and maximal force loads generated experimentally with the theoretical computational model, a representative stress field could be mapped onto the skull, which patterned well with the actual experimental fractures. Information obtained in this study aids in contextualizing why cranial cortical bone fractures in a patterned and predictable manner under blunt impact conditions, in addition to how engineering mechanics can be utilized by forensic practitioners in the interpretation of cranial trauma.

TOWARDS COMPREHENSIVE EVOLUTIONARY DESIGN AUTOMATION

Lee Wang
Poster: 264
Mentor(s): Sam Macaluso (Geography)

One approach to robot design automation is evolutionary design, which applies Darwinian principles to the search for and optimization of morphology and controller designs. Previous work by Risi and Stanley (2013) presented an approach to learning relationships between robot morphologies and neural controllers through the use of a compositional pattern producing network (CPPN). In this study, we extend this with support for genetically generated morphologies and multiple objectives. Through the co-evolution of morphologies and neural controllers by multi-objective selection, we achieve full automation from morphological to controller design.

ENGINEERING, COMPUTER SCIENCE, & MATHEMATICS
POSTER PRESENTATIONS, SECTION 6
BALLROOM, 1:30 – 3:00 PM

AGE OF ITALIAN RYEGRASS EFFECT ON PHOSPHORUS RELEASE IN FREEZE-THAW CYCLES

Lauren Costantini
Poster: 267
Mentor(s): Steven Safferman (Biosystems and Agricultural Engineering)

Eutrophication occurs when an overabundance of the nutrients phosphorus and nitrogen enters water sources and stimulates an excessive amount of algae growth, leading to oxygen depletion and decreased water quality. A major source of nonpoint phosphorus pollution is farms, which apply phosphorus-rich fertilizers and manure to the land. The use of cover crops is widely advocated as a way to decrease nutrient runoff and soil erosion, but recent research has suggested that despite its success in decreasing particulate phosphorus loss, cover crops such as Italian ryegrass (Lolium multiflorium) increase the concentration of

soluble phosphorus being discharged, which can directly enter tile drains. This release of soluble phosphorus is heightened during winter freeze-thaw cycles when the changing temperatures damages cell membranes. This project sought to examine the risks of planting Italian ryegrass later in the season, by comparing its age with its level of phosphorus release after undergoing a freeze-thaw event. The ryegrass was examined during a period of vigorous growth and after becoming well-established (approximately four and six weeks after seeding, respectively). The intent of this experiment was to provide information to assist farmers in understanding the environmental impacts of planting cover crops later in the season.

ANTIMICROBIAL EFFECTS OF MAGNETIC NANOPARTICLES

Gurveer Deol
Poster: 268
Mentor(s): Evangelyn Alocilja (Biosystems and Agricultural Engineering)

Proper sanitation of nutritional sources and healthcare institutions is imperative for the health of the general public. Nutritional sources and healthcare institution play a major role for the public. However, according to the FDA, these major aspects of life contain major risks of illness, foodborne illness and healthcare associated illness. The Center for Disease Control (CDC) estimates that approximately one-sixth of Americans obtain a foodborne illness, 128,000 are hospitalized, and 3,000 American die from a foodborne illness each year. The objectives of this study revolve around showing the versatility of the antimicrobial effect of bio-functionalized nanoparticles. The study illustrates the ability of the nanoparticles to inhibit the growth of bacteria in various matrices. In addition, this provides a cost-effective way to contain bacterium in impoverished communities. In this study, antimicrobial effects of three bio-functionalized magnetic nanoparticles (MNP-F1, MNP-F2, and MNP-F3) were evaluated against Gram-negative bacteria. For proof-of-concept, Escherichia coli C3000, E. coli O157:H7, and Salmonella Enteritidis were used in the study. Bacteria grown in TSB was compared with bacteria grown with MNPs. Samples were removed and plated every hour for a total of 24 hours. Preliminary results showed that growth in the presence of MNP-F#2 resulted in 50% reduction in bacterial concentration for all three organisms. Additional experiments are being conducted to validate these initial results. If successful, we expect to advance these MNPs to coating of food packages and biosensor technology developments.

UML MODELING FOR VISUALLY IMPAIRED PERSONS

Bradley Doherty
Poster: 269
Mentor(s): Betty Cheng (Computer Science and Engineering)

Software modeling is generally a collaborative activity and typically involves graphical diagrams. The Unified Modeling Language (UML) is the de facto standard for modeling object-oriented software. It provide notations for modeling a system's structural information (e.g. databases, sensors, controllers, etc.), and behavior, depicting the functionality of the software. Because UML relies heavily on graphical information, visually impaired persons (VIPs) frequently face challenges conceptualizing the often complex graphical layouts, involving numerous graphical objects. The overall objective of the PRISCA project is to facilitate collaborative modeling between VIPs and other project team members. Towards this end, this poster describes preliminary PRISCA work into developing software that automatically generates a haptic 3D representation of the UML diagrams from the output of an existing UML diagram editor. In addition, textual annotations for the models are converted to Braille and printed in 3D atop the respective graphical objects.

THE CHANGING ANATOMY OF HOCKEY STICKS

Kathryn Hamer
Poster: 270
Mentor(s): Carl Boehlert (Engineering)

The composite hockey stick was introduced to the NHL in the 1980's. The fiberglass layers of composite sticks allowed for more flexibility and power than previously used wooden sticks. In 1990 when composite sticks were not popularly used, the fastest slap shot ever recorded was 96 mph; however, in 2015 the world

record is 110 mph. This can most likely be attributed to the changing material of sticks. Electron Dispersion Microscopy, EDS, a component of Scanning Electron Microscopes will reveal what materials in fiberglass sticks makes these records possible. Both samples from wooden sticks and composite sticks will be compared using images taken from primary electrons from the scanning electron microscope, as well as information on the chemical makeup of both samples from electron dispersion microscopy. Contrasting their unique chemical makeups as well as these images will provide information as to why composite sticks seem to be the stick of choice in today's hockey leagues.

EVALUATION OF CHIP SEAL TREATMENT ON PAVEMENTS USING IMAGE PROCESSING

Derek Hibner

Poster: 271

Mentor(s): M Emin Kutay (Civil and Environmental Engineering)

Chip sealing is a preventative maintenance treatment that is commonly applied to roads each year by many transportation agencies. It consists of an application of emulsified asphalt to an existing pavement surface and the spreading of uniformly graded aggregates onto the emulsified asphalt. The emulsified asphalt sets into a binder layer and creates an impermeable medium above the existing pavement surface. The primary purpose of this asphalt layer is to prevent rain/snowmelt water from penetrating into the existing pavement, whereas the aggregate chips provide traction for vehicle tires on the road. If aggregate embedment into the asphalt binder layer is too high, then bleeding of the binder will occur, typically along the wheelpath. Insufficient embedment depth can lead to inadequate bonding between the aggregates and the binder, which results in aggregate loss. Aggregate loss can lead to reduction in tire/pavement friction and compromise the safety of drivers and passengers. It is important to determine percent embedment to verify the quality of chip seal construction. Currently, there is not a quantifiable method measuring embedment depth of the aggregates into emulsion. Aggregate embedment depth is one of the most important parameters of a chip seal design. The objectives of this project were to develop a laboratory apparatus to make chip seal samples with various embedment depths as well as develop an image processing tool to directly measure aggregate embedment. Upon completion of the project, the algorithm developed can be used by various transportation agencies as an acceptance method for chip seal projects.

PATH NAVIGATION FOR VISUALLY IMPAIRED USERS

Anna Little

Poster: 272

Mentor(s): Richard Enbody (Computer Science and Engineering)

The MSU Paths app development group is researching an effective interface for the visually impaired to navigate campus footpaths. Underlying that work is the creation of an application for Android phones and iPhones to allow a visually impaired individual to independently navigate MSU's campus. Commonly available navigation apps can currently route the user along known roads and some sidewalks, but do not have full knowledge of the complex system of sidewalks traversing MSU's many green spaces. This group is working with the MSU campus geographic information system (GIS) to ensure our data is complete and up-to-date. Although the app will provide a visual map interface similar to that of common navigation apps this is a secondary feature. The key focus is creating a product designed specifically for the visually impaired community. With that in mind the group has also worked closely with the MSU Resource Center for Persons with Disabilities (RCPD). The app utilizes ArcGIS API's and combines data from multiple MSU campus GIS services to generate routing information and instructions. A SQL database on the phone provides information regarding the potential destinations, i.e. buildings. Power conservation is critical so care has been taken for power management of both wireless and GPS; data. To test for consistency and obtain overall feedback the group hopes to begin real-world, mass testing later in 2016.

ORTHODROME STEERING EQUATION FOR BIRD NAVIGATION

Devinda Wijewardena, Clayton Threatt

Poster: 273

Mentor(s): Andre Benard (Mechanical Engineering), Andrew Bowden (Chemical Engineering and Materials Science), Charles Petty (Chemical Engineering and Materials Science)

This research illustrates that a bird could quantitatively follow an orthodrome path by continuously monitoring its local collatitude, an idea supported by the observation that the orthodrome coefficient associated with three navigational sky vectors is a constant. The above conjecture is illustrated mathematically by comparing the navigational bearing predicted by the orthodrome steering equation and the local coordinates of a specific orthodrome. The analysis shows that the volume of a parallelepiped associated with three navigational sky vectors is constant for a given orthodrome. Although extensive literature exists that supports the idea that birds migrate within an orthodrome corridor, a quantitative explanation of how they are capable of this feat has not been developed. It is well known that the coupling between the Coriolis field and the velocity field in the Navier-Stokes equation redistributes turbulent kinetic energy to the velocity component collateral with the geoaxis. This phenomenon suggests that the troposphere is optically anisotropic at all scales. Thus, if birds are able to detect intrinsic hue differences in the troposphere induced by the Coriolis field, then they could determine their local collatitude. Most significantly, if a bird experiences a displacement from its ancestral orthodrome path, its ability to detect hue differences in the troposphere may provide a means to return to its ancestrial orthodrome corridor.

ENVIRONMENTAL SCIENCE & NATURAL RESOURCES

ORAL PRESENTATIONS, SECTION 1
MSU ROOM, 1:45 – 3:00 PM

INFLUENCES OF WETLANDS ON STREAM FISH ASSEMBLAGES: INVESTIGATION OF REGIONAL TRENDS ACROSS MICHIGAN'S LOWER PENINSULA

Paul Gibson
Time: 1:45 PM
Mentor(s): Dana Infante (Fisheries and Wildlife)

Wetlands provide many benefits to the streams to which they drain. For example, wetlands can store surface runoff, slowing delivery to streams and promoting stable flows. Wetlands can also trap excess sediments, nutrients, and pollutants resulting in improved habitat quality. Despite these benefits, the presence of wetlands may have negative relationships with stream habitat for some fishes. Stored surface runoff may warm before entering the stream, resulting in temperatures beyond the thermal range of some species. Wetlands can also encourage rapid delivery of storm water to stream channels when fully saturated, leading to flashier stream flows. Because a focus of wetland management programs includes creating and restoring wetlands across the landscape, it is essential to understand the positive and negative relationships wetlands have with stream habitat. Our study investigates relationships between wetlands and fishes from 724 streams throughout Michigan's Lower Peninsula. Our objective was to characterize associations between abundances of stream fishes and the amount of wetlands in stream catchments. Using Covariance Structure Analysis, we predicted species abundance from landscape data important to fish, including catchment area, geology and percent wetlands within a catchment. Results suggest that many species had a positive association with wetlands. However, Brook and Brown trout, both economically valuable game fishes, were negatively associated with wetlands. Our results underscore the importance of understanding potential impacts of creating new wetlands in landscapes drained by trout streams and suggest a need for continued exploration of the relationships between wetlands and stream habitat characteristics.

THE EFFECTS OF ECONOMIC GROWTH ON CLIMATE CHANGE IN BRAZIL

Lindsey Schnell, Wayne Askew, Tyler Thur
Time: 2:00 PM
Mentor(s): Lisa Cook (International Relations)

This group is going to evaluate the causal relationship between economic growth and climate change in Brazil. The measures used to evaluate economic growth will be GDP per capita, GNI per capita, and the percent change of each of these measures from 1990 to 2012. To measure climate change, CO2 emissions from residential buildings, manufacturing, and transport, as well as CO2 emissions in metric tons per capita. We hope to find a causal relationship between economic growth and climate change to show the negative effects economic growth has on climate change.

USING FUZZY COGNITIVE MAPPING TO UNDERSTAND STAKEHOLDER BELIEFS ABOUT PRESCRIBED FIRE IN OREGON

Degen Gembarowski
Time: 2:15 PM
Mentor(s): Steven Gray (Community Sustainability)

In recent years, forested ecosystems in the Pacific Northwest have experienced dangerous wildfires of unmanageable size, which have incurred considerable social, economic, and ecological costs. Through the fire suppression policies of the last decade, burnable fuel loads have increased and resulted in these wildfires. A management tool supported by fire scientists to reduce wildfires is the prescribed burn. This method reduces risk and restores ecosystems, but is not currently implemented on a large scale. This study serves to analyze the fire prone community of Ashland, Oregon with regards to stakeholder beliefs, and similarities and differences between stakeholder groups. The stakeholder groups of municipal decision makers, large private landowners, United States Forest Service employees, Bureau of Land Management employees, and members of conservation or non-governmental organizations (NGOs) were surveyed and taught how to build fuzzy cognitive maps. The data resulting from these maps and surveys was analyzed to determine if any of the groups agreed or disagreed with one another in the following facets: beliefs about the risks and rewards of prescribed fire, and barriers and solutions to prescribed fire. Understanding the relationships between the beliefs of stakeholders can aid the implementation of sustainable wildfire management practices using prescribed fire.

THE NEGATIVE EFFECTS OF THE WATER RESOURCE RECOVERY FACILITY ON AMMONIA AND PHOSPHORUS CONCENTRATIONS IN RED CEDAR RIVER OF LANSING, MICHIGAN, USA

Janice Chiou
Time: 2:30 PM
Mentor(s): Matthew Rowe (Integrative Biology)

Increasing human activity (HA) of wastewater treatment facilities along rivers has altered nutrient levels in aquatic ecosystems. When these chemical compounds become concentrated and accumulated above optimal ranges, they become toxic to aquatic organisms. We analyzed chemical composition of suspended phosphorus (P), nitrogen (N), and dissolved oxygen (DO) levels of the Red Cedar River, Lansing, Michigan. For this study, we used NH3 as a proxy for N availability. Samples were collected at our site of interest, the East Lansing Water Resource Recovery Facility (WRRF), as well as two other sampling sites 1 km upstream and 1 km downstream to assess the influence of human activities on water quality. We found significantly higher nutrient levels (NL) at sites downstream of WRRF, where P had a negative quadratic relationship with DO ($p=0.095$) and NH3 had an inversely-proportional relationship with DO ($p=0.044$). Our results showed that HA could alter NL, and NL could negatively affect DO levels. Although HA do not directly affect DO levels at the Red Cedar River, it is still important to regulate HA. People were unaware and were exposed to polluted water through recreational activities (RA) at Down. As human activities (RA and wastewater) could potentially alter the stability and health of aquatic ecosystems, it is important for the public to understand and gain awareness of possible danger and impacts on these freshwater bodies.

THE PHYSIOCHEMICAL AND NUTRITIONAL EVALUATION OF FAST COOKING DRY BEAN (PHASEOLUS VULGARIS L.) GENOTYPES GROWN IN THREE LOCATIONS IN TANZANIA

Diego Crespo
Time: 2:45 PM
Mentor(s): Karen Cichy (Plant, Soil & Microbial Sciences), Jason Wiesinger (Plant, Soil & Microbial Sciences)

Dry beans (*Phaseolus vulgaris* L.) are a nutrient dense food produced globally as a major pulse crop for direct human consumption. Despite being rich in protein and micronutrients, long cooking times limit the purchase of dry beans worldwide, especially in nations where fuelwood needed for cooking is often expensive or scarce. Fast cooking bean genotypes can positively impact consumers by reducing fuelwood needs and meal preparation time. The unique physiology and potential nutritional implications of fast cooking beans are not known. This study evaluated the physiochemical and nutritional value of a group of fast cooking bean lines from the Andean gene pool grown in three diverse regions of Tanzania; the high elevations sites of Arusha and Mbeya, as well as the low fertility - arid environment of Morogoro. Fast cooking genotypes were compared to slower cooking genotypes from four market classes of economic importance in Eastern and Southern Africa, and the Caribbean. Seed size and water uptake capacity under cationic soaking conditions were used to evaluate di erences in physical seed properties. Nutritional quality was measured as total crude protein density in a sample of 50 seed following a standardized cooking protocol. When examined across all regions, the fast cooking dry beans took 40 – 65% less time to become palatable when compared to their slower counterparts within each market class. The results of this study also suggest fast cooking beans have improved nutritive value through greater retention of total protein.

ENVIRONMENTAL SCIENCE & NATURAL RESOURCES
POSTER PRESENTATIONS, SECTION 1
BALLROOM, 9:00 – 10:30 AM

DEVELOPING AND CHARACTERIZING GELS WITH ANTIMICROBIAL CAPACITY FOR FOOD PACKAGING APPLICATIONS

Linh Dao
Poster: 277
Mentor(s): Eva Almenar (Packaging)

One of the challenges in food packaging is to extend product shelf life. Developing a packaging material that has the ability to slow down microbial growth and consequently, to minimize spoilage caused by microorganisms can help address this challenge. The objective of this research is to develop a semi-solid gel made from renewable resources with the potential to release an antimicrobial volatile. This gel consists of chitosan and citral. Chitosan is a polysaccharide with gel forming properties, and citral is an essential oil with proven capacity of controlling post-harvest diseases in fresh produce. Four variables are studied for their effects on gel formation: molecular weight of chitosan, chitosan-citral ratio, processing temperature, and amount of ethanol as a gel facilitator. Different combinations of these variables have been tested on a trial-and-error basis and gel characterization has been done to collect data regarding effects of the four variables on chemical and physical properties of the gel. My poster will summarize my research progress including an outline of the used gel forming methodologies and data collection from the characterization of the obtained gels. The results from this research present an empirical assessment of the potential to develop a bio-based, antimicrobial food packaging material and pave way for future research in bioplastics and renewable materials.

SOLAR KIOSK

Will Mianecki, Zach Dutcher, Malarie French, Olivia Rose
Poster: 278
Mentor(s): Tobin Craig (James Madison), Rebecca Tegtmeyer (Art, Art History, and Design)

The Solar Kiosk is a concept for an energy-efficient solar installation that powers two 60-inch interactive screens capable of displaying interactive maps, videos, advertisements, and more. The project, created as an interdisciplinary collaboration between four students, was designed to integrate solar energy on MSU's campus in the form of a cost-effective and design-centric installation. We began our project by researching existing solar solutions at MSU and the unmet needs of the campus population. While exploring MSU's existing solar installations, we noticed a theme: they were located on the edges of campus (far from areas of

high traffic) and didn't directly engage users. We also noticed that the maps provided on campus were dated and often ineffective. With this in mind, we focused our efforts on creating an installation that would provide an innovative, solar-powered solution to the informational needs of typical campus users. The installation is designed to maximize both energy collection and the positive practical impact on the campus community. The Solar Kiosk features four solar panels capable of generating enough annual energy to power two interactive screens, even during periods of high use or low solar exposure. The structure's form and proposed location are a response to relevant solar collection variables, including shade factor, irradiance, soiling, and solar radiation.

DEFINING THE GROUNDWATERSHED AND QUANTIFYING ITS RELEVANCE FOR MANAGING SURFACE WATER QUALITY AND QUANTITY

Heather Moule
Poster: 279
Mentor(s): Anthony Kendall (Geological Sciences), Sherry Martin (Geological Sciences)

In Michigan, surface water contamination sources are generally studied within a surface watershed. Yet for much of the year, groundwater provides the bulk of water for streamflow. Groundwatersheds, the area of land that provides groundwater to a particular point of a stream network, do not necessarily share the same boundaries as surface watersheds. Thus, to better understand water quality and quantity issues, management needs to take into account the differences between a groundwatershed and a surface watershed. This study delineates groundwatersheds for the entire Lower Peninsula of Michigan at three different spatial scales. These scales, defined by their Hydrologic Unit Codes (HUC), extend from groundwatersheds averaging 210 km^2 with 8-digit HUCs to just 23 km^2 for 12-digit HUCs. The groundwatersheds were defined using ArcGIS tools created to study surface watersheds, but using an interpolated water table as the input topographic surface. Groundwatershed and surface watershed areas were then visualized and compared using descriptive statistics. Results show that disagreement between surface- and ground-watersheds increases as the scale of analysis shrinks. In particular, 8% of each groundwatershed is unique from the surface watershed for the HUC-8 scale while this increases to 19% at the HUC-12 scale. This result is particularly significant because the smaller HUC-12 scale is more often targeted for watershed management plans, such as EPA section 319, because of the difficulty in managing larger watersheds with a single plan. Future work should include comparing groundwatershed area with difference in topography, soil type, groundwater recharge, and other factors that affect hydrology.

ANIMALS IN CUBA: CUBAN RELATIONS WITH DOMESTIC AND WILD ANIMALS CORRESPOND TO ENVIRONMENTAL STEWARDSHIP

Emily Mall
Poster: 280
Mentor(s): Gerald Urquhart (Fisheries and Wildlife)

Environmental sustainability relies upon participation by citizens in initiatives aimed at reducing their ecological footprint. Government initiatives involving conservation and outreach programs provide official efforts indicating importance of sustaining the environment. However, interactions between people and animals may play a larger role in determining environmental consciousness. In Cuba, I compared and contrasted human relationships with animals in both urban and rural regions. Secondary research was conducted before and after departure to understand the state of environment and to develop upon observations. Interviews and conversations with locals were used to determine how they treat animals found in urban settings. Animal handlers and urban officials provided information about common circumstances of human-pet relationships and health concerns. In rural regions, I relied on observations to determine face-value health of working animals. Positive interactions between people and animals, in Cuba, aid in stewardship of the environment.

IRRIGATION IN THE HIGH PLAINS: ASSESSING THE ACCURACY OF REMOTELY SENSED DATASETS

Jeremy Rapp
Poster: 281

Mentor(s): Anthony Kendall (Geology)

As future climatic conditions become a focal point of policy within the United States a better understanding of hydrologic budgets will be critical. Water usage, the most important being water used for irrigation, is a major component of the hydrologic budget across the US. One of the most heavily irrigated regions in the US overlies the High Plains Aquifer. The High Plains Aquifer is the largest aquifer system in the US, covering portions of eight states, and primarily used for agricultural irrigation. The only nationwide maps of actual irrigated field locations have been produced using remotely sensed data at a 250 meter cell size. Together, maps for 2002, 2007, and 2012 make up the Moderate Resolution Imaging Spectroradiometer Irrigated Agriculture Dataset (MIrAD-US). The creators of the MIrAD-US dataset have validated it within California and portions of the Great Plains states. However it is important to consistently validate and analyze these remotely sensed datasets across the entire High Plains Aquifer region using current aerial imagery. Creating a reliable validation dataset over such a large region presents significant challenges. Here, randomly distributed points were generated within agricultural land uses of the 2011 National Land Cover Dataset. These points were manually classified as irrigated/non-irrigated, and used to assess accuracy, commission, and omission errors of the 2012 MIrAD-US dataset. These statistics serve as an important tool in ensuring that the datasets that may be influential on future policy regarding consumptive water uses are accurate and representative of current conditions.

IMPACTS OF ANIMAL MIGRATIONS ON HUMAN SOCIETIES IN A TELECOUPLED WORLD

Taryn Withers
Poster: 282
Mentor(s): Vanessa Hull (Fisheries and Wildlife), Jianguo Liu (Fisheries and Wildlife)

Globally, many animal species engage in long-distance migrations that may take them to different countries, oceans, and continents. Through migration, animals create connections between distant systems via a variety of impacts that are not often readily apparent. Animal migrations are a form of telecoupling – socioeconomic and environmental interactions among distant systems. Since telecoupling is a relatively recent concept, the extent of these interactions between distant systems has not been explored in detail before. This study used literature review and synthesis of published studies that examined the impact of migratory animals on distant systems, specifically focusing on the impact of migratory animals on human societies. The aim was to identify major trends and any notable gaps in the literature for use in future research and policymaking. Most prior research has been interested in finding ways to best promote conservation or control of various migratory species in areas where they interact with humans. Some articles also looked into the profits gained from migratory species, often in the form of fish during their spawning periods. Few articles, however, focused on how migratory animals directly affect humans, such as human health. Areas that require future research include feedback systems between migratory animals and humans, the role of migratory species in spreading diseases, and quantification of the services that migratory species provide. This research sheds new light on how humans and migratory species impact each other, which could help improve future policies and management decisions.

ENVIRONMENTAL SCIENCE & NATURAL RESOURCES
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 11:15 AM – 12:45 PM

THE EFFECT OF PLANT MUTUALISTS ON POLLINATOR VISITATION IN CHAMAECRISTA FASCICULATA UNDER A GLOBAL WARMING SIMULATION

Krista De Cooke
Poster: 285
Mentor(s): Jennifer Lau (Kellogg Biological Station Natural Science), Susan Magnoli (Plant Biology)

Plants are often involved in complex mutualistic interactions with multiple other species. Chamaecrista fasciculata (Partridge Pea) is a legume native to Michigan. It has mutualistic interactions with ants,

pollinators, and rhizobia. Ants defend the plant from herbivory, and in return are rewarded with extrafloral nectaries produced by the plant. Rhizobia, which live in nodules on the roots, fix nitrogen in exchange for carbon. These positive interactions currently aid in the success of Chamaecrista fasciculata, but with rising global temperatures these relationships could be decoupled. A global warming experiment was conducted at the Kellogg Biological Station Long-Term Ecological Research site (KBS LTER) in which Chamaecrista fasciculata was grown at both ambient temperatures and three degrees Celsius above ambient temperatures. Each plant was subject to one of four treatments that manipulated the presence or absence of ants and rhizobia. Using plants grown in the three degrees Celsius above ambient temperatures condition and plants grown in ambient conditions, I explored how each of these treatments affected pollinator visitation rates. The findings of this study provide insight into the effects of rising temperatures on complex mutualisms.

SOIL TEMPERATURE RESPONSES TO LAND USE AND CLIMATE VARIABILITY IN THE GRAND TRAVERSE BAY REGION

Jay Hull
Poster: 286
Mentor(s): Anthony Kendall (Geology), Sherry Martin (Geology)

Soil temperature plays a role in phenological cycles such as seed germination, spring tree budding, and insect larval development. Near-surface soil temperature also determine the temperatures of deeper groundwater systems, which help regulate aquatic ecosystems temperatures. The MSU Hydrogeology lab has been collecting soil temperature data at several depths at sites across the Grand Traverse Bay area since 2008 with the goal of monitoring how climate and land use changes affect soil temperature. Previously, this data had been collected and stored, but undergone very little analysis. A scripted framework using the R programming language was developed for importing and analyzing these data, facilitating both this current work and later follow-on studies. This poster examines the seasonal and yearly variation in soil temperatures at multiple depths across sites, observing the effects of changing land cover and climate on soil temperature trends over annual and seasonal timeframes.

EFFECT OF FREEZE-THAW CYCLES ON MACROPORE DEFORMATION

Natsuki Ikeda
Poster: 287
Mentor(s): Steven Safferman (Biosystems and Agricultural Engineering)

Nutrient discharge from agricultural wastewater has received attention, both globally and locally, due to its presumed link to the occurrence of algae blooms, some of which have led to temporary interruption of the water supply in the Midwest. Cover crops and no-tillage farming are thought to reduce nutrient leachate due to the better nutrient assimilation capacity of the soil. However, these practices have the potential of increasing nutrient loss to surface water because of the creation of macropores by plants and insects, that rapidly percolate water. In cold climates, like Michigan, freeze-thaw cycles of soil are considered to impact the nutrient transport but previous research does not provide a clear insight on their effect on macropore deformation. Experiments were conducted to investigate the effect of freeze-thaw cycles on the deformation and size of macropores. The research hypotheses were that the freeze-thaw cycles increases the volume of macropores, and the presence of macropores increases the speed of thaw and the frost depth. Four soil columns, each with macropores having a different radius but at an equal moisture content, were subjected to six 24-hour freeze-thaw cycles. Throughout the experiment, the temperatures of each column were measured at three different depths, at the end of every freezing period and thaw period. After the experiment, the macropores were casted with paraffin wax to measure their lengths, diameters and the level of deformation.

FRUIT CONSUMPTION OF FALL MIGRATING LANDBIRDS IN MID-MICHIGAN

Aya Pickett
Poster: 288
Mentor(s): Jennifer Owen (Fisheries and Wildlife)

Migration is an energetically costly event that landbirds undergo during the fall and spring months. This journey largely depends on the amount of energy that the birds can store before migration. In the fall, this energy predominantly comes from fruits. We used samples from American robins (Turdus migratorius), Gray catbirds (Dumetella carolinensis), and Swainson's thrushes (Catharus ustulatus), in order to become more familiar with the fruit usage of migratory birds. From mid-August to mid-October of 2015, fecal samples were collected from an exotic-dominated shrubland at Rose Lake State Wildlife Preserve in central Michigan. Birds were captured using mist nets and then placed in boxes with sheets of white paper where they would defecate. From those papers, fruit type was then determined by observing colors and seed types. Despite their low stem counts in the habitat, all three species showed high fruit usage of European Buckthorn (Rhamnus cathartica), Highbush Cranberry (Viburnum opulus) and Nannyberry (Viburnum lentago). Out of those three fruits, European Buckthorn was used the most. Buckthorn is an exotic fruit that has lower energetic potential and fat than native fruits. In fact, landbirds must consume twice the amount of exotic fruits to obtain the same nutrients from native fruits. Despite their low stem count, buckthorn was observed to have a high fruit count per bush, which may explain the high usage.

MICHIGAN ANGLER'S RECREATIONAL SPENDING

Jonathon Siegle
Poster: 289
Mentor(s): Frank Lupi (Agricultural, Food, and Resource Economics)

Fishing trip related expenditures in Michigan totaled $1.1 billion in 2011 (NSFHWAR, 2011). However, less is known about how individual factors contribute to angler spending. We surveyed holders of Michigan fishing licenses on the details and spending during one trip in the 2012-2013 season, their fishing preferences and beliefs, and demographic information on the angler. Our presentation will detail the results of a linear regression on the total spending for the reported fishing trip. We found that, other factors held constant, each additional day spent on a fishing trip resulted in approximately 115 dollars of additional recreational spending by the angler ($p<0.05$).

ENVIRONMENTAL SCIENCE & NATURAL RESOURCES
POSTER PRESENTATIONS, SECTION 3
BALLROOM, 1:30 – 3:00 PM

DIFFERENCES IN NITROGEN CYCLING IN WILDFIRE BURNED AND CLEARCUT HARVESTED JACK PINE FORESTS USING IN SITU METHODS

Kenneth Fanelli
Poster: 292
Mentor(s): David Rothstein (Forestry)

Understanding the effects of natural disturbance can be used to provide a baseline for evaluating the sustainability of forest management. Jack pine (Pinus banksiana) forests in Northern Lower Michigan, which were naturally maintained by stand replacing wildfire, are managed through clear cut harvesting. In 2007 a study comparing the effects of harvesting vs wildfire on soil properties, Leduc and Rothstein found that harvested stands had much greater rates of nitrification than soils from recently burned sites. This is significant because nitrification is a key ecosystem process that can be greatly affected by human disturbance. However, Leduc and Rothstein (2007) only observed this response in the laboratory. This study looks to advance their findings using in situ soil incubations and ion exchange resins to see if this is also occurring in the field. Several sites in Northern Lower Michigan were selected that had recently experienced wildfire and where a nearby jack pine harvest took place around the same time. Both NH_4^+ and NO_3^- production was higher in sites that were clear cut; however, nitrification was very low or absent in burned sites. These results are remarkably consistent with the lab data of Leduc and Rothstein (2007), and clearly show that clear cut harvesting stimulates nitrate production to a much greater degree than wildfire. Future

research aimed at elucidating the underlying mechanisms will be necessary to develop new approaches to stand initiation that may better emulate the effects of natural disturbance on this key ecosystem process.

EXPERT-NOVICE DIFFERENCES IN DIFFERENTIATING BETWEEN ARID AND DROUGHT-AFFECTED ENVIRONMENTS

Joshua Haga
Poster: 293
Mentor(s): Raechel Bianchetti (Geography)

Understanding how novices perceive visual representations of climate change impacts is important for designing effective communication for the public. Previous research concerning the use of realistic imagery for communication has suggested that the use of realistic landscape representations may prompt novices to more readily believe the message being conveyed, despite its truthfulness. This current work addresses whether visual perspective of these presentations also affects believability. In this current study, we address the influence of visual perspective and expertise on people's classification of arid environments from satellite imagery. An eye tracking experiment is used to assess how accurately experts and non-experts are able to classify satellite images into two classes (normal arid condition vs. drought condition), and assess what visual characteristics they use in classifying the images. Experts for this study were climatology and geography students who have completed a course in climatological remote sensing, while non-experts were geography students who have not had specialized climatological training.

INTRODUCTION TO SUSTAINABILITY (CSUS 200) RELATIONSHIP WITH THE NEW ECOLOGICAL PARADIGM (NEP) STUDENT TEST SCORES AT MICHIGAN STATE UNIVERSITY

Kera Howell, Joseph Micallef
Poster: 294
Mentor(s): Michael Everett (Community Sustainability), Matt Raven (Community Sustainability)

Society today is facing a number of grand challenges, many directly linked to the environment. A common goal in higher education sustainability courses is to increase students' attitudes and awareness of the role the environment has in sustainable practices. The New Ecological Paradigm (NEP) scale measures a person's ecological worldview by having them answer fifteen environmental statements. The Department of Community Sustainability at MSU has used the NEP scale in the Introduction to Sustainability class (CSUS 200) since 2012 as one measure to determine changes in students' attitudes and awareness around the environment. Data is collected in each section by administering pre and post-tests to students using the NEP. The purpose of this study was to determine if completing Introduction to Sustainability course changes student's environmental view as measured by the NEP. A total of 453 students have taken the pre-test and so far 432 have completed the post-test. The average pre-test score for the data collected from 2012 to 2016 is 56.2 with the average post-test score being 60.0. The range of the NEP is 0 to 75. Having a higher score on the NEP scale indicates the student has an overall ecological worldview. A lower score indicates the students have more of an anthropogenic worldview. Overall, students demonstrated an ecological view with a score of 60.0. The scores presented improvements of student's NEP scores of 3.75, which indicate their ecological worldview has increased while in CSUS 200.

METHOD ANALYSIS OF DOCUMENTING MACROPORE PRESENCE

Madison Kirby, Rachel Konchal, Chase Smitterberg , Colton Vrabale
Poster: 295
Mentor(s): Steve Safferman (Biosystems and Agricultural Engineering)

This research examines how phosphorus travels into the environment. The study conducted focuses on the agricultural aspect and the soil macropores in which the nutrient can travel through the ground, leaching the phosphorus using macropores as the conduit to the tile drainage system. This leads to phosphorus escaping into ditches, rivers, and lakes where it will cause algal blooms and eutrophication, absorbing all available oxygen and creating a dead zone. Our tests consisted of making a soil profile of the macropores by pouring melted paraffin wax into the soil, allowing it to dry, removing the soil, and studying the size, frequency, and

interconnection of the macropores. This mapping will allow us to see the variation between soils and how the phosphorus is leached from the soil and taken out into the water channels.

THE EFFECT OF BORDER HABITATS ON PREDATION OF A KEY PEST

Lidia Komondy
Poster: 296
Mentor(s): Zsofia Szendrei (Entomology)

Habitats around agricultural fields can be sources for a diversity of natural enemies that can provide pest control, especially in cases where pests are concentrated at field edges. Ecosystem diversity theory predicts that more diverse border habitats around fields will support a more diverse and abundant natural enemy assemblage and this may lead to higher incidences of predation in agricultural field edges. In this study we examined how four different types of field borders, asparagus, forests, anthropogenic regions, or other agricultural crops influence predation by spiders of asparagus miners Ophiomyia simplex (Diptera: Agromyzidae), a specialist pest on asparagus, in field edges. We collected spiders in and around asparagus fields in 2014 and 2015, and used molecular gut content analysis with an asparagus miner specific primer to find spiders that fed on this pest. In particular, web-building spiders were one of the most prominent predators of asparagus miner. Two families appear to be important predators; Linyphiidae (Araneae) and Hahniidae (Araneae). There was a higher abundance and diversity of spiders in the wooded border habitats compared to other habitat types, but these measures were lower in the field edges. Therefore, while spiders are influenced by habitat quality outside agricultural fields, this does not impact biological control in field edges positively.

THE EFFECTS OF ANTHROPOGENIC FACTORS ON ENDANGERED SPECIES RECOVERY

Katherine Magoulick
Poster: 297
Mentor(s): Jianguo Jack Liu (Center for Systems Integration and Sustainability)

As humans expand across the globe, there are an increasing number of negative human impacts on animal populations such as land use change, climate change, and invasive species. In many cases this has led to the destruction of ecosystems and the decline of animal populations. However, some animal populations have been able to successfully recover with the help of effective conservation planning. Previous studies have examined individual populations of animals in localized geographic areas to determine the factors that have caused their decline or recovery. The disadvantage of this piecemeal approach is that it prevents broader trends in animal population recovery successes and failures from being identified, thus thwarting efforts to recommend conservation techniques in the future. To overcome this limitation, I analyzed and synthesized numerous individual research studies on animal species recovery conducted across the globe in order to obtain a more comprehensive picture of factors influencing the success or failure of animal population recovery projects. I drew cross-comparisons between studies based on a set of key anthropogenic factors of interest. Key findings include that anti-poaching measures and education promoted successful animal population recovery across species, while creating new wildlife preserves was generally less important. I also developed guidelines and a step-by-step plan for the recovery of dwindling animal populations and habitats that can be used across a broad array of endangered species. This project not only provides ideas on how to assist in species recovery around the globe, but also important reasons and incentives to do so.

USING MESOCOSMS TO ASSESS CONTROLS OF FLOCCULANT ORGANIC RICH SEDIMENTS ON ORGANIC CARBON AND NITRATE CHEMISTRY AT THE STREAM-GROUNDWATER INTERFACE

Stephen Plont
Poster: 298
Mentor(s): Jay Zarnetske (Geological Sciences)

Flocculant, organic-rich sediment (floc) deposits are ubiquitous throughout low land streams. However, current understanding around floc deposits as a control on biogeochemical cycles in stream systems is lacking. We hypothesize that floc deposits are a significant control on stream-groundwater interface (i.e.,

hyporheic zone) chemistry, because they function as a source of organic carbon, nutrients, and trace elements. To test this, a hyporheic floc manipulation experiment was conducted using in situ streambed flow-through mesocosms. Mesocosms were inserted into groundwater upwelling sites along a second-order reach of Augusta Creek (Michigan, USA). There were three floc addition treatments, each using unique floc sources with the Augusta Creek watershed, and one control. Hyporheic porewater samples, along with surface water and groundwater samples, were collected twelve days after the floc addition at four discrete depths in each mesocosm using MINIPOINT samplers. Samples were analyzed for dissolved organic carbon (DOC), nitrate, and various ion concentrations, as well as DOC optical properties, to infer DOC qualities. Results indicate that the floc treatments had no persistent effects on hyporheic DOC quantity or qualities, likely due to the rapid flushing of hyporheic porewaters from upwelling groundwater or fertilization of stream sediments by highly labile DOC and nutrients. Currently, laboratory analysis and experiments are being performed to assess the bioavailability of floc DOC and the nature of the microbial activity in the floc treatments to test these hypothesis, and to further understand the nature of floc as a nutrient source for biogeochemical cycles in stream systems.

ENVIRONMENTAL SCIENCE & NATURAL RESOURCES
POSTER PRESENTATIONS, SECTION 4
BALLROOM, 1:30 – 3:00 PM

MOLECULAR DIET ANALYSIS TO QUANTIFY PREDATOR-SPECIFIC PREDATION OF LARVAL STAGE LAKE STURGEON (ACIPENSER FULVESCENS)

Danielle Blumstein

Poster: 300

Mentor(s): Kim Scribner (Fisheries and Wildlife)

Population levels of recruitment are often affected by rates of mortality during the early life stages. Low recruitment in regionally threatened Lake Sturgeon (Acipenser fulvescens) has been attributed to high rates of predation at the larval stage. The objective of this study was to quantify levels larval sturgeon predation by predatory fishes inhabiting gravel and sand stream substrates within a 2 km stretch of upper Black River (Michigan USA) during the lake sturgeon. In traditional diet studies, the gastrointestinal track contents are removed and prey species composition is quantified through visual observation. For our diet analysis, we used a molecular approach. We developed mitochondrial DNA lake sturgeon specific barcoding primers to identify the presence or absence of lake sturgeon DNA in the partially digested gastrointestinal track contents of potential predators (344 specimens of n=18 potential predator species). We will compare the proportions of predators that consumed lake sturgeon in different habitats as a function of predator and alternative prey relative abundance. Results will be discussed in terms of broader implications of predation to lake sturgeon management given knowledge of predator communities known to inhabit Michigan streams.

EXPLORATION OF THE SURFACE CHARACTERISTICS DUE TO WEATHERING IN SPACE OF AN LL-CHONDRITE ASTEROID

Sydney Gable

Poster: 301

Mentor(s): Michael Velbel (Geological Sciences)

In June of 2010, a sample capsule from Hayabusa Spacecraft returned micrograins from the surface of an equilibrated LL- ordinary chondrite-like asteroid called Itokawa. From these micrograins, researchers from the Japanese Aerospace Exploration Agency (JAXA) observed surface characteristics indicative of space weathering caused by impact collisions as well as solar wind. This research project explores the surfaces of grains exhumed from a similar LL-Chondrite type meteorite by using scanning electron microscopy to look for microcrater characteristics, as well as splash and dome features, which suggest impact collisions and similar space weathering on the surface of the meteorite's parent asteroid while it was previously in space.

THE TECHNICAL AND PERFORMANCE CHARACTERISTICS OF A LOW-COST, SIMPLY-CONSTRUCTED, BLACK LIGHT INSECT TRAP

Katharine Glover, Joel Stewart

Poster: 302

Mentor(s): Peter White (Lyman Briggs and Natural Science)

Mercury-vapor black-light (MVBL) funnel traps have demonstrated a great capacity to survey moth assemblages and other nighttime insects in a variety of habitats. They have been used in applications ranging from quantifying the impact of habitat fragmentation on forest insect assemblages, to monitoring the presence and prevalence of agricultural pests. Typically, MVBL funnel traps are constructed of a mercury vapor black light bulb, powered by a car battery. When used at night, insects fly towards the low wavelength black light, strike one of three plastic vanes extending out from the light, and then fall into a funnel trap where they are collected. While effective, these MVBL funnel traps cost $250 or more, per unit. This can quickly become prohibitively expensive as research projects often require a dozen or more traps running concurrently in different locations. As a result, moths can be an impractical taxonomic group to study, particularly when research budgets are limited. To address this problem, we designed a simply constructed and cost-effective trap using plastic bottles and LED black lights, powered by rechargeable 9V batteries. We tested our new LED-based funnel (LEDF) trap in the spring and summer of 2015 and found that it had an overall moth catch yield of 50% to 70%, compared to MVBL funnel traps. Though it demonstrated this reduced catching efficiency, it cost less than $33.00 per trap to construct, making it a reasonable low-cost alternative to MVBL funnel traps. Here, we present the technical and performance characteristics of our new trap design.

SOLUBLE NON REACTIVE PHOSPHORUS REMOVAL USING CERAMIC NANOMATERIALS

Amanda Godar

Poster: 303

Mentor(s): Steven Safferman (Biosystems and Agricultural Engineering)

Excess levels of Phosphorous have been cited as the highest source of environmental pollution in freshwater systems. It is hypothesized this is uncontrolled release from point sources such as waste water and industrial facilities and nonpoint sources such as agricultural runoff. These levels of phosphorous can lead to high levels of eutrophication and thus damage natural ecosystems. Phosphorous has been recently evaluated into several different categories differentiated by solubility in water, reactivity, and organic/inorganic state. Those that are soluble nonreactive phosphorus species (SNRP) have been shown to have high ratings on the Biological Availability Phosphorous scale (BAP) and can be resistant to traditional waste water treatments. Research was conducted to determine the possibility of SNRP removal using a porous, iron-based ceramic containing nano materials that has proven effective in phosphorous removal before. This could prove to provide a cheap, efficient removal method that meets EPA standards for removal. In addition, the ceramics provide the possibility of renewal and thus recovery of phosphorous for potential use as fertilizer.

COMPARING REMOTELY SENSED TO HAND-DELINEATED IRRIGATED FIELDS IN NORTHERN INDIANA AND SOUTHERN MICHIGAN

Quercus Hamlin

Poster: 304

Mentor(s): Anthony Kendall (Geological Sciences)

Irrigation is a widely used agricultural technique and a major component of the hydrologic budget in parts of the United States. Even in humid areas, like Southwest Michigan, irrigation can increase yield of crops and provide security against drought by helping to achieve optimum soil moisture. In order to understand the effects of irrigation on the hydrologic budget, an accurate spatial dataset is needed. To address this, we collected data on irrigated fields in 11 counties in Northern Indiana and Southwest Michigan by viewing satellite imagery and hand-delineating polygons around fields with the “bullseye” pattern of center-pivot irrigation, or with irrigation equipment visible. We compared this hand-delineated dataset to Pervez and Brown’s (2010, 2014) Moderate Resolution Imaging Spectroradiometer Irrigated Agriculture Dataset (MIrAD-

US) using raster analysis. MIrAD-US was created using a combination of remotely sensed vegetation patterns and irrigation statistics; however its accuracy was only quantitatively measured in semi-arid parts of the United States. Furthermore, we compared the areas of agreement and disagreement to the cell's land cover class and soil type to look for factors that might be correlated to misclassification. Overall, the MIrAD-US dataset had a poor 20.7% mean accuracy. Soil type did not have an obvious effect on accuracy. Although most errors of commission for MIrAD-US were in land classified cultivated crops and pasture, the next most significant land covers were deciduous forest and woody wetlands, showing analysis of spectral signatures for vegetation may be confusing natural areas for cropland.

THE BAILEY COMPOST INITIATIVE

Alex Marx, Haley Fulco, Selena Perez
Poster: 305
Mentor(s): Laurie Thorp (Evironmental Studies and Sustainability)

Students in dorm rooms generate organic waste, such as apple cores, banana peels, and tea bags, on a daily basis. With 40% of organic matter wasted globally, this problem of waste diversion is being addressed by The Bailey Compost Initiative (BCI). BCI is a collaborative unit aiming to advance sustainable approaches to food waste management and diversion. Recently funded by The Office of Campus Sustainability, BCI is constructing various compost facilities that will allow us to look at the feasibility of the Natur-Tec compostable bags in an urban environment through the practice of pre-composting, as well as the most sufficient, efficient, and sustainable way to compost in general. This is important because it allows us to determine whether or not the convenience of the Natur-Tec bags currently used in hot composting is worth the time it takes for them to break down. The method of hot composting (with an internal heat source to initiate the degrading process) versus the use of vermicomposting will be tested in year-round temperatures inside the compost research facilities located in and outside the Bailey GREENhouse. Our goal is to create a system that will allow students campus wide to easily and properly dispose of food waste generated in dorm rooms. We know that with education, proper disposal, and initiative, BCI can close the food loop and help lead to a more sustainable world.

EPIDEMIOLOGY & PUBLIC HEALTH

ORAL PRESENTATIONS, SECTION 1
ROOM 36, 9:00 – 10:15 AM

THE ROLE OF NATURAL REMEDIES IN CUBA'S WIDELY RESPECTED MEDICAL SYSTEM

Amelia McGill
Time: 9:00 AM
Mentor(s): Gerald Urquhart (Fisheries and Wildlife)

As Cuba entered into their special period after the fall of the Soviet Union, they were mired deep in an economic crisis that extended to impact Cuba's highly regarded medical system. Supplies for basic human necessities became sparse, so the government implicated a mission to become self sustainable; in the health care system this became a push for natural healing remedies. This form of medicine continues where doctors are hands on and the approaches of treatment are split between natural and synthetic drugs. How does Cuba have a leading industry in health care when they lack the development of synthetic drugs that most developed (or wealthy) countries have? I explored this question through research ranging from interviewing locals, shadowing in hospitals, and talking with pharmacists. The first distinction I discovered is that the Cuban medical system is unique. They have maintained the health of their citizens along with the trust in the medicine, with public opinion on natural medicines being overwhelmingly positive. When compared to identical surveys to United States citizens, there was a shift in the response. Rather than accepting natural remedies as a form of true medicine, it was considered a form of pseudo medicine. The significance in these findings is that even in Cuba's skilled health system they still practice with natural medicine. The United

States has put off these ideas, since they are not developed in the same sense, but could they be overlooking a key aspect that could vastly improve overall health care.

EXPLORING RISK-TAKING BEHAVIORS AND SENSATION SEEKING NEEDS BETWEEN COLLEGIATE STUDENT-ATHLETES WITH AND WITHOUT A HISTORY OF SPORTS-RELATED CONCUSSION

Emily Cissell, Meghan Klakulak, Julianna Pannone

Time: 9:15 AM

Mentor(s): Erica Beidler (Kinesiology), Tracey Covassin (Kinesiology), Meghan LaFevor (Kinesiology)

Approximately 300,000 sports-related concussions (SRCs) occur in the USA annually. One prevention strategy is to identify SRC risk factors. Risk factors have been investigated (i.e. sport, body type, playing position), but there is minimal evidence on how SRC relates to intrinsic psychological variables. The purpose of this study was to investigate differences in risk-taking behaviors and sensation seeking needs between collegiate student-athletes with and without a history of SRC. Participants completed a 10-minute quantitative survey that included demographics, SRC history information, the Barratt Impulsiveness Scale, and the Brief Sensation Seeking Scale. There were 1,250 [male(n=700,56%);female(n=550,44%)] student-athletes from 28 collegiate sports. Of those, 940(73.7%) participants reported 0 previous SRCs, 224(17.6%) had 1 SRC, and 112(8.7%) had 2+ SRCs. ANCOVAs were completed to determine if there were differences in risk-taking behaviors and sensation seeking needs between previous SRC groups with sex and sport type covariates. Results found significant group differences for the total impulsivity risk-taking[$F_{(1,248)}$=7.62, p=0.00] and total sensation seeking [$F_{(1,228)}$=7.62, p=0.00] scores. Tukey post-hoc analyses revealed significant mean differences (MD) between the 0 and 2+ previous SRC groups(MD=0.18, p=0.00, d=0.41) and between the 1 and 2+ previous SRC groups(MD=0.15, p=0.01, d=0.32) for the total impulsivity risk-taking score. A significant mean difference between the 0 and 2+ previous SRC groups(MD=0.18, p=0.03, d=0.26) was also observed for the total sensation seeking score. Overall, relationships between previous SRCs and the psychological variables of risk-taking and sensation seeking were identified in collegiate student-athletes. Future research is needed to clarify these relationships and determine their clinical application.

SPORTS-RELATED CONCUSSION KNOWLEDGE AND REPORTING BEHAVIORS OF COLLEGIATE CLUB SPORT STUDENT-ATHLETES

Colin Hanock, Rami El-Baba

Time: 9:30 AM

Mentor(s): Erica Beidler (Kineisology), Abby Bretzin (Kinesiology), Tracey Covassin (Kinesiology)

Sports-related concussion (SRC) is a public health concern. It is important that athletes receive education on the common SRC signs and symptoms and the importance of reporting an injury to their coach or certified athletic trainer. Collegiate club sports may not receive formal SRC education or have direct access to healthcare providers. The purpose of this study was to investigate SRC knowledge and reporting behaviors of collegiate club sport student-athletes. Participants completed a 10-minute survey that included demographics, SRC knowledge, and reporting behaviors. There were 399 [male(n=239,60%); female(n=160,40%)] student-athletes that participated from 15 different collegiate club sports. Descriptive statistics were completed to determine the percentage of subjects who correctly identified the most common SRC signs and symptoms and why participants reported or didn't report a SRC. The majority of participants correctly identified headache (n=372,95%), confusion (n=368,94%), dizziness (n=357,91%), and fogginess (n=317,81%) as common SRC signs and symptoms. The most common responses why participants reported a SRC is that they thought they had a concussion (n=257,66%) or they didn't want to have any further damage to their brain (n=183,47%). The most common responses why participants said they wouldn't report a SRC is that they didn't think that it was serious (n=164,55%) or they didn't want to lose playing time (n=126,42%). Overall, most participants had suitable SCR knowledge, but barriers still exist that discourage club sport student-athletes from reporting their injury.

DEATH AS A FUNCTION OF EVOLUTION
Mitch Distin
Time: 9:45 AM

A new paradigm on aging has evolved throughout the last few decades, focusing on death and aging as an adaptation or function of evolution, rather than as spandrel. These theories, denoted "programmed theories of aging" or "Phenoptosis," place emphasis on comparative evidence while contending orthodox Darwinian theory. Theoretical paradigms supporting Phenoptosis are minimal due to its infancy, which is why we examine evolutionary mechanics revolved around a central question of: What are the adaptive values of aging and/or death? Using the experimental evolution software AVIDA, we tested the relationship between evolvability and death rate, evolvability salience due to extinction events, death as a natural selection amplifier, and neoteny.Further theoretical proof that longevity past a species-specific lifespan is detrimental to the species, genes, or kin as a whole supports the perspective that death is a function of evolution, and diminishes traditional Darwinian mechanics, as well as Neo-Darwinianism theory.

A COMPARISON OF THE VACCINATION PROGRAMS AND MEDICAL APPROACHES IN CUBA VERSUS THE UNITED STATES
Grace Flynn
Time: 10:00 AM
Mentor(s): Gerald Urquhart (Biology)

Since the 19th century, vaccines have played a crucial role in preventing diseases and sustaining the health of a population. However, in recent years the percentage of Americans choosing not to vaccinate their children has increased, largely due to perceived controversies or negative consequences of vaccines. My goal was to explore the differences in public knowledge and perception of vaccinations in Cuba compared to the United States. I will provide a general overview of the primary health care system in Cuba, especially with regard to its strategy of preventative rather than curative medicine. Comprehensive vaccination coverage is critical to Cuba's preventative strategy, as Cuba lacks the resources needed for expensive treatment of the diseases that vaccines prevent. I will discuss the history of Cuba's vaccination program along with the current statistics of immunization coverage and preventable disease prevalence. These statistics will be compared to similar statistics from the United States and differences will be examined. In addition, I will present my findings from surveys conducted in both Cuba and the United States. The surveys contain questions to assess public knowledge of vaccines and the immunization program in each country as well as questions to determine public opinion of vaccination. The responses from both Cuba and the United States will add to my conclusion about the underlying causes of the United States exhibiting a greater prevalence of vaccine preventable diseases than Cuba.

EPIDEMIOLOGY & PUBLIC HEALTH
POSTER PRESENTATIONS, SECTION 1
BALLROOM, 9:00 – 10:30 AM

RELATIONSHIP DYNAMICS OF PATIENT-DRIVEN SOCIAL SUPPORT FOR PERSONS WITH CHRONIC ILLNESS
Jamie Beaulieu
Poster: 308
Mentor(s): Roxane Chan (Nursing)

Chronic obstructive pulmonary disease (COPD) is the third leading cause of morbidity and mortality in the United States. The subjective experience of shortness of breath for persons with COPD causes them to curtail group self-care activities greatly increasing morbidity and mortality. Studies demonstrate that people with chronic illness may benefit from group meditation training with improved symptom management and health-related quality of life (HRQOL) outcomes. Therefore, a recent discovery of persons with COPD who maintain a self-led meditation group created an opportunity to assess how this resource may be expanded

to other community rehabilitation sites. The purpose of this study was to describe how the group functions to maintain their group meditation practice, including the evolution of the roles and relationship dynamics within the meditation group. A focused ethnographic study was conducted involving all members of the group (10). Transcribed audio recordings of four sessions of the meditation group combined with individual interviews of 6 of the 10 members were analyzed following the ethnographic principles of Roper and Shapiro. Findings thus far identify the inclusive nature of the group sessions that allow for the processing of ancient wisdom traditions. Important aspects of the group function include; individual contributions to group discussion content, flexible group structure, group acceptance of individual meditation styles, and non-judgmental nature of members. The structure and content of the group are discovered and related to evidence based group therapy and group meditation formats. Similarities to ancient spiritual groups such as the Sangha and Satsang are notable.

AMERICA TODAY: PRO-LIFE STATES VERSUS PRO-CHOICE STATES

Aja Green-Walker, Cailynn Kotzke, Toyia Montgomery

Poster: 309

Mentor(s): Mark Largent (Lyman Briggs)

Abortion can be defined as the deliberate termination of a human pregnancy so that it does not result in the birth of a child. In 1880 most states in America banned abortion, only allowing it when required to save the life of a woman. The Supreme Court's decision in Roe v. Wade then legalized abortion in 1973 and it still remains legal in the United States today. Although women have the right to receive an abortion there are still a substantial amount of restrictions put in place varying from state to state. These restrictions stem from issues including: religion/culture, age, health, safety, access, cost, employment, standards, and family. As a result of the strong opinion that society holds towards abortion, we have chosen to compare and contrast the 3 most and 3 least hostile states.

BROSELOW TAPE ACCURACY IN PEDIATRIC PERUVIAN POPULATION

Sumaira Hai, Abigail Maynard

Poster: 310

Mentor(s): Maddi Massa (Medical School)

When treating pediatric emergencies, it is not always time-efficient to weigh a child on a scale to obtain information for medication dosages or shock voltage. The time required for this action could be better used towards active measures to actually help the patient. The Broselow Tape is a fast alternative to the scale that relates a child's height to their weight using a color-coded tape measure. Michigan State University College of Osteopathic Medicine (MSUCOM) collected pediatric information from various regions throughout Peru from 2010-2014. The purpose of this study was to investigate the accuracy of the Broselow Tape in predicting the weight of Peruvian children. Based on various studies, it was predicted that the Broselow Tape would be a reliable tool for Peruvian children. A total of n=909 children were surveyed in this study. Analysis of collected data verified that the Broselow Tape did not accurately predict the actual weight for Peruvian children and would lead to under-resuscitate patients. This is significant in that Peru and other international communities currently lack a standardized weight estimation device. The Broselow Tape was designed for children up to 12 years of age with a maximum weight of 80 pounds. To avoid adverse reactions to medication or dosage errors, it is suggested that more research be done to either find another method to estimate weight or to find a modifier to the Broselow Tape to enhance its prediction accuracy for pediatric emergencies in other countries as well as the United States.

PHYLOGROUP ASSOCIATION AND ANTIBACTERIAL RESISTANCE OF E.COLI RESPONSIBLE FOR CAUSE OF URINARY TRACT INFECTION

So Kim
Poster: 311
Mentor(s): Lixin Zhang (Epidemiology and Biostatistics)

Urinary tract infection (UTI) is one of most common bacterial infections. E.coli causes the vast majority of UTI. Many studies suggest E.coli phylogroup B2 is associated with UTI. Also some straisn of E.coli obtained resistance to antibiotics. I hypothesized that since B2 phylogroup causes most UTI, it accumulated most resistance to antibiotics. To test this hypothesis, I obtained 81 urine samples from patients with urinary tract infection and 81 fecal samples from healthy individuals. E.coli DNA was isolated and purified from all 162 samples. Quadraplex PCR was used to target four DNA fragments: ArpA, ChuA, YjaA, and TspE4.C2, to determine the phylogroup of each sample. Phylogroup was determined depending on presence or absence of these four DNA fragments, and antibacterial resistance using the standard disc diffusion method. I found that B2 phylogroup in both urine and fecal samples. The number of phylogrop B found in urine versus fecal samples was not significant. I am currently testing for antibacterial resistance in all the samples. My data demonstrate that B2 phylogroup is found in both urine and fecal samples. Perhaps distribution of B2 group varies among different study populations. Further study is being done to compare antibiotic resistance profiles between urine and fecal samples, and among different phylogroups.

FREQUENCY OF SALMONELLA INFECTIONS IN FOUR MICHIGAN HOSPITALS

Jessica Plemmons
Poster: 312
Mentor(s): Shannon Manning (Microbiology and Molecular Genetics)

Salmonella enterica is a gram-negative foodborne pathogen and a leading cause of diarrhea in the U.S. In 2014, the Centers for Disease Control and Prevention reported 1.2 million cases per year resulting in 450 deaths. It is therefore important to track the prevalence of Salmonella in specific geographic locations to determine the risk factors involved in development of infection. To do this, we collected epidemiological data from 309 Salmonella cases identified at four hospitals in southern Michigan between 2011 and 2014. We have observed variation in the distribution of cases across the four sites and by demographics including age and sex. Cases also differed with regard to the length of hospitalization, duration of sickness, and symptoms. Better understanding of disease frequencies and patterns in Michigan will enhance our ability to develop new prevention strategies aimed at reducing the number of Salmonella infections.

IMPACTS ON CHILDHOOD BMI

Leah Vicini
Poster: 313
Mentor(s): Brooke Ingersoll (Psychology)

In order to combat childhood obesity and promote nutritional health, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) was established for pregnant and postpartum women and their children from low income homes in which they may be predisposed to weight gain and lack of healthy food options. Programs such as WIC receive a tremendous amount of public and governmental support, but are not typically subject to rigorous empirical investigation. This raises an important question: do supplemental programs for low income families, such as WIC, have a profound impact on childhood BMI given a variety of home environments and genetic influences that also contribute to childhood weight status? Previous research suggests that WIC participation is associated with lower/healthy childhood BMI, but these studies are limited in that they use small sample sizes and do not examine other factors that influence childhood weight, such as maternal BMI and the home environment. Therefore, the goal of this study was to examine the interactions between maternal pre-pregnancy BMI, WIC participation, and home environment on childhood BMI in a population-based sample of 3-6 year old children from an ongoing prospective pregnancy cohort in mid-Michigan, the Archive for Research on Child Health (ARCH). Maternal BMI was calculated using the mother's weight and height; WIC participation was determined through a

prenatal questionnaire and home environment was assessed using a Home Screening Questionnaire. Through revision and evaluation it can be determined which program will have the most success for each individual person.

EPIDEMIOLOGY & PUBLIC HEALTH
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 11:15 AM – 12:45 PM

VBACS: MISCONCEPTIONS AND WHY SOME MOTHERS PREFER IT

Kaleigh Galloway, Hannah Walker

Poster: 316

Mentor(s): Mark Largent (Social Relations and Policy)

There's a large argument around having a vaginal birth after cesarean, and many women don't know the actual risks or benefits involved. Although most hospital staff will direct a mother to the more 'reformed' choice of undergoing another cesarean, we would like to educate others on why both options are available depending on one's predilection. Numerous hospitals and insurance companies refuse to support the choice of VBACs and 40 states have banned them all together. This presents ethical issues regarding a mother's free will to determine how she will give birth. It would be understandable to have such intense restrictions on a medical procedure that posed great harm. However, after the data has been analyzed and both options have been compared and contrasted, are VBACs actually that dangerous? In contrast to the quantitative data of fact analysis, the idea of childbirth as more than just a medical procedure needs to be taken into account. Even if VBACs are found to be more dangerous, some mothers may still choose to go through with one. Why? Because many expecting mothers feel that a child's birth is an experience to be remembered more so than a medical procedure. Many families believe that it should be a shared event, and, for whatever reason, the first pregnancy was unable to be experienced in such a way. The truth about the risks associated with VBACs needs to be uncovered so that mothers can make their own educated decision about how they give birth.

WESTERN INFLUENCE ON INDIAN FERTILITY

Sandipta Haldar, Sabrina Bronni

Poster: 317

Mentor(s): Mark Largent (Social Relations and Policy)

In the 1970s there was pressure from the Indian government's family planning policy for men and women to be sterilized due to fear from the projected population growth. Compulsory sterilization was legalized and enforced; a woman could bear a total of three children to her husband before being forced to visit a sterilization facility. The United Nations and other bodies of western influence aided the effort to decrease India's population by offering incentives, such as money and utilities, to encourage women to visit these facilities before the child bearing limit. While sterilization of the masses is still instituted in modern India, surrogacy of sterilized women is on the rise. These Indian women of lower classes are offered a considerable amount of money, but nowhere near the amount that is offered to surrogates of other nations, to bear children for wealthy western families. If sterilizations are being enforced to lower the staggering population growth, why are these same women being paid to continue to bear children. This begs the question, was the issue not with the growing population of the world, but the growing population of Indians on the lower end of the socioeconomic scale?

USING HADDON'S INJURY MATRIX TO IDENTIFY PREVENTION STRATEGIES FOR BULLYING IN NURSING HOMES
Katie Nurenberg
Poster: 318
Mentor(s): Carolyn Pickering (Nursing)

Bullying between certified nurse aides (CNAs) has become a prevalent problem in nursing homes which affects the health and well-being of these workers, and ultimately affects the residents. The purpose of this case study is to analyze individual incidences of bullying, as explained by the victim, and determine possible prevention strategies. This study is a secondary analysis of data which has been collected from interviews with CNAs that have had personal experiences with bullying as part of a grounded theory study. Guided by the Haddon's Matrix, which is a framework used for injury prevention, incidences of bullying in the data were analyzed to determine primary, secondary, and tertiary prevention strategies. The prevention strategies identified in the findings include changing practices at the organizational as well as interpersonal level. By implementing bullying prevention strategies we can reduce the culture of violence, and in doing so may positively impact resident care.

COMPARING CHILDREN'S ESTIMATED AND ACTUAL VISUAL EXPOSURE TO 'GREEN' AND 'BLUE' SPACES
Richard Wetzel
Poster: 319
Mentor(s): Amber Pearson (Geography)

This study will compare the simple cross-sectional measure of residential exposure to blue space (VVI) to the actual visual exposure to blue space for children in the Wellington region, using photographic data for each child in the existing KidsCam study. Specifically, this study aims to: 1) quantify visual exposure to blue space throughout daily activities using photographs; 2) compare the quantities of visible blue space observed at home locations compared to elsewhere; 3) compare the quantities of visible blue space observed during week days compared to at the weekend; and 4) compare the actual, average daily visual exposure to blue space and the simplified VVI measure. These aims will be achieved through work by the undergraduate researcher, the faculty supervisor, and a visiting Fulbright Scholar (Harvard Uni).

THE CORRELATION BETWEEN HEALTH INSURANCE AND WEIGHT MANAGEMENT FOR BARIATRIC PATIENTS
Kailyn Williams
Poster: 320
Mentor(s): Heather Howard (Anthropology)

This study explores healthcare insurance for weight management and how it affects the way medically monitored weight loss products are used. Based on a qualitative study of patients from a weight management clinic where the majority pursue bariatric surgery, this poster describes how and why a number of patients decided not to fully utilize or discontinue use of the products and services recommended for them. The study involved ethnographic interviews with patients and clinicians, and participant observation, which spanned over one year in the clinic. In many of the interviews the patients point out that they have some form of insurance that covers some of the costs associated with weight management. However, they are required to pay entirely for the products and most of the services required for them to achieve the optimal outcomes of their weight loss program. This results in many of these patients discontinuing their medication and care. Lack of insurance coverage for these aspects of weight management is therefore a barrier. This study analyzes the correlation between the usage of weight management products, medications, and treatments and health insurance by reviewing the patient interview data, and situating the study in the context of related scholarly literature on this topic. It will also analyze how this correlation can possibly affect the total health and wellness of these patients and patients like them.

EPIDEMIOLOGY & PUBLIC HEALTH
POSTER PRESENTATIONS, SECTION 3
BALLROOM, 1:30 – 3:00 PM

FACTORS ASSOCIATED WITH STUDY ATTRITION AMONG LUNG CANCER PATIENTS ENROLLED IN TELEHEALTH-DELIVERED MINDFULNESS THERAPY FOR SYMPTOM MANAGEMENT

Adam Barrett, Lindsay Ross

Poster: 323

Mentor(s): Rebecca Lehto (Nursing)

Studies suggest that cancer patients' benefit from therapies such as meditation training with improved symptom management and health-related quality of life(HRQOL) outcomes. A pilot study was conducted to evaluate the acceptability and preliminary efficacy of a telehealth delivered mindfulness meditation intervention for vulnerable patients with advanced lung cancer receiving radiation and/or chemotherapy. The purpose of this study was to evaluate factors associated with study attrition. A HRQOL framework adapted by Ferrans was used. The sample included 22 patients with advanced lung cancer ranging in age from 54 to 82 years. Analysis included descriptives, t-tests, and group comparisons at weeks 8 and 11 using linear mixed effects models and estimation of effect sizes for average group differences over time. Attrition analysis revealed that patients who dropped out of the study had poorer function on numerous indices compared with study completers, including poorer mental HRQOL function, lower perceived cognitive effectiveness, higher general worry, more cancer related worry, and higher depression. There were no significant differences in therapy expectancy, use of complementary therapies, spirituality, and social support between the completion group and those who dropped out. These preliminary data suggest that telehealth delivery is not optimal for vulnerable patients with high cognitive and emotional symptom burden. Given the high attrition rates, the findings suggest that patients may benefit from personal choice in intervention delivery. Telehealth mindfulness delivery may be feasible for technically literate patients who have effective cognitive functioning during treatment, while providing advantages towards decreasing provider time, travel, and cost.

PATIENT PERCEPTIONS ABOUT PARTICIPATION IN A MINDFULNESS STUDY FOR LUNG CANCER SYMPTOM MANAGEMENT

Lindsay Ross, Adam Barrett

Poster: 324

Mentor(s): Rebecca Lehto (Nursing)

Patients undergoing treatment for advanced lung cancer report high symptom burden and lower health-related quality of life(HRQOL). Thus, supportive interventions to help patients manage symptoms during conventional medical treatment are needed. A randomized pilot study was conducted to test acceptability, feasibility, and early efficacy of a newly developed home-based mindfulness meditation(MM) protocol for patients receiving treatment for advanced lung cancer. It is essential to evaluate patient perceptions about study participation when evaluating acceptability and needs for future modifications for intervention delivery. The study purpose was to compare perceptions of therapy expectancy (credibility/expectancy) and study exit interviews between patients in the treatment and control groups pre- and post-intervention. Patients were randomly assigned to either six weekly MM training sessions (intervention group;n=16) or standard care(control group;n=16). Both groups received weekly symptom interviews. Exit interviews evaluated patient's perceptions of study acceptability. A mixed methods approach was used. There were no significant differences between the intervention and control groups on therapy credibility (intervention:18.06+5.69, control:18.06+7.07), and intervention expectancy (intervention:15.37+8.79, control:14.19+9.43) at baseline. Post-intervention, there were significant differences on both credibility(intervention:22.25+3.66; control:15.06+6.08; p<.005) and expectancy(intervention:16.56+8.52; control:6.94+7.9; p<.005). Exit interview data indicated that controls did not perceive benefits in alleviating symptom burden but appreciated the weekly calls. Most intervention participants reported the study beneficial and helpful for improving HRQOL. Some found participation challenging due to symptom severity

and lack of time. Both groups would recommend the therapy to others. Concerns for future interventions include modifying the therapy depending on symptom severity and the amount of time required.

BIRTH OUTCOME AND CITIZENSHIP DISPARITIES BETWEEN NATIVE AND NON-NATIVE MOTHERS IN THE U.S.

Audrey Drotos, Ewurama Appiagyei-Dankah, Gina Pike
Poster: 325
Mentor(s): Mark Largent (Lyman Briggs)

The subject of immigration policy and border policing has been of increasing interest recently in the political realm. Often neglected in this study is the effect of laws governing pregnant mothers and their children, and the birth discrepancies that result. Throughout the years, there have been many undocumented immigrants that came to the United States to have their children. This project seeks to understand, through analysis of previously published academic literature regarding birth outcomes and immigration, how these mothers experiences were shaped by their citizenship status, both physically through birth outcomes and politically through the social policies that shape their lives. This comparison then establishes differences between these non-native mothers and native mothers living in the U.S., and the different receptions they face in the healthcare and social community. In conclusion, there are changes that can be made to the procedures pertaining to non-native mothers to create a more positive birthing experience for them in the United States.

EPIDEMIOLOGICAL ANALYSIS OF CONFIRMED SHIGA TOXIN-PRODUCING E. COLI (STEC) O157:H7 CASES IN FOUR MICHIGAN HOSPITALS, 2007-2014

Matthew Peters
Poster: 326
Mentor(s): Shannon Manning (Microbiology and Molecular Genetics), Rebekah Mosci (Microbiology and Molecular Genetics)

STEC is a pathogenic bacterium that causes approximately 73,000 illnesses per year, according to the CDC. In 1982, serotype O157:H7 emerged and continues to be the most prominent serotype to cause illness today. It is often transmitted through ingestion of contaminated food, and can cause a variety of harmful symptoms, including bloody diarrhea and hemolytic uremic syndrome (HUS). This study aims to analyze patient data for 384 confirmed STEC O157 cases, reported by the Michigan Department of Human and Health Services from 2007 to 2014. Cases were initially identified at four hospitals in southern Michigan and epidemiological data was collected to identify associations with patient information (age, gender, etc.), disease onset, severity of symptoms, and other exposures (hospital location, pre-illness diet, travel information, etc.). Our preliminary analyses have identified variation in disease frequencies by age and residence, and have shown that O157 infections frequently result in high rates of hospitalization. Identifying factors that are associated with STEC infections and monitoring disease trends is important for determining which human populations are most susceptible and for guiding future prevention protocols.

FIGHTING THE GLOBAL OBESITY EPIDEMIC: INVESTIGATING THE UTILITY OF MUAC AND WC IN PREDICTION OF OBESE PERUVIAN PEDIATRICS

Jacob Shermetaro, Sumaira Hai, David Kuo, Abigail Maynard, Kotomi Obayashi, Mackenzie Robson
Poster: 327
Mentor(s): Shane Sergent (Osteopathic Medical Specialties)

Obesity is a global issue of epidemic proportions that increases risk for several chronic diseases. This study's goal was to determine if mid-upper arm circumference (MUAC) and waist circumference (WC) measurements correlated with BMI, and thus predictive of obesity in Peruvian children. Using MUAC and WC measurements allows for a physician to be able to diagnose obesity with a tape measure rather than the scale and measuring stick that are traditionally used to calculate BMI. From the years 2010-2014 pediatric patients were enlisted from various regions across Peru. Height, weight, MUAC, and WC were measured. BMI and Z-score was calculated for each child. A series of chi squared calculations was done to determine

confidence intervals between BMI vs. WC and BMI vs. MUAC. Data on WC for 8-year-old boys and girls and 9-year-old boys was predictive for obese BMI (P<0.15). This correlation was the same for MUAC in 8-year-old boys. For WC, with respect to 7-year-old boys, and MUAC, for 6-year-old girls and 7-year-old boys and girls, the data showed a stronger relationship correlated to obesity (P<0.1). The strongest relationship was seen in WC and obese BMI for 3-year-old boys (P<0.001). In conclusion, one sixth of this Peruvian pediatric population proved to be obese. It can be said that MUAC and WC are useful biometrics when evaluating health and nutritional status of certain ages. Based on these results, we can conclude that the use of MUAC and WC may be useful as early screening tools to predict obesity.

INJUSTICE OF FAT AND SUGAR: FOOD INSECURITY, ACCESS AND HARVESTS IN RURAL TRIBAL COMMUNITIES

Marilyn Werner
Poster: 328
Mentor(s): Jubin Cheruvelil (History, Philosophy, and Sociology of Science)

Diabetes is a health issue affecting people worldwide. 29.1 million Americans have diabetes, and a disproportionate amount are Native Americans. The Center for Disease Control estimates that 15.9% of Native Americans over the age of 20 have diagnosed Type 1 or Type 2 diabetes as of 2012, which is a considerably higher rate than the national average, and higher than any other ethnic group. Among Tribal communities, prevalence of diabetes has often been framed as a genetic issue, but research shows the complex relationship that food access plays in fat and sugar consumption and development of diabetes. Tribal history and contemporary government programs are also determinant factors in current diabetes prevalence, and can both hinder and support Native Americans' fight against diabetes. Further, the geographic isolation of rural Tribal communities complicates their ability to access healthy resources. Federal food programs fail to include or support the use of traditional foods, contributing to the reliance on unhealthy foods and culturally and nutritionally inappropriate patterns of consumption. We explored a composite set of variables that contribute to diabetes, including rural settings and food access. The study analyzed six counties in Wisconsin, comparing Tribal harvest patterns, access to store-purchased food, and diabetes rates to demonstrate that diabetes is determined by many factors, especially income level and access to food. Cultural values can be used to promote overall well-being and healthy choices, but only situated on the ability of communities to practice and employ these values.

FOOD SCIENCE & HUMAN NUTRITION

POSTER PRESENTATIONS, SECTION 1
BALLROOM, 9:00 – 10:30 AM

EFFECTS OF TEMPERATURE, WATER ACTIVITY, AND STRUCTURE ON THERMAL RESISTANCE OF SALMONELLA IN DATES AND DATE PASTE

Sarah Buchholz
Poster: 331
Mentor(s): Bradley Marks (Biosystems and Agricultural Engineering)

Low-moisture products have been implicated in salmonellosis outbreaks/recalls. However, few studies have addressed *Salmonella* in dried fruits, even though it has been shown to be present and able to survive long periods in such products. Additionally, the effect of structure change (whole fruits vs. fruit paste) on *Salmonella* thermal resistance is not well studied. The objective was to quantify the thermal resistance of *Salmonella* on dates and in date paste during heat treatment at different water activities (a_w). Date surfaces and pitted dates (later processed into paste) inoculated with *Salmonella* Enteritidis PT30 were equilibrated in controlled-humidity chambers to 0.25, 0.45, or 0.65 a_w. Samples were treated isothermally in sealed containers in a water bath (70, 75, 80°C) for defined periods. *Salmonella* survivors were recovered on modified trypticase soy agar, incubated for 48 h, and enumerated. D-values were determined from linear

regression of the survivor curves for each treatment. D-values decreased ($P < 0.05$) with increasing temperature at 0.25 a_w. At 80°C, D-values were not affected ($P > 0.05$) by a_w. D-values for *Salmonella* were greater in date paste than on date surfaces ($P < 0.05$) at 0.45 a_w and 80°C. In most food products, a_w significantly affects thermal resistance of *Salmonella*, but this appeared less true for dates. Other compositional factors may be more important than a_w in this product type. Future studies should continue exploring the effects of these factors to ensure reliable data for process design and validation.

ACCEPTABILITY OF A BACTERIAL SURROGATE FOR CROSS-CONTAMINATION IN LOW-MOISTURE FOODS

Joanna Carroll

Poster: 332

Mentor(s): Sanghyup Jeong (Biosystems & Agricultural Engineering), Bradley Marks (Biosystems & Agricultural Engineering)

Outbreaks associated with *Salmonella* in low water activity foods suggest a need for an improved understanding of factors contributing to pathogen cross-contamination. *Enterococcus faecium* is a non-pathogenic bacteria used as a *Salmonella* surrogate for thermal inactivation of food products. This project compares inoculation methodologies and investigates the feasibility of *Enterococcus faecium* as a surrogate during cross-contamination studies. Almond kernels (200 g) were wet- and dry-inoculated with *Salmonella* Enteritidis PT30 or *Enterococcus faecium*. The inoculated kernels (5 g, ~8 log CFU/g) and un-inoculated kernels (200 g) were conditioned to 0.2, 0.4, or 0.6 a_w and tumbled in a stainless steel drum (140 mm diameter, 64 mm depth) for the total number of rotations (TNR) of 5, 20, 40, and 80 rev (three rotational speed of 8, 16, and 24 rpm × durations (10-300 s)), in triplicate. At each condition, samples (four kernels) were retrieved, stomached, plated on modified tryptic soy agar, and incubated to enumerate total bacteria transferred. Water activity significantly affected maximum transferred bacterial load (MTBL) for wet inoculation methodology ($P < 0.001$). For 0.2 and 0.4 a_w levels, inoculation methodology significantly affected MTBL ($P < 0.001$), but not at 0.6 aw ($P = 0.10$). *E. faecium* may not be a surrogate for *Salmonella* at 0.4 a_w ($P = 0.04$), but needs further verification. Knowing how environmental/physical conditions influence bacterial transfer will enhance the accuracy of cross-contamination modeling (secondary models), and contribute to elucidating mechanism of cross-contamination in low-moisture foods.

ANTIMICROBIAL COATING FOR FOOD PACKAGING

Johnathan Harrison

Poster: 333

Mentor(s): Evangelyn Alocilja (Biosystems & Agricultural Engineering), Leann Matta (Biosystems & Agricultural Engineering)

The CDC estimates that in the US alone, foodborne illness affects 1 in 6 people each year resulting in 128,000 hospitalizations and 3,000 deaths (Center for Disease Control, 2014). Outbreaks of contaminated food can cause numerous infections before they are recalled. Current food packaging materials lack inhibition against bacterial contamination. This study examined the potential of bio-compatible functional groups (F2, proprietary at the moment) as an antimicrobial coating for food packaging. In this study, we evaluated one type of plastic food packaging with F2 targeting Salmonella enteritidis, the leading cause of death due to foodborne illness. Plastic strips were functionalized with F2 groups through a heating method. Bacterial capture on the strips took place at either 10⁻⁴ or 10⁻⁵ dilution from stock culture in phosphate buffered saline (PBS) for 30 minutes, followed by four hours of growth within tryptic soy broth (TSB) and plating for quantitative comparison. It was found that washing the strips with PBS on each side removed 99% of uncaptured, clinging bacteria from the non-functionalized positive control strips, compared to dunking strips into PBS. Capture was proportional to the culture cell concentration, however, cell growth in TSB was inversely proportional to the amount of F2 on the strip, showing potentially antimicrobial effects. If successful, this antimicrobial technology could help reduce foodborne illness in the food supply chain.

TOOLS 4 TEEN MOMS: PRELIMINARY SATISFACTION OF AN EDUCATIONAL SOCIAL-MEDIA INTERVENTION

Emma Thomas, Emily Stoddard
Poster: 334
Mentor(s): Mildred Horodynski (Nursing)

Adolescent mothers are less likely to utilize infant-centered feeding practices. Maternal responsiveness to infant cues has been shown to decrease rapid weight gain and the risk for obesity and chronic illnesses. Tools for Teen Moms (T4TM) is a social media-based intervention intended to improve maternal knowledge while assessing feasibility, efficacy, and satisfaction with the program's platform. This study was part of a larger randomized controlled trial targeting low income 15-19 year old first time mothers. Selected participants joined T4TM, a six week program which provided daily infant feeding challenges via text message. Website activity and challenge completions were monitored and post-intervention surveys and phone interviews were conducted. Participants completed 22 of 42 challenges (n=40) and 60% visited the website at least once after intervention. Participant feedback indicates satisfaction with T4TM content and structure. Ninety-four percent agreed they found the website helpful and 91% learned a lot about infant feeding. Ninety-one percent responded positively to T4TM formatting and usability with 69% of participants mentioning specific challenges. Satisfaction with the social media-based intervention indicates this model to be successful and may prompt incorporation of similar platforms into other health care interventions with adolescents.

AROMA CHEMISTRY AND CONSUMER ACCEPTANCE OF NAVY BEAN FLOUR

Joshua VanderWeide
Poster: 335
Mentor(s): Sungeun Cho (Food Science and Human Nutrition)

Bean flour has been gaining in popularity among consumers due to its reported health benefits including reduced risk of heart disease, obesity and diabetes. Extruded navy bean (Phaseolus vulgaris L.) flour can be considered as a cost-effective alternative to resource intensive traditional methods of processing. The objectives of this study were 1) to assess the volatile chemistry of extruded and commercial navy bean flour to determine the odor-active compounds using Headspace solid-phase microextraction combined with gas chromatography-olfactometry and 2) to investigate consumer acceptance of navy bean crackers made with the extruded or commercial bean flour. The odor-activity was highest from aldehydes in the extruded and commercial samples, representing 55% and 47.5% of the total response, respectively. Commercial bean flour was found to have approximately 12.5 times more peak area from aldehydes. Aliphatic aldehydes are most often formed during the degradation of linoleic and linolenic fatty acids, which are the primary fatty acids found in navy bean. These findings indicate that the commercial flour may have undergone severe lipid oxidation prior to the experiment. Consumer acceptance data showed a significant preference for baked navy bean crackers made with the extruded bean flour over the crackers made with the commercial bean flour. Development of highly acceptable bean flours that are mindful of cost and resource waste will help increase consumption of healthful dry beans. This study furthers our understanding of the sensory implications of extrusion on bean flour acceptability and reveals that lipid oxidation in bean flour may impact consumer liking.

FOOD SCIENCE & HUMAN NUTRITION
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 1:30 – 3:00 PM

DETECTION OF FOODBORNE PATHOGENS USING BIOSENSORS

Rebecca Jones, Tess Cannon

Poster: 337

Mentor(s): Evangelyn Alocilja (Biosystems and Agricultural Engineering)

Foodborne illness is caused by pathogenic bacteria such as *Eschericia coli* and *Salmonella* that are present in high levels in the food supply. This is a prevalent issue in many countries, including those that have well-enforced regulations for the food industry. In the US, 1 in 6 people get sick from foodborne pathogens each year[1]. Current methods are time consuming, expensive, and labor-intensive. There is a need to develop methods to detect foodborne pathogens that are fast, inexpensive, and simple. The development of magnetic nanoparticles (MNP) has allowed for rapid extraction of bacteria in a sample and for rapid detection using electrochemical techniques. In this experiment, MNP were used to extract bacteria from samples of fish, oysters, and shrimp. The detection process involved cyclic voltammetry by introducing electric potential through the liquid sample in the electrode and measuring current output. The initial hypothesis was that detection would be possible in a variety of seafood matrices. Our preliminary results indicate that capture efficiency is above 80% in each matrix. Detection correlated well with the bacterial count. This research will lead to rapid detection of foodborne pathogens in seafood, reducing outbreaks of foodborne illness. This method of capture and detection is suitable for use in developing countries because it is cost and time efficient.

LIPID OXIDATION ASSESSMENT IN CHEDDAR CHEESE FORTIFIED WITH MICRO-ENCAPSULATED FERROUS SULFATE

Marielle Kouassi

Poster: 338

Mentor(s): Abraham Arce (Food Science and Human Nutrition), Zeynep Ustunol (Food Science and Human Nutrition)

Milk, an important part of the human diet historically provides low amounts of iron. As iron deficiency remains a health concern, iron fortification of cheese could potentially increase iron intake. The addition of iron (Fe 2+) salts are known to enhance lipid oxidation, acting as a catalyst in the transformation of fatty acids to aldehydes, ketones and peroxides. These by-products contribute to sensory changes and to combat this, microencapsulated mineral salts were incorporated into the cheese due to its ability to fortify foods without altering properties. The objective was to assess lipid oxidation changes in Cheddar cheese fortified with microencapsulated ferrous sulfate salts. Thiobarbituric Acid (TBA) analysis was done to assess whether lipid oxidation rates were affected by ferrous ions. Although, TBA assessment measures malondialdehyde (MDA) formation, 1,1,3,3 - tetraethoxypropane (TEP), a MDA precursor, was used as the standard reagent due to the high instability of MDA. TBA values were collected over a 90 day aging period after cheese manufacturing. All collected data were analyzed using one-way ANOVA ($p = 0.05$). There was no significant difference when comparing Day 0; Control- 0.43 Tbar, Treatment- 0.51 Tbar, Treatment 2- 0.57 Tbar. After 90 days of aging, results remained unchanged with no significant difference among treatments, Day 90; Control- 0.47 Tbar, Treatment 1- 0.64 Tbar, Treatment 2- 0.62 Tbar. Consumption of a 28g serving of regular Cheddar cheese provides ~0.3% of the RDA for iron in the U.S. diet, whereas a serving of iron-fortified Cheddar cheese would provide ~30% of the RDA.

CHARACTERISTICS OF MARKET GARDENS PARTICIPATING IN A GROWER SUPPORT PROGRAM IN DETROIT, MICHIGAN

Alissa Mossbarger, Ashlynn Calka, Shannon Line

Poster: 339

Mentor(s): Katherine Alaimo (Food Science and Human Nutrition)

Keep Growing Detroit is a non-profit organization that exists to promote a food sovereign city where the majority of fruits and vegetables Detroiters consume are grown by residents within the city's limits. The Garden Resource Program is administered by Keep Growing Detroit and provides resources to gardeners such as seeds, plants, soil testing, and technical assistance. Another program of Keep Growing Detroit is Grown in Detroit which provides an opportunity for sales at local farmers' markets to a network of market gardeners. This research project analyzed Grown in Detroit program trends based on market sales data from 2009-2014. Grown in Detroit participant information was collected through written applications to the Garden Resource Program. Grown In Detroit sales data was reported following weekly markets. Data were entered into Access databases for analysis. Total program revenue by year and the top three crops sold annually by weight and revenue will be reported. In addition, data from 2014 will be summarized including number of growers, average land cultivated, average number of growers per garden, and average profit per garden. Grown in Detroit data can be used by growers in making valuable marketing and production decisions, which will contribute to the collective impact of local Detroit cultivation and accessibility of fruits and vegetables. In addition, determining overall revenue by year allows us to assess the success of growers in the city markets.

ASSAYING APPARENT AMYLOSE CONTENT IN CULTIVATED AND GENETICALLY ENGINEERED POTATO TUBERS

Brianna Nelson

Poster: 340

Mentor(s): Dave Douches (Horticulture), Daniel Zarka (Horticulture)

Regular potatoes have 20-30% amylose levels. The only way to modify or increase amylose ratios in potato is through genetic engineering. The gene controlling starch branching, Starch Branching Enzyme A (SBE A), plays a role in modulating the levels of amylose in the leaves and tubers of potato plants. The SBE A codes for a protein with branching enzyme activity. By inhibiting the expression of SBE A, the apparent amylose content of potato starch could be increased. Individual plants will be identified that have a reduced SBE A gene expression using RT-PCR. High amylose potatoes have potential health benefits that can result from a reduced glycemic index (GI) and by increasing the resistant starch (RS) content. Glycemic index is a ranking of foods on how they affect blood-sugar levels. Lower numbers on the glycemic index scale means a healthier food, generally. The long term goal for this project is to increase the amylose content of potatoes, thereby increasing their nutritional value.

CHARACTERIZATION OF FATTY ACID AND MINERAL COMPOSITION OF SELECTED SEEDS, NUTS AND OILS IN TANZANIA

Kelly Valentini

Poster: 341

Mentor(s): Jenifer Fenton (Food Science and Human Nutrition)

Fatty acids (FA) and micronutrients are required for normal growth and development. Deficiency in FAs and micronutrients is prevalent in several African countries. The objective of this study was to determine mineral and FA composition of seeds and oils available to residents of Rudewa-Mbuyuni village in Tanzania. Samples were analyzed for FA and mineral composition by GC-MS and ICP emission spectroscopy, respectively. Linoleic acid (LA) and alpha-linolenic acid (ALA) were highest in sunflower (Helianthus sp) oil, 251.50 mg/g and 0.58 mg/g, and pumpkin seeds (cucurbita pepo), 125.60 mg/g and 0.29 mg/g, respectively. Pumpkin seeds contained the highest amounts of potassium (9170 mg/kg), iron (115 mg/kg), and zinc (62 mg/kg) compared to other seeds, which are minerals important for FA metabolism. Pumpkin seeds and sunflower oil are dietary sources of essential FA (EFA) that could be incorporated into Tanzanian diets, especially where

there is a high prevalence of growth stunting, cognitive impairment, and EFA deficiency such as in Rudewa-Mbuyuni. Since the sunflowers and pumpkin genus analyzed in this study are widely distributed throughout Africa, these data may be beneficial to various regions where EFA and mineral deficiencies are common.

GLOBAL & AREA STUDIES

ORAL PRESENTATIONS, SECTION 1
LAKE MICHIGAN ROOM, 11:30 AM – 12:30 PM

THE IMPACT OF NORMALIZATION OF RELATIONS ON CUBAN EDUCATION

Taryn Stefanski
Time: 11:30 AM
Mentor(s): Donna Kaplowitz (Residential College in the Arts and Humanities)

With the recent normalization of diplomatic relations between Cuba and the United States, a multitude of political and economic changes in both nations have begun to unfold. The influx of US tourism coupled with Cuba's opening economy has led to rapid changes in certain traditional high quality Cuban social services, such as education and medical care. Cubans no longer enjoy uniform access to those services. My presentation focuses how the change in US-Cuban relations has altered the Cuban national curriculum, impacted access to private schools and tutors, and shifted allocation of resources throughout schools nationwide. The swift arrival of huge numbers of United States tourists has heightened the emphasis on English language acquisition. The improved relations between the two historic enemies has initiated a curricular transformation in the perception of the United States government. I collected information about Cuba's education structure and opinions concerning the U.S., immediately following the revolution up until present day, from various articles and books. Additionally, qualitative data from primary sources was collected through personal interviews in Cuba with current school teachers, teachers who had left the field, a private tutor, and other Cuban citizens. The socioeconomic gap that was once virtually nonexistent will only become more prevalent as the private sector is permitted and encouraged.

WHAT DOES IT MEAN TO BE JEWISH IN CUBA

Sydney Salit
Time: 11:45 AM
Mentor(s): Donna Kaplowitz (Residential College in the Arts and Humanities)

Many people are not even aware that Cuba has a Jewish population. Not only does the population exist but it is strong and anything but stagnant. It is not an easy thing to do but being Jewish in Cuba does have its benefits. To be Jewish in Cuba comes with the privilege of increased food allotments, access to additional supplies and medications, as well as the much sought after ability to leave Cuba, and therefore its hardships, behind. But, contrary to the beliefs of some outsiders, being a Cuban Jew is not all reward and no work. These people have to fight to keep their beliefs alive in a country that doesn't even have a Rabbi. The Cuban Jewish population is inspiring in its ability to be resourceful, resilient, and more dedicated to community than would be expected of a group with numbers as low as theirs. I conducted interviews in Cuba with some incredible Jewish people that gave me insight into what their religion means to them. In this presentation, I explain the true meaning of Judaism in Cuba through both a religious and cultural lens and try to determine how these people keep their faith in a country that barely provides its citizens with enough to survive.

THE CUBAN INTERNET
Tim Giessner
Time: 12:00 PM
Mentor(s): Donna Kaplowitz (Residential College in the Arts and Humanities)

Not until 2011 was Cuba connected, via fiber wire cables, to the Internet. But even after this development, connection was limited to a very esoteric group of elites. It wasn't until president Obama's announcement of normalized relations that the Cuban government decided to start expanding access to the general public. Even those who have visited the country a mere 8 months ago would get a complete different set of answers with regards to many subjects, so I set out to answer both basic questions about Internet access on the Caribbean island —how to access, where to access, who uses the Internet, and what is the quality of Internet— and answer some questions that are a little more complicated like the public's opinion of the current status of connectivity and the direction that it's heading.Through interviews with Cubans, observations of public and private spaces with WIFI access, and amassing a large collection of news and scholarly articles on the matter, I've: made clear the current state of the Internet; received predictions of its future from employees of ETECSA (the Cuban telecommunication monopoly), professional and social users; and extrapolated my findings to determine the impact that continued proliferation of Internet access will have on Cuban culture.

KAZAKHSTAN
James Millar
Time: 12:15 PM
Mentor(s): Norman Graham (James Madison)

This research focuses on Kazakhstan's economic development, particularly the expansion of the non-oil sector, governance effectiveness, corruption and the inherent dynamics of the authoritarian system. Though there is a large amount of primary source data, various secondary sources from experts in the field are cited and analyzed in a grounded research method. The comparative nature of the Russian and Azerbaijani economy and their similar struggles with non-oil diversification will demonstrate tangible measures with which to measure the diversification progress in Kazakhstan.

GLOBAL & AREA STUDIES
ORAL PRESENTATIONS, SECTION 2
ROOM 30, 11:00 AM – 12:15 PM

AN EXAMINATION OF MSU STUDY ABROAD PROGRAMS FROM A BLACK STUDENT PERSPECTIVE
Crystal King
Time: 11:00 AM
Mentor(s): Donna Kaplowitz (Residential College in the Arts and Humanities)

When I learned about the opportunities to travel at Michigan State University, I knew it was the place for me. As I have experienced new places as a student, I have come to understand that there are so many cultures to explore—even at MSU. But, I never thought about how I would be affected living within these other cultures. Being African American, and from a predominantly African American city, is highly important to my identity and has shaped the lens in which I view the world. This is a narrative research project that exposes my personal experiences through my travels in the United States, South Africa, and Cuba, both in predominantly white social environments, and in non-white social environments. I will also analyze how and why my experiences affected me as an African American. My occurrences will be used to give voice to other African American students who have had similar encounters in the United States or while travelling abroad.

MERGING EAST AND WEST: THE CONSTRUCTION OF TRANSNATIONAL IDENTITIES IN AN ONLINE CHINESE STUDENT MAGAZINE
Tunan Guo, Yisi Fan
Time: 11:15 AM
Mentor(s): Steven Fraiberg (Writing, Rhetoric, and American Cultures)

At Michigan State University, there has been a rapid increase in the Chinese student international population over the past eight years, increasing from 4% of the student population in 2007 to nearly 10% of the student population in the 2015 academic year. Reflecting wider trends in higher education, these shifts have led to a rapid transformation in the linguistic, social, and physical landscape in and across campus and the local community. Despite these transformations, there is little systematic research into how the international students transition from home to host culture or how this process is bound up in the construction of hybrid, transnational, cosmopolitan identities: i.e., blending world views from the U.S. and China. To uncover these issues, we examine a locally produced online magazine that targets the Chinese international students. Published on the Chinese social media application Wechat, the Chinese student-run publication has developed a broad-based readership with stories covering a range of issues. Performing a content analysis of the more than 100 articles published in the magazine, we identify key themes in relation to wider cultural frames, narratives, and tensions. The findings foreground issues surrounding social, cultural, and class shift within modern China. The analysis complicates and enriches current and often overly simplified understandings of this population.

BREAKING BORDERS: A CULTURAL COMPARISON BETWEEN SOUTH AFRICA AND THE UNITED STATES
Alexa Stechschulte, Emily Skupin, MacKenzie Stephans
Time: 11:30 AM
Mentor(s): James Lucas (Undergraduate Education)

Emily Skupin, Alexa Stechschulte, and MacKenzie Stephans conducted research during their 2015 Freshman Seminar Abroad in South Africa. Through observations, personal experiences, and informative encounters, the three students were able to collect data and record their perspectives on the culture and identity of South Africans through field notes, photos, and memories. Their presentation will include a compare and contrast theme about the cultures of South Africa and the United States. The research conducted in their time spent in South Africa is important, for it aids in eliminating the stereotypical view that many people of the Western World place on other continents, particularly, Africa. In an enlightening PowerPoint, the students will discuss cultural elements: including time, education, family life and more. Additionally, in this presentation, the students will stress the importance of globalization and the positive impact countries can have on one another, by using South Africa's unique and recent history as a prime example.

SHARED SUFFERING: A STUDY ON THE EFFECTS, ON SIKH MEN, OF POST-9/11 RACIALIZATION OF BROWN MEN IN THE US
Sohela Suri
Time: 11:45 AM
Mentor(s): Jennifer Goett (Comparative Cultures and Politics)

Focusing on the post-9/11 period, this project analyzes microaggressions and hate crimes committed against Sikh men in the United States to underscore the misrecognition of Sikhs and how brown men, mainly men of South Asian and Middle Eastern descent, are similarly racialized in the US. This research, primarily, draws on scholarly journals and theoretical articles; it also examines primary sources such as newspaper articles about widely publicized hate crimes and personal testimonies, mostly regarding microaggressions. The study concludes that although the misrecognition of Sikhs as Muslims is problematic and reflects widespread ignorance about Sikhism, the root of these acts of aggression stems from racism toward people from South Asia and the Middle East paired with Islamophobia. This suggests that Sikhs share certain experiences of

discrimination with South Asian and Middle Eastern Muslims. Moreover, the study undermines the notion of a post-racial society and critiques the different variations of discrimination brown men face.

DOMINANT NARRATIVES IN MEDIA PORTRAYALS OF AFRICA OVER TIME

Aileen Acuna
Time: 12:00 PM
Mentor(s): Leo Zulu (Geography)

Western experiences on the African continent are for the most part vicarious. While Africa has a wealth of different cultures, peoples, and lifestyles, often in the typical western mind, an entire continent has been simplified. What people envision, moreover, is based on the reoccurring themes present in the voices of a few. Travel to Africa has historically been limited, resulting in a reduced selection of testimonies available for western consumption, and lending each of these greater weight. In particular time periods, certain dominant narratives have taken center stage and informed perceptions of the continent and policies relating to it in both the public and private sectors. Only recently have more African voices come to greater western recognition as the narrative of the day shifts to be more Afro-centric. It is critical, however, that dominant narratives are examined to address and challenge received 'truths', and to heighten critical awareness of potential limitations in media we consume. In this presentation, I will share findings from an examination of several sources that convey particular perceptions about Africa as well as some modern examples of increasing African agency and voice in the world today.

HISTORY, POLITICAL SCIENCE, & ECONOMICS

ORAL PRESENTATIONS, SECTION 1
ROOM 30, 11:45 AM – 2:00 PM

THE ONLINE PRIMARY

Kaitlyn Beyer
Time: 11:45 AM
Mentor(s): Corwin Smidt (Political Science)

In the era of the social network, millennials are thought to be detached from public, civil society. As if to support this stereotype, voter turnout is unprecedentedly low among 18-to-25-year-olds. But due to the Internet, presidential candidates experience a unique publicity – their messages are shared, and their strengths and weaknesses discussed, on social media in addition to professional news media. The result is that coverage of the presidential primaries is reaching the audience of young voters in their court. Candidates and campaign strategists have learned that they must conduct their campaign online as well as on the ground. Top contenders for the Democratic nomination, Bernie Sanders and Hillary Clinton, both run active online campaigns. The support of their fans on the Internet spreads their messages even further. But does social media popularity correlate to success in the primaries? If so, why? And what tactics are most useful? I consider the top two democratic candidates' activity and popularity on Facebook, Twitter, and Reddit to determine if and how candidates can utilize these social networks to attract the youth vote. Activity here refers to the candidate's (or campaign's) self-promotion on these forums – how often they are posting and tweeting. Popularity is determined by numerical support – "likes," "shares," "retweets," and "upvotes," – as well as qualitative support – what positive and negative messages are being posted about the candidate.

EVALUATING THE USE OF RANDOMIZED CONTROL TRIALS IN DEVELOPMENT ECONOMICS

Grace Hough

Time: 12:15 PM

Mentor(s): Christian Ahlin (Economics), Leah Lakdawala (Economics), John Waller (History)

This presentation will evaluate how well Randomized Control Trials (RCTs) measure the effects of poverty-alleviating programs, such as microfinance initiatives (MFIs). The first section looks at the use of RCTs in medicine and the methodology's transition to development economics. The second section outlines the assumptions necessary for RCTs to give valid results in development economics. For this experimental methodology to evaluate the effect of a treatment on an individual or group the researchers have to overlook some potential problems with the method. The third and fourth sections will discuss RCTs' potential improvements over existing techniques and the potential drawbacks of their use in development economics. The fifth section will compare the use of RCTs in development economics to its use in medicine, with a special focus on their shared, and different, biases. The final section will analyze six evaluations of microcredit published in the American Economic Journal: Applied Economics to evaluate how they fare in regard to the advantages and critiques of RCTs' use in development economics as discussed in the previous sections.

WOMEN IN CENTRAL BANKING: POLITICS, INSTITUTIONS, AND SOCIETY

Ethan Santangelo

Time: 12:30 PM

Mentor(s): Cristina Bodea (Political Science)

We propose to investigate systematically the prevalence of women in the highest echelons of leadership within the world's central banks. This includes top positions ranging from central bank governors or presidents to membership in their respective boards. We are also interested in studying the relation between the gender patterns of appointments in central banks to key features of countries (e.g., level of democracy, size of welfare spending, or partisanship) and important features of the central banks themselves (e.g., independence from politics or operational transparency). Accordingly, countries with more welfare spending may be related to better options for childcare and, therefore, promote increased chances for women to remain in the workforce. This increased access could then allow a larger number of women to participate in topmost central bank governance. Additionally, it may be the case that liberal oriented governments nominate and appoint a higher amount of women to significant central bank positions due to the nature of left wing parties being traditionally associated with more progressive social agendas. Another possible implication is how the absence of strong professional networks and, thus, of trust relationships with politicians, may also be reflected in fewer appointments of women for top positions in those central banks that, by law, are designed to be institutionally more independent from politics. Relatedly, it may be that greater operational transparency of central banks that helps reduce the exclusiveness of the central banking profession, making it easier for women to be accepted in the profession and therefore nominated by governments.

THE RESOURCE CURSE, STATE-LED DEVELOPMENT, AND PATRONAL POLITICS--ECONOMIC DIVERSIFICATION AND IN POST-SOVIET AZERBAIJAN

Cody Schulz

Time: 12:45 PM

Mentor(s): Norm Graham (International Relations)

The economic development and diversification of oil-rich states has been the subject of extensive scrutiny, often viewed through the lens of the resource curse, with the state playing an important role in exacerbating or mitigating the harmful tendencies of natural resources. Drawing upon statistical analysis of economic indicators, extensive interviews with a wide variety of actors across economic sectors and political functions, and a novel study of most large, diversified companies in Azerbaijan, I find that the state in Azerbaijan has overall played a positive, but mixed role in fostering economic diversification and escaping the resource curse. It has assisted the process of retooling the economy away from oil by allowing a degree of market

competition, reforming corrupt areas of government, and providing investment to key sectors with high skills spillover. However, it has failed to dismantle large monopolies with corrupt state connections, spent most of its oil money, and fostered dangerous bubbles in many important sectors. Utilizing a framework that combines elements from literature on the resource curse, state-led development, and patronal politics, I craft a model of political economy that explains the variegated impacts of state efforts to diversify a resource-rich economy.

TRANSBOUNDARY FISHING CONFLICT RESOLUTION: TWO-LEVEL GAMES, LEADERSHIP CHANGE, AND CONFIDENCE BUILDING BETWEEN INDIA AND SRI LANKA

Houston Smith
Time: 1:00 PM
Mentor(s): Mark Axelrod (James Madison, Fisheries and Wildlife)

The Palk Strait, a valuable fishing zone shared by Sri Lanka and India, is consequently experiencing a conflict over fishing rights. While Sri Lanka points to the mutual agreement of the International Maritime Boundary Line (IMBL), which Indian fishermen routinely cross, Indian fishermen argue that they have traditional rights to fish in the Palk Strait. My research focuses on the interactions between these countries, both on the national and the local level. Although negotiations take place between Indian and Sri Lankan national governments, their resolution depends upon the likelihood of implementation at the local level. Tensions intensify or ease on a daily basis. Arrests and boat impoundments by either side indicate conflict escalation, while prisoner and boat releases along with local stakeholder consultations represent confidence-building measures intended to resolve interstate and intercommunal conflicts. While certain leadership changes led to an immediate change in the number of arrests, other political developments had little to no effect. Using an original dataset of daily arrests, releases, and negotiations, taken from an Indian newspaper, The Hindu, and the website of the Sri Lankan Navy, I assess the trends about conflict intensity and resolution over a period of two and a half years from August 2013 to February 2016.

MUSLIMS OF THE MIDWEST

Allison Tumas
Time: 1:15 PM
Mentor(s): Mohammad Khalil (Muslim Studies)

Despite the significant history of Muslim presence in “the heartland,” there has been relatively little oral and visual historical documentation of Midwestern Muslims. The primary goal of the present project is to establish and build a digital archive that documents the varied experiences of American Muslims in the Midwest through testimonies across generational, gender, geographical, socio-economic, and ethnic differences. The desired outcome would be to produce a digital archive that would serve as (1) primary source material for scholarly research and (2) material for instructional use for schools and colleges. In this project I assist in conducting, editing, and producing interviews for the Muslims in the Midwest Digital Archive.

ECONOMICS DURING THE SPECIAL PERIOD IN CUBA IN 1992

Raghav Jain
Time: 1:30 PM
Mentor(s): Donna Kaplowitz (Residential College in the Arts and Humanities), James Lucas (Undergraduate Education)

The collapse of the Soviet Union caused extreme economic hardships, plunging Cuba into one of its darkest times in history known as The Special Period. Between 1992 and 2000, Cubans experienced food and resource shortages after being forced to run their country without the support of the Soviets and become more self-sufficient. Recent changes in US foreign policy towards Cuba have renewed the American public’s interest toward the long isolated island nation generating questions about how Cuba survived in a post-Soviet era, as well as how entering a period of improved relations with the US will help Cuba reintegrate into the world. This research project examines the economic policies and changes in policy that allowed Cubans

to survive The Special Period. Prior to on site research, secondary sources were consulted to gain an understanding of the circumstances both during and surrounding The Special Period. After arriving in Cuba, primary research mainly consisted of interviews with Cubans who lived during The Special Period to understand their personal experiences. The research conducted provides insight into the spirit of the Cuban people as well as sheds light on how a very mysterious, Communist Cuban government operated and controlled a nation of people who struggled for basic necessities such as food, water, and electricity. The information found may also provide clues to how rigid, or flexible, the Cuban government will be with their policies as they open up their country to foreign evaluation and criticism.

THE POLITICAL AND ECONOMIC IMPLICATIONS OF CAPITAL TAXATION

Hannah Jones, Harris Bunker, Ryan Panczak

Time: 1:45 PM

Mentor(s): Tony Doblas Madrid (Economics)

Income inequality is undoubtedly one of the central issues of our time. Historically, governments have combated income inequality through progressive tax policy, which dates back to the early 20th century in the United States. It is a rule of thumb in macroeconomics that two-thirds of GDP comes from labor and one-third comes from capital. This means that US tax revenue should be 1/3 from capital income and 2/3 from labor income. Our preliminary results suggests that only 24.8% of tax revenues come from capital income. Capital income is disproportionately concentrated among the wealthy, so in order to preserve progressivity, capital income should be taxed at a higher marginal rate. Some scholars argue that the current capital gains tax policy is extremely favorable to those who possess large amounts of capital because of numerous exemptions, sheltering, and the low statutory rate. These aspects of capital taxation lowers the progressivity of capital taxes, and begs the question if the tax code is still progressive. Billionaire Warren Buffett mentioned that he paid a higher average tax rate than his secretary. Our results show that the Buffet's statement is not just anecdotal evidence and extends to the nation as a whole. We offer several political economy reasons why there is this perceived favoritism towards owners of capital. We will also be looking at how public opinion on tax policy varies across the income distribution. We consider several policy options including an inheritance tax, and a higher marginal capital gains tax.

HISTORY, POLITICAL SCIENCE, & ECONOMICS
POSTER PRESENTATIONS, SECTION 1
LAKE HURON ROOM, 9:00 – 10:30 AM

NMTC: WHO WINS, WHO LOSES?

Alexandra Cull

Poster: 345

Mentor(s): Richard Hula (Political Science)

Government at all levels seek to create policies to revitalize the nation's aging industrial cities. Current redevelopment schemes almost always involve some strategy to leverage a modest public outlay into a much larger private investment. The most often cited examples are the direct deep public sector subsidies of dramatic projects such as large industrial facilities, sports stadia, and convention facilities. This project, however, examines a somewhat less visible, but intriguing example of the intermingling of public and private resources: the New Market Tax Credit (NMTC) program. Although the NMTC is relatively modest in scope (The U.S. Treasury has granted approximately 37 billion dollars' worth of credits since 2001), it provides an interesting test of the capacity of public actors to attract private sector capital into low income and distressed areas. New Market Tax Credits are allocated to Community Development Entities (CDE's). The intended purpose of a CDE is to solicit investments in qualified low income communities. However, this may not be how the program actually works. Preliminary analysis of the program suggests that the NMTC is actually controlled by the recipients of tax credits. This question of how the program actually operates is a key focus of our preliminary research. A more fundamental issue for urban politics is what impact the program has had on local political agendas, decision making and political accountability. Once again, there

seems to be some evidence that the NMTC program can substantially impact local redevelopment priorities of political actors.

DOES THE CRIMINAL JUSTICE SYSTEM TRULY VALUE BLACK LIVES?

Amari Fleming
Poster: 346
Mentor(s): Tamara Butler (African American Literature and Culture / English Education and Critical Literacies)

According to Guardian's statistics, in 2015, police officers in America killed 776 people, 161 of whom were completely unarmed at the time of their death. However, members of the Black Lives Matter movement assert that police kill Black people at a rate disproportionately lower to their total percentage of the population in the United States. African Americans have been social marginalized and faced many injustices throughout the Criminal Justice System. African Americans such as Trayvon Martin, Oscar Grant, Tamir Rice, Ayianna Jones, Sandra Bland, Reneisha McBride, Freddie Grey, Mike Brown, Jordan Davis, Eric Garner, Mario Woods and Marshawn McCarrel have been murdered in cold blood and the corrupt criminal justice fails to find anyone at fault. Unarmed and innocent adolescent African Americans are not only ostracized but blatantly murdered. Therefore, in this research project, I will address the following question: Does America truly value Black lives? This will help policy changes within the field of law and advocate equality with race relations. Through examining court documents and news articles/news reports and interviews with the family I plan to analyze these injustices. I will highlight the racial inequalities within American. This research is significant to the field of African American and African Studies (or criminal justice) because this project will perpetuate a primary tenant within the Critical Race Theory. Racism is an endemic within American society. This will help policy changes within the field of law and advocate equality with race relations.

PROPAGANDA USED BY THE CHARLESTON COURIER DURING THE CIVIL WAR

Marissa Jacks
Poster: 347
Mentor(s): Thomas Summerhill (History)

With very few significant wins for the Confederacy during the Civil War, keeping up the morale of the men proved to be a tremendous task. The Charleston Courier (South Carolina) has many great examples of the tactics used by the Confederates to keep their men believing in the cause. This project takes a closer look at these tactics used from 1860-1865.

THE CHICAGO SCHOOL'S FIDELITY TO ECONOMICS AS A SCIENCE

Kade Katrak
Poster: 348
Mentor(s): Ross Emmett (James Madison College)

Lay observers consider the Chicago School of Economics as an ideologically homogeneous group who use economic theory to justify a heavier emphasis and reliance on markets. This perception does not extend to the Chicago School economists themselves, however. They have long considered themselves devoted not to ideology, but to advancing the use of economics as an analytical tool. Professor Ross B. Emmett (James Madison College), conducted a series of interviews with Chicago economists. These interviews reveal that Chicago School economists overwhelmingly characterize the Chicago School as driven by the goal of applying economics to the real world and not by any preformed ideological loyalty. Nonetheless, the interviewees testify to being aware of the exterior perception of their work as ideologically driven and partisan. The project uses the interviews to examine how Chicago economists perceived the Chicago School and its relation to broader economic and political movements over the course of the School's most influential years. Using the words of these influential economics thinkers, several of whom number among the many Chicago Nobel Prize in Economic Sciences winners, the project seeks to explain how and why the gulf between the Chicago economists and the broader perspective of the Chicago School grew and changed over time.

ELEANOR AND ISABELLA: HOW TWO QUEENS CONSORT SHAPED MEDIEVAL EUROPEAN HISTORY
Katherine Magoulick
Poster: 349
Mentor(s): Emily Tabuteau (History)

Many people know the reputation of King John of England; however, much less acknowledged are his mother, Eleanor of Aquitaine, and his wife, Isabella of Angoulême. The two women led remarkably similar lives and yet they are portrayed by historians in very different ways. Both women were criticized in their time, but now Eleanor is portrayed as a strong woman and Isabella as a disgrace. Especially since celebrating the 800th anniversary of Magna Carta, it is important to reexamine the life of King John and his family. Despite their depictions throughout history, my research shows that Eleanor of Aquitaine and Isabella of Angoulême made huge impacts, especially when taking into account views of women at the time, and shaped the course of European history for years to come.

CHARTER SCHOOLS AND LOCAL DEMOCRACY: EVIDENCE FROM OHIO
Alexa Malesky
Poster: 350
Mentor(s): Sarah Reckhow (Political Science)

Recently published research in political science has shown that school tax referenda are more likely to fail when districts are labeled as academically failing. We argue that prior research is missing an important unmeasured variable: charter school enrollment. Charter school enrollment varies significantly across districts; for example, some districts in Ohio have over 20% of students attending charter schools, while other districts have none. When families choose to enroll their children in charter schools, the loss of these students can impact academic performance in traditional public schools. Moreover, families might be more likely to leave traditional public schools if they are concerned that public schools are faltering--a failed bond referendum may serve as a sign of trouble. We investigate the relationships between charter school enrollment, academic performance, and school tax referenda in Ohio. For example, we are curious to see if charter enrollment is associated with a district's academic performance. Additionally, we examine how the failure to pass a new school bond impacts charter school enrollment--do families leave the district after a bond failure over concerns that the public schools are not receiving adequate support? If bond failures lead to increased charter school enrollment, this relationship could produce a downward spiral for district enrollment, financing, and performance.

HISTORY, POLITICAL SCIENCE, & ECONOMICS
POSTER PRESENTATIONS, SECTION 2
LAKE HURON ROOM, 11:15 AM – 12:45 PM

AN OVERVIEW AND THE MAIN DRIVERS OF GENTRIFICATION IN THE OLD HAVANA DISTRICT OF HAVANA, CUBA
Christopher Bailey
Poster: 353
Mentor(s): Rene Hinojosa (Urban and Regional Planning)

Recent economic reforms in Cuba have led to the displacement of the local population for tourist activities in the Old Havana district of Havana, Cuba. This movement has created a growing rift between the populations of Old Havana. The Cubans who are of means have been able to capitalize off of the increase in tourism while those without means become increasingly separated from its economic benefits. My research focuses on the main causes and the extent of gentrification in the Old Havana district of Havana Cuba. Gentrification is the restoration of a decaying urban space that causes movement of the affluent members of a society into this area, displacing the poorer residents. I searched to answer how the Cuban government was handling the gentrification of Old Havana and what measures were being put in place to protect the

local poorer population of Old Havana. My research was conducted through observances of areas with high tourist activity in Old Havana and observances of areas surrounding areas with high tourist activities. My research also included interviews with the local population. My presentation is on the extent of the gentrification in the Old Havana district and the factors that caused it.

DATASET ON REINFORCING AND CROSSCUTTING CLEAVAGES, ETHNIC VOTING, AND SOCIAL MOBILITY

Lauryn Boag
Poster: 354
Mentor(s): Christian Houle (Political Science)

Research from several worldwide surveys (Afrobarometer, WVS, etc) was collected in this project to observe the differences in equality between and within different ethnic groups in countries all around the world. These surveys allow us to collect data on information such as income, education level, etc. They can also help us to look at the voting patterns for ethnic groups, and we can try to see the likelihood that ethnic groups vote similarly when there is inequality between or within the groups. Finally we will look at less developed countries and the chance that social mobility might occur in these countries. This research will help my mentor to observe the correlation between ethnic inequality and coups d'etat. The research will also be used to see if social mobility has a connection to regime changes. This research will still be ongoing by the time of my presentation, but I will be able to share the results I have come across at the time of the forum as well as what will be done with the research when it is collected.

STITCHED TOGETHER: HOW A PRESIDENT AND A TAILOR WON THE ELECTION OF 1864

Jaazaniah Catterall
Poster: 355
Mentor(s): Thomas Summerhill (History)

There is an abundance of research focused on Abraham Lincoln's rise to the presidency and his time in the White House during the Civil War. Likewise, many historians have researched Andrew Johnson's single notorious term after Lincoln's assassination. This project explains why Johnson, and not Hannibal Hamlin, was in position to succeed Lincoln as President. While there was a clear and obvious conflict between the North and the South in 1864, there was an enormous divide within the North itself as well. Republicans and Democrats clashed repeatedly on issues like slavery, states' rights, and whether or not the war should continue. This led to a hotly-contested election, one in which many in Lincoln's own party called for someone new to take his place as President. This project investigates how Lincoln, an Illinois Republican, and Johnson, a Democrat from Tennessee, were able to defeat both Democrats and radical Republicans. The project incorporates speeches, letters, campaign posters, political cartoons, newspaper articles, and election returns to analyze why Lincoln ran with Johnson, what effect this had in the North, and how they succeeded in winning the election.

CLIMATE INNOVATION IN AMERICAN CITIES

Renee O'Connell, Marina Carabellese, Connor Lockman, Benjamin Sych
Poster: 356
Mentor(s): Joshua Sapotichne (Political Science)

City governments across the country are challenged by insufficient resources, gridlock federalism and increasingly high expectations from their residents for quality services and greater responsiveness to pressing environmental problems. This project explores the way in which urban policymakers have developed innovative and data-driven policy approaches to respond to these expectations. We consider the ways in which the complex intergovernmental system in the United States can stifle policy innovation. In this project, we investigate what cities can do to overcome institutional obstacles and what states can do to create an encouraging environment for these efforts. Using Knoxville, TN, Dallas, TX, and Grand Rapids, MI as case studies, we take an analytical look at the successes, or lack thereof, of the implementation of local

climate action plans as a way to gauge how local elected officials have collaborated with or overcome existing structures in their search for inventive solutions.

THE SEARCH FOR MILAN'S IDENTITY
Andrew Pomaville
Poster: 357
Mentor(s): Emily Tabuteau (History)

The aim of this project is answer the question, where did regionalism in Italy originate? My theory begins understanding the political instability of the eleventh century which I argue created the right conditions for formation of city states in the twelfth century. As these city states broke away from the traditional hierarchy and became autonomous political entities there was the creation of civic pride. This was through the citizens taking an active participation in the cities day to day affairs.
In order to test my hypotheses, I will use the city of Milan as a case study. I have collected data from archive centers in Italy (a large portion of archival material has been made available via online), the use personal accounts of individuals living during the League's alliance, and economic data from the time period. In doing so, I will examine the rise of the Milanese commune and test if it fits my hypothesis.

VOTING RIGHTS AND INSTITUTIONS: COMPARATIVE STUDY OF BRAZIL AND THE UNITED STATES
Katherine Rifiotis, Alex Maranville, Isabel Marcelletti, Eloise Mitchell, Kaila Waineo
Poster: 358
Mentor(s): Constance Hunt (Social Relations and Policy)

Given the current conflicts regarding voting rights in the United States, it is useful to do a comparative study of voting institutions and processes with the Brazilian voting system, since it has a common social-economic context. Electoral processes and institutions structure the ways in which citizens interact with their government and with one another. As a nation-wide, mass-participation event, voting is instrumental in shaping how citizens relate to one another across social cleavages, and could contribute to the formation of a cohesive national consciousness. However, voting systems do not always encourage participation or reinforce positive perceptions of the nation. We compare the mandatory voting practice of Brazil to the voluntary voting process of the United States in order to consider how these disparate voting systems affect citizen perceptions of political efficacy and national identity in each country. This project examines components of differing voting systems through careful consideration of quantitative public opinion and demographic data, as well as qualitative reporting on contemporary events and attitudes in both nations. We evaluate the strengths and weaknesses of each system, considering how the successes of one system might be applied to the other. Would changes in voting processes and institutions address the contemporary conflicts the United States is facing concerning voter rights?

PLAN B: PROXY FOR THE POWER DEBATE
Emily Schneider, Riya Malhotra, Emily Whyte
Poster: 359
Mentor(s): Mark Largent (Social Relations and Policy)

Lately there has been a large amount of controversy surrounding the morning after pill, or Plan B. Topics that surround emergency contraceptives, such as availability and how it works, are being discussed in both the media and in the scientific community. While the science of this drug is very clear that is not an abortion drug and it is very safe for people to use, some people continue to oppose these drugs believing that it should not be so easily available. On the other hand there are people who support the drug and believe it should be available more openly and without so much stigma. The goal of this research group is to look more closely at the conflicting beliefs and where they arise from, whether it be from proven science or more personal reasons. In an extension of the conflicting belief systems, emergency contraceptives, most famously Plan B, are being investigated as a proxy for the much larger power debate over women's bodies and who should ultimately have the power over female reproduction and sexuality.

HUMANITIES & PERFORMING ARTS

ORAL PRESENTATIONS, SECTION 1
LAKE MICHIGAN ROOM, 9:00 – 11:00 AM

DANCE THERAPY AS AN EFFECT METHOD OF TEACHING NON-MOVEMENT SUBJECTS

Jenise Cook
Time: 9:00 AM
Mentor(s): Alison Dobbins (Theatre)

IAH 209: Performance Arts and Healthcare focused on researching dance therapy as an effective method of teaching and community therapy. The class looked at how the arts and humanities influenced healthcare in all aspects while also incorporating a service-learning project. Service Learning is a Michigan State University initiative to enhance education through community engagement focusing on increasing social and civic responsibilities of the students. This class visited senior citizens living in Lansing area retirement homes and taught dance therapy. Dance therapy activities were explored at every class period as a way to engage and encourage student participation in class. The activities built from day to day, beginning as simple movement and expanding to choreography. The class explored actor body warm ups that incorporated loosening the body and vocal cords and the 5 rhythms groove; created by Gabrielle Roth as a method of uninhibited exploration of the body. These methods were employed to test how dance or movement can affect a student's learning and how they perceive the world of movement and dance. Socialization, risk-taking, vocalization during discussion, and perception of complex topics were observed before and after movement was incorporated. A pre-assessment self-survey was given at the beginning of the semester gathering student perceptions of dance, mental illness, emotions with body language, and perceptions of the elderly and medical doctors. After the service learning is complete, the assessment will be given again to see if any opinions changed over the course of the class.

PARTICIPATORY MUSEUMS: THE USER EXPERIENCE OF CREATIVE AGENTS

Erin Campbell
Time: 9:15 AM
Mentor(s): Ben Lauren (Writing, Rhetoric, and American Cultures)

User experience (UX) is an emerging field. However, some organizations, such as museums, still struggle with implementing UX methods. Too often people view museums as places to visit once and never return to. Cultural artifacts hang on walls next to "Do Not Touch" signs and museums remain bound by traditional ways of interacting with art. But what if curators removed the "Do Not Touch" signs and encouraged visitors to participate as part of the experience? This research project will explain the participatory work I am doing with the Eli and Edythe Broad Art Museum at Michigan State University. The museum has encountered a unique challenge collecting information on visitors since people are not required to stop at the front desk to pay admission or interact with museum staff. Thus, most visitors participate and leave while remaining anonymous. To help solve this problem, I have designed a project aimed at discovering visitor's experiences to better understand how the museum could encourage different kinds of participation. Researching visitors' experiences could provide an appropriate time and place for collecting information. Visitors would no longer come and go anonymously. For my presentation(s) at LOCUS, I will explain the results of this research, noting how the case can inform future work with museums. I will also explain the connections of this information to important work in UX, like service and participatory design. Finally, I will address the promise of this work as someone interested in doing UX work in museums as a future career goal.

EMOTIONS AND OBJECTS
Kristen Bilyea, Courtney Bennet, Emily Vaughn
Time: 9:30 AM
Mentor(s): Natalie Phillips (English)

In literature, connecting characters and their emotions is key in any literary analysis. In the study we are focusing on, subjects tended to latch onto physical objects in their evidence provided within their close readings of the novel Mansfield Park by Jane Austen. Interestingly, the objects they latched onto were then connected to emotions and characteristics of the characters in the novel. Our data is based off of an interdisciplinary Stanford University experiment in which 18 PhD students read a chapter of the novel while in an fMRI scanner. Afterwards, the participants were asked to write essays regarding what they had just read. Through our specific study we focused on both Austen's narrative and the essays written by the participants in order to identify where the subjects picked up on the emotion when quoting about a certain object. Our research will focus on Chapter 2 of the novel which is where many subjects quoted specific parts within this chapter. For example, Subject 2 quoted 6 times from the same chunk of text, known as Block 8. The subject's quotes contained exact word matches from this block. This demonstrates how quoting physical objects serves as a springboard for literary analysis.

WOMANIST THEORY AND METHODOLOGIES SHAPING IDENTITY DEVELOPMENT AND CONSCIOUSNESS
Dana Reynolds
Time: 9:45 AM
Mentor(s): Kevin Brooks (Residential College in the Arts and Humanities)

This paper examines Africana Studies as a discipline and the role womanist theory and methodologies play in shaping personal and collective identity development, as well as building and sustaining a consciousness that improves community and humanity. Each individual has a set of habits that create each of our identities. They are fluid throughout our lives and respond to the influences that surround us such as science, religion, education, technology, economics, environment, history, media, people, politics, and so on. The identities we perform give us a sense of belonging with others who may identify in a similar way. They help to build the communities that we belong to and are held together by commonalities between members, whether that be a set of similarities or differences. They may be small including the people we share a home with or may be large including all the people of our nation. The shared space forms a way of life, or a culture, which is unique to the members of the community. The largest community of all is the universe where we are united by consciousness. Womanist theory and methodologies help us to understand how and why consciousness, as an energy force that connects us from one being to another, can be understood through shared spaces, mutual understandings, and communal living. We are all connected as we are all sharing a space in the place we call home, our Universe.

THE POWER OF CREATIVITY: THEATRE AND THE INTELLECTUALLY DISABLED COMMUNITY
Ryan Duda
Time: 10:00 AM
Mentor(s): Dionne O'Dell (Theatre)

Individuals with intellectual disabilities such, as Autism and Down's Syndrome, suffer from genetically impaired cognitive development, which can negatively affect their social and communicative skills. Theatre is an art form that requires strong communication skills, equally strong creative thinking abilities, and extreme confidence in order to achieve success. Presenting intellectually disabled students with the task of creating a theatrical production challenges the students to learn to communicate effectively, embrace their creativity, and most importantly, gain confidence in expressing who they truly are. This study, a collaboration between 4th Wall Theatre Company and the Michigan State University Department of Theatre, engages special needs students in a ten-week long performing arts residency leading up to a theatrical sharing which the students help write. This presentation highlights the success of the collaboration, an

exciting vision for the future, and professional feedback from theatre educators at Lincoln Center Education and Trusty Sidekick Theatre Company in New York City.

UNCONVENTIONAL FASHION DESIGNS

Olivia Vinckier, Sarah Vocke

Time: 10:15 AM
Mentor(s): Theresa Winge (Apparel and Textile Design)

Our research is about unconventional materials being used in fashion design. Our presentation will touch on high fashion and the MSU Apparel and Textile Design fashion show. High fashion, conceptual garments are successful in the fashion shows due to the surprising use of materials. For example, in 2015, over 6000 golf tees were used to make a highly dynamic dress. The general population is unaware of high fashion and unconventional materials being used together. As the pendulum of fashion swings from liberal to conservative, fashion designers are challenging the norms with unconventional materials. The new mix of art and apparel is the future and current face of the fashion industry. According to Fashion United, "apparel and textiles are among the worlds largest industries. Total global apparel exports are worth approximately USD 412 billion (2011) and global textile exports USD 294 billion". They go on to state "the global apparel market was valued at US $1.7 trillion in 2012 and employs approximately 75 million people". Our research will focus on the ATD unconventional fashion designs from the annual fashion show. We focus on the designs from the juried show, namely, those recognized by external judges. Additionally, we will include research about luxury designers.

"AND WE JUST CLICKED": EXPANDING THE RCAH CENTER FOR POETRY'S OUTREACH THROUGH A DIGITAL ARCHIVE

Kelsey Block

Time: 10:30 AM
Mentor(s): Anita Skeen (Residential College in the Arts and Humanities)

Poetry is a tradition older than measured time. From the epic of Gilgamesh to the tales of Homer, people have been using the rhyme, rhythm, imagery and metaphor to tell stories, comment on society and connect with others. Today, the role of poetry in our lives has not changed much, but the ways in which we interact with it have. The RCAH Center for Poetry was founded to spread an awareness of poetry in our everyday lives. Under the direction of poet Anita Skeen, we invite accomplished poets, writers and musicians to share their knowledge with the MSU community and beyond through performances and workshops. But the work doesn't stop once the event is over and the artist goes home. As a research assistant and intern at the Center, my job has been to expand our reach in a digital context. Through interviews, photos, audio and video recordings, I've helped to provide a digital experience that appeals to young people and students, as well as those who want to dig a bit deeper into poetry after the event is over or who are unable to attend events in person. In just under three years, our blog has gathered more than 6,000 views from people in more than 70 countries. Even though we no longer rely on traveling bards to share our stories and poems, through this digital archive, we are building a connection with those who want to share in our mission and love for poetry from afar.

LOCAL MUSIC IN MICHIGAN

Jay Hull

Time: 10:45 AM
Mentor(s): Jonathan Ritz (Writing, Rhetoric, and American Cultures)

This project entailed writing and researching overviews of regional music hotspots, venues, events, and bands in several distinct areas of Michigan. This presentation will cover the content created, the rhetorical choices made, and the impact this content is expected to have. The overviews written will be posted on the website of Middle of the Mitten (MOTM) along with supporting pictures. MOTM is a community arts organization founded by MSU alumnus Joel Heckaman and staffed by current MSU students. MOTM's mission is to enhance Michigan's cultural health by nurturing local music scenes statewide. They provide a

virtual platform where musicians, fans, and other people invested in Michigan music can find one another and interact. These overviews provide base content for the website, and information about the popular music venues, festivals, and bands in and from theses regions to people new to the area, or interested in getting involved in local music.

HUMANITIES & PERFORMING ARTS
ORAL PRESENTATIONS, SECTION 2
MSU ROOM, 11:00 AM – 1:00 PM

APPAREL AND TEXTILE DESIGN
Emily Zaatar, Chung-Ming Hsieh
Time: 11:00 AM
Mentor(s): Theresa Winge (Apparel and Textile Design)

Our research is about sustainable fibers and how they benefit not only the fashion industry but also our environment. Still, there are cons to current eco-friendly materials. Some of these fibers are hemp, recycled synthetic fibers, organic cotton, and bamboo, which are made into high fashion, accessories, and even mass market t-shirts and jeans. Our research is important because recycled and sustainable fibers are the future of the fashion industry, but at what cost? If we, as consumers of fashion, demand more eco-friendly, recycled, and reused materials, we will have a more sustainable fashion industry that does not exploit the environment. Everyone needs to understand that current sustainable fibers do not produce truly sustainable fashion, and that we all need to be involved in the solution in order to create a more sustainable Earth.

THEMES WITHIN FASHION SHOWS
Breanna Goree
Time: 11:15 AM
Mentor(s): Teresa Winge (Art, Art History, and Design)

My research revolves around conceptual design styling in a fashion show and in the context of wearable art. Successful shows include one central theme. A single stylish look can turn into a unified conglomerate of festive individual designs. My focus on the importance of concepts will be proven by elaborating on fashion shows with highly prominent and interesting themes over the past few years.Using the appropriate steps to create an aesthetic,fashion shows can attract the attention of various groups outside of fashion communities.My analyzation and research of fashion shows is based off of public responses of individual shows' themes.

WORKING IN PRINT AND POETRY
Sarah Teppen
Time: 11:30 AM
Mentor(s): Anita Skeen (Arts and Humanities)

The basement art studio of Snyder-Phillips Hall houses a printing press from the 1920s which students may still use to print beautiful postcards, pamphlets, and booklets. For the past three semesters, I have been using it to print poetry broadsides for MSU's Center for Poetry, which we hand out at various public events as a means of celebrating and more widely circulating the imagistic beauty of poetry. I have been learning this meticulous craft for little over a year under the tutelage of a Lansing-based specialist, and have recently picked up on the art of linocut printing (as a complement to the poem, in this context) with another local artist. The broadsides have proved to be a tremendous vehicle for Center engagement with the community – they are a very special component of our annual Spring Poetry Series for both poets and event attendees – but on a personal level, the creative process has become an important outlet for me, as an artist and student, as well. Furthermore, for several months I have worked closely with the Director and Assistant Director of the Center for Poetry to improve my own skills in writing poetry – we meet on a weekly basis to share our work and exchange advice. Today, I present my own poems printed on broadsides as products

inspired by these talented artists who mentor me, our local community members, and by the various media I have been experimenting with all year.

WHAT MAMA NEVER TOLD ME: SEX, SHAME, AND GROWING UP

Emma Gregory
Time: 11:45 AM
Mentor(s): Marcie Ray (Musicology/Ethnomusicology)

Sex education for adolescents remains a controversial subject in the twenty-first century. Parents dread the idea of having the "sex talk," instilling a fear of sex in their children with hopes that they will not take part in the act. Some sex education curricula preach abstinence instead of teaching students about the purpose of their basic sex organs. Teenagers reach their first sexual experience and have no idea what to expect. Spring Awakening, an Expressionist play written by German writer Frank Wedekind in 1891, tells a story of troubled teenagers struggling to understand their budding sexuality in a society that suppressed any sort of sexual feeling. Most people know this story from writer Steven Sater and composer Duncan Sheik's 2007 Broadway musical adaptation. This story and its discomfort with sex continue to resonate with the twenty-first century teenager. In this talk, I examine how the rock-infused musical numbers convey the tensions of the work, particularly between sexual repression and need to express bodily desires. This reveals the internal conflict felt by many teenagers in our sex-shaming society. Because of its emotional and often times explosive nature, rock music allows teens to release these emotions and validate the confusing feelings that come in the transition from childhood to adulthood.

DEATH, DIVAS AND DIVORCE: REESTABLISHING MALE DOMINANCE THROUGH FRENCH GRAND OPERA

Bronwen McVeigh
Time: 12:00 PM
Mentor(s): Marcie Ray (Musicology)

Following the dissolution of canon law and passionate cries for "Liberté, égalité, fraternité," the French political landscape after the Revolution returned to the absolutist rhetoric of God and the Monarchy, with occasional outbursts of resistance. While the loosening of Catholic influence on the state during the Revolution expanded women's rights, art and literature reflect a distrust of women outside the traditional family mold. Six years after the July Revolution, Giacomo Meyerbeer debuted his Les Huguenots, an operatic collaboration with writers Eugène Scribe and Émile Deschamps. By using one of the most shameful events in France's collective memory, the St Bartholomew's Day Massacre of 1572, as an operatic subject, they present a cautionary tale against a perceived decay of contemporary morality. Through the spectacle of French Grand Opera, the opera demonizes independent women, dismissing them as calculating and incompetent when given roles traditionally held by men. This paper shows how the traditional portrayal of Catherine de Medici as the primary force behind the massacre is manipulated as a plot device. Rather than presenting a purely historical work, the opera focuses on the disruption of traditional marriage between a Huguenot nobleman and a pure Catholic girl as the catalyst for the ensuing large-scale violence. By framing this historical event as the result of a woman's machinations, the authors condemn nineteenth-century champions for the reinstitution of divorce and expansion of women's rights because the opera concludes that women continue to need paternal guidance both from spouses or fathers and from the state.

THEATRE AS SOCIOPOLITICAL COMMENTARY: JESUSA RODRíGUEZ

Carlisle Shelson
Time: 12:15 PM
Mentor(s): Phylis Floyd (Art, Art History, and Design)

My project will focus on Jesusa Rodríguez, the Mexican actress and performance artist, and her 'espectáculos,' which act as a form of art and of political discourse. The term 'espectáculo' incorporates genres such as opera, cabaret, Brechtian Theater, Greek tragedy, religious mass, and indigenous ritual. I intend to deconstruct two performances to examine how she manipulates these forms to reclaim power

from the traditional social, political, and religious power structures, as well as how she utilizes these manipulated theatrical genres in tandem with media, music, and costume to enhance audience participation in the critical discussions occurring within her performances. I also want to explore why Rodríguez uses humor and parody in her pieces, even in ones concerned with violence against women in Mexico, and how that manages to translate successfully to an audience inherently affected by that violence. My presentation will focus on a pastorela, 'Pastorela terrorista,' and arguably Rodríguez's most famous performance art piece, 'Las Horas de Belén, the Book of Hours,' in order to demonstrate why Rodríguez uses theatre as a form of advocacy and intellectual discussion. Ultimately I want to expand my project to possibly include a live performance as a means of testing the relational aesthetics of her pieces—in a sense, testing the accessibility of her pieces not only to Latino/a audiences but also to American and potentially international audiences, especially considering how Rodríguez's messages concern universal themes of feminism, gender and sexuality, gay rights, religion, extremist ideologies, diversity, education, and empowerment.

THE LINE TO SEPARATE THEOLOGY FROM PHILOSOPHY WITHIN THE WORKS AMONG AFRICAN AMERICAN PHILOSOPHERS

Nanfeng Li
Time: 12:30 PM
Mentor(s): John McClendon (Philosophy)

In areas of philosophy, people can always see that theology somehow overlaps philosophy. For instance, just as in the area of metaphysics, many metaphysicians always tend to use their philosophic ideologies to propose arguments to prove the existence of god or divinity. The task of this research is to show what is the point or the line to separate the theology from the philosophy. There are two approaches for this research, first is focusing on the topic itself. Since theology has its own studies about god and religions, it should be able to distinguish from philosophy. So to find out the line to separate them is important. The second approach is a broader one. Since there is a group of people, like Hegel, arguing that Africans or African Americans do not have their own ideologies, including both philosophy and theology, we need to object to this argument by showing the ideological works of African Americans. The way of doing this research is by looking at the works of some of the African American philosophers such as Nelson Baker, Roy D. Morrison and Marquis Lafayette Harris, etc., who also appeared to be theologians. We should both look at their theological and philosophical theories, and to see how they mix them and separate them. In my presentation, I will abstract some ideas from several philosophers of them in order to explain what should be the line based on my findings.

UNINTENDED CONSEQUENCES

Harbir Brar
Time: 12:45 PM
Mentor(s): Phylis Floyd (Art, Art History and Design)

This research presentation draws upon the work of Chris Jordan and analyzes his pieces to examine the impact they have on the audience. Jordan couples hard-hitting statistics and number theory in order to generate profound images. These images focus on the harsh realities of American and global consumer cultures by incorporating everyday items used by consumers that ultimately end up as waste and pollute our land and oceans. This work is usually portrayed with a hint of irony in that these waste items form a bigger representation of the animals and ecosystems that are affected. It is important, in today's society more than ever, to be able to understand the lasting impact that our daily lives have on the world around us. Many people know that it is a problem, but the sheer magnitude of this impending issue goes without notice. Chris Jordan's pieces represent this problem in a way that connects with the audience and helps to portray his message.

HUMANITIES & PERFORMING ARTS
POSTER PRESENTATIONS, SECTION 1
MOSAIC MULTIPURPOSE ROOM, 9:00 – 10:30 AM

THE REVOLUTION OF PUBLIC ART
D'angelo Bragg
Poster: 362
Mentor(s): Phylis Floyd (Art, Art History, and Design)

"it is easy to challenge a social issue using art, BUT it harder to show the ISSUE/COMMUNITY how to solve its issue." My presentation will explore Theaster Gates? Dorchester Project in Chicago begun 2009 and ongoing and its relationship to his community. I will discuss his connection to the community and how he has transformed public art into a living agency in the Dorecheser Project, so the community builds what it needs. In the first step he takes the door off the hinges, and secondly those using the building reconstruct it to their vision. It is an example of how artists' new forms of creativity transform the creative process; his work represents a transformation in the very idea of art making. Previously, artist-activists such as Krzysztof Wodiczko, Mierle Ukeles, and Suzanne Lacy, all made art in public places but Gates and his communities raise the idea of public activist art to a new level. I will discuss how Gates has taken those previous types and expanded and revitalized public art. In my research I will investigate the similarities of Gates' work with other works such as "The Homeless Vehicle Project" (1988), "The Manifesto on Maintenance Art." (1976), "Mapping the Terrain" (1994) and assess his strategies not only socially, but economically, in terms of the needs of communities in which he acts.

CULTURAL APPROPRIATION
Rachel Brunhild, Nazila Jamallifard
Poster: 363
Mentor(s): Theresa Winge (Apparel and Textile Design)

Cultural appropriation is an issue that is often discussed in regards to popular culture, specifically in the arts. Music, literature, and fine art will frequently be critiqued on the use of cultural appropriation within their works. The fashion industry is one of the biggest offenders of cultural appropriation, often walking the line between being inspired by and inappropriately stealing cultural elements from specific culture groups or religions. These elements are often sacred or have a deeper meaning to the respective peoples from whom they are being appropriated. Ignorance on the part of the designer and insensitivity to the cultural group results in the meaning being lost to those unfamiliar with the original content. Focusing on how designers incorporate aspects of Native American culture into their lines, specifically the culture of the Navajo people, we plan on analyzing how elements become commercial and inevitably a pattern that loses all connection to its origins.

ASSISTANT SCENE DESIGNER FOR MISS TEEN AT STAGES REPERTORY THEATRE
Kenzie Carpenter
Poster: 364
Mentor(s): Kirk Domer (Theatre)

The intermingling of artistry and technology is at the core of any theatrical design process. Researching the role and expectations of theatrical design assistants and interns in repertory theatres throughout the United States is essential in order to transition from the academic environment to the regional theatre setting. Having the ability to serve as the assistant scene designer for the world premiere production of Michele Riml's Miss Teen at the Stages Repertory Theatre provided first-hand experience working outside educational theatre in a professional regional setting with industry professionals, as well as the role of a theatrical design assistant.Through this process the ability to connect with theatrical internship coordinators and current interns at a professional theatre offered the full scope of existing internship programs. This experience reinforced our research that current professional theatrical internships are geared toward the

advancement of technology and do not fully focus on the artistry (design) as interns are not offered a great amount of opportunity in this area. Through this hands-on process, Stages Repertory Theatre professionals: Technical Director (Michael Mullins), Production Manager (Joel Burkholder) and Properties Designer (Jodi Bobrovsky) expanded their collaborative reach to connect with this artistic internship in order to communicate and realize the design for this world premiere production.

ARCHIVE OF MALIAN PHOTOGRAPHY

Stephanie Colwell, Anna Backman

Poster: 365

Mentor(s): Catherine Foley (Digital Humanities and Social Sciences), Candace Keller (Art, Art History, and Design)

The Archive of Malian Photography is in the process of cleaning, digitizing, and rendering globally accessible circa 100,000 negatives from the archives of five internationally renowned photographers: Mamadou Cisse, Adama Kouyate, Abdourahmane Sakaly, Malick Sidibe, and Tijani Sitou. Funded by the British Library and the National Endowment for the Humanities, this five year project addresses significant needs for international scholarship and the preservation of cultural heritage in Mali as access to the photographers' studio archives is limited and the archives are not cataloged, appropriately preserved, or accessible for research and education. Moreover, the physical integrity of these collections is in serious jeopardy due to poor storage and harsh climactic conditions, as well as mistreatment, theft, and exploitation by unscrupulous dealers in international art markets.

APPAREL AND TEXTILE

Luxin Li, Qiuli Shi

Poster: 366

Mentor(s): Theresa Winge (Apparel and Textile Design)

Avant Garde fashion design is the synthesis of art and fashion inspired by an inspirational concept. This type of fashion is a piece of art; it is a wearable art. Avant Garde fashion is unlike fashions people would commonly see on the street. This type of design is always ahead of the trend and fashion-forward, and there are no limits to its creativity and innovation. Avant Garde fashion can lead to popular trends, and can extend trends. It may be minimal or complex. This kind of fashion design challenges the designer and the wearer. In fact, people who wear Avant Garde fashions are known as fashionistas and are commonly trendsetters. Avant Garde fashion designs could overturn the classic fashion but it often reinforces traditions in new and innovative ways. Famous fashion designers, such as Jean Paul Gaultier and Viktor and Rolf, practice it and it is taught on the MSU campus in the Apparel and Textile Design program. Avant Garde fashion design is a piece of art that moves down the runway and entertains while it encourages the viewer/wearer to think more deeply about fashion.

DRIFTING IN DAYLIGHT AND INTERACTIVE ART

Ling Peng

Poster: 367

Mentor(s): Phylis Floyd (Art History and Design)

In this presentation, I will discuss an interactive project called Drifting in Daylight presented in New York City's Central Park in 2015. A key aspect of my research is to demonstrate the progression of art, specifically the changing dynamic between audience and art itself, the collaborations of artists and the growing community of the art world. Drifting in Daylight was a free public exhibition featuring 8 different artists. The exhibit was described as "a dreamy springtime pathway of art winding through the world's most iconic park. Drifting in Daylight includes performative, participatory, and perceptual work" on the website of its sponsor, Creative Time. The objective of Drifting in Daylight was to "tempt visitors to transcend their busy lives, losing themselves along a playful trail of sensory experiences." Through a discussion of this project, I conclude that art is evolving from its traditional forms, such as sculptures, paintings, or pottery, into forms that involve technology, an active participating audience, or performances. This is important for today's

society because art is more than simply visual works to admire for beauty; it is becoming a medium to bring attention to important issues and practice creative and free expression.

HUMANITIES & PERFORMING ARTS
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 11:15 AM – 12:45 PM

SIDEWALK POETRY
Suzanna Smentowski
Poster: 370
Mentor(s): Nancy DeJoy (Writing, Rhetoric, and American Cultures)

For this project, I utilized the research that I gathered while working with Dr. Nancy DeJoy on her poetry to formulate the idea for a public art poetry project on campus. I focused my research on the history as well as the present day progression of public art projects around the world. As an even narrower focus, I looked into how poetry and written works have been incorporated with public art. In doing so, I came across the poetry project of Marcus Young of St. Paul, Minnesota. Since 2008, St. Paul has organized a poetry contest. The winners of the contest are rewarded by having their short poem stamped into the sidewalks of the city's downtown. My project focuses on mirroring this idea on campus. I will work with a team to propose a contest in which members of the Spartan community including students, faculty, staff, and alumni can submit their poetry. The winners will have their work stamped into the sidewalks around campus. Through the collaborations and funding of several on campus organizations, this "Sidewalk Poetry" idea can enhance Michigan State's campus by engaging community members through public art.

LIGHTS AND MAKEUP
Kenzie Carpenter
Poster: 371
Mentor(s): Karen Kangas-Preston (Theatre)

A study of the effect of gel color on foundation make-up. Lighting designers use different colored gels to change the color of theatrical lighting. The effects of lighting on fabric is fairly obvious, and often lighting and costume designers will work together to test colors. Gel colors also affect the makeup worn by the actors. Our research is examining the effect gels have on makeup foundation tones and how the makeup designer can choose appropriate makeup tones using gel colors provided by the lighting designer. Looking at the correlation between wave length in light colors and pigment in makeup we are striving to determine whether there is an easy answer to which makeup to use knowing the color of light.

POOR SINNERS PAMPHLETS: 17TH-19TH CENTURY EUROPEAN CRIMINAL PUNISHMENT AND EXECUTION DOCUMENTS
Ian Clark, Katie Grimes
Poster: 372
Mentor(s): Matt Handelman (German)

Our project focuses on the digital archiving and analysis of the extensive criminology collection housed in the MSU special collections library. These nineteenth-century central European—mostly German—records of capital punishment depict an age, not too long ago, when cruel and unusual punishment was the norm. Over the course of the semester, our class will be working on the data gathering and curation of Michigan State University's criminology collection dataset. This work will include archive design to ensure best practices with collecting and storing images of and information about the pamphlets, image capture using U.S. National Archives and Records Administration technical guidelines for digital archiving, data visualization such as image plotting timeline mapping and network graphs using tools like gephi, cartodb and ImagePlot, and text analysis using Voyant and Topic Modeling Tool. What we hope to show from this research is the connection between a governing body and its constituents, specifically in light of an overbearing power

using fear and public display of punishment to instill a sense of consequence. This is important to look into when finding references to today's modern struggle to fight crime and criminals.

ASSISTANT SCENIC DESIGN AND PAINT CHARGE CAPE FEAR REGIONAL THEATRE
Melissa Hunter
Poster: 373
Mentor(s): Lex Van Blommestein (Theatre)

Networking and portfolio building are vital for a career in theatre. By assisting Lex van Blommestein with the scenic design for The Wiz at Cape Fear Regional Theatre, I was able to gain valuable experience in the professional world while still a student. I worked in a professional role making decisions with the designer as a way to observe and participate in professional work situations. The second portion of this research project was to take on a professional role of my own as Paint Charge. I was entrusted with painting the scenery of the show and was able to learn new skills in a work rather than classroom setting. I left this research project with a better understanding of professional theatre positions, valuable working connections, as well as important portfolio pieces to use in my future job searches.

AN EVALUATION OF MODERN ARTISTS: TOM CZARNOPYS
Camilla Inman
Poster: 374
Mentor(s): Phylis Floyd (Art History and Design)

This project is an evaluation and display of the works of Tom Czarnopys. Czarnopys is a Michigan based sculptor, taxidermist, and conceptual artist who has been working since 1987. Czarnopys currently works in the movie industry where his past experiences as a sculptor show through. His sculptures range from creation of human-like tree forms to arming trees with pencils of their own. In this project, I delve into what makes Czarnopys tick, and what his works show about humanity and it's interaction with the environment. What is our place in the natural world around us? What connection is there between man and tree? Czarnopys strives to find out – and tell the world.

ONE THING TO RULE THEM ALL?: RECENT CROSSOVER TRENDS IN SCIFI/FANTASY AND LITERACY FICTION
DuRay Petersen
Poster: 375
Mentor(s): Curtis Vandonkelaar (Writing, Rhetoric, and American Cultures)

Literary fiction has seen a recent boom in production of work that features elements once relegated to pulp and genre writing. Examples include writing that involves crossover connections to post-apocalyptic settings —Cormac McCarthy'sThe Road for one recent example—and fantastical elements blended into realistic fiction. Journals such as the The Fairy Tale Review and Gargoyle among many others now regularly publish works that earn recognition in annual best of science fiction and fantasy collections alongside works which appear in traditional literary anthologies, and sometimes in both. Numerous "New Gothic" journals are arising in the Midwest and South, and presses known for literary work have recently published themed books on monsters stories among other atypical literary faire. A surge of grotesque characters and experimental work seems nothing but on the increase in literary publishing, and this proposal will be a paper/media presentation that surveys a number of recent publications and the trends in these genre crossovers. This project features data collection as well as interviews with some editors/authors in the field to help establish a basis for interpretation of this trend with results compiled for visualization.

HUMANITIES & PERFORMING ARTS
POSTER PRESENTATIONS, SECTION 3
BALLROOM, 1:30 – 3:00 PM

LITERARY NEUROSCIENCE: UNDERSTANDING THE NATURE OF AESTHETIC PLEASURE
Sal Antonucci, Jacob Frazier
Poster: 378
Mentor(s): Natalie Phillips (English)

The emerging field of neuroaesthetics aims to examine how higher level cognition allows humans to interpret and feel beauty. Critical to this is an understanding of how certain elements of an artistic work can elicit a positive or negative emotional response. As part of a GIAS Global Initiative at New York University, English undergraduates (n=30) were tasked with reading 16 sonnets and responding to a number of questions that assessed their aesthetic experience while reading. They were also asked to mark the portions of the text they found particularly pleasing or displeasing by highlighting in green or red, respectively. A control group, (n=30, non-English majors) read the same sonnets, giving short-answer responses and noting the poems they liked and disliked. Preliminary data analyses have found that highlighting data from the English major group correlate with pleasure ratings from the control group. Within the English major group, aesthetic pleasure correlates most significantly with the strength of feelings elicited while reading. Further investigation of subjects' responses and the poems will attempt to find connections between formal literary elements and aesthetic pleasure. The results of this behavioral study will shape an fMRI study that will aim to measure the brain regions and neural networks implicated in an aesthetic response on an individual and group level. These results will be combined with results from similar studies at NYU using visual art and music stimuli to understand how we perceive beauty.

THE AUD: ACROSS THE DECADES
Megan Cochrane
Poster: 379
Mentor(s): Karen Kangas-Preston (Theatre)

The Auditorium Building on campus has a rich history. It has seen events ranging from historical political speeches to modern rap concerts and various performing arts acts since its opening in 1940. This presenter has scoured archives, newspaper clippings and photos to discover the dynamic history that those walls hold. In order to liven up the building's main lobby and share the building's history, her findings will be arranged in display cases for students, faculty and the public to experience when they walk into this iconic campus building.

HARRY POTTER, FANDOM CULTURE, AND PARTICIPATORY MEMORY
Emily Dallaire
Poster: 380
Mentor(s): Liza Potts (Writing, Rhetoric, and American Cultures)

The Harry Potter Participatory Memory project centers around how fans interact, share, and celebrate Harry Potter in both physical and digital spaces. While it has been years since the last movie and books were released, the Harry Potter fandom is still very much alive and prevalent in popular culture and media, continuing to share their experiences, explore and analyze canon material and form new opinions and beliefs, especially with new material being created in different forms. We explored, analyzed and evaluated digital and physical spaces sacred in the HP fandom to see how they participate, empower, interpret, and interact across platforms, consume media, and share things with other fans. I will be presenting the trends in participation between physical and digital spaces as well as the variety of content, communities, and experiences offered in both types of spaces to represent the social user experience that fans create for themselves and others in these spaces.

THE ART OF INFERTILITY
Lauren Gaynor
Poster: 381
Mentor(s): Robin Silbergleid (English)

Founded in 2014 by Elizabeth Walker, The ART of Infertility is a national art, portraiture, and oral history project that focuses on the struggles and journeys of infertility patients. Infertility is an extremely prominent issue within healthcare, affecting almost one in eight individuals. Although common perceptions tend to focus on the experiences of heterosexual couples, it is important to expand the definition of infertility to include the experiences of single women and homosexual couples (partly because they do not have the resources to reproduce in the way that we consider "typical"). Infertility can be highly expensive depending on the treatment plan, and in LGBTQ situations, these costs can become exponential. Furthermore, many state laws can be a hindrance to LGBTQ couples seeking infertility treatments, and the effect of socioeconomic deficits can also limit access to resources. This research for ART of Infertility focuses on interviews from various LGBTQ couples that explains their process of dealing with infertility. The research shares the honest story of each of those individuals, whether it be a homosexual couple trying to conceive or a transitioning individual deciding to freeze their eggs for future use. Because they all have varying circumstances, the research focuses on the cost of infertility treatments, the emotional experience that accompanies it, and the laws and regulations that surround LGBTQ rights when it comes to infertility. There are so many special scenarios that can occur and this research seeks to break the stigmas surrounding infertility in LGBTQ situations.

CONCRETENESS OF WORDS AND THEIR MEMORABILITY
Madison Meter, Ritu Narayan
Poster: 382
Mentor(s): Natalie Phillips (English)

What makes literature memorable? What do people recall after they read, and why? These inquiries frame the context for our particular look at the weight an individual word, or phrase, may carry in a text . Our study draws on an interdisciplinary experiment in literary neuroscience, where 18 PhD students read a chapter of Jane Austen's Mansfield Park using two different styles of attention in reading – close and pleasure – while inside an fMRI scanner. Afterward, the participants wrote short essays on specific passages without being able to reference the text. After careful analysis of the behavioral data, including the brainstorming session and formal essays written by the subjects, we began to notice patterns in which words and phrases were frequently quoted across multiple subjects' essays. Using the Brysbaert Scale of Concreteness to measure the relative imagability of individual words, we noticed that the words and phrases frequently quoted by subjects scored highly on the concreteness side of the scale. In particular, the words and phrases often quoted were as a whole more concrete than the passages of text overall. This specific angle of the study is particularly important for the emerging field of literary neuroscience as a whole because of the implications it may have for the process of reading and retention of information.

FREE VERSE ARTS
Claire Babala
Poster: 383
Mentor(s): Guillermo Delgado (Residential College in the Arts and Humanities)

This project works with the Ingham County Youth Services Center (ICYSC)in Lansing, MI and the Residential College in the Arts and Humanities (RCAH) to share weekly art and poetry seminars with poets, starting at age 9, at the ICYSC. The purpose of the seminars is to use art and poetry to develop the creativity and problem solving skills of the poets. It has been shown through past research that expressing oneself through art can help increase a person's self-confidence and self-esteem. Art is an exploratory, reflective process that can allow the participators to learn more about themselves, and ponder on their past actions and experiences. Due to these facts, we believe that these seminars will be beneficial to both the poets at the

ICYSC and the students interacting with them. It will also produce countless samples of work that display the complexity of the poets, and their lives.

INTEGRATIVE & ORGANISMAL BIOLOGY

POSTER PRESENTATIONS, SECTION 1
LAKE HURON ROOM, 9:00 – 10:30 AM

DOES VARIATION IN BEHAVIORAL TRAITS INFLUENCE PROBLEM SOLVING IN SPOTTED HYENAS?

Paige Barnes
Poster: 387
Mentor(s): Kay Holekamp (Integrative Biology)

Many animals exhibit behavioral flexibility when presented with novel problems, but it is not yet understood what factors influence an animal's success. Previous research has shown that exploration, neophobia, and persistence all play a role in an animal's problem solving ability, however there is still more to learn about the behaviors' effects. We hypothesize that reactive animals, or ones that generally express more neophobia, exploration, and persistence, will be more successful than proactive individuals. In order to investigate this, 5 spotted hyenas (Crocuta crocuta) were selected as test subjects. These 5 are similarly sized, captive, adult hyenas at same zoo, which conserves environmental and physical factors across the tests. Spotted hyenas are the most numerous carnivore in sub-Saharan Africa; their diverse habitats and opportunistic hunting style suggest high behavior flexibility and their morphology allows for physical dexterity, which makes them optimal candidates. We presented each hyena individually with a multiple access box. The box offered four different ways to achieve success, defined as the opening of the box and the retrieval of the food inside. All trials were filmed and we coded the videos for the hyena's behaviors, including the latency to approach the box, behavioral diversity, and the ratio of time in contact with the box with the total trial time. These behaviors showed a test subject's neophobia, exploration, and persistence, which we compared to the success rates. These results determine whether the reactive individuals are more likely to achieve success.

A PROBLEM-SORTING TASK DETECTS CHANGES IN UNDERGRADUATE BIOLOGICAL EXPERTISE OVER A SINGLE SEMESTER

Cody Bekkering
Poster: 388
Mentor(s): Anne-Marie Hoskinson (Center for Engineering Education Research)

Recent calls for undergraduate biology reform, from AAAS' Vision and Change to the University's Undergraduate Learning Goals, share similar aspirations: to produce a generation of individuals who can organize, use, make connections among, and communicate about scientific knowledge. Achieving this goal requires students to gain disciplinary expertise. Previous work has shown that experts organize, access, and apply disciplinary knowledge differently than novices, and that changes in expertise are measurable. Drawing on a rich history of card-sorting from the cognitive sciences, we investigated whether and how introductory biology students at Michigan State University changed the ways they organized and linked biological ideas over a single semester of introductory biology. Over three semesters, we administered the Biology Card Sorting Task (BCST) to 751 students enrolled in their first or second semester of introductory biology, in courses focusing on either cell-molecular or organismal population topics, and under two different sorting conditions. Consistent with previous findings, students used a combination of superficial, deep-conceptual, and yet-uncharacterized ways of organizing and connecting their biological knowledge. In some cases, this did translate to more expert-like ways of organizing knowledge over a single semester, best predicted by whether a student was enrolled in their first or second semester of biology and by the sorting condition completed. In addition to illuminating differences between putative novices and experts,

our results suggest that card-sorting is a robust means of detecting changes in novices' biological expertise – even in heterogeneous populations of novice biology students over the timespan of a single semester.

MASS MORTALITY, MASS MATING, MASS MOLTING OR JUST A MASS? INTERPRETATION OF A FOSSIL ASSEMBLAGE FROM THE MIDDLE CAMBRIAN BURGESS SHALE, BRITISH COLUMBIA, CANADA

Leanne Chambers
Poster: 389
Mentor(s): Danita Brandt (Geology)

Banffia constricta is an enigmatic animal described by Charles Walcott in 1911 from the Burgess Shale, British Columbia, Canada. Walcott considered B. constricta to be an annelid worm. In 2001, Caron reclassified B. constricta as an arthropod. Controversy over the classification of B. constricta continues today. Likewise, there is controversy over how this organism lived. ROM 53647 is a slab containing roughly 37 specimens of B. constricta. This assemblage might reflect a gregarious, benthic habit for B. constricta. The possible gregarious nature of B. constricta might have been an anti-predator strategy or resembles a group that had assembled to mate, as observed in some modern annelids (e.g. palolo worms). Alternatively, the assemblage may represent physical transportation and deposition. Taphonomic analysis of this slab shows no preferred orientation (13 specimens aligned in the northwest direction, 12 specimens aligned in the northeast direction, and 12 specimens aligned in the north direction). Seventeen of the specimens are clustered together, even on top of each other. Lack of preferred orientation and clustering supports the hypothesis that benthic dwelling B. constricta were congregating to feed on a particular food source. This behavior is seen in other Cambrian organisms: another slab from the Burgess Shale displaying nine Ottoia prolifica (priapulid worms) in a circular pattern around a disarticulated arthropod is interpreted as mass feeding of the worms on the arthropod. Modern marine invertebrates such as holothurians and echinoids show mass feeding behavior and may serve as analogs for the Cambrian organisms.

KAUAI CHICKENS

Matthew Gedritis
Poster: 390
Mentor(s): Eben Gering (Integrative Biology)

Studies of feral populations can help us learn how to manage and control invasive species. Recently, the chicken population has greatly increased, enough to cause concern over the damage they could cause to native ecosystems. Kauai's chickens are a mix of domestic varieties of chickens and Red-jungle-fowl that Polynesians brought to the island. This research is meant to find out the breeding patterns of the Kauai chickens. Understanding these patterns can give us insight into how the chickens became so pervasive on the island or how to control their population growth in the future. To find out what the breeding patterns are, we looked at online photos taken by tourists. This allowed us to overcome the obstacle of having to have a team at the island year-round taking samples. We used these publicly available photos to look at the size of the clutches and are using other images of hens and clutches to determine when the chickens most likely breed. We looked at 31 images for the clutch sizes and we gathered 10 photos for each month to see how many chicks were around during different parts of the year.

BIOLOGY IN THE GALAPAGOS ISLANDS AND AMAZONIA

Poster: 391
Mentor(s): Charles Elzinga (Biological Science), Gerald Urquhart (Biological Sciences)

The purpose of this research is to examine the preferred habitat of Eucidaris galapagensis and Lytechinus semituberculatus within Darwin's Bay in the Galapagos Islands. This was analyzed by counting the number of Pencil Sea Urchins vs. the number of Green Sea Urchins in multiple habitats. These habitats were either located inside the bay or outside of it and each area was characterized as a rough area or smooth area. A chi-squared test for independence was used to analyze the data, finding no evidence for a relationship

between location and abundance of urchins or a relationship between substrate type and abundance of urchins.

GIGGLE VOCALIZATIONS IN SPOTTED HYENAS AND THEIR IMPLICATION FOR SOCIAL INTELLIGENCE

Morgan Lucot
Poster: 392
Mentor(s): Kenna Lehmann (Integrative Biology, Ecology, Evolutionary Biology, Behavior)

Large, stable social groups tend to generate complex interactions between individuals. Spotted hyenas (Crocuta crocuta) live in clans which have a strict social structure. There is evidence to support higher social intelligence in hyenas, to cope with a large social system. Deeper studies on hyena social intelligence indicate that hyenas can understand third party relationships. To further understand how third party relationships can affect communication, we analyzed a common hyena vocalization, the giggle. The giggle vocalization is a loud call and widely thought to be a submissive signal made in response to aggression. We hypothesize that the giggle provides information about third party relationships. In order to test this, I extracted all interactions involving high, medium, and low rankers that led to a recorded giggle vocalization. The interactions and accompanied recordings were analyzed in Raven and R to determine if the giggle vocalization occurs during previously undocumented aggressive contexts and varies according to these submissive and aggressive contexts. This variation has the potential to inform eavesdroppers of the third party relationship between the interacting individuals that emit the giggle. Understanding how hyena's use third party relationships will help build a template for understanding social intelligence in social non-primate taxa.

INTEGRATIVE & ORGANISMAL BIOLOGY
POSTER PRESENTATIONS, SECTION 2
MOSAIC MULTIPURPOSE ROOM, 11:15 AM – 12:45 PM

PATTERNS IN DIFFERENCES OF LEAF LOSS BETWEEN SEXES IN THE SPICE BUSH (LINDERA BENZOIN)

Mirna Kaafarani Natalie Roodbeen
Poster: 395
Mentor(s): Charles Elzinga (Biology)

We were interested in the sexual dimorphic characteristics of the spicebush, Lindera benzoin, and what physical traits could be attributed to sexual dimorphism. Our goal was to examine patterns in leaf loss between the male and female spicebush and how quickly leaves changed color from green to yellow. To assess the differences, five pairs of spicebush were selected, a male and female in each pair. The highest western-facing branch was chosen. The yellow leaves and leaves remaining were recorded three times a week until all of the marked leaves fell. The average leaves remaining per day for males and females were converted into proportions, transformed using arcsine function and then used to create a regression line. There was no statistical difference between average male leaf loss and average female leaf loss, possibly due to the fact that female leaf loss was not linearizable. However, there is a substantial difference in color change between the sexes. The results showed male leaves turning yellow sooner than female leaves, falling off sooner as well, and in a more gradual pattern. This difference suggests that leaf loss patterns may be affected by sexual dimorphic characteristics, which would open up the realm for further studies.

RECRUITMENT BEHAVIOR IN SPOTTED HYENAS

Sarah MacLachlan
Poster: 396
Mentor(s): Kay Holekamp (Integrative Biology), Kenna Lehmann (Integrative Biology), Tracy Montgomery (Integrative Biology)

Lions (Panthera leo) and spotted hyenas (Crocuta crocuta) are apex predators in most African ecosystems. These two species compete directly for food resources and often interact over carcasses and kills (Periquet et. al. 2015). During these interactions, hyenas may recruit conspecifics to increase the likelihood of gaining control of food from lions. Hyenas can recruit by whooping, a long-distance vocalization that can be heard up to 5km away (Theis et. al. 2007). We hypothesize that hyenas will differentially recruit based on rank. We predict that low-ranking hyenas will not recruit because the presence of recruited higher-ranking individuals will prevent them from feeding. Conversely, we predict that high-ranking hyenas will recruit conspecifics because if the food resources are won, these individuals will gain all the resource benefits. Our goal is to learn more about the social factors that influence recruitment during lion-hyena interactions.

LAUGHTER IS THE BEST MEDICINE

Erica Melkonian Heidi Garner, Lindsay Schichtel
Poster: 397
Mentor(s): Erica Wehrwein (Physiology)

The purpose of this comprehensive study was to analyze the impact of laughter on overall physical and psychological health. We hypothesized that both genuine and forced laughter would increase feelings of happiness, reduce anxiety, transiently increase heart rate and blood pressure, and increase energy expenditure. Both male and female subjects between the ages of 20 and 28 were divided into two groups: those who were prompted to laugh with a 7 minute montage of comedy film clips (N= 12; 8 M/4 F) and those who were asked to laugh voluntarily and continuously for 2 minutes (N= 11; 5 M/6 F). Heart rate and blood pressure were measured directly using a finometer, while energy expenditure was measured indirectly using a respiratory mask and gas analyzing chamber. Psychological surveys were administered before and after the testing period. Paired sample t-tests showed both genuine and forced laughter significantly reduced feelings of anxiety, with lower STAI scores post-laughter ($p<0.05$ and $p<0.01$, respectively). However, there was no significant effect of either condition on feelings of happiness. Furthermore, one-way ANOVAs with Tukey's post-hoc analysis revealed that forced laughter, but not genuine laughter, resulted in significant, transient increases in heart rate, blood pressure, and energy expenditure ($p<.001$). These results suggest a means by which laughter may improve both psychological and physiological health.

PERCHES IN ORCHARDS ATTRACT SOME BENEFICIAL BIRD SPECIES

Emily Oja
Time: 11:15 AM
Poster: 398
Mentor(s): Catherine Lindell (Integrative Biology)

Cherry production is a large industry and important economically in Michigan. Frequently, fruit growers incur a significant economic loss due to bird damage every year, and finding a way to mitigate this damage with the use of biological control is appealing environmentally and economically. In this study, we attempted to determine if the use of man-made perches would attract Cooper's Hawks (Accipiter cooperii) to cherry orchards to consume damage-causing birds in northwestern Michigan. Over the study period, we broadcasted Cooper's Hawk calls in cherry orchards to detect raptors in the area. We also recorded video of the perches using security cameras to determine if Cooper's Hawks or other bird species were using the perches. We did not detect any Cooper's Hawks on the videos or during the broadcasts, however other beneficial species such as American Kestrels (Falco sparverius) and Eastern Bluebirds (Sialia sialis) were witnessed on the video using the perches. Use of perches in orchards could reduce damage by birds and mammals, especially in areas with large American Kestrel populations. Future studies could also explore the use of perches in areas of high Cooper's Hawk populations, as there is likely not a large population in the study area.

EFFECTS OF NITRIC OXIDE PRE-CURSORS IN BEETROOT AND L-CITRULLINE SUPPLEMENTS ON BRACHIAL ARTERY BLOOD FLOW AND DIAMETER DURING MAXIMAL FOREARM MUSCLE CONTRACTION

Tyler Shubitowski Jon Sanford

Poster: 399

Mentor(s): Erica Wehrwein (Physiology)

Certain natural plant foods such as beetroot are rich sources of dietary nitrate, which can aid human exercise by promoting vasodilation of vasculature. Vasodilation allows more oxygen and nutrients to be delivered to bodily tissues by increased blood flow. However, whether or not natural plant foods are more effective vasodilators than commercial pre-workout supplements remains under scrutiny. To investigate the vasodilatory effects of these two, we measured brachial artery blood flow and diameter in young, healthy, 18-22-year-old human subjects (n=7, 4 males and 3 females) before and after consuming fresh beetroot (293g) or L-citrulline (375mg) controlled for amount of nitrate (375mg). Each participant received both treatments at least 24 hours apart and had their brachial artery blood flow and diameter measured at t= 0, 30, and 60 minutes after ingestion by ultrasound technology. A two way repeated measures ANOVA with post hoc Tukey test compared brachial artery blood flow and diameter changes at various intervals in the two conditions. Notably, the average brachial artery blood flow rate (mL/min) increased between t=0 and 60 minutes postprandially in the beetroot achieving statistical significance ($p<.05$) not seen in the L-citrulline condition. Additionally, the beetroot condition demonstrated increased arterial diameter ($p = .051$) in the artery diameter test from t=0 to 60 minutes, unseen in the L-citrulline condition. It's speculated that a larger sample size would've obtained significance. Together, these results indicate that natural plant foods can achieve the same, if not greater, vasodilatory effects than pre-workout supplements to aid in exercise.

EVALUATING HATCHING SUCCESS AND DEVELOPMENTAL ABNORMALITIES OF SNAPPING TURTLE (CHELYDRA SERPENTINA) HATCHLINGS IN RELATION TO ENVIRONMENTAL FACTORS

Marisa Spain

Poster: 400

Mentor(s): Jeanette McGuire (Integrative Biology)

Abstract: Turtle populations are threatened by human activities such as habitat destruction, degradation, and fragmentation. Absent or degraded nesting areas can impact hatchling development and recruitment, and therefore impact the longevity and sustainability of populations. In this study, we examined environmental factors associated with hatching success and hatchling attributes, such as size and developmental abnormalities in Snapping Turtles (Chelydra serpentina) on the Edwin S. George Reserve (Hell, MI, USA). Among nests that survived depredation, 90.5% of eggs hatched. On average, nests that did not completely hatch had 22.63% of eggs that showed no evidence of development, 15.67% of eggs showed evidence of partial development, and 19.8% of eggs were fully developed but died before hatching. Further analyses will compare hatching percent and developmental abnormalities with environmental factors. Implications of the results of these analyses for conservation efforts will be discussed.

INTEGRATIVE & ORGANISMAL BIOLOGY
POSTER PRESENTATIONS, SECTION 3
BALLROOM, 1:30 – 3:00 PM

THE EFFECTS OF INTRASPECIFIC COMPETITION ON AGGRESSIVE BEHAVIORS IN MALE THOMSON'S GAZELLES

Kylie Ayers

Poster: 403

Mentor(s): Sarah Jones (Integrative Biology), Kenna Lehmann (Integrative Biology), Julie Turner (Integrative Biology)

Thomson's gazelles (Gazella thomsonii) are members of the ungulate family Bovidae, frequently found in the grasslands of Kenya and Tanzania. Thomson's gazelles, commonly referred to as "Tommies", employ a polygynous mating system based on sexual selection where males exhibit a repertoire of agonistic behaviors in order to secure mate choice among the females. Male Tommies are known for being especially aggressive and territorial when it comes to competition among other males for access to mates during the breeding season. Thus, we explored how herd size impacted different aggressive behaviors shown by male Tommies in the Masai Mara National Reserve, Kenya. Three common forms of aggression were observed: horning, chasing, and clashing. We predicted that as the number of Thomson's gazelles in the herd increased, the rate of aggressive occurrences would also increase. After employing all-occurrence sampling and correlation tests, we determined that there was no correlation between the herd size and agonistic behaviors, except with a significant increase in clashing behaviors in the presence of more male Tommies, specifically. The fact that aggressive incidences increased with the number of male Tommies, but not with group size as a whole, is indicative of the effects that male presence has on the behavior of Thomson's gazelles. Further investigation into this area of behavior would be useful in better understanding the mating dynamics and aggressions of Thomson's gazelles in the wild, as well as other Bovids to aid in their management and conservation.

BIRDS OF A FEATHER

Abigail Bryson

Poster: 404

Mentor(s): Per Askeland (Composite Materials & Structures Center), Carl Boehlert (Chemical Engineering & Materials Science)

Bird feathers have certain properties that could provide beneficial developments for modern technologies. The structures of feathers from Mallards, a Great Horned Owl, and a Blue Jay were examined and compared under scanning electron microscopes. It was found that the structure a feather greatly depends on the type of bird and its origin on the body, which directly corresponds to its function. Specifically, infrastructure for silent flight and structural coloration were observed. These findings can be applied to technologies such as counterfeit protection, enhanced picture quality, and propeller noise reduction.

NOCTURNAL CAVE EXIT PATTERNS OF BATS IN COSTA RICA

Katie Kierczynski

Poster: 405

Mentor(s): Ryan Kimbirauskas (Control for Integrated Studies - General Science)

There are more than 1200 species of bats in the world, yet the cryptic nature of these mammals has contributed to gaps in knowledge for many of these species.Costa Rica is home to 113 species of nocturnal bats, and many of these species live and interact in colonies. On the Osa Peninsula of Costa Rica is a bat cave containing three of Costa Rica's nocturnal bat species: Pteronotus parnelli, Pteronotus gymnotus, and Pteronotus personatus. The Campanario Biological Station has been gathering bat data from this cave for ten years. This study looks at both nightly and annual patterns in the number and species of bats leaving the cave to feed at night. Data was only available for the first hour of bats leaving the cave. Preliminary results

show no significant patterns in nightly exit behavior. However, we did find annual differences among species, with more P. parnelli leaving the cave nightly in February and P. gymnotus leaving in May through August.

PLASTICITY OF BOLDNESS IN SPOTTED HYENAS
Rebecca LaFleur
Poster: 406
Mentor(s): Kay Holekamp (Integrative Biology)

In my analysis, I seek to determine whether boldness in spotted hyenas (Crocuta crocuta) is shaped predominantly by external pressures or biological traits. Individuals of this species live in large, female-dominated clans, experiencing environmental stress from humans, other carnivores, and extreme weather events. Such pressures, combined with the influence of internal factors such as sex and hierarchical rank, have the capability to influence personality traits like boldness, and this trait in turn can influence the inter- and intra-species interactions each individual has, including those with nearby human communities. I predict that biological traits have the capability to set a baseline boldness threshold for an individual. However environmental pressures will be the predominant factor in shaping not only an individual's boldness over their lifetime, but the average personality climate for a clan as well. Thus, one clan should have a higher average level of boldness than another, because clans in the area naturally experience different stress levels based upon environmental forms of selection common to one region, but not the other. To test this hypothesis, I will be analyzing data collected from an artificial trial testing response behavior to a "novel intruder," modeled by an archery target which looks like the species in question. Initial interactions with strange individuals, such as the one analyzed here, are standard indications of individual boldness. Boldness will be determined primarily based upon the distance at which each individual approaches the intruder, as well as the latency to approach and the reactions displayed in each session.

COMPARING THE EFFECTS OF INCREASED COGNITION AND STRESS ON CEREBRAL BLOOD FLOW THROUGH THE CAROTID ARTERY
Andrew Manning Kathryn Schauer
Poster: 407
Mentor(s): Erica Wehrwein (Physiology)

Activation of thinking centers in the brain causes an elevated demand for both oxygen and energy, which are delivered to the brain through the bloodstream, thus resulting in an increase in cranial blood flow. The purpose of our experiment is to determine if the increase in cerebral blood flow during cognition can be observed in the carotid artery. We predicted that increased cognition would cause an increase in blood flow while observing flashcards compared to rest and a larger increase while observing stressful pictures. Participants were young, healthy college students (n=8, ages 18-22). TA Mean Velocity (MV) and Volume Flow (VF) were monitored in the right carotid artery using Doppler Ultrasound. We obtained resting baseline, maximal values observing math flashcards, rest between trials, and maximal MV and VF values while observing stressful pictures. Data was analyzed using One Way RM ANOVA with Tukey's Post Hoc test. For MV, there was no significance (P= 0.096) when comparing either condition to the baseline. For VF, there is no statistical significance when comparing either condition with the baseline values (P= 0.65). The results for several participants followed the predicted trends, however they were not significant, and more subjects are needed due to variation in the data. In conclusion, our hypothesis could not be proven with this data set. Future studies could include a greater number of participants, standardized cognitive and stress tests, and the use of an electrocardiogram to assess additional components of the stress response.

GENETIC IDENTIFICATION OF PROPORTIONAL CONTRIBUTIONS OF BROWN TROUT STRAINS TO THE LAKE MICHIGAN SPORT FISHING HARVEST

Alexander Samborski

Poster: 408

Mentor(s): Kim Scribner (Fisheries and Wildlife)

Sustaining viable populations of Brown Trout (Salmo trutta) in the Great Lakes relies on fish stocked from hatcheries. Multiple strains of Brown Trout have been stocked by different agencies in near-shore waters of Lake Michigan. The strains stocked included Wild Rose, Gilchrist, Seeforellen, and Sturgeon River. In order to adaptively manage the species, genetic data can be used to quantify proportional contributions of each strain to the harvest in situations where strains are not morphologically distinguishable, and are not physically marked. Our objectives were to assess the proportions of each strain in samples taken from anglers in 2014. Fin clips of Brown Trout were collected from four Lake Michigan harbors (Frankfort (n=43), Ludington (n=32), Manistee (n=44), and Onekama (n=3)). We used multi-locus (11 microsatellites) genotypes and likelihood-based analysis to assign samples to strain of origin. The Wild Rose strain was the most abundant strain in the creel at all ports (0.88, 0.84, 0.86, and 1.0 at Frankfort, Ludington, Manistee, and Onekama, respectively). The Wild Rose strain accounted for only 0.45 of all Brown Trout stocked from 2010 through 2014. The large difference in proportions of fish belonging to the Wild Rose strain at the time of stocking and the time of sampling suggests that Wild Rose Brown Trout have the highest relative survival of strains stocked in Lake Michigan. Results have direct implications for future stocking programs.

MODERN SERIES OF 94 CONSECUTIVE PATIENTS UNDERGOING TRANSTHORACIC REPAIR OF TYPE III/IV PARAESOPHAGEAL HERNIAS

Mallory Wilson

Poster: 409

Mentor(s): Shamus Carr (Thoracic Surgery)

The purpose of this study was to review our current results of Belsey-Mark IV for repair of type 3 and 4 paraesophageal hernias in the modern era of laparoscopic repair. Between 2011 and 2015 there were 94 consecutive patients, from a single institution who underwent transthoracic paraesophageal hernia repair via a Belsey-Mark IV operation. We assessed length of stay, recurrence rates, and complications. There were 94 patients between age 26 to 94 that were 80.6% female who underwent transthoracic repair for 91.5% type III and 8.5% type 4 paraesophageal hernias. A single mortality (1.06%) occurred within 30 days of surgery. Average length of stay was 11.7 days (5-54 days). Readmission rate within 30 days was 7.45%. The clinical recurrence rate when primary surgery was done by a thoracic surgeon was 1.06%. This patient is also the only one to require re-operation. Charlson comorbidity index scores were not associated with readmission or need for re-operation. These results indicate transthoracic repair remains the gold standard. While length of stay is shorter for minimally invasive surgery, recurrence rates are 15-59%. Our approach provides optimal results with only a single patient having recurrence and none readmitted. These results are of potentially greater significance in the current reimbursement environment.

KINESIOLOGY

POSTER PRESENTATIONS, SECTION 1
MOSAIC MULTIPURPOSE ROOM, 9:00 – 10:30 AM

A QUALITATIVE EXPLORATION OF COACHING EFFECTIVENESS AS INFLUENCED BY ATHLETE PERSONALITY

Adrea Donaldson
Poster: 413
Mentor(s): Karl Erikson (Kinesiology)

A major focus of research in the fields of sport and coaching has been to examine how a coach can effectively tailor their individual approach in order to motivate and engage athletes in their sport. The purpose of this study is to examine how an athlete's personal characteristics impact preferences for and perceptions of coaching effectiveness, specifically relating to two different personality characteristics: introversion and extroversion. In-depth retrospective qualitative interviews will be conducted with approximately 20 student-athletes and 10 experienced coaches from a variety of sport backgrounds in high school to early college levels to integrate both perspectives. The athlete participants will also complete a short personality survey to measure their personality type with respect to introversion-extroversion and the interviews will assess perceived coaching preferences from the athlete's point of view as well as perspectives from a coaching point of view on motivational variability between individuals. Qualitative data from the interviews will be analyzed to compare and contrast how the effectiveness of coaching styles may differ between extroverts and introverts. The results will help understand how different approaches may contribute to positive holistic development for each personality type. Instructional practitioners (coaches/teachers) can benefit from this study to enhance their coaching skills. These findings may give insight to successful coaching practices in relation to individual motivational variability for both introverts and extroverts.

LEARNING TO COMPENSATE FOR A MOTOR DEFICIT IN A VIRTUAL ENVIRONMENT

Lauren Edlbeck Aarthi Manjunathan
Poster: 414
Mentor(s): Rajiv Ranganathan (Kinesiology)

According to the U.S. Centers for Disease Control and Prevention, stroke is the primary cause of long-term disability in individuals in the United States. Often, this results in persons with stroke having to compensate for motor deficits on one side of the body. In our study, we examined how healthy college aged individuals compensate for such deficits in a virtual task. We used a motion capture system which detected movements of the participant's upper extremities. Participants were instructed to move both hands to control a cursor on a screen. After a short adjustment period, we induced a virtual deficit in one hand so that the cursor did not always move in a predictable direction. The usage of one “good” hand and one “bad” hand was chosen to represent a virtual stroke. We examined how participants compensated for this virtual deficit by studying the initial trajectory of the cursor and comparing the movement of the affected and unaffected hands. Based on these results, we aim to understand how compensation strategies are learned, and how they can be applied in stroke rehabilitation.

CAN OLD DOGS LEARN NEW TRICKS? MOTOR LEARNING IN OLDER AND YOUNGER ADULTS

Arielle Farhi, James Montgomery
Poster: 415
Mentor(s): Mei-Hua Lee (Kinesiology)

Is it possible for a 65-year-old to learn how to hit a baseball as well as a 20-year-old? The ability to learn is an evolving process as people age, especially when applied to learning a new motor skill. This study

investigated the differences in the learning process of elderly adults and younger adults using a novel motor task. The use of a novel task eliminates confounding variables including prior experience and physical strength. We compared motor learning in young adults and older adults by using a customized body machine interface (BoMI) where participants used their shoulder movements to move a cursor to different targets on the screen. Participants learned this task through 160 practice trials and 72 test trials. Overall participants in both age groups improved their performance by decreasing movement time and path length. However, elderly adults had longer movement times and path lengths than younger adults. Understanding the learning process of different age groups is important to improve the design of rehabilitation programs in people with various motor deficits.

EXAMINING THE INFLUENCE OF PERSONALITY TRAITS ON COLLEGE ATHLETES' SPORT PARTICIPATION CHOICE AND PERCEPTIONS OF SPORT EXPERIENCES

Madison Kohler
Poster: 416
Mentor(s): Karl Erickson (Kinisiology)

Previous research has shown that athletes stick with the sport they are passionate about regardless of the challenges that face them, such as the Passion and Psychological Adjustment study. However, is it possible they are passionate about the sport because of their personal qualities rather than pure skill? This study aims to find the difference among those who favor individualized sports as opposed to those who take on team sports. Roughly ten athletes from a variety of sports will undergo retrospective interviews that will reveal their motives for choosing their sport. An assessment looking at the big five personality traits in depth will be used to distinguish the different traits that influenced their decision in participating in a particular college sport, comparing and contrasting them across the different areas of athletics and main challenges of the different sport. The primary purpose behind the proposed research is to examine the link between athletes' diverse personality characteristics and the sport they choose to participate in. Possibly showing a trend of introverts sticking to individual competitive athletics whereas extroverts lean more towards team centered athletics. This study is designed to show the personal qualities that influence the mental decision in which sports these particular individuals seriously pursue.

THE RELATIONSHIP BETWEEN ACADEMIC SUCCESS AND ONE-YEAR OF GROUP FITNESS AND INTRAMURAL SPORTS USAGE BY NEIGHBORHOOD RESIDENTS

Lauren Kosowski
Poster: 417
Mentor(s): James Pivarnik (Kinesiology)

Michigan State's neighborhood-style housing allows students access to academic advising, health services, and recreational sports opportunities within residences. Previous research has found small, positive relationships between academic success and recreational sports participation, but longitudinal use has not been assessed in neighborhoods. We investigated differences in cumulative grade point average (GPA) and cumulative credit difference (CD) among users and nonusers following one year of group fitness and intramural sports use. Participants included first time freshmen from the FS13 and FS14 semesters. Matched samples for group fitness (n=558) and intramural sports (n=1,796) were generated based on cohort, high school GPA, race, socioeconomic status, first generation status, and gender. Means±SD and percentages were calculated for all variables of interest. Paired sample t-tests were used to assess differences in cumulative GPA and CD between users and nonusers after first semester and first year time points. First year cumulative GPA was significantly higher (p-value=0.002) for group fitness users (3.38±0.52) than nonusers (3.25±0.66). No differences were found between group fitness users and nonusers for cumulative CD. First semester cumulative GPA was significantly higher (p-value<0.001) for intramural sports users (3.25±0.66) than nonusers (3.09±0.80). First year cumulative GPA (p-value<0.001) was significantly higher for intramural sports users (3.25±0.63) than nonusers (3.07±0.78). First semester cumulative CD was significantly lower (p-value=0.001) for intramural sports users (5.53±7.00) than nonusers (6.63±7.72). First year cumulative CD (p-value<0.001) was significantly lower for intramural sports users (6.09±7.13) than

nonusers (7.70±8.20). Results suggest neighborhood recreational sports participation is favorable to freshman academic performance.

SELF-EFFICACY OVER 3 MONTHS OF INTENSE EXERCISE WITH A VIRTUAL PARTNER

Nicole Lemmen Mackenzie Kelbel, Megan Sutherland

Poster: 418

Mentor(s): Deborah Feltz (Kinesiology), Christopher Hill (Kinesiology), Steve Samendinger (Kinesiology)

High levels of self-efficacy are important in maintaining adherence to a vigorous physical activity protocol. Therefore, understanding the role of self-efficacy with and without the presence of a software generated (SG) partner is vital for continued persistence during high-intensity exergames. The purpose of this study was to determine if adult exercisers have a higher self-efficacy when exercising with or without a SG partner. As part of a longitudinal study, where participants exercise on a stationary bike with or without a SG partner 6 days a week for 3 months, participants were asked to assess their efficacy beliefs to cycle at a set intensity over a 30-minute period at nine separate time points. Participants were randomly assigned to three conditions; (a) control, with no partner, (b) paired with a partner who is always superior, and (c) paired with a partner who they occasionally beat. For this portion of the study, we examined if there were significant differences in self-efficacy in (a) partnered versus non-partnered conditions, (b) if they were more confident after beating the partner versus not beating the partner, and (c) if self-efficacy increased in all conditions over the 3-month period. Self-efficacy was measured according to Bandura's (1997) guidelines. Participants were asked about their efficacy beliefs after cycling for 30 minutes at 75% of their max capacity. Results will be reported and the findings will be discussed in line with the theoretical underpinnings of self-efficacy theory.

Grant: NASA/National Space Biomedical Research Institute, MA03401

EVALUATION OF DIVISION I ICE HOCKEY PRACTICES AND GAMES VIA HEART RATE MONITORING AND DIRECT OBSERVATION

Montana Pruett Daniel Fryc, Alina Levy, Joseph Marsalese

Poster: 419

Mentor(s): Jim Pivarnik (Kinesiology), Ashley Triplett (Kinesiology)

Heart Rate (HR) monitoring (via telemetry) is used to assess sport training intensity, but the validity of this measurement modality has not been assessed in collegiate ice hockey. PURPOSE: To compare assessment of on-ice practice and game intensity via HR monitoring to direct observation. METHODS: On-ice practices consisted of high intensity drills, tactical discussions, and game simulations. HR was divided into five intensity zones (<60%, 60-69%, 70-79%, 80-89%, and 90-100% of HRmax) for analysis. Direct observation was used to classify intensity into four observation zones (2-5). Percentage of time spent in each HR and observation zone was computed for players during weekly practices and for two players during two games. RESULTS: HR telemetry showed 26% of practices were spent at <60% of HRmax, 27% at 60-69%, 26% at 70-79%, 18% at 80-89%, and 3% at 90-100%. Direct observation showed 60% of practice time was spent at an intensity level of 2, 32% at 3, 7% at 4, and 1% at 5. During competition, HR showed 19% was spent at <60% of HRmax, 25% at 60-69%, 24% at 70-79%, 16% at 80-89%, and 16% at 90-100%. Direct observation showed 78% of the game was spent at intensity level 2, 11% at 3, 10% at 4, and 1% at 5. CONCLUSION: HR monitoring appears to be a valid indicator of hockey practice intensity, compared to direct observation, but tends to over predict during games. Direct observation categories may have to be adjusted to better match HR monitoring during competition.

KINESIOLOGY
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 11:15 AM – 12:45 PM

EXPLORING UNMEDIATED LEARNING BEHAVIORS OF SWIM COACHES

Steven Maier

Poster: 423

Mentor(s): Andy Driska (Kinesiology), Dan Gould (Kinesiology)

In the United States, the education of sport coaches is not compulsory, thus much professional development occurs through informal and unmediated channels. Given the unstructured nature of informal, unmediated learning, little is known about the habits of coaches involved in unmediated learning processes. Unmediated learning typically operates through self-guided processes, including consumption of social media and other internet-based coaching resources (Facebook, LinkedIn, blogs, chats, and sport-specific sites). Specifically, the extensive use of these resources by swimming coaches warrants a deeper understanding of their use in order to obtain an accurate picture of knowledge transfer within the swimming community. The purpose of this study is to explore the habits of coaches seeking information: specifically, the sites and platforms through which they connect and share knowledge, the topics most often sought, and the levels of behavioral engagement in social media. A survey instrument (Qualtrics) will obtain participation consent and collect data confidentially. Statistical analyses of preliminary data will explore differences between coaches' unmediated learning habits based on inherent beliefs, job characteristics, and demographic data.

ASSOCIATIONS AMONG PERCENT BODY FAT, TIME SPENT OUTSIDE, AND SLEEP IN LOW SOCIOECONOMIC CHILDREN

Luke McCormick

Poster: 424

Mentor(s): Karin Pfeiffer (Kinesiology)

Sleep deprivation and poor sleep quality in children is associated with numerous adverse outcomes including increased risk of behavioral issues and impaired academic performance. Limited research examined if excess body fat (BF) and minimal time spent outside (OT) contribute to reduced sleep time and poor sleep quality in children. This study determined if percent BF and OT were related to sleep time and sleep quality in children from a low socioeconomic, urban city. METHODS: Data were collected from nine elementary schools in Flint, MI in grades 4-6. Percent BF was measured using a bioelectrical impedance analyzer. Over a 7-day period OT, sleep quality (SQ) and total sleep time (ST) was self-reported. Physical activity was measured using the PAQ-C questionnaire for children. Multiple linear regression analyses were used to examine associations of BF and OT with ST and SQ. RESULTS: Mean BF was 25.9 + 10.3%. The mean OT and mean ST were 2.6 + 1.6 hours/day and 9.1 + 1.7 hours/day, respectively. Mean SQ was 3.4 + 0.8. Results from multiple linear regression, without controlling for covariates, showed no association among BF and OT with ST (F=0.03, p=0.97, Adjusted R2=-0.004) or with SQ (F=0.50, p=0.61, Adjusted R2=-0.002). Controlling for age, sex, race, and physical activity showed that BF and OT were not associated with ST (F=1.79, p=0.10, Adjusted R2=0.010) or with SQ (F=0.75, p=0.61, Adjusted R2=-0.003). CONCLUSION: Results showed that percent BF and OT were not associated with ST or SQ in children from a low socioeconomic, urban city.

REWARD AND PUNISHMENT IN MOTOR LEARNING: DOES HANDEDNESS HAVE AN EFFECT?

Julie Pieciak Kristin Kearfott , Ten-Niah Kinney

Poster: 425

Mentor(s): Rajiv Ranganathan (Kinesiology)

Previous studies on motor learning have demonstrated that being rewarded or punished during practice results in differential effects on how much participants learn. In addition, there is also evidence documenting differences in learning between the dominant and non-dominant hands. The purpose of our study was to

examine if the incentive structure (reward vs. punishment) has a different effect on learning depending on handedness. In our study, we utilized the Box and Blocks Test, a standard motor assessment test in which participants transfer as many blocks from one side of a barrier to the other in a specified time period. Participants were healthy college-aged adults who performed the motor task while wearing motion sensors on their hands. Six groups of participants (Reward/Punishment/Control x Dominant/Non-Dominant) were recruited and practiced the task for approximately a 30 minute period. To evaluate performance, we measured the overall number of blocks transferred as well as their movement patterns. Understanding the influence of handedness on the effects of incentive structure could provide insight on how to maximize motor recovery in clinical populations.

PERCEIVED IMPORTANCE OF HEALTH BEHAVIORS AMONG LOW-INCOME PREGNANT WOMEN

Montana Pruett

Poster: 426

Mentor(s): Lanay Mudd (Kinesiology)

It is important to understand pregnant women's perceptions of physical activity (PA) and healthy diet to develop effective interventions. PURPOSE: To determine low-income pregnant women's perceptions about the importance of PA and a healthy diet during pregnancy, and interest in receiving advice about these behaviors. METHODS: We recruited women (n=77) in their 2nd or 3rd trimester from an OBGYN clinic serving a low-income population. Women reported sociodemographics current PA and dietary habits. Women rated perceived importance of nutrition and PA for pregnancy outcome using 10 pt. scales (not important at all - very important), and interest in receiving information about these behaviors on 10-pt scales (not interested at all - very interested). Responses were dichotomized into LOW (1-5) or HIGH (6-10) perceived importance and interest. Spearman correlations evaluated relations among nutrition and PA perceived importance and interest. Chi-square analysis evaluated whether personal characteristics were related to HIGH perceived importance and interest ratings. RESULTS: Most women gave HIGH importance to nutrition (87%) and PA (83%) during pregnancy; only about half were interested in receiving advice about nutrition (57%) or PA (53%). Spearman correlations showed ratings of perceived importance were moderately correlated with ratings of interest (r_s=0.29-0.43, $p<0.05$). White women were significantly more likely to report HIGH PA importance ratings (90%) compared to nonwhite (70%, $p>0.05$) Women in the 2nd vs. 3rd trimester had greater interest in advice on healthy behaviors ($p<0.05$). CONCLUSION: More work is needed to understand how to deliver advice about PA and nutrition to low-income pregnant women.

JOYSTICK KINETICS INFLUENCE INTERFERENCE BETWEEN HANDS IN BIMANUAL MOVEMENT

Bradley Miller Emily Steffke

Poster: 427

Mentor(s): Florian Kagerer (Kinesiology)

When using both hands for different movements simultaneously, there is a high chance for interference between the hands. Previous research using isometric force generation has shown motor overflow between the hands during intense gripping in one hand. This study's purpose was to determine if interference patterns are affected by the amount of force required to move joysticks. In this study, we used a center-out movement paradigm in which participants controlled two cursors using a joystick in each hand. Participants of one group used "hard" joysticks, which required 3.5 times more force to move than the "soft" joysticks used by the other group; all participants were right-handed. During baseline, both hands moved with normal visual feedback (12 trials: pre-exposure). The right hand then was exposed to an abrupt 60° visual feedback rotation (120 trials: exposure), while the left hand operated without visual feedback. This was followed by re-introducing veridical visual feedback to the right hand, while the left hand continued to operate without visual feedback (48 trials: post-exposure). The right hand's visual feedback perturbation updated its visuomotor map; the unperturbed left hand could continue to use its established 'normal' visuomotor map. However, the left hand was potentially subject to interference from the right hand. Preliminary results show greater interference in the nonvisible hand for participants using the hard joysticks than those using the soft joystick. This suggests that directional interference following the perturbation of one hand is modulated by the force input required to move the joysticks.

THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY TRACKER ADHERENCE AND TEAM STEP COUNTS DURING AN 8-WEEK CHALLENGE.

Angela Sherman Mary Robbins

Poster: 428

Mentor(s): James Pivarnik (Kinesiology)

Fitness tracker usage to promote physical activity is growing, but little research exists regarding the role of team based motivation. We investigated differences in step counts of an 8-week physical activity challenge based on team adherence level. Participants included faculty and staff from various departments across the MSU campus. Participants competed as one of five team members from their departments. Each team member received a Pivotal Living Band for use during the challenge. Total team step counts and user ID login frequencies were obtained from the Pivotal Living Company. Adherence was based on number of logins per team over the course of the challenge. Teams were categorized with high, moderate or low adherence based on tertiles. Outcome measures were total team steps and steps per user login. Differences between adherence levels were assessed using One-Way ANOVA. Eighteen teams (n= 90) participated and completed the challenge. Significant differences were found between teams with different adherence levels for steps per user login ($F(2,16)=7.539, p=0.005$) and for total team steps ($F(2,16)=26.431, p<0.0001$). Tukey Post hoc comparisons indicated that the mean total steps of high adherence teams (2348167.2±490632.2) is significantly different from that of low (830017.2±331923.1) and moderate (1355428.6±261858.9) teams (low: p-value<0.0001; moderate: p-value<0.0001). Mean steps per user login of high adherence teams (9919.3±1621.3) was also significantly different from that of low (7241.3±1552.4) and moderate (7489.2±732.7) adherence teams (low: p-value=0.008; moderate: p-value=0.012). Given our results, future research should focus on factors contributing to participant adherence within a team.

SEX DIFFERENCES IN BASELINE KING-DEVICK CONCUSSION ASSESSMENT AMONG YOUTH ATHLETES

Jimmy Stathakios Grant Goodfellow, Anna Stankewitz

Poster: 429

Mentor(s): Tracey Covassin (Kinesiology), Ryan Moran (Kinesiology)

The King-Devick (KD) oculomotor test has recently been advocated for sideline assessment of sport-related concussion, but very little research has examined youth athlete's performance on this assessment at baseline. The purpose of this study was to compare baseline sex differences on the King-Devick (KD) assessment between male and female youth athletes. Athletes were recruited from an on-going Mid-Michigan sport-related concussion study. A total of 272 youth football and soccer athletes volunteered to participate in the study. All athletes were administered the KD test prior to the start of their season. The independent variable was sex (male, female). An analysis of covariance was conducted with age (8-10, 11-14) as a covariate, with a p value set at .05. The average performance time on the KD test was 58.26±15.3s. There were no significant sex differences on the KD test (p=.10). Normal reference values for youth athletes are also presented in this study. Additional research is needed to determine if these findings persist and influence post-concussion performance.

KINESIOLOGY
POSTER PRESENTATIONS, SECTION 3
BALLROOM, 1:30 – 3:00 PM

THE EFFECT OF RESEARCHER GENDER ON MALE AND FEMALE PARTICIPANTS' RATINGS OF EXERTION DURING INTENSE EXERCISE

Alexandra Higbee Andrew Rabaut, Alexander Woods

Poster: 433

Mentor(s): Deborah Feltz PhD (Kinesiology), Christopher Hill (Kinesiology), Stephen Samendinger (Kinesiology)

Although the findings have not been conclusive, previous research has demonstrated that male and female exercisers may report ratings of exertion differently dependent upon coactive exercisers or the presence of others. Self-presentational concerns may influence the differences in exertion ratings and affect the interpretation of these perceptions in exercise regimens. The aim of the current study is to examine interactions between the gender of the participant and the gender of the researcher. Ratings of perceived exertion (RPE) were assessed using the Borg scale at the end of the 30-minute continuous workouts, which participants completed three times per week. A sample of 22 participants (10 females, 12 males), completed workouts for 24 weeks while on a stationary bicycle and playing an exercise video game. Either a male or female researcher entered the lab to collect the ratings of exertion at the end of the 30-minute session. For the purpose of this study, data analysis was limited to the starting point (Week 2) to the midpoint (Week 13) due to higher rates of attrition in the second half of the study. Results will be analyzed using correlations and linear regression models. Findings will be interpreted and discussed to draw implications for this study and real-world application.

Grant: NASA/National Space Biomedical Research Institute, MA03401

OBSTACLES AND ROLES IN TEAM SUCCESS

Sonny Metoki Derek Hart, Madeline Keller

Time: 1:30 PM

Poster: 434

Mentor(s): Eric Martin (Kinesiology)

An individual's role can impact their goals as well as how they are able to overcome obstacles they may encounter. Further, by looking at roles and challenges athletes face we will be able to investigate how athletes' cooperation and self-confidence influences team dynamics. If we can understand these questions, we can better understand how these psychological aspects relate to team success and find effective methods of mental preparation to optimize future sport performance. Therefore, our primary research question explored how an athlete's team role influenced the goals they set for the upcoming season. We also wanted to look at the obstacles an athlete may anticipate for the upcoming season and how successful they thought they would be in overcoming them. For the study, we transcribed interviews from 11 high school women's and men's basketball athletes. Through the transcription process, each of us took notes of common themes and met to code each interview to find information relevant to our research questions. From our analysis, we expect to see several conclusions. Specifically, because both of these programs are successful, we expected their past goals will include a high level of success that could be both individual and team oriented. We also believe that the athletes will view past challenges will help them to better prepare for the upcoming season. Finally, based on the relatively high level of success within the programs, we believe they will foresee being successful as they work through expanded role and expectations.

RELATIONSHIP BETWEEN PARENT AND CHILD'S PASSION FOR SPORT

Alyssa Redoute

Poster: 435
Mentor(s): Eric Martin (Kinesiology)

Most young athletes play a sport because they love it; however outside sources can influence that feeling. Parents often influence the decisions of what their children can do, which can influence children's activities in which they do. Additionally, the relationship between a child and a parent can influence what a child loves to do and is passionate about. Passion is defined as a strong sensation toward an activity that one finds important, loves, and devotes time and energy on a daily basis. It is important to find that passion in children and whether or not they value that time on the sport. The present study was designed to assess young athlete's perceived passion for a sport they are currently involved in. The sample consisted of high school athletes across Ingham County high schools that were engaged in a high school sport occurring in the fall season. Because parents often influence children, our research question is do parents have an influence on their children's general passion for sport? Data was collected at the beginning of the season using a variety of surveys. Overall, the expected findings are that parents do have a positive influence on their children's general passion for their sport.

CHANGES IN VO2MAX OVER A 24-WEEK CYCLE ERGOMETER INTERVAL PROGRAM

Alexander Smith Ashley Schneider

Poster: 436
Mentor(s): Deborah Feltz (Kinesiology), Chris Hill (Kinesiology), James Pivarnik (Kinesiology), Ashley Triplett (Kinesiology)

Little is known about how to maintain aerobic fitness in space among healthy adults. PURPOSE: To determine if participation in an exergame cycling program has an effect on aerobic fitness (VO2max). METHODS: Participants completed a 6-day/wk exercise program on a cycle ergometer for 6-months. Participants were healthy adults (M age = 46.9, SD = 7.4, n = 19) who self-reported participating in at least 30 minutes of vigorous exercise, 3 times/wk. Participants exercised 6 day/wk, using routines developed by Ploutz-Snyder that consisted of (a) 30 min. continuous aerobic cycling at or above 75% of maximum heart rate (HRmax), (b) long, 4x4 min. intervals at or above 90% HRmax with 3 min active rest, (c) medium 6x2 min intervals at 70%, 80%, 90%, 100%, 90%, 80% of HRmax, respectively with 2 min active rest, and (d) short, 30 sec. max sprint intervals with 20 sec active rest. Outside lab physical activities were tracked and recorded, and participants did not report strength training during the study. VO2max was measured pre, mid, and post intervention. RESULTS: Average VO2max increased from pre to mid test (34.3 ml/kg/min vs. 39.1 ml/kg/min), but did not change from mid to post-test (39.1 ml/kg/min vs. 39 ml/kg/min). CONCLUSION: Exergame interval training appears to be viable for increasing VO2max over 6-months training for healthy, middle-aged adults.
Grant: NASA/National Space Biomedical Research Institute, MA03401

LEARNING TO MOVE A ROBOTIC ARM

Logan Springgate, Jonathan Kushion

Poster: 437
Mentor(s): Rajiv Ranganathan (Kinesiology)

Prostheses are abandoned by about 25% of pediatric and adult amputees (Biddiss, Beaton, & Chau, 2007). One of the biggest challenges to continued use of prostheses is the difficulty of learning to control an external object non-intuitively. Therefore, it is essential to examine the motor learning process necessary for adjusting to controlling an external device. As a first step to studying this learning process, we developed a setup using a small robotic arm (MeArm Robotics) that could be controlled by hand and finger motions using an inexpensive motion capture system (Leap Motion). MeArm is a ready-to-assemble, open-source robotic arm with its motion controlled by four small servo motors. These motors are controlled by an Arduino Uno R3 microcontroller board, a microcontroller frequently used for small electronics projects. Hand

position data is collected by the Leap Motion 3D Controller which uses infrared LEDs and cameras for small scale motion capture. This data is processed and scaled by MATLAB (MathWorks), then relayed to the Arduino board, allowing the user's hand motions to move the robotic arm. This project will enable us to identify best learning and control methods for controlling a robot arm, which can then be used to increase the ease of controlling new prostheses.

A COMPARISON STUDY OF GAIT SPEED MEASUREMENTS
Alexi Vasbinder
Poster: 438
Mentor(s): Barbara Smith (Nursing)

Measuring gait speed has been shown to be an effective measure for assessing functional status and predicting poor health outcomes such as physical and cognitive declines, falls, hospitalizations, and mortality. The GAITRite® is an instrumented walkway that uses pressure sensors to detect gait parameters. However, this method is an expensive alternative to using a pre-marked walkway and a stopwatch. The purpose of this study is to explore the differences between the laboratory test (GAITRite®) and the field test (stopwatch) in measuring gait speeds to determine which method is more feasible for the clinical and community setting. In this study, we will recruit healthy participants between the ages 18-55 for women and 18-45 for men who are able to walk 1000 feet without assistance. We will record participant's age, gender, blood pressure, pulse, oxygen saturation, height, and weight. Participants will then be asked to walk 16 feet three times at their normal pace and three times at their fastest pace. The field test will be performed first and then the laboratory test. If the stopwatch shows similar reliability and validity to the GAITRite®, it would be a more cost effective and convenient tool for measuring gait speed in a busy clinical and/or community setting.

EFFECT OF GRIT ON STUDENT ATHLETES
Sarah Weber
Poster: 439
Mentor(s): Eric Martin (Kinesiology)

Grit is a critical topic because it has been shown to predict an individual's determination and work ethic. We should continue to study how it relates to athletics because it could potentially predict how dedicated or passionate one may be about their chosen sport and how it allows them to identify with the sport. The research topic I chose revolves around how someone's grit can be affected by or have an effect on various elements. This topic is vital because a person's grit and inner personality effects every aspect of their life greatly, and there is not much that can cause their level of grit to fluctuate. Knowing how someone tends to act in and react to different aspects in their life can help coaches, managers, bosses, and parents appropriately guide individuals. Studying young adolescents in something they are passionate about, such as athletics, allows for a good basis to actually determine what kind of effect grit has on an individual's perceptions about their sport. Therefore, I want to investigate how grit affects a student athlete's sense of identity in their sport or influences their sport specialization preference. Data was collected with 174 student athletes who each completed a survey prior to and following their sport season. These questionnaires related to levels of passion and grit, along with questions regarding sport specialization and sense of identity. The expectation is that the level of grit will have a positive correlation with success in their sport and a tendency to specialize.

LINGUISTICS, LANGUAGES, & SPEECH

POSTER PRESENTATIONS, SECTION 1
MOSAIC MULTIPURPOSE ROOM, 9:00 – 10:30 AM

IT IS EITHER HIGH OR LOW: INVESTIGATING CHILDREN'S AND ADULT'S UNDERSTANDING OF 'OR'
Julia Andary, Natalie Chemey, Robert Felster
Poster: 443
Mentor(s): Adam Liter (Linguistics and Languages), Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)

The conjunction 'or' allows two interpretations depending on the context. In "the cat can eat tuna or salmon" we infer that the cat can have one or the other, but not both (the exclusive reading of 'or). In "the cat can't eat tuna or salmon" the preferred interpretation is that the cat cannot eat tuna and the cat cannot eat salmon (the inclusive reading of 'or'). The inclusive 'or' interpretation is almost obligatory in negative contexts. When 'or' is combined with 'either', matters become more complicated. 'Either' can appear in multiple places: there is high placement (before the verb, e.g. "The cat either ate tuna or salmon"), low placement (after the verb, e.g. "The cat ate either tuna or salmon"), and some others. With sentence negation, 'either' placement changes inclusive-exclusive readings of 'or'. If the 'either' is higher than negation as in "the cat either didn't eat tuna or salmon" and "It was either tuna or salmon that the cat didn't eat, 'or' is interpreted exclusively, while in "The cat didn't eat either tuna or salmon" 'or' is interpreted inclusively. In this project, we focus on the effect of 'either' placement on pre-school children's and adults' interpretation of 'or' in negative sentences using a picture selection task. Our results will help gain a better understanding of how young children learn the inclusive/exclusive interpretations of 'or'.

REASSESSING THE VERBAL DISTINCTION OF THE MARATSOS EFFECT
Tess Huelskamp
Poster: 444
Mentor(s): Adam Liter (Linguistics and Languages), Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)

One aspect of linguistics involves trying to understand how children acquire their first language. We investigate how children acquire passive constructions, e.g., "the ball was kicked by the girl". It is well known that children acquire the passive construction later than the active construction, e.g., "the girl kicked the ball" (Hirsch & Wexler 2006). Furthermore, children are known to acquire passives of nonactional verbs, e.g., "chase", later than passives of actional verbs, e.g., "see" (Maratsos et al. 1985). This phenomenon, known as the Maratsos Effect, has been widely replicated. However, a close inspection of previous studies reveals that the verbs classified as nonactional are quite heterogeneous. Using linguistic diagnostics for the verbal properties of agentivity and eventivity, we show that there are three types of verbs that have been tested as nonactional in previous studies: (i) eventive agentive verbs, (ii) eventive nonagentive verbs, and (iii) noneventive nonagentive verbs. A verb is agentive if it can be used in a sentence with "deliberately", e.g., "the girl deliberately kicked the ball". A verb is eventive if it can be used in a sentence with "what happened was", e.g., "what happened was the girl chased the ball". We report two studies using a Truth Value Judgment Task (Crain & Thornton 1998). Experiment 1 tests children's comprehension of agentive eventive verbs and eventive nonagentive verbs. Experiment 2 tests children's comprehension of eventive nonagentive verbs and noneventive nonagentive verbs. We find a three-way distinction, suggesting that both agentivity and eventivity drive the Maratsos Effect.

INVESTIGATING AUTOMATED PART-OF-SPEECH TAGGING OF CHILD LANGUAGE
Renee Dennis
Poster: 445
Mentor(s): Amaresh Joshi (Linguistics and Languages), Alan Munn (Linguistics and Languages)

Automated part-of-speech tagging provides a quick, consistent method for annotating words in a corpus with their corresponding parts of speech. Although part-of-speech tagging is a method frequently used in corpus linguistics, most existing tagging software is trained solely on grammatical, adult language. The goal of this project is to first explore the differences between current tagging methods and existing tagging software in the context of child language. Specifically, we aim to successfully tag raw child language data collected from native Chilean and Mexican Spanish speakers. It is unclear as to whether taggers trained on adult language data perform sufficiently on child language data. Child language often lacks the grammatical information present in adult speech, which has the potential to influence the algorithms used in tagging software. For example, depending on a child's age, his or her utterance may use a word in a non-adult way, or perhaps omit words entirely, effectively diminishing the reliability of a word's context to determine its part of speech. We ultimately hope to gain understanding of the difficulties involved with tagging such data and devise methods to overcome them.

XU BING'S EXPLORATION OF LANGUAGE

Joseph Hazelton
Poster: 446
Mentor(s): Phylis Floyd (Art, Art History, & Design)

The Chinese contemporary artist Xu Bing has gained international recognition for his exploration of language in mixed-media installations. In this presentation I will explore the relationship between his two printed publications: Book From the Sky, and Book From the Ground. Bing crafted Book From the Sky in a meaningless Chinese-like glyph. The four volume, 600 page work has often been seen as a commentary on the meaninglessness of contemporary political language. Xu Bing himself has stated that the work intends to, "expose the fact that Chinese literary culture is taoyari [boring/tedious]." Book From the Ground: From Point to Point, in contrast, tells a story understandable to all. With a language of collected pictograms, Xu Bing gives 24 hours in the life of an unnamed man. Through the comparison of these two works I hope to demonstrate Bing's artistic intent: his political criticism, and commentary on language.

FOCUS LOCUS HOCUS POCUS: CHILDREN'S COMPREHENSION OF FOCUS CONSTRUCTIONS

Kyle Latack Bethany Dickerson
Poster: 447
Mentor(s): Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)

Language allows us to focus elements in a sentence, thus making assertions not only about events that happened, but also alternative events that did not happen. For example, the use of 'only' in "only John ate an apple", with focus on John, indicates that nobody else ate an apple. Another example is Contrastive Reduplication (CR), in which the focused element is repeated: "John ate a salad-salad" implying that he did not eat alternatives like tuna-salad. The alternatives associated with focus have also been linked to the way words like some implicate not all. Previous studies have found that children do not interpret 'only' or 'some,' like adults do, but there have been no studies on CR. This study compares children's ability to calculate each of these three types of alternatives using a covered-picture selection task. Participants are asked to select the picture that best matches the sentence they hear, from an array of three pictures, one of which is obscured. Compared to experiments where all alternatives are visible, this setup provides some alternatives, while forcing the participant to generate the remaining alternatives. For example, if asked for the picture where "the box is open-open" with two pictures showing slightly open boxes and one covered picture, the participant has to generate a stronger alternative to select the covered one. Since CR makes the focused element more salient via explicit repetition, we expect children to perform better on this condition than in sentences with alternatives generated through only and some.

SECOND FORMAT TRANSITIONS IN STUTTERING PERSISTENCE AND RECOVERY

Jacob Nitzkin

Poster: 448

Mentor(s): Eric Hunter (Communicative Sciences and Disorders)

Developmental stuttering disrupts the rhythmic flow of speech in 5% of preschool age children. Up to 80% of children who stutter recover naturally. As stuttering persists into adulthood, secondary characteristics, such as laryngeal tension may be observed. These secondary characteristics could possibly be detected in speech but presently there are no objective markers to differentiate those children who persist versus those who recover from stuttering. One potential objective marker is the second formant transition (a dynamic component of the second resonance of a speech vowel). Our study aims to determine whether second formant (F2) transitions can serve as a prognostic indicator for recovery in children who stutter. We hypothesize that children who persist in stuttering will demonstrate smaller frequency change than those who recover. Narrative speech samples were collected from 26 children (13 persisted in stuttering, 13 recovered) between 3-6 years of age who are currently participating in a 5-year longitudinal study at Michigan State University. Consonant-vowel segments will be clipped from single words based on the classification of initial consonants (bilabial, alveolar, and velar placement). Following target selection, the duration and frequency of the F2 transitions will be analyzed to determine the variability between children who persist in stuttering and those who eventually recover. The current study's findings have the potential to develop prognostic factors that help prioritize treatment for those children most likely to develop persistent stuttering.

THE DISTICHS OF CATO AND LATIN INSTRUCTION FROM THE LATE 16TH TO EARLY 18TH CENTURY

Olivia Sheridan

Poster: 449

Mentor(s): Kate Fedewa O'Connor (Writing, Rhetoric, and American Cultures)

The Distichs of Cato were a set of proverbial Latin couplets grouped into books. These Distichs were used during the middle ages to aid in teaching Latin to school children. Not only did this set of phrases leave an impression on education throughout Europe, they were also translated into many languages. Within these translations, into English specifically, there are some discrepancies. What I would like to do is understand what accounts for these differences. I would also like to expand on this and discover what different sorts of usages called for different sources of English translations from the late 16th to the early 18th century.
To do this I will study in depth the different translations of the Distichs, including Penkethman, Hoole, Baker, and Logan, and what separates each translation from others based on word choice, rhyme, and adherence to the original Latin. I will also study when each of these were translated, who translated them, and how the Distichs were being used at that time. When I look at the individual translations, I will look at who the translator was and for what purpose, commercial or personal, they translated the Distichs. That will provide some insight into what the translation of the Distichs was used for at the time it was translated. Researching this will provide context about language teaching and education during the time period that they were translated, in addition to possibly aiding a future translation of the Distichs.

LINGUISTICS, LANGUAGES, & SPEECH
POSTER PRESENTATIONS, SECTION 2
MOSAIC MULTIPURPOSE ROOM, 9:00 – 10:30 AM

PERFECT USES IN AMERICAN ENGLISH: THE ROLE OF INPUT IN CHILD-LANGUAGE ACQUISITION

Kimberly Hulliberger Katherine Rock

Poster: 453

Mentor(s): Alan Munn (Linguistics and languages), Cristina Schmitt (Linguistics and languages)

Research has shown that by age 3 children can distinguish present, from past and future (John likes/liked/will like dogs) quite accurately (Valian 2006). However, it seems that American children take a long time to acquire the so-called Perfect tenses (I have eaten this before, I have lost my dog, I will have had lunch by 3pm). Previous work has shown that by age 6 children are still not using the Perfect in adult-ways. Based on a small sample Gathercole (1986) argued that this is because American-English speakers use the Perfect less than speakers of other dialects and therefore children have less input. Using much larger corpora, we ask: (i) is there a correlation between parental use and children production? (ii) what are the properties of the Perfect in adult and child speech? (iii) if the input is so meager how do children end up acquiring the Perfect? We hypothesize that the input children receive partially predicts child use in at least two different ways: frequency of use should play a role, but also the different properties of the perfect may also play a role, including the properties of the participles used (I should've ate vs. I should've eaten). We also hypothesize that different children may arrive at the Perfect following different paths. To test these hypotheses we extracted from the American-English corpora available on CHILDES (MacWhinney 2000) all sentences with the Perfect from children and adults and we manually coded for both its syntactic and semantic properties.

DIFFERENTIATING BETWEEN STUTTERING AND NORMAL DISFLUENCY IN CHILDREN

Kelly Jones Nicole Macker

Poster: 454

Mentor(s): Soo-Eun Chang (Communicative Sciences and Disorders)

Developmental stuttering is a speech disorder with typical symptom onset during preschool age. Stuttering is diagnosed if a child exhibits ? 3% of stuttering-like disfluencies (SLDs) in his speech. SLDs include part-word (PW) (e.g., p-p-p-puppy) and single syllable word (WW) repetitions (e.g., I-I-I), and dysrhythmic phonations (DPs) such as prolongations (e.g. ssssnake) or tense blocking of speech sounds. The presence of SLDs is indicative of developmental stuttering, although normally fluent children also exhibit SLDs. A question arises then, whether the number of SLDs from speech samples is sufficient to differentiate between children who do (CWS) and do not (controls) stutter. In this study, we examined whether a weighted SLD measure (Yairi & Ambrose, 1999), which takes into account not only the frequency of SLDs but also the extent of repetitions (number of iterations), and the durations of DPs, could better differentiate CWS from controls. We compared speech samples from 22 CWS and 8 controls who exhibited intermediate %SLD in their speech samples (2-4% per 100 words). The two groups did not differ in %SLD ($p = 0.68$). When using the weighted SLD metric, however CWS (mean = 4.87; SD = 1.89) scored significantly higher than controls (mean = 3.07; SD = 0.70) ($U = 108.000$, $p = 0.017$). All controls scored ? 4 on the weighted SLD metric. Further research is needed to examine whether differential weighting based on repetition units, and duration of DPs, could further improve the diagnostic utility of this metric.

GENDER DIFFERENCES IN YOUNG CHILDREN'S NARRATIVE LANGUAGE DEVELOPMENT

Alexa Meier
Poster: 455
Mentor(s): Hope Gerde (Human Development & Family Studies)

Previous research has established that young girls develop language earlier and at a faster rate than boys (Bouchard et al., 2009). However, most of this work has focused on vocabulary development specifically, providing a limited and decontextualized model of language. A more comprehensive model of language might demonstrate a different trajectory of development; risk due to gender may not be prevalent. This study examines children's use of advanced language in a narrative production task with preschoolers. Previous work has found narrative skills to predict academic success (Paul, 2012) and narrative is a creative and developmentally appropriate way to examine multiple components of children's language. We use narratives regularly in our daily dialog as we converse with others about a range of topics. Thus, children's narrative productions are meaningful both socially and academically (Pindzola, Plexico, & Haynes, 2016). To answer the research question, does young children's use of vocabulary and adjectives differ by gender, archival data was used from the Michigan Child Longitudinal Study database developed by the Early Language and Literacy Investigations lab at Michigan State University. The database contains over 300 videos of 4-5-year-old children assessed by the Narrative Assessment Protocol (NAP; Pence, Justice, & Gosse, 2007). These videos were transcribed and coded for many variables including total words, distinct words, and adjectives. Descriptive analyses identified variation in words and adjectives used by boys and girls. ANOVA identified differences in parts of speech by gender. The results and implications of the work will be presented.

DESIGNING MULTIMODAL REPRESENTATIONS OF A LANGUAGE LEARNING APP GAME IDEA

Christian OKeefe
Poster: 456
Mentor(s): Catherine Ryu (Linguistics,germ,slavic,asian,afr Lang)

The purpose of my research is to understand and design multi-modal representations of language learning. I am doing this under Dr. Catherine Ryu's guidance as part of her Cube2Cube and Mandarin Tone Perception and Production team. My presentation will focus on the development of these representations and the challenges, problem-solving approaches, and opportunities involved. There is an emphasis on the multidisciplinary nature of developing various modes of language learning. Part of my research is understanding the necessity of these multi-modal representations in order to create effective language learning modules. This is being done through collaborative efforts between students and professionals from many different backgrounds.

OBJECTIVE MEASURES FOLLOWING THYROPLASTY

Collin Potter
Poster: 457
Mentor(s): Eric Hunter (Communicative Sciences and Disorders)

Thyroplasty is used by otolaryngologists to treat severe dysphonia caused by vocal fold paralysis or paresis. Voice care professionals report that patients have better voicing as a result of thyroplasty. From a wide range of objective measures, we attempt to identify which measure(s) best identifies the likely improvement due to the procedure. In this retrospective study, we compared pre- and post-thyroplasty recordings for 30 patients. Recordings consisted of sustained /a/ vowels and reading the Rainbow Passage.

INVESTIGATING THE EFFECTS OF PRIOR LANGUAGE EXPOSURE ON SECOND LANGUAGE ACQUISITION IN CONTENT-BASED INSTRUCTION

Haley Rooney

Poster: 458

Mentor(s): Angelika Kraemer (CeLTA), Sandhya Shanker (CeLTA)

This qualitative project seeks to explore the effects of prior language exposure on second language acquisition in content-based instruction (CBI) in elementary and middle school classrooms. Current literature supports the idea that CBI is effective among learners who are above the intermediate level of proficiency (Curtain & Dahlberg, 2010). This study investigates if prior exposure and duration of exposure to a language and culture contribute to the effectiveness of CBI at the beginner level. It is hypothesized that the contextualized nature of CBI will permit greater retention of vocabulary and cultural information, specifically among students with some prior language exposure. The research questions were studied in a Spanish enrichment program at a local school. The program focused on the topic of Food and Nutrition in Spanish-speaking countries with the objective of providing students with a working knowledge of Spanish as well as integrating cultural information about people's day-to-day eating habits, nutritional standards, and dietary preferences. Instruments included a pre-survey, eliciting demographic information and prior language exposure, and post-program assessments to evaluate students' recall of vocabulary and cultural information. It is hoped that the study will provide more insights into the feasibility of using CBI for beginners and the optimal stage for introducing this form of learning to older children and teens.

A COMPARISON OF STRESSED AND UNSTRESSED PRONOUNS IN ENGLISH

Catherine Seibert

Poster: 459

Mentor(s): Hannah Forsythe (Linguistics), Cristina Schmitt (Linguistics)

Pronouns are highly ambiguous, yet native speakers are very good at using context to establish their antecedents, that is, what object(s) they refer to. To establish the antecedent of a pronoun, comprehenders rely on various sources of information and biases, many of which have been well studied. One outstanding question, however, is how stressing a pronoun changes these inherent biases. One hypothesis is that stressing a pronoun simply reverses whatever original expectation listeners had for the antecedent. For example, with neutral stress on 'she' in "Mary greets Sara and she greets Joey," the preferred interpretation for the pronoun is Mary. Stressing the pronoun shifts the interpretation to Sara. Another hypothesis is that stressed pronouns just signal contrast, that is, "Mary greets Sara and SHE greets Joey" indicates a contrast between Mary greeting someone and Sara greeting someone. We use a picture-selection task to test native English speakers' preferred interpretations of stressed and unstressed pronouns embedded in short discourses linked by parallel, sequential and causal relations. If stress reverses pronoun interpretation, then, to the extent that the unstressed pronoun prefers one antecedent, the stressed version will show an equally strong, opposing preference. However, if stressed pronouns simply indicate contrast, then they should only be felicitous in contexts that support a contrastive interpretation. In our experiments, the sequential and causal contexts do not support this contrast and therefore we expect no preference in either direction. The results will be compared with the contrast between null and overt subject preferences in Spanish.

LINGUISTICS, LANGUAGES, & SPEECH
POSTER PRESENTATIONS, SECTION 3
LAKE HURON ROOM, 1:30 – 3:00 PM

AMBISYLLABIC CONSONANTS IN A SPOKEN CORPUS

Robert Felster
Poster: 463
Mentor(s): Karthik Durvasula (Linguistics and Languages)

Ambisyllabic consonants are consonants whose syllabic affiliation is unclear to native speakers. For example, native speakers disagree on which syllable the “n” in “money”, or in “honey” is in. Such consonants have been a frequent subject of various studies (Treiman & Danis, 1988; Gussenhoven, 1986; Hayes, 2009; Kahn, 1976). Some have suggested such consonants belong to the first syllable; others have suggested it belongs to the second syllable; and some others have suggested it belongs to both syllables. In our research, we attempted to answer the question by looking at such consonants in naturalistic productions, and comparing them to consonants in other positions where the syllabic affiliation is clear. Using data from Ohio State University's Buckeye Corpus (Pitt, Johnson, Hume, Kiesling, & Raymond, 2005), we gathered enough evidence to make a claim about the nature of ambisyllabic consonants. We measured the durations of ambisyllabic consonants and compared that to the durations of other consonants which are in one of the following positions (a) word-initial, (b) word-final, (c) word-internal syllable-initial, (d) word-internal syllable-final. We used Praat (Boersma & Weenink, 2016), a phonetic analysis program, to gather the relevant data from a total of 12,092 words from 34 speakers in the Buckeye Corpus. Our results suggest that ambisyllabic consonants largely pattern with word-internal syllable-final consonants in American English. The only cases that pattern more closely to word-internal syllable-initial consonants are cases where the ambisyllabic consonants are the class of sounds called liquids (i.e., [l],[r]).

ICH GEBE XIEM XIESES BUCH ZURÜCK: ATTITUDES AND USAGE OF AN EMERGENT PRONOUN IN GERMAN TWEETS

Natalie Chemey
Poster: 464
Mentor(s): Suzanne Wagner (Linguistics and Languages)

In recent years, there has been a movement to have more gender-affirming language in professional, academic, and LGBTQ+ communities. One of the linguistic phenomena promoted by some of these groups is gender-neutral or non-binary pronouns. English has begun to use “they” in singular contexts when a person’s gender is unknown or does not fit into the traditionally-defined male-female binary. Its use was acknowledged by the Linguistic Society of America in January as the “Word of the Year” at their annual conference. In German, however, progress towards a similarly gender-neutral pronoun has been slower. There are some pronouns which have begun to see use in online communities, such as Twitter. In particular, a pronoun, “xier”, has been used in tweets, acting as a pronoun to refer to both specific people, unknowns, and abstract entities. My research focuses on the usage of and attitudes to “xier”, using Twitter as a corpus to collect utterances which discuss and/or use the “xier” system in place of an already existing pronoun. Specifically, I am investigating how errors in case, number, and gender markings correlate to type of pronoun and gender/case/number of what follows. Also, opinions of “xier” range from positive (labelling “xier” their favorite pronoun) to confused (about its pronunciation) to disgust (comparing it to excrement). I am looking at these attitudes towards “xier” to find the opinion of German-speaking Twitter, which could have long-term effects on its continued use.

WHAT MAKES A LATE-TALKER? AN INVESTIGATION OF GET, PUT, AND MAKE IN THE SPEECH OF LATE-TALKERS AND TYPICALLY DEVELOPING CHILDREN

Kyle Latack, Julia Andary, Bethany Dickerson, Catherine Seibert

Poster: 465

Mentor(s): Cristina Schmitt (Linguistics and Languages)

We know that some children begin talking later than their peers, and that some late-talkers eventually catch up to their peers, while others develop specific language impairment (SLI). It has been claimed that one of the properties of late-talker speech is the overuse of so-called General All-Purpose (GAP) verbs, including "get," "put" and "make," which are characterized by their ability to combine with a wide variety of phrases, or complements ("get going," "get hurt," "get in," "get to go to the zoo," etc). The original hypothesis was that late-talkers over-rely on these verbs to compensate for a small vocabulary (e.g. substituting "get dead" for "die."). However, the results may be due to previous studies' focusing on overall rates of use rather than verb quality. Here, we examine the use of GAP verbs (by token and type of complement) by late-talkers and typically developing children (Weismann corpus) with samples taken at ages 2;6, 3;6 and 4;6. We focus on productivity, or syntactic and semantic variety of use, controlling for the input children receive, something that has not been done before. If late-talkers over-rely on GAP-verbs to compensate for a small vocabulary, we expect them to use GAP verbs with many different types of complements. If late-talkers overuse GAP verbs as idiom-like forms, we expect them to only use those combinations they hear in the input. By examining the quality of these children's speech we can help shed light on the reasons for the quantity/timing difference.

PREDICTION OF NOUN-NOUN COMPOUNDS IN ENGLISH

Brian Pinsky

Poster: 466

Mentor(s): Alan Beretta (Linguistics)

For the past 50 years, various tasks have given linguists convincing evidence that people make predictions as they read or hear sentences. Each incoming word either supports their prediction, or forces them to revise their understanding of the sentence. Recent EEG research can give us a millisecond by millisecond picture of this process as it unfolds. However, despite our accurate measurements of how closely a sentence matches people's expectations, it is often unclear exactly what people are expecting. Many contemporary experiments specifically study how people process noun-noun compounds, so we attempted to answer this question in this context. Specifically, we performed a sentence completion task to find out what people are expecting when they have heard the first noun in the compound, but not the second. The standard model of compound processing suggests that if the first noun plausibly fits in the context, people do not predict another noun; and they do predict another noun if the first noun is implausible. Our results, while mostly supporting this model, indicate that familiarity of the compound and availability of alternative syntactic structures also significantly effect whether people predict a compound.

PERFECTING OUR UNDERSTANDING OF THE PERFECT: JUDGEMENTS OF THE PERFECT TENSE FROM AMERICAN ENGLISH SPEAKERS

Adam Smolinski, Kimberly Hulliberger, Katherine Rock

Poster: 467

Mentor(s): Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)

In English, there are many ways to describe events that happened in the past. We can use the simple Past Tense (John ate a cake) or the Present Perfect (John has eaten a cake). Although the two tenses seem interchangeable, they are not. Different verbs and different modifiers highlight the difference: while the Simple Past just locates an event at a time before now and can be modified by "in 2006", for example, (John lived in Paris in 2006), the Perfect creates an interval that extends to "now" and can be modified by "since phrases" (John has lived in Paris since 2006). Although in the latter examples the contrast appears to be very sharp, this is not always the case. In fact, there is some evidence showing that American-speakers prefer the simple past and sub-use the Present Perfect in comparison to British speakers. We ask to what

extent this is reflected in their acceptability of the present perfect and the simple past with different types of modifiers. In this project we use two methods to investigate MSU students' acceptability of the simple past and the present perfect with different modifiers. Study 1 uses an offline acceptability judgement task (Likert Scale) and Study 2 uses an online self-paced reading task. Our goal is to determine which modifiers are (un)acceptable with each tense, and in the unacceptable cases at which point in the sentence the violation is detected.

C-OR-PUS: HOW CHILDREN LEARN THE PROPERTIES OF 'EITHER/OR'

Rachel Stacey, Adam Smolinski

Poster: 468

Mentor(s): Adam Liter (Linguistics and Languages), Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)

The conjunction 'or' often co-occurs with the word 'either'. 'Either' can appear in various positions in a sentence, and sometimes it is displaced from the 'or' it is associated with. 'Or' itself can have an 'exclusive' meaning, where it means "one or the other, but not both", as in "You can have coffee or tea". It can also have an 'inclusive' meaning, as in "I didn't have tea or coffee" meaning "I didn't have tea and I didn't have coffee". Previous experimental research has shown that children understand inclusive interpretations of 'or' (Crain 2012). However, no study has investigated the use/interpretations of 'or' and 'either' in child-directed speech. Here we examine 'either-or' sentences in adult speech to children. We ask two questions: do children receive input that supports variable position of 'either', and do children receive input that would allow them to learn the inclusive interpretation of 'or'. Using a corpus of children's and adults' child-directed speech we extracted all instances of 'or', yielding 13,395 cases out of 2,213,831 utterances. We will analyze these sentences to see what kinds of evidence children have in the speech directed to them for displaced 'either' and inclusive interpretations of 'or' in negative sentences. Our results will give us a better understanding of whether children receive input data that supports displaced 'either' and both interpretations of 'or', and whether their productions match or not that input data.

EXPLORING LOCAL LINGUISTIC LANDSCAPES

Mengtian Wang

Poster: 469

Mentor(s): Peter De Costa (Linguistics and Languages)

In our contemporary society, we are surrounded by different languages. As observed by sociolinguists who study linguistic landscapes (e.g., Shohamy, et al., 2010), the languages displayed in public spaces not only communicate surface meanings, but also convey embedded ideologies, attract people's attention, and constitute the social milieu in which the languages and its users exist. In light of this multilingual reality, I plan to focus on the greater Lansing and East Lansing communities because of their diverse and multicultural environments. One of the significant landscapes I have encountered in our local public space is the MSU library. The poster at the entrance of the main library, for example, represents the word library in different languages such as Hindi, Arabic, and French. This linguistic token makes students who come from various countries feel welcomed in the community. Another such welcoming place is the 54B District Court. When people go to the court, they can see a notice stating, "we provide service in Chinese, Japanese and Korean" near the service window. This message is also expressed in those three languages, thereby suggesting efforts to ensure that the court provides different language services to people and is committed to promoting equality. People whose native language is not English will find it easier to integrate into the society through such initiatives. Hence, by examining a range of linguistic landscapes in my poster presentation, I seek to underscore the importance of language in our environment and offer insights into how social justice can be achieved.

MICROBIOLOGY, IMMUNOLOGY, & INFECTIOUS DISEASE

POSTER PRESENTATIONS, SECTION 1
BALLROOM, 9:00 – 10:30 AM

CHARACTERIZING LANTHANIDE-DEPENDENT METHYLOTROPHY FOR BIOMETALLURGIC APPLICATIONS

Lucy Bolerjack
Poster: 473
Mentor(s): Norma Cecilia Martinez-Gomez (Microbiology and Molecular Genetics)

Rare earth elements are often used in alloys for technologies such as camera lenses, laptop and cell phone batteries, specialized lasers, and more. However, extracting and purifying lanthanides from the earth's crust requires harsh acid treatments that release toxic, radioactive chemicals. Methylobacterium extorquens AM1 are lanthanide-dependent methylotrophs, and can use La3+, Ce3+, Pr3+, Nd3+, and Sm3+ when present during methanol growth. Our laboratory has shown that La3+ and Nd3+ act as a cofactor during methanol oxidation by at least 3 enzymes: methanol dehydrogenases XoxF1 and XoxF2, and ethanol dehydrogenase ExaF. We propose to use M. extorquens as an efficient bioleacher of lanthanides using re-used Nd-magnets or ores containing a mix of La, Ce, and Nd. We have confirmed that M. extorquens is able to use Nd-magnets as a lanthanide source when methanol is added to the media. To engineer an efficient bioleacher for increased lanthanide uptake, I have introduced a high copy plasmid over-expressing the lanthanide-dependent enzyme ExaF. I will test if this construct can be used to recover increased yields of Nd. Additionally, we will evolve M. extorquens to be tolerant of high concentrations of lanthanides as well as acid resistant. These characteristics will enable M. extorquens to integrate with current chemical extractions methods, and increase recovery yields. Overall, my goal is to apply our current knowledge about lanthanide metabolism by M. extorquens to design a sustainable, clean, biometallurgic alternative.

SERINC5 RESTRICTS NEF DEFICIENT HIV INFECTIVITY

Samuel Brill
Poster: 474
Mentor(s): Yong-Hui Zheng (MMG)

Nef is one of the fifteen proteins expressed by HIV-1. Serine Incorporator 5 (SERINC5) is a large transmembrane protein that was recently discovered to be a strong Nef-dependent HIV restriction factor. Initial studies have shown that cells expressing SERINC5 can reduce infectivity of produced -/-Nef virions 100 fold compared to cells not expressing SERINC5, though the infectivity is restored in virus with a proficient Nef. This has been attributed to it being a large transmembrane protein that attaches itself to the HIV virion as it buds out from the producer cell. When subsequently infecting cells with HIV produced in cells with high SERINC5 levels, the virus seems to bind the target cells but then is unable to enter the cell due to the SERINC5 on the virus surface. The hypothesis of the mechanism being strictly attributed to SERINC5's large size does not explain why from the class of SERINC proteins (1-5), only SERINC3 produces a phenotype which is similar, though less robust, than SERINC5's. Furthermore, it has been identified that Nef redirects SERINC5 to a Rab7-positive endosomal compartment which prevents it from becoming incorporated into HIV virions. However, Nef proteins from various HIV clades have a wide range of effectiveness against SERINC5, the reason for which is still unclear.

ADAPTING MULTIPLEX GENOME EDITING TO ACTINOBACILLUS SUCCINOGENES

Vladislav Jdanov

Poster: 475

Mentor(s): Claire Vieille (Genetics and Molecular Genomics)

Maleic Anhydride is a petroleum-derived intermediate used in the petrochemical industry. Succinate is a potential substitute. The goal of the laboratory is to engineer a microbe to produce industrial quantities of succinate. Actinobacillus succinogenes produces high levels of succinate from sugars. It is hypothesized that if the organism is optimized to produce succinate at commercial levels, it may replace maleic anhydride as the precursor of a $15 billion chemical industry. A. succinogenes has been evolved to grow on xylose, the second most abundant sugar in plant lignocellulosic wastes. Three evolved strains produced more succinate and grew faster. Each strain contained several point mutations. The mutations' function must be understood in order to optimize A. succinogenes for succinate production on xylose. Conventional recombination methods use selection cassettes that result in DNA scars. These interfere with the clean transfer of point mutations. Mutliplex Genome Editing allows unmarked mutations to be co-transformed with a selectable mutation and recombined, allowing for the transfer of unmarked, point mutations. To demonstrate that this can work in A. succinogenes, we needed to show that co-transformation of two mutations generates a percentage of co-recombinants high enough for direct amplicon screening of unmarked mutations. We used the selectable mutation ?pflb::icd and the markerless gene deletion ?lacZ. The icd cassette allows recombinants to grow on media containing isocitrate; bypassing their glutamate requirement. The ?lacZ mutation prevents co-recombinants from hydrolysing lactose, leading to white colonies on X-Gal-containing plates. In our experiments, co-recombinant populations did not generate. Further modification is required.

PRODUCING FERMENTATION PRODUCTS: A WAY TO REDUCE METHANE AND FEED OTHER ORGANISMS

Nabila Khan

Poster: 476

Mentor(s): Cecilia Martinez-Gomez (MMG- Microbiology)

Methylotrophs are bacteria that are able to use one carbon compounds to grow. These compounds include methanol and more importantly methane- an abundant and potent green-house gas. Microorganisms that have the ability to use methane allow for a large environmental impact since they are able to reduce it from the atmosphere. Metylomicrobium alcaliphilum 20Z is a type II methylotroph capable to use both methane and methnol. My project focuses on optimizing growth conditions to improve yields of fermentation products by M. alcaliphilum during methane and methanol growth. I am monitoring growth rates using different oxygen concentrations and shaking parameters. To separate and quantify the amount of fermentation products such as formate, lactate, and acetate, the supernatant and cell extracts samples are analyzed via HPLC. Recently, it has been discovered that lanthanides affect aerobic methylotrophy. Another goal is to define if lanthanides affect microaerophilic methylotrophy or fermentation. We have shown that the presence of lanthanides, specifically lanthanum, affect growth rate for M. alcaliphilum during methanol-dependent fermentation. We will corroborate its effect on fermentation products yields using HPLC analysis. Together, these experiments will allow the definition of the optimal growth condition driving fermentation. Our future goal is to couple this system to an additional strain Geobacter sp, to synthesize a sustainable fuel cell.

METHYLOBACTERIUM EXTORQUENS AM1, LANTHANIDE BIOMINERS

Adam Kibiloski

Poster: 477

Mentor(s): Norma Cecilia Martinez-Gomez (Microbiology and Molecular Genetics)

Our lab focuses on single carbon metabolism in the model methylotroph Methylobacterium extorquens AM1. Lanthanides, considered 'rare' due to the fact that they do not appear in large ores, play a key role in single carbon metabolism in M. extorquens AM1 by providing a more efficient oxidation pathway with fewer toxic intermediates. Lanthanides are imperative to modern day life; they are found in phones, computers, and in

the catalytic converters of cars. The current method for lanthanide extractions produces toxic waste. Concentrating large amounts of lanthanides from the environment requires the removal of coexisting radioactive elements (i.e. thorium and uranium) and the use of highly concentrated acid, creating byproducts that can do irreversible damage to the environment. My goal is to engineer strains that accumulate large amounts of these rare earth elements, taking advantage of our current knowledge for transport and lanthanide uptake. Our laboratory has recently discovered that lanthanides are sensed and taken up via siderophores. Our data also suggest that the production of these siderophores is influenced by other metals, such as iron. I have defined growth conditions using methanol medium and a neodymium magnet and will measure differences in recovery while changing concentrations of iron to promote over-production of siderophores. In addition, I am designing a "less harsh" partial chemical extraction that will be compatible with an evolved acid-tolerant M. extorquens. Our efforts will describe an efficient biomining process that will provide a safer and economically viable alternative for lanthanide recycling and mining in the environment.

MICROBIOLOGY, IMMUNOLOGY, & INFECTIOUS DISEASE POSTER PRESENTATIONS, SECTION 2 BALLROOM, 9:00 – 10:30 AM

EXPLORATION OF DYNAMIC ANTIBIOTIC TREATMENT OF PSEUDOMONAS AERUGINOSA

Charnay Gloss

Poster: 480

Mentor(s): Michael Maiden (Microbiology & Molecular Genetics), Chris Waters (Microbiology & Molecular Genetics)

Chronic bacterial infections are a major cause of morbidity and mortality. One of the most common pathogens found in chronic bacterial infections is Pseudomonas aeruginosa. A hallmark of chronic bacterial infections is the formation of biofilms. Biofilms are a community of stationary cells surrounded by a matrix of extracellular polymeric substances that significantly reduces the penetration and effectiveness of antibiotics, making them extremely difficult to treat. For this reason, there is a need to identify new compounds that enhance the efficacy of antibiotics against biofilms. Tea tree oil is an essential oil derived from the Melaleuca alternifolia plant. It is said to have antimicrobial, antifungal, and antiviral capabilities (1). We hypothesize that tea tree oil may enhance tobramycin, an antibiotic that is commonly used to treat chronic bacterial infections caused by P. aeruginosa. To test this, we will grow P. aeruginosa biofilms on 96-well MBEC™ (minimum biofilm eradication concentration) plates and then treat with a combination of tea tree oil and tobramycin. Subsequently, biofilm killing will be quantified using BacTiter-Glo™, which is a microbial cell viability assay that determines the number of viable bacteria based on ATP. This study can serve as a model for identifying compounds that enhance the ability of antibiotics to eradicate biofilms, leading to the development of improved therapies for chronic bacterial infections.

DEVELOPMENT OF AN IN VITRO MODEL FOR MAREK'S DISEASE VIRUS MACROPHAGE INFECTION

Chelsey Klein

Poster: 481

Mentor(s): Cheng Hans (Genetics), Cari Hearn (Comparative Medicine and Integrative Biology)

Marek's Disease Virus (MDV) is an oncogenic alpha herpesvirus that infects chickens and causes T-cell lymphoma. Not only is it relevant to the poultry industry, but MDV is a useful biomedical model for lymphoma and for the study of pathogen virulence driven by vaccination. The virus enters chickens through the respiratory system by breathing in the cell-free virus shed from an infected chicken's feather follicle epithelium, eventually infecting the host's lymphocytes. Previously it has been shown in vivo that macrophages are infected by MDV, supporting the hypothesis that MDV infects macrophages in order to move from the lungs to the lymphoid organs. However, there has not been a successful in vitro model to date for MDV macrophage infection. Using methods including calcium phosphate transfection, lipofection, and co-culture with MDV infected DF1 cells, we attempt to transfect HD11 cells and MQ cells (macrophage-

like chicken cell lines) with pTracer-CMV GFP and two MDV expressing BACs, RB1B-UL47GFP-BAC and RB1B-UL49GFP-BAC. If successful, it will open up a gateway towards discovering an in vitro MDV-macrophage model. With this potential model, a new path for studying MDV could be explored helping to further understand MDV and leading towards a final solution.

EFFECTS OF PSEUDOMONAS AERUGINOSA BIOFILMS ON WOUND HEALING IN A DIABETIC MURINE MODEL

Casandra Larrivee
Poster: 482
Mentor(s): Julia Busik (Physiology), Christopher Waters (Microbiology)

Diabetes and obesity have reached epidemic proportions in the United States. According to 2011 CDC reports diabetes affects 25.8 million people, or 8.3% of the U.S. population. Due to the high blood glucose, neuropathy is a common occurrence in diabetic patients which can lead to poor detection of any wounds on the body. Wounds that go undiagnosed have a high chance of becoming infected, and bacterial biofilms have recently been implicated as an underlying cause of chronic non-healing wounds. Using a diabetic murine model, we examined the impact of biofilm formation on the rate of wound healing in diabetic versus non-diabetic mice. The rate of healing and biofilm viability were then monitored via in vivo imaging system (IVIS) and by microscopy until complete recovery. This study established that diabetic mice not infected with biofilms do present a delay in healing compared to non-diabetics. Infection postponed closure of wounds in the non-diabetic mice but retarded healing even further in diabetic ones. In addition, IVIS imaging showed a rapid decrease in biofilm viability in the non-diabetic mice in contrast to a general initial increase in biofilm in the diabetics. Infection of wounds by mutant biofilms had even more impacting results: infected diabetics were incapable of combating the infection which resulted in death of over 40 percent of the cohort. In conclusion the presence of biofilms impacts wound healing even further than diabetes alone. Future experiments will investigate the molecular mechanism that contribute to diabetic chronic wounds.

INHIBITION OF MYCOBACTERIUM SMEGMATIS GROWTH BY FUNCTIONALIZED MAGNETIC NANOPARTICLES

Linda Lay
Poster: 483
Mentor(s): Evangelyn Alocilja (Biosystems Engineering)

Tuberculosis is one of the top infectious diseases in the world, second only to HIV. The disease poses a major challenge in rural areas due to poor healthcare infrastructure (Sandhu 2011). Over the years, our lab has developed a novel biosensor for the capture and detection of Mycobacterium tuberculosis. This method uses functionalized magnetic nanoparticles in order to capture and detect the bacteria in samples of lung sputum, allowing for easy detection in areas with little access to tuberculosis treatments. However, it is unknown whether the nanoparticles inhibit the growth of M. tuberculosis, which could be a major drawback in culturing the bacteria. For this study, the model organism Mycobacterium smegmatis was cultured in the presence of four different varieties of nanoparticle. Samples were plated every 4 hours over a 36-hour time period. After a 7-day period, the plates were counted and the number of colony forming units (CFU) was calculated. Functional Group 3 is predicted to have a deleterious effect on mycobacterial growth, however further research needs to be conducted to confirm this result. The speed and ease of use of these nanoparticles make them a valuable tool to combat tuberculosis infection, and nanoparticles that do not inhibit growth would be ideal.

DEFINING THE ROLE OF LANTHANUM IN ONE-CARBON METABOLISM

Sarah Mourtada

Poster: 484

Mentor(s): Cecilia Martinez-Gomez (Microbiology and Molecular Genetics)

Methylotrophs are a diverse group of microorganisms that can oxidize one-carbon compounds such as methanol as sole source of carbon and energy for growth. In Methylobacterium extorquens AM1, the first step for methanol metabolism involves the oxidation of methanol to the toxic compound formaldehyde, and it was believed that this reaction was catalyzed by the methanol dehydrogenase, MxaF. Once formaldehyde enters the cell, an additional pathway catalyzes the oxidation of formaldehyde to formate allowing assimilation of carbon. It has been recently discovered that with lanthanum added to the media, a new set of methanol dehydrogenases catalyze the first oxidation of methanol, XoxF1 and XoxF2. Recent biochemical studies have suggested that these enzymes catalyze direct oxidation of methanol to formate leading to important implications in metabolism related to redox and energy balance. My project will define the physiological consequences of this direct oxidation in methanol metabolism when considering accumulation of formaldehyde and production of reducing power (NAD(P)H). To assess these changes we used a combination of genetic approaches and phenotypic studies testing mutants sensitive to formaldehyde and measuring growth on solid media containing various concentrations of methanol with and without lanthanum. These tests showed growth with lanthanum observed at higher concentrations of methanol (formaldehyde) suggesting that presence of lanthanum favored direct oxidation of methanol to formate. Future work will focus on measuring internal NAD(P)+/NAD(P)H ratios in the presence and absence of lanthanum. This will contribute to further knowledge about the specialized metabolism of this bacteria and its impact on carbon cycling.

USE OF CMEIAS COMPUTER-ASSISTED MICROSCOPY FOR THE COMMUNITY ANALYSIS OF HUMAN VAGINAL MICROFLORA IN HEALTH AND BACTERIAL VAGINOSIS DISEASE

Kylee Prater

Poster: 485

Mentor(s): Frank Dazzo (Microbiology & Molecular Genetics)

Bacterial vaginosis (BV) is a complex polymicrobial disease in women resulting from the disruption of normal vaginal microflora, recognized during microscopical examination of the patient's Gram-stained vaginal community. Flaws of the Nugent scoring system commonly used for BV diagnosis include the difficulty of objectively including bacterial morphotypes present but not listed in that scoring system, lack of statistically tested quantitative microscopy data, etc. My research project uses CMEIAS software of computer-assisted microscopy to evaluate an alternative "Claeys" 6-category scoring system (developed at Ghent University, Belgium) that addresses these limitations of the Nugent system to assess the human vaginal microflora in health and BV disease. Phase-contrast micrographs of 13,288 individual cells representing all 6 Claeys categories of vaginal microflora from Belgium volunteers were digitally edited, spatially calibrated, and analyzed by CMEIAS v. 4.0 to define their morphological signature at 0.2 μm spatial resolution. Statistical tests indicated significant differences ($p \leq 0.05$) within 26 tested indicators of morphological richness, ranked abundance, diversity, dominance/rarity and evenness of community members assigned to the different Claeys categories. We will next evaluate a more comprehensive CMEIAS classifier of Operational Morphological Units (with statistically-defined size subclasses) to significantly increase the discrimination/detection of community diversity for each Claeys category of vaginal microflora. This research will validate the enhanced morphological differentiation of vaginal communities among Claeys categories, increase the objectivity, accuracy and reproducibility of clinical BV diagnosis, and contribute to a deeper understanding of the dynamic diversity of the vaginal microbiome and the etiology of this polymicrobial disease.

MICROBIOLOGY, IMMUNOLOGY, & INFECTIOUS DISEASE
POSTER PRESENTATIONS, SECTION 3
BALLROOM, 9:00 – 10:30 AM

ANTIBIOTIC RESISTANCE OF CAMPYLOBACTER JEJUNI IN MICHIGAN

Joseph Bednarczyk

Poster: 488

Mentor(s): Shannon Manning (Microbiology)

Campylobacter jejuni is the leading cause of acute bacterial gastroenteritis in the world. The infection is self limiting. These bacteria are hyper variable, which helps them evade the host's immune responses and acquire mutations that can result in resistance to common antibiotics. Recently there has been a rise in antibiotic resistance rates among C. jejuni strains, which could be from the increase in use of antibiotics in agricultural settings where C. jejuni is commonly found. The purpose of this research is to determine antibiotic resistance frequencies among C. jejuni isolates recovered from patients at 4 different hospitals in Michigan between 2011 and 2014. A total of 146 isolates are available for antibiotic resistance testing. Preliminary results show that of 96 isolates tested, 66 were resistant to at least one antimicrobial, and 15 were resistant to more than one of the isolates tested, 61.7% were resistant to tetracycline, 19.1% to both ciprofloxacin and nalidixic acid and 2.1% to azithromycin. Future work will involve identifying relationships between disease severity and antibiotic resistance, as well as the identification and sequencing of resistance genes while making comparisons to isolates recovered via the National Antimicrobial Monitoring System. Assessing resistance frequencies in different C. jejuni populations is important for identifying factors associated with resistance and guiding treatment practices that target resistant bacterial pathogens.

FUNCTIONAL DIFFERENCES ASSOCIATED WITH EAT-2 EXPRESSION LEVELS IN NATURAL KILLER CELLS

Lekha Bapu

Poster: 489

Mentor(s): Sungjin Kim (Microbiology and Molecular Genetics), Jeannine Scott (Microbiology and Molecular Genetics)

A subset of natural killer (NK) cells, known as FcRg-deficient NK cells, has recently been identified in the human population. These NK cells have demonstrated an enhanced ability to kill tumor cells and produce cytokines in the presence of antibodies. A microarray analysis was performed as a preliminary step to examine differences in gene expression between the FcRg-deficient and conventional NK cells. This analysis revealed differential expression of several transcripts in both types of NK cells. Among those found to be downregulated in FcRg-deficient NK cells compared to conventional NK cells, was Ewing's sarcoma-associated transcript 2 (EAT-2), a signaling molecule involved in NK cell activation. In order to confirm the microarray results at the protein level, intracellular staining will be used to perform a flow cytometric analysis of the two NK cell types. The initial task is to optimize staining conditions to clearly reveal any differences in EAT-2 expression between the FcRg-deficient NK cells and conventional NK cells. This process is influenced by the donor samples selected and involves varying the concentrations of primary and secondary EAT-2 antibodies used, as well as the reagent used to permeablize the cells. Functional differences in NK cell activity, as measured by IFN-g production, due to differential expression of EAT-2 will also be analyzed.

ENDOPLASMIC RETICULUM AMINOPEPTIDASE-1 GENE IMPORTANT IN PRODUCTION OF IL-18 TO PROTECT COLITIS-INDUCED MICE

Ashley Raedy
Poster: 490
Mentor(s): Yasser Aldhamen (MMG)

Inflammation in the body is very serious and can lead to many acute and chronic complications including Inflammatory Bowel Diseases like Ulcerative Colitis and Crohn's Disease. The concerning pathogenesis of colitis motivated this study to determine the effect of the endoplasmic reticulum aminopeptidase-1 (ERAP1) gene in the protection of the intestinal epithelial cells of the innate immune system. The hypothesis is that ERAP1 is important in the development of colitis due to the findings of varying levels of IL-18, which is a cytokine important in the protection of colitis, amongst the groups of mice based on age and sex. Mice with the ERAP1 gene (WT) and mice without the ERAP1 gene (ERAP-/-) were assessed on their susceptibility to the colitis-inducing drug dextran sodium sulfate (DSS) through measuring mortality rates. The findings revealed that the ERAP-/- mice showed decreased levels of IL-18, indicating that ERAP1 is important in the protection against colitis.

ANALYSIS OF VIBRIO CHOLERAE TOXR TRANSLOCATION

Morgan Rice
Poster: 491
Mentor(s): Victor DiRita (Microbiology and Molecular Genetics), Jeremiah Johnson (Microbiology and Molecular Genetics), Rhiannon Leveque (Microbiology and Molecular Genetics)

Vibrio cholerae is a Gram-negative bacterium that colonizes the small intestine of humans, causing an extensive efflux of water into the lumen, resulting in watery diarrhea, vomiting and, if left untreated, death. Cholera is contracted via consumption of contaminated food and water, with the majority of cases occurring in countries that have inadequate sanitation systems and clean water. V. cholerae uses a complex regulatory network, the ToxR regulon, to control expression of two essential virulence factors, cholera toxin (CT) and toxin coregulated pilus (TCP). ToxR is a bitopic membrane with a cytosolic DNA binding domain and periplasmic domain of less understood function. ToxR collaborates with other membrane proteins to control expression of toxT, whose product directly activates genes encoding CT and TCP. Translocation of ToxR through the inner membrane is an important step in virulence gene regulation, and we are investigating this mechanism. To do so, we are fusing a localization reporter – alkaline phosphatase (PhoA) – to the carboxy terminus of ToxR. When translocated properly, the periplasmically-localized PhoA portion of this fusion is active, and if not translocated, the resulting cytoplasmically localized PhoA is inactive. This reporter fusion (ToxR-PhoA) is being used to interrogate a V. cholerae transposon library for mutants unable to translocate PhoA to the periplasm. Using color-indicator plates with the compound 5-Bromo-4-choloro-3-indolyl phosphate (BCIP), mutants unable to cleave BCIP – indicating a lack of ToxR-PhoA fusion translocation - will be studied further to determine the genes and cofactors involved in translocation.

ROLE OF PPAR? IN MODULATING T-CELLS DURING HYPEROXIA

Abdulsalam Salem
Poster: 492
Mentor(s): Said Omar (Pediatric and Human Development)

Peroxisome proliferator-activated receptor (PPAR) has been studied in its relation to the inflammatory process underlying the development of BPD in the lungs of premature infants. PPAR? negatively regulates T-cell activation by inhibiting nuclear factor of activated T-cells (NFAT) and subsequent IL-2 production. In addition, inhibition of proliferative response and inflammatory cytokines expression in CD4 T-cells was correlated with the suppression of AP-1 and NF-kB transcription factors. Finally, studies have shown that during hyperoxia, the first pulmonary response was the increase of NF-kB levels before any cytokines. This activation of NF-kB led to the binding of NF-kB to the promoter regions of many genes that encode proinflammatory cytokines such as IL-8. The Omar lab hypothesize that during hyperoxia condition PPAR-gamma levels deplete while NFAT and NF-kB levels increase therefore inducing a proinflammatory response

resulting in lung injury. In this study, we'll measure postnatal changes in PPAR-gamma, NFAT, and NF-kB expression after prolonged exposure of 85% O2 (hyperoxia) during the first month of life, evaluating wild-type newborn mice at 7,10, 14, and 28 days. Lung tissue samples will be run via Western Blotting, and analyzed via infrared immune blotting to assess the expression levels of the protein mentioned above. The expected outcome is that there will be an increase of NFAT, and NF-kB transcription factors and a decrease in PPAR-gamma levels in hyperoxia samples compared to the normoxia samples. This study will provide more understanding of the mechanism that led to the inflammatory response which results in the lung injury.

CODING FOR CMEIAS
Rooshabh Shah
Poster: 493
Mentor(s): Frank Dazzo (Microbiology)

CMEIAS is a software utilized to analyze images of microbes, and sorting them. Code work included mode of patch area, standard deviation, among other things. Expected results include finding a 97% accuracy, in regards to the mean and mode. Cumulative object analysis is utilized, along with palette files so as to obtain the desired results. Using Borland v5.02, CMEIAS has undergone numerous changes over time. My area of contribution has lied in fixing bugs in object analysis where a number of objects in the image would cause a crash. To handle, this an exception was created and an image could then be tackled in parts.

MICROBIOLOGY, IMMUNOLOGY, & INFECTIOUS DISEASE
POSTER PRESENTATIONS, SECTION 4
BALLROOM, 9:00 – 10:30 AM

IDENTIFYING MUTATIONS OF THE FMN RIBOSWITCH (RFN ELEMENT) UPSTREAM OF THE RIB OPERON AND THEIR EFFECTS ON ROSEOFLAVIN-RESISTANT LACTOCOCCUS LACTIS SUBSP. CREMORIS NZ9000
Kylie Bocklund
Poster: 495
Mentor(s): Poorna Viswanathan (MMG)

Lactococcus lactis subsp. cremoris NZ9000, a common dairy fermenter, was evolved environmentally by exposure to roseoflavin, a riboflavin analog, to isolate riboflavin overproducers. Three mutants were phenotypically evaluated for riboflavin overproduction using a disk-diffusion bioassay; however, the mutations did not generate cells capable of producing quantities greater than 0.5ug/uL of riboflavin, which in this study was the lowest observable concentration. Previous literature indicates that mutations in the RFN element upstream of the rib operon leads to riboflavin-overproducing Lactococcus lactis. Sequencing the 500bp upstream region revealed many specific point and insertion mutations of the three mutants, both within and without the RFN element. This work confirms that exposure of Lactococcus lactis to roseoflavin induces mutations within the RFN element, allowing the cells to produce their own riboflavin and looking forward, possibly inducing overproduction of riboflavin for use as a dietary supplement in fermented and other food applications.

EXAMINING THE ENVIRONMENTAL CONDITIONS THAT ELICIT BIOFILM FORMATION IN PSEUDOMONAS AND SERRATIA STRAINS
Jesse Kato
Poster: 496
Mentor(s): Terence Marsh (Microbiology and Molecular Genetics)

An understanding of what influences biofilm formation is significant in clinical and nonclinical settings because of the resilience of bacteria within a biofilm once it has been established. Greater resilience is manifested through increased antibiotic resistance and greater evasiveness to attacks by the immune

system (Hoiby 1663). In this study, P.aeruginosa, P.chlororaphis, S.marcescens, and S.nematodiphila were the bacterial strains of interest. P.aeruginosa is of particular importance because its biofilm has been found to be responsible for the deteriorating health conditions of cystic fibrosis (CF) patients due to the lung infections it produces. S.marcescens is a strain that is associated with nosocomial infections in patients, which is an area of concern for hospitals. Nonclinical importance, such as food safety, is also an area of concern for bacteria biofilms, and Pseudomonas strains have been found to be the main culprit for "fresh meat spoilage" (Jay 944). The purpose of this study was to examine the environmental conditions that elicit the formation of biofilm by Pseudomonas and Serratia strains. Preliminary data suggests that 100mL of R2B containing 2.5g of litmus milk, 1mL of sodium acetate, and 1mL of sodium lactate greatly increases the formation of biofilm. These conditions were selected as representative of alveolar fluids. Repeated and follow-up experiments are necessary to support these results and to discover which additions contributed to the increase in biofilm. Further research will include the effect of metal concentrations on bacterial biofilms.

DEVELOPMENT OF NOVEL DIAGNOSTICS FOR THE RAPID DETECTION OF TUBERCULOSIS IN RURAL AREAS

Nathan Murray, Kasey Pryg, John Shinners
Poster: 497
Mentor(s): Evangelyn Alocilja (Biosystems and Agricultural Engineering)

Smear microscopy using Ziehl-Neelsen staining is a globally accepted method to diagnose Mycobacterium tuberculosis (Mtb), the etiological agent for tuberculosis (TB). However, diagnoses using smear microscopy are shown to have decreased sensitivity at low bacterial concentrations1. More sensitive methods are available but they are also prohibitively expensive. This experiment seeks to inexpensively improve the accuracy of smear microscopy for Mtb detection. To generate preliminary data, we are using nonpathogenic surrogate bacteria Mycobacterium smegmatis and artificial sputum. The assay employs a functionalized magnetic nanoparticle (MNP) that interacts with the bacteria and pulls them out of sputum matrix using a simple magnet. Once the bacteria are separated from their matrix, they can be concentrated and quantified either with Ziehl-Neelsen staining or a handheld cyclic voltammetry device. Cyclic voltammetry screening allows for detection of bacteria in the sputum, which presents an opportunity for rapid screening. Nanoparticle capture paired with smear microscopy and cyclic voltammetry presents promising results and offers the advantages of concentrating the bacteria present and localizing the bacteria to facilitate more sensitive detection.

GROWTH EFFICIENCY OF THE EASTERN TREE-HOLE MOSQUITO, AEDES TRISERIATUS, WHEN NUTRIENTS AND TEMPERATURE VARY

Alexander Ruhs
Poster: 498
Mentor(s): Beth Norman (Microbiology and Molecular Genetic), Edward Walker (Microbiology and Molecular Genetic)

The efficiency of larval mosquito growth significantly limits production of adult mosquitos from larval habitats, and is therefore a process limiting the capacity of adult mosquito populations to serve as vectors for a plethora of infectious agents that infect and cause disease in humans. Furthermore, increasing temperature in the biosphere, a feature of global climate change, could lead to larger habitable zones for mosquitos, exposing more populations of humans to vector-borne diseases. Growth efficiency, considered here as the conversion of food material to mosquito biomass, is likely to vary with temperature. Our objective was to describe the response of larval growth rate and efficiency to temperature change in conjunction with the constraints imposed on mosquito development by food availability. In order to measure this efficiency, we compared the mass of adult Aedes triseriatus mosquitos with the mass of detritus ingested by the larvae, accounting for losses due to larval egestion and respiration. Three initial leaf masses were used: 50 mg, 100 mg, and 200 mg ration per larva. Larvae were grown at three incubation temperatures: 20°C, 25°C, and 28.5°C. Predictions are that larvae will grow fastest at the highest temperature and leaf ration, but will grow most efficiently at the lowest temperature and leaf ration. From

these observed growth efficiencies, we will generate predictions on the response of mosquito populations to global temperature increases.

ANALYZING MICROBIAL POPULATIONS USING COMPUTING TECHNIQUES

Wenhsi Tan
Poster: 499
Mentor(s): Frank Dazzo (Microbiology)

Center for Microbial Ecology Image Analysis System (CMEIAS) is a computing tool developed to aid users in analyzing their microbial images. This tool is able to classify microbes based on morphotypes such as shape, size, and biovolume using user-defined spatial calibrations. The results are reported in both a pseudo-colored image (with each group represented by a different color) and in a grid form which can be easily copied onto an excel worksheet. CMEIAS is also able to provide other features such as computing abundance, richness and evenness, spatial organization, splitting and merging objects, diversity and various manual object tools (i.e. count and tag, line profiles of gels).

GENOMIC DIFFERENCES IN ENSIFER MEDICAE FROM NATIVE AND INVASIVE RANGES OF MEDICAGO POLYMORPHA

Katherine Wozniak
Poster: 500
Mentor(s): Maren Friesen (Plant Biology)

Globally important mutualisms include gut flora in humans, algae in coral reefs and nitrogen-fixing bacteria in legumes. Legume-rhizobial symbioses have agricultural and ecological importance and are used as model systems of how mutualisms operate in diverse ranges. The Medicago polymorpha-Ensifer medicae mutualism increases legume growth due to symbiotic nitrogen fixation in nodules and has evolved from the Mediterranean coast to all continents except Antarctica. As the legume has evolved in diverse ranges, we assume the genomes of its rhizobial symbiont have also evolved as a consequence of new ranges. We predict that as genetic diversity of host is reduced in the invasive range, so will the diversity of rhizobial strains. Additionally, if adaptations to novel habitats occur through horizontal gene transfer, symbionts in the invaded range may have larger accessory genomes. Strains were collected from nodules of geographically distinct M. polymorpha genotypes and sequenced using Illumina. Sequences will be aligned, assembled, annotated and finally compared. From genomic DNA of native and invasive E. medicae strains, abundances of core and accessory genes will be determined. This information will give further insight into functional roles of Ensifer strains in both native and invasive regions and allow us to make predictions about how their associations with M. polymorpha have changed across regions. The proposed project will be presented as a timeline of beginner's bacterial genome analysis with latest results and future goals.

MICROBIOLOGY, IMMUNOLOGY, & INFECTIOUS DISEASE
POSTER PRESENTATIONS, SECTION 5
LAKE HURON ROOM, 11:15 AM – 12:45 PM

BACTERIOPHAGE P22 INFECTION OF SALMONELLA

Kaitlynne Bohm
Poster: 503
Mentor(s): Kristin Parent (Biochemistry and Molecular Biology)

Bacteriophages (also called "phage") are viruses that infect bacteria via either the lytic or lysogenic pathways. Phages have played and continue to play an important role in the evolution of bacteria, as they are largely responsible for the diversification of bacterial DNA. I have focused my research on bacteriophage p22 and its interaction with Salmonella typhimurium. P22 is very similar in genetic structure to bacteriophage ? (lambda), differing mostly in the proteins that comprise its head and tail. It infects S. typhimurium specifically, and has allowed for major advancements in understanding of this bacterium's

transduction mechanisms. My research entails finding which gene in S. typhimurium codes for the outer membrane structure that allows for phage entry. I have already identified approximately 5 single gene deletion (SGD) strains that show phage resistance when plated on LB, and I plan to continue my research until I have identified the gene solely in charge of bacteriophage entry.

CHARACTERIZATION OF A MUTANT STRAIN OF GEOBACTER SULFURREDUCENS ADAPTED FOR IMPROVED LACTATE UTILIZATION IN A MICROBIAL CONSORTIUM IN GLYCEROL FED MICROBIAL ELECTROCHEMICAL CELLS.
Thilo Hamlischer
Poster: 504
Mentor(s): Gemma Reguera (MMG)

Clostridium cellobioparum is an anaerobic cellulose-degrading bacterium isolated from the bovine rumen that is able to ferment the industrial waste product glycerol into a high-value product 1,3 propanediol as well as a mix of organic acids including acetate, lactate, and formate. These byproducts can then serve as electron donors for the exoelectrogen Geobacter sulfurreducens in bioelectrochemical systems to generate electrical current and drive the production of 1,3 propanediol. To maximize the electrical yield, G. sulfurreducens was adapted to better utilize lactate. A point mutation in the gene GSU0514 was found in the adapted strain which was then cloned into the progenitor to demonstrate the significance of this mutation on lactate utilization. Acetate, lactate, and a previously unutilized electron donor pyruvate were provided as electron donors and the effect of these genetic changes on growth was characterized. Finally, the ability of these strains to both grow electroactive biofilms and produce current in microbial electrochemical cells oxidizing lactate was investigated.

REGIONAL INTESTINAL CHANGES FOLLOWING ANTIBIOTIC AND PROBIOTIC TREATMENTS
Tristan Lemon
Poster: 505
Mentor(s): Laura McCabe (Physiology)

Antibiotic use has become commonplace in the US, with more than 182 million prescriptions given in 2011. A side effect of antibiotic use is reduced intestinal bacteria levels. Interestingly, our lab has found a role for the microbiome in maintaining intestinal health. Therefore, we wondered if the intestine was negatively affected by antibiotic treatment. In addition, we wanted to test if giving probiotic bacteria after antibiotic treatment could help repopulate the intestine and be anti-inflammatory. We chose to give the mice the probiotic Lactobacillus reuteri (L. reuteri) because it has known anti-inflammatory properties. Mice were treated for 2-weeks with two antibiotics (ampicillin and neomyocin) which are poorly absorbed. Subsequently, mice were treated with or without L. reuteri (108 CFU/ml drinking water). At the end of the study we isolated duodenal, jejunal, ileal and colon sections of the intestine from control and antibiotic +/- probiotic treated mice. Tri-reagent was added to the frozen intestinal sections, which were then homogenized and processed for RNA analysis. Gel electrophoresis was used to confirm the RNA quality. cDNA was prepared by reverse transcription and used for RT-PCR analysis to examine epithelial cell gene expression for both pro- and anti-inflammatory cytokines as well as epithelial cell barrier tight junction proteins, such as occludins, claudins and junction adhesion molecules. Our results will contribute to the understanding of the effect of antibiotics on regional intestinal inflammation and epithelial barrier function and how probiotics may influence these changes.

A GENETIC APPROACH TO CHARACTERIZE THE NOVEL SECOND MESSENGER CYCLIC-GMP-AMP DEPENDENT REGULATION OF CHEMOTAXIS IN VIBRIO CHOLERAE

Christopher Rhoades

Poster: 506

Mentor(s): Ann-Katrin Kieninger (Microbiology and Molecular Genetics), Geoffrey Severin (Biochemistry and Molecular Biology), Christopher Waters (Microbiology and Molecular Genetics)

Vibrio cholerae, a pathogenic Gram-negative bacterium responsible for the disease cholera, contains a vast complex regulatory network responsible for virulence factor expression and pathogenicity. The latest V. cholerae biotype, El Tor, has supplanted Classical V. cholerae strains notably due to the acquisition of two novel gene islands, VSP-1 and VSP-2. While most genes in these islands remain to be characterized, the gene VC1079 located in VSP-XXX encodes for a dinucleotide cyclase, DncV, whose predominant product is the hybrid cyclic nucleotide, cyclic-GMP-AMP (cGAMP). cGAMP is the newest described bacterial second messenger whose function has just begun to be explored. Cyclic-di-GMP, a ubiquitous bacterial second messenger, is involved in many cellular processes in V. cholerae, most importantly biofilm formation and motility via flagellar biosynthesis. Transcriptome analysis revealed that cGAMP signaling does not overlap with cyclic-di-GMP associated genes. However, increased intracellular concentrations of cGAMP down regulate the chemotaxis genes in V. cholerae. Within a host, reduced chemotaxis is critical to V. cholerae pathogenicity but the molecular mechanisms involved in this cGAMP-mediated repression are unknown. I will determine this molecular pathway by inducing strong selective pressures for the evolution of suppressor mutations, which resist cGAMP induced chemotactic inhibition. Whole genome sequencing of suppressors will reveal genes involved in cGAMP mediated chemotactic repression. Chemotactic regulation is vital to V. cholerae pathogenicity and knowledge gained from this research will provide clues to understanding the enhanced pathogenic capacity of the El Tor biotype and cGAMP's role in virulence.

CHARACTERIZATION OF A FOURTH METHANOL DEHYDROGENASE IN METHYLOBACTERIUM EXTORQUENS AM1

Carly Suriano

Poster: 507

Mentor(s): Norma Cecilia Martinez-Gomez (Microbiology and Molecular Genetics)

When the rare earth element, lanthanum, is present in methanol growth medium, the model methylotroph Methylobacterium extorquens AM1 is able to grow without the known MxaF-type and XoxF-type methanol dehydrogenases. This indicates that within the genome of M. extorquens, an unknown enzyme is capable of lanthanide-dependent methanol oxidation. Methanol oxidation activity in cell-free extracts of the mxaFxoxF1xoxF2 mutant was measured and low methanol dehydrogenase activity was detected. Two candidate enzymes were identified in the genome: quinoprotein ethanol dehydrogenase (Exa) and a putative quinoprotein alcohol dehydrogenase. When the gene encoding for Exa was mutated in the triple MDH mutant, the strain could no longer grow on methanol even in the presence of lanthanum. This mutation was successfully complemented by the expression of exa from the lanthanide-dependent xoxF1 promoter but not the calcium-dependent mxaF promoter. Exa was purified in both calcium+lanthanum and calcium conditions through Immobilized Metal Affinity Chromatography. Although Exa presented as a relatively inefficient enzyme when compared to other methanol dehydrogenases, Exa was found to oxidize formaldehyde more efficiently. A higher formate to formaldehyde product ratio was detected in vivo when comparing the triple mutant and wild-type strains indicating that Exa may be able to oxidize methanol directly to formate. As the first ever ethanol dehydrogenase to be reported to uptake lanthanides, Exa has a secondary methanol dehydrogenase activity capable of supporting methylotrophic growth when utilizing a lanthanide as a potential cofactor.

THE EFFECT OF CELL BEHAVIOR AND EVOLUTION ON SWIMMING PERFORMANCE

Lucas Werner
Poster: 508
Mentor(s): Yann Dufour (MMG)

Bacteria can swim using flagella through various environments in a random walk fashion. This walk can be biased toward favorable conditions allowing cells to follow chemical gradients. This behavior is called chemotaxis. It is in the cell's best interest to do this as quickly as possible, thus the fittest cells are the ones that achieve the best average velocity. However, the underlying mechanisms for differences in chemotactic performance in different environments are not well defined. We posit that cell behavior, such as swimming speed, probability of tumbling, and directional persistence determines chemotactic performance. To test this hypothesis we performed directed evolution experiments on agarose swim plates, which create a mazelike environment for cells to swim through. We picked cells from multiple locations and repeated the competition assay. After multiple rounds of selection we found that the performance of all the lineages increased regardless of the position they were selected from. To determine what underlies the increased chemotactic performance, we are comparing several phenotypic characteristics between the evolved strains and the ancestral strains using single-cell tracking.

MICROBIOLOGY, IMMUNOLOGY, & INFECTIOUS DISEASE
POSTER PRESENTATIONS, SECTION 6
BALLROOM, 1:30 – 3:00 PM

CIMEAS

Fartun Abukar
Poster: 511
Mentor(s): Frank Dazzo (microbiology& molecular genetics)

We are developing new image analysis software named "CMEIAS" (Center for Microbial Ecology Image Analysis System) designed to strengthen computer-assisted microscopy-based approaches for understanding microbial ecology. My research is focused on measurement of the performance accuracy of one of the CMEIAS image processing plugin tools used to accurately separate multiple cells that are touching each other so they can be evaluated as individual cells. Two automated computing plugin tools were evaluated: one is called "objects separator" and the other is a "watershed" editor. The study involved the manual acquisition of "ground truth" data (100% correct) of 356 object counts, 356 being in 27 binary digital images and 375 in12 gray scale digital images, and compare that information to the object counts obtained after applying the automated segmentation tools. Two types of errors were evaluated: the Type 1 error registers objects split where they should not occur, and the Type 2 error registers object splits that are not made where they should be. Both types of errors produce erroneous outputs that compromise the accuracy of image analysis output da. The CMEIAS plugin performed significantly better than did the watershed plugin. The CMEIAS plugin produced a few Type 1 and Type 2 errors, with an overall performance accuracy of 99.99%. The watershed plugin produced several Type 2 errors only, with an overall accuracy of 76.6%.

DETERMINING IF PAIN IS ASSOCIATED WITH DEVELOPMENT OF SPONTANEOUS AUTOIMMUNE PERIPHERAL POLYNEUROPATHY IN A MOUSE MODEL

James Chen
Poster: 512
Mentor(s): Julia Bell (Large Animal Clinical Sciences), Linda Mansfield (Large Animal Clinical Sciences)

Guillain Barre Syndrome (GBS) is the most common acquired inflammatory peripheral neuropathy and occurs in patients with a history of Campylobacter jejuni or influenza infections. The main symptoms of GBS include leg weakness, tinging, and ascending paralysis. NOD CD86-/- mice develop a spontaneous peripheral polyneuropathy (SAPP) which is reminiscent of ascending paralysis found in GBS. According to

previous studies, NOD CD86-/- show evidence of peripheral nerve demyelination beginning at 20 weeks of age. We hypothesized that NOD CD86-/- mice develop and express pain as a result of severe nerve demyelination compared to unaffected NOD wild type controls. We tested our hypothesis by determining if there is a statistically significant association between the phenotypic expressions of pain and development of nerve lesions. When NOD CD86-/- mice reach a humane endpoint ranging 25-40 weeks of age, they were videotaped, humanely euthanized, and necropsied. The sciatic nerve, brachial plexus nerve, and dorsal root ganglia from lumbar nerve 3 (L3) to L6 were harvested, fixed, embedded enbloc, sectioned and stained with hematoxylin and eosin and F4/80 markers for macrophages by immunohistochemistry to detect inflammatory infiltrates. Mouse pain scoring was done by identifying phenotypic clinical signs, such as grimacing, in the video footage blinded to genotype. Current data suggests an association between pain and nerve lesions; however, data analyses of additional mouse nerve lesions and pain scores are still underway. Resulting information may add insights on the intricate mechanisms of autoimmunity and aid development of treatments for Guillain-Barre Syndrome and other autoimmune demyelinating neuropathies.

MAPA AS POSSIBLE LIPOPROTEIN SORTING FACTOR IN CAMPYLOBACTER JEJUNI

Marisa Fallone

Poster: 513

Mentor(s): Victor DiRita (Microbiology), Jeremiah Johnson (Microbiology)

Campylobacter jejuni is a major cause of gastroenteritis in the United States, often by infecting those who consume undercooked poultry. This is due to C. jejuni asymptomatically colonizing the intestinal tract of chickens. In many gram-negative bacteria, the Lol system shuttles lipoproteins from the cytoplasm to the appropriate membrane. In this system, the inner membrane complex LolCDE, releases lipoproteins to periplasmic LolA, which passes them to the outer membrane protein, LolB. Annotated orthologues of all lol genes are encoded within the C. jejuni genome, except lolB. Based on bioinformatics and a region of homology to lolA, we hypothesize that the protein MapA is involved in sorting lipoproteins to their proper membranes in C. jejuni. INSeq analysis of mutant libraries identified mapA as contributing to the fitness of C. jejuni during colonization of the chicken gastrointestinal tract. Subsequent assays showed that mapA mutants exhibited no difference in motility or capsule production when compared to wild-type C. jejuni, but were hypersensitive to the membrane perturbing antibiotic, polymyxin B. A FLAG-tagged derivative of MapA was used in cell fractionation procedures to determine localization of the protein and examine for interactions with lipoproteins. FLAG-tagged MapA was shown to be present in membrane fractions of C. jejuni and Western blot analysis is being used to detect Lol-dependent lipoproteins in these membranes. Additionally, proteomics is being used to compare lipoprotein composition of wild-type and mapA mutant membranes. Current results support the hypothesis that MapA resides in the membrane and is involved in lipoprotein composition.

GIVING INSIGHT INTO MORE EFFECTIVE HUMAN IMMUNODEFICIENCY VIRUS TYPE 1 DRUG THERAPIES BY PREDICTING AND MAPPING ITS PATHWAYS TO OPTIMAL FITNESS

Laura Finn

Poster: 514

Mentor(s): Aditi Gupta (relocated), Yong-Hui Zheng (Microbiology and Molecular Genetics)

Human immunodeficiency virus is a highly infective microorganism that hijacks and renders human helper T cells nonfunctional, disturbing the ability to fight off otherwise non-life threatening infections. HIV therapies often aim at disturbing normal viral activity. For example, the targeting and inactivity of the viral enzyme, protease, suspends the cleavage of a viral polyprotein (Gag), which is necessary for capsule protein maturation and infectivity. While this treatment is initially effective, the rapid evolution of HIV's genome makes it difficult to find drugs with long-lasting effects, especially if treatments are discontinued. We hypothesize that if the fitness landscape of HIV-1 protease was determined, peaks and valleys could be used to predict the most probable courses of mutation, giving insight into necessary drug treatments. To test our hypothesis, PCR was used to induce mutagenesis at all combinations of six common mutation sites on an HIV-1 strain. The resulting plasmid was transformed into E. coli cells for amplification. The virus was transfected into 293T cells and allowed to replicate in vitro. A subsequent Western blot of each mutation

combination revealed the presence of viral proteins; a small amount of the Gag polyprotein suggested that protease was effective in cleaving it into functional component proteins, while a large amount of Gag suggested the opposite. Preliminary data includes some highly fit genetic combinations that could be helpful in producing treatments for patients with HIV; a drug targeting the optimal genotypes may render the most-fit protease enzymes ineffective.

GROWING MICROBIAL NANOWIRES: GENETIC INVESTIGATION OF PILUS POLYMERIZATION IN GEOBACTER SULFURREDUCENS

Alex Grohalski
Poster: 515
Mentor(s): Gemma Reguera (Department of microbiology and molecular genetics)

Geobacter sulfurreducens is a metal-reducing bacterium that is able to transfer electrons from intracellular donor molecules to external electron acceptors utilizing c-type cytochromes in conjunction with specialized conductive pili. The monomer of these filaments has been identified and is required for the reduction of iron oxides and the wiring of electroactive biofilms; however, the motors responsible for the polymerization of the subunits have not yet been characterized. Homologs of the polymerization and retraction motors, PilB and PilT respectively, were identified and characterized. One of the PilT homologs, PilT4, was found to be essential for the reduction of iron oxides and associated with biofilm thickness. In order to correlate these phenotypes with pilus production, pili were isolated from strains lacking these putative molecular motors. The pilus production was then quantified by atomic force microscopy and LC-MS of a methylated phenylalanine residue on the pilin protein.

ANTIFUNGAL ACTIVITY OF LAKE STURGEON EGG BACTERIAL ISOLATES AGAINST CHAETOMIUM AND SAPROLEGNIA

Karla Helena Bueno
Poster: 516
Mentor(s): Terence L Marsh (Microbiology and Molecular Genetics)

The breeding of lake sturgeon (Acipenser fulvescens) in hatcheries for their later introduction to their natural habitat has been used as a strategy to increase the population size of this endangered species. Fungal infections are an important contributing factor in the mortality of lake sturgeon eggs in both natural and artificial environments. Chemicals used to reduce fungal infections can pose a health risk for the personnel handling these compounds, and can also have a negative impact on the environment. An alternative proposed as part of this experiment is the use of bacteria isolated from the surface of lake sturgeon eggs to treat infections caused by two fungi isolated from infected eggs: Chaetomium and Saprolegnia. Indications of antifungal effects were assessed by visual inspection of fungal growth inhibition in the presence of the bacteria isolated. The bacterial isolates were streaked on an agar plate in close proximity to the fungi. Fungal growth on the plates streaked with certain bacterial isolates was visibly inhibited as compared to plates containing different isolates and a control plate. Our experiment showed that seven out of one hundred and forty-seven bacterial isolates tested restricted the growth of Chaetomium, five of which belonged to the genus Pseudomonas, one to the genus Janthinobacterium, and one Bacillus. Our observations also suggest that four out of twenty-seven isolates tested against Saprolegnia displayed some degree of antifungal activity. These were all Pseudomonas isolates that also hindered the growth of Chaetomium having a similar yet weaker effect on Saprolegnia.

MICROBIOLOGY, IMMUNOLOGY, & INFECTIOUS DISEASE
POSTER PRESENTATIONS, SECTION 7
BALLROOM, 1:30 – 3:00 PM

GENETIC FACTORS CONTRIBUTING TO THE FORMATION OF ANTIBIOTIC RESISTANT SMALL COLONY VARIANTS IN STAPHYLOCOCCUS AUREUS

Laura Hesse

Poster: 519

Mentor(s): Neal Hammer (Microbiology and Molecular Genetics)

Staphylococcus aureus is a leading cause of skin and soft tissue infections, pneumonia, endocarditis, and bacteremia in the United States. S. aureus poses a difficult clinical challenge because of its ability to rapidly develop resistance to antibiotics. One mechanism by which S. aureus resists antimicrobial therapies is by adopting a slow growing, respiration arrested state called the small colony variant (SCV) phenotype. To identify the metabolic pathways that support the respiration-arrested growth of S. aureus, we performed a genetic screen using a small molecule inhibitor of respiration and discovered a mutant, ispA, which is impaired for growth when respiration is obstructed. Genetic inactivation of heme and menaquinone (MK) biosynthesis pathways leads to respiration arrest and the SCV phenotype. Both of these types of SCVs are commonly isolated from patients persistently colonized with S. aureus. To determine if ispA is required for the SCV phenotype associated with heme and MK biosynthesis mutants, the ispA transposon was transduced into ?hemA and ?menB mutant backgrounds, respectively. Both the ?hemA ispA and the ?menB ispA double mutants exhibited a reduced colony size compared to the ?hemA and ?menB SCVs. SCV formation can also be induced by exposure to the antibiotic gentamicin. Cells lacking ispA develop as SCVs at a much lower rate in the presence of gentamicin than wild-type cells. These results demonstrate that ispA-dependent metabolic pathways support the growth of SCVs. Future studies will identify the specific ispA pathways that assist the transition to the respiration-arrested growth of S. aureus.

DOES COOPERATIVE PHOSPHORYLATION BETWEEN DNA-PKCS AND ARTEMIS PROTEINS OCCUR IN VDJ RECOMBINATION?

Alana Kramer

Poster: 520

Mentor(s): Katheryn Meek (Pathobiology & Diagnostic Investigation), Jessica Neal (Microbiology & Molecular Genetics)

Double-strand breaks (DSBs) constitute one of the more detrimental forms of damage that DNA can sustain. Paradoxically, DSBs must be established in the DNA in order to diversify T cell antigen receptors and immunoglobulins of the immune system. During B and T cell maturation, the RAG endonuclease complex purposefully generates DSBs in order to rearrange the variable (V), diversity (D) and joining (J) gene segments of the DNA in antigen receptors via a process known as VDJ recombination. The non-homologous end joining (NHEJ) repair pathway acts to repair the DSBs following gene rearrangement as part of the VDJ recombination mechanism. The Artemis protein plays an instrumental role in end processing by opening hairpins generated by the RAG complex after introduction of the DSBs. DNA-dependent protein kinase catalytic subunit (DNA-PKcs) is required in phosphorylated form for recruitment and activation of Artemis's endonuclease abilities. To determine if Artemis and DNA-PKcs protein phosphorylation works in a cooperative manner during VDJ recombination, we utilized the Cas9/CRISPR gene targeting technology to disrupt the Artemis gene in V3 cells, a CHO cell strain deficient in DNA-PKcs. These cultured V3 cells containing a deletion in the Artemis gene were then complimented with DNA-PKcs mimicking and blocking phosphorylation mutants. Finally, Artemis mimicking and blocking phosphorylation mutants were transiently transfected into the DNA-PKcs complemented V3 cells. Flow cytometry was conducted to analyze the CHO cells containing both DNA-PKcs and Artemis phosphorylation mutants for the cell's ability to support VDJ recombination activity.

ARSENIC RESISTANCE IN BACTERIA AS IT RELATES TO COAL MINE FIRES

Justine Miller
Poster: 521
Mentor(s): Ashley Shade (Microbiology and Molecular Genetics)

Coal mine fires, like the one still burning in Centralia, PA, cause a variety of problems including increasing the levels of metal and metaloid pollution in the surrounding soil. Arsenic (As), a metaloid which exists naturally in the earth's crust, can also be found in coal and coal ash which rises up and deposits on the soil. Over time, microorganisms have developed resistance mechanisms to tolerate and grow under these toxic conditions. Arsenic exists as a variety of species which has been shown to correlate with microbial activity. Environmental isolates have been taken from the soil at the coal mine site in Centralia to be screened for various genes that have previously been described as mechanisms for arsenic resistance. The mechanisms involve: converting from one form of arsenic to another, efflux pumps that pump arsenic out of the cell, and/or methylating arsenic. The 26 isolates collected have been classified using 16S sequence, minimal inhibitory concentration of arsenite and arsenate, temperature growth, and screening for the various mechanisms.

CORRELATION BETWEEN SHIGA-TOXIN PRODUCING ESCHERICHIA COLI (STEC) SEROTYPES AND DISEASE SEVERITY IN MICHIGAN PATIENTS

Moriah Moore
Poster: 522
Mentor(s): Shannon Manning (Microbiology & Molecular Genetics)

Escherichia coli is a gram-negative bacterium commonly found in the intestinal tract of animals and humans. STEC represents a type of pathogenic E. coli that can cause a variety of illnesses including non-bloody and bloody diarrhea as well as hemolytic uremic syndrome and death. Multiple STEC serotypes besides O157 (non-O157) have been linked to disease, though these serotypes vary in their ability to cause more severe clinical outcomes. Determining the distribution of serotypes and other virulence characteristics such as the type of Shiga-toxin (Stx) produced, is critical for surveillance and the investigation of outbreaks. The purpose of this study is to determine the serotypes (O-antigen) and virulence factor profiles of 470 STEC strains recovered from patients in Michigan via the Michigan Department of Health and Human Services (MDHHS). DNA was isolated from each strain and polymerase chain reaction (PCR) was used for serotyping and virulence gene screening, while epidemiological data provided by the MDHHS was used to identify factors correlated with disease severity. Preliminary analysis of 32 non-O157 strains shows the frequency of stx1 to be 56.3% and of stx2 to be 34.4%; 9.4% of strains had both the stx1 and stx2 genes. This study is valuable to provide an up-to-date picture of the constantly changing STEC population from patients and to give a more comprehensive understanding of the pathogenicity of lesser known serotypes.

ESTABLISHING WOLBACHIA INFECTION IN MAJOR MALARIA VECTOR ANOPHELES ARABIENSES MOSQUITO

Bryant Nummer
Poster: 523
Mentor(s): Deepak Joshi (Microbiology & Molecular Genetics), Xiao Liang (Comparative Med & Integ Biol)

The purpose of this research is to establish a population of Anopheles arabienses mosquitos infected with Wolbachia symbiotic bacterium. Wolbachia is a maternally transmitted endosymbiotic bacteria that is thought to infect around 60% of all insect species. This bacterium is special in its ability to spread through host populations via a reproduction-interfering mechanism called cytoplasmic incompatibility (CI). This bacterium has been shown to boost host innate immunity to parasitic infection, thus inhibiting disease transmission. A unique and unfortunate aspect is that it doesn't occur naturally in many important malaria vectors. The mosquito species, Anopheles arabienses, is one such vector that doesn't naturally become infected with Wolbachia. Through means of embryonic microinjection, we hope to establish a successful infection of Wolbachia in a population of An. arabiensis in order to study the affect of the bacterium on host

health, host parasite resistance, and its mechanisms for such processes. This may lead to a novel strategy for intervention in malaria rich regions in sub-Saharan Africa.

PHYLOGENETIC PROFILE OF PYTHIUM INSIDIOSUM STRAINS ISOLATED FROM USA ANIMALS

Samuel Trabucchi, Jake Amailio, Krunaal Mody, Bruce Proctor

Poster: 524

Mentor(s): Leonel Mendoza (Biomedical Laboratory Science)

Our research objective is to categorize, using phylogenetic analysis, different Pythium insidiosum strains recovered from dogs, horses, and humans with pythiosis in the USA. To achieve this goal, first we will culture the strains and then extract their genomic DNA. We will be analyzing the internal transcriber sequence (ITS) sequences because they are plentiful and other serotypes of Pythium have these regions deposited at the National Center for Biotechnology Information (NCBI). This epitope is targeted using universally available ITS primers. The goal is to analyze these sequences in phylogenetic analysis. 11 P. insidiosum strains maintained in Dr. Mendoza's laboratory at MSU will be sequenced. The phylogenetic correlation of the three described cryptic strains of P. insidiosum and the strains recovered from USA animals with pythiosis will be evaluated. An immunotherapeutic approach using proteins extracted from one of the cryptic strains of P. insidiosum, to treat the disease, is available. Thus, it is of importance to determine the most prevalent P. insidiosum strains in the USA to include their immunogens as part of the proteins used in the management of pythiosis.

NEUROSCIENCE

ORAL PRESENTATIONS, SECTION 1
MSU ROOM, 9:00 – 10:15 AM

DETECTION OF ALZHEIMER'S DISEASE IN MICE USING CELLULAR MRI OF PERIPHERAL MONOCYTES

Michael Baer

Time: 9:00 AM

Mentor(s): Christiane Mallett (Radiology), Erik Shapiro (Radiology)

Alzheimer's disease (AD) incidence is rising: the current incidence of 5.3 million Americans is projected to rise to 7.1 million by 2025. AD is characterized by the accumulation of amyloid beta (AB) plaques in the brain. In mice, AB has been linked with inflammation and the infiltration of peripheral monocytes. We are testing a cellular Magnetic Resonance Imaging (MRI) method for early detection of AB plaques using peripheral monocytes labeled with iron oxide particles; these particles appear as dark spots on MRI images, allowing for detection of single labeled cells. First, we chimerized mice so that their peripheral monocytes were green fluorescent and used immunohistochemistry (IHC) to quantify the association between AB and monocytes. 10-50% of plaques were associated with monocytes and vice versa. However, the ionizing radiation used for ablation caused widespread inflammation and monocyte infiltration throughout the brain that confounded the results. Our current strategy is to label monocytes with iron oxide particles in vitro and inject them into mice with AD to try to detect AB plaques. First, we will collect bone marrow from donor mice and generate monocytes, using flow cytometry to confirm monocyte purity. Next, we will develop a method to label the monocytes with iron oxide particles. We will then inject the labeled monocytes intravenously into AD mice and image using a high-field (7T) dedicated animal MRI system. We will again use IHC to validate our results. This work may lead to a method for early diagnosis and treatment of AD patients.

DOPAMINE NEURONS IN PARKINSON'S DISEASE

Hannah Phillips

Time: 9:15 AM

Mentor(s): Timothy Collier (Translational Science and Molecular Medicine)

Parkinson's disease (PD) is a neurodegenerative disorder that involves the death of dopamine neurons in the nigrostriatal pathway, along with a decrease in dopamine in the striatum. Recent studies have shown that this neuronal degeneration is somewhat selective, in that the dopamine neurons in the ventral tier of the substantia nigra seem to be the most vulnerable to degeneration. This is thought to be because these neurons have a very broad distribution of axons, which makes them more susceptible to stress and degeneration. In this experiment, we injected the fluorogold (FG) into several rat brain areas innervated by the substantia nigra and mapped the distribution of the substantia nigra pars compacta (SNc) neurons labelled by this retrograde tracer. Two groups of ten rats underwent stereotactic surgery and were unilaterally injected with the FG tracer, each in a different brain area innervated by the SNc. After the tissue was sectioned and mounted the dorsal SNc, ventral SNc, and the substantia nigra pars reticula were all examined for cell bodies labelled with fluorogold. The ventral SNc showed the most cell bodies labelled with fluorogold across all 10 of the injections sites, suggesting that one of the reasons these neurons are so vulnerable to degeneration in PD is because they undergo excessive stress by supplying innervation to multiple brain areas.

COMPARISON OF EYE MOVEMENTS FOR CLOSE READING AND PLEASURE READING OF JANE AUSTEN DURING FMRI

Philip Dooley, Morgann Brafford

Time: 9:30 AM

Mentor(s): Devin Mcauley (Cognitive Science)

Previous fMRI research on reading has primarily investigated the neural mechanisms involved in processing of individual words and phrases. Less work has investigated neural activity while reading full length narratives at a natural pace. This research examines eye movement data from a study where participants read a chapter of Jane Austen during close reading and pleasure reading conditions during functional magnetic resonance imaging (fMRI). Participants were English PhD candidates (n=18) who read chapter two of Jane Austen's Mansfield Park, half of which with close reading instructions and half with pleasure reading instructions, at a natural reading pace. The fMRI scanner was equipped with an fMRI compatible eye tracker, a device that tracked listeners eye movements during the reading of the text. For this project, a new graphical user interface and software package was developed in MATLAB to visualize, quantify, and compare participants eye movements during the two reading conditions. Preliminary results will be presented along with a demonstration of the new software. Of particular interest will be 1) the number of fixations and times participants backtrack in the text in the close reading compared to the pleasure reading conditions and 2) the relation between the eye movement data and the quotes that participants generated when they wrote a literary essay following the fMRI reading portion of the study.

NIGRAL NEUROINFLAMMATION AND DEGENERATION AS A RESULT OF ALPHA SYNUCLEIN PREFORMED FIBRILS

Olivia Barth

Time: 10:00 AM

Mentor(s): Caryl Sortwell (Translational Science and Molecular Medicine)

Alpha-Synuclein is an intraneuronal protein known for its central role in Parkinson's Disease pathology and its tendency towards aggregation which contributes to neuronal death in the nigrotstriatal pathways of the diseased brain. Recent studies on PD have established the link between the formation of toxic A-syn fibrils and PD pathology in rodent models. PD diagnosis and treatment occurs long after disease onset, thus our aim was to characterize the inflammation and degeneration at various time points in a rat preformed fibril model to more carefully understand the pathological progression of PD. Injections of recombinant mouse preformed fibrils (PFFs) were unilaterally injected into Fischer 344 rats at 2 months of age, alongside a

control cohort of rats injected with saline. Rats were euthanized at 4 predetermined time points post-injection. Nigral sections were cut and stained for phosphorylated alpha-synuclein aggregates, Tyrosine Hydroxlase (TH), and activated microglia. Alpha synuclein aggregation was observed in the substantia nigra ipsilateral to the injection site along with an increase in activated microglia. TH neurons decreased in numbers and exhibited smaller cell bodies bilaterally at the later time points. These results indicate that injected PFFs lead to Parkinson's pathology rats and that pathology changes over time, along with the degree of neuroinflammation and nigral degeneration. In order to more effectively treat PD, understanding the temporal relationship between A-syn aggregation and neuroinflammation and degeneration in the nigrostriatal pathway is necessary.

NEUROSCIENCE
POSTER PRESENTATIONS, SECTION 1
BALLROOM, 11:15 AM – 12:45 PM

THE INFLUENCE OF MUSCLE-DERIVED BDNF ON ANDROGEN-DEPENDENT MOTONEURON CHARACTERISTICS

Courtney Cox
Poster: 528
Mentor(s): S Marc Breedlove (Neuroscience), Katherine Halievski (Neuroscience), Cynthia Jordan (Neuroscience)

Motoneurons of the spinal nucleus of the bulbocavernosus (SNB) are sexually dimorphic and depend on androgens for their survival and growth (e.g., size of motoneuronal cell bodies). Evidence also suggests that androgens' trophic effects on SNB motoneurons may depend on muscle-derived neurotrophic factors, but which factors and how such factors work to regulate the development of SNB motoneurons is not completely clear. One particular neurotrophic factor, brain-derived neurotrophic factor (BDNF), delivered peripherally in adulthood to either SNB motor axons or their target muscles has been found to mimic androgens' trophic effects on SNB motoneurons, leading us to hypothesize that androgens may act via muscle-derived BDNF to promote normal development of SNB motoneurons. To test this hypothesis, we used a transgenic mouse model that overexpresses BDNF specifically in the target muscle using Cre-lox recombination technology. In a 2X2 design, male mice that overexpress muscle BDNF or not (wild type) were castrated as adults; half received testosterone replacement, while the other half did not. We counted the number of motoneurons and measured their size in the androgen-sensitive SNB and dorsolateral nucleus, and the non-androgen-sensitive retrodorsolateral nucleus. We predict that if muscle-derived BDNF exhibits trophic influences independent of testosterone, then these measures will be maintained in androgen-sensitive motor pools of male castrates who did not receive testosterone treatment. Such findings would be consistent with the idea that the action of muscle BDNF may be downstream of testosterone to promote the survival and growth of SNB motoneurons.

TREATMENT WITH TPPU IMPROVES COGNITIVE FUNCTION IN HYPERTENSIVE RATS WITH BILATERAL COMMON CAROTID ARTERY STENOSIS

Courtney Fisher
Poster: 529
Mentor(s): Anne Dorrance (Pharmacology and Toxicology), Nusrat Matin (Pharmacology and Toxicology)

Chronic cerebral hypoperfusion (CCH) and hypertension are risk factors for vascular cognitive impairment (VCI). Reduced blood flow through the common carotid arteries, induced by bilateral common carotid artery stenosis (BCAS), is a physiologically relevant model of CCH. Soluble expoxide hydrolase (sEH) converts epoxyeicosatrienoic acids (EETs), arachiodonic acid metabolites produced by cytochrome 450 enzymes, into less metabolically active compounds. sEH inhibitors have been proposed to have vascular and neural protective effects in stroke models. We hypothesized that treatment of stroke prone spontaneously hypertensive rats (SHRSPs) with BCAS with the sEH inhibitor, trifluoromethoxyphenyl-3 (1propionylpiperidin-4-yl) urea (TPPU), would alleviate cognitive dysfunction. Data are shown as mean ±

SEM, vehicle vs TPPU, and p <0.05. After 8 weeks of BCAS, TPPU treated rats showed improved short-term memory (novel exploration quotient, 90 minutes retention time: 0.5 ± 0.06 vs 0.06 ± 0.04), evaluated by novel object recognition test. RNA extracted from the brain was reverse transcribed and qRT-PCR was used to assess the mRNA expression of the neuronal markers doublecortin and uncoupling protein 2 (UCP-2), and vascular modulator sEH. Data were expressed as fold change from control (housekeeping gene beta-2 microglobulin) ±SEM. Doublecortin, sEH, and UCP-2 all were upregulated in TPPU treated SHRSPs compared to vehicle treated (p <0.05, unpaired t-test). These data suggest that TPPU improves short-term memory after BCAS and upregulates neural protective genes doublecortin and UCP-2.

ENVIRONMENTAL LIGHTING CONDITION MODULATES HYPOTHALAMIC OREXINERGIC ACTIVITY

Sara Golidy
Poster: 530
Mentor(s): Lily Yan (Psychology)

Light affects mood and emotion, exemplified by Seasonal Affective Disorder, in which patients experience recurring episodes of depression and anxiety when there is less sunlight (Rosenthal, 1984). Previous work in our lab has developed an animal model of SAD using the diurnal grass rat (Arvicanthis niloticus) and found that the attenuated activity of orexinergic system in the hypothalamus underlies depression-like responses induced by daylight deficiency (Deats et al, 2014). The objective of this study is to determine whether summer-like bright light (briL) condition can restore orexinergic activities in animals previously housed in winter-like dim light condition (dimL). Adult male grass rats (n=12) were divided into 2 groups. One group of the animals was housed in winter-like dimL for 4 weeks, while the other group was initially housed in dimL for 4 weeks and then switched to summer-like briL for another 4 weeks. After a total of 8 weeks, the animals were perfused with 0.9% saline followed by 4% paraformadehyde. The brains were removed and sectioned coronally for immunohistochemistry analyzing the expression of orexin in the hypothalamus. The number of orexin-immunoreactive (ir) cells was quantified using NIH ImageJ software. We found that the animals housed in dimL had fewer number of orexin-ir cells compared to those switched from dimL to briL condition. An independent samples t test revealed that the difference was significant. The results from this experiment demonstrate that environmental lighting condition influences hypothalamic orexinergic system, and suggest that changes of orexinergic activity could be a neural mechanism underlying SAD.

LONG-TERM SYNAPTIC PLASTICITY WITHIN THE DENTATE GYRUS OF FMRP KNOCK OUT MICE

Samuel Gregerson
Poster: 531
Mentor(s): Charles Cox (Physiology)

Fragile X Syndrome (FXS) is the most common form of inherited intellectual disability that falls on the Autism Spectrum Disorder (ASD). Those afflicted with FXS exhibit cognitive and behavioral impairment. FXS is caused by an absence of the Fragile X Mental Retardation Protein (FMRP), and lack of this protein has been associated with numerous alterations in neuronal function. The hippocampus is part of the limbic system and plays a major role in learning and memory. In addition, early studies within the hippocampus using a mouse model of FXS (FMRP knock out) have demonstrated alterations in long-term depression (LTD), a specific form of synaptic plasticity. In my studies, I have focused on a different pathway within the hippocampus, namely the perforant pathway that connects the entorhinal cortex to the dentate gyrus. Activity within this pathway has been associated with novel object recognition, a behavioral representation of memory that is altered in FMRP knock out mice. My working hypothesis is that long-term synaptic plasticity is dampened within the dentate gyrus of FMRP knock out mice. To test this, I will make extracellular electrophysiological recordings from the dentate gyrus using in vitro brain slices. Long-term potentiation (LTP), another form of long-lasting synaptic plasticity, will be elicited by high frequency tetanic electrical stimulation of the perforant pathway within the dentate. I am currently able to routinely evoke LTP within this pathway, so my next step is to repeat these experiments in hippocampal brain slices from FMRP knock out animals.

CHANGES IN PROPORTION OF MUSCLE FIBER TYPES IN FELINE PLANTOR FLEXORS POST TRANSTIBIAL AMPUTATION

Katelyn Kretzschmer
Poster: 532
Mentor(s): Annette Pantall (Osteopathic Medicine)

Lower limb amputation impacts muscle function and consequently impairs gait. Factors include loss of firm fixation, disruption of innervation and disturbance of muscle structure. Little research has been undertaken on changes in muscle fiber types following amputation which impacts muscle function. The study was performed to investigate changes in muscle fiber types after amputation. The hypothesis was that there will be an increase in faster fiber types. Two cats, AM1 and AM2, underwent transtibial amputations and were fitted with osseointegrated prostheses. After 21 weeks, the cats' soleus, lateral gastrocnemius, medial gastrocnemius, and tibialis anterior muscles were harvested during terminal surgery and frozen at -80°C. 5 mm thick transverse sections of muscle were preserved in formalin and encased in paraffin. 3 ?m sections were stained with BF-35, F8, and 2F7 monoclonal antibodies which stain for Type 1 and Type 2a, Type 1, and Type 2a muscle fibers respectively. Little change was found in cat AM1 while AM2 showed decrease in the proportion of Type 1 and/or Type 2a muscle fibers. The only muscle to increase in 2a fibers was the soleus muscle of AM2 which was expected as the control contained 100% Type 1 fibers. There are several possible reasons why fiber proportions changed including poor reinnervation or change in muscle function. In summary, there was a difference in muscle fiber changes between the two cats with AM2 showing the greater change which corresponds with AM2's more impaired gait as reported in a previous study.

PSYCHOLOGICAL AND NEUROBIOLOGICAL MECHANISMS UNDERLYING 'HEDONIC HALLUCINATIONS' IN RATS

Jillian Mullally, Jane Balasz
Poster: 533
Mentor(s): Alexander Johnson (Psychology)

'Hedonic hallucinations' occur when a food paired cue results in appetitive taste reactivity responses to water. That is, rats consume and show hedonic responses to the water in the presence of the cue, as if it were sucrose. The present study examined the neurobiological mechanisms underlying 'hedonic hallucinations' in rats. To achieve this, one group of rats were trained on a Pavlovian conditioning procedure in which auditory conditioned stimuli (CS) were paired with the delivery of sucrose solution (paired condition). A second group of rats received the same CS, however the delivery of sucrose was unpaired with cue presentation (unpaired condition). During the test stage, when the sucrose was substituted for water, rats in the paired condition showed significant hedonic hallucinations to the water, relative to unpaired rats. To observe these responses, video recordings were taken and appetitive taste-reactivity responses, including lateral tongue protrusions—indicators of high hedonic evaluation of a substance—were measured. To begin characterization of the neuronal systems underlying these hedonic hallucinations, we used immunohistochemical techniques to stain for the immediate early gene marker for neuronal activity, c-fos. Using brightfield microscopy, we revealed significant c-fos activity in the basolateral amygdala and nucleus accumbens shell of rats from the paired conditions (relative to unpaired rats). Both of these brain regions have been implicated in reward learning, and the dysfunction seen in many neuropsychiatric conditions.

NEUROSCIENCE
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 11:15 AM – 12:45 PM

ANIMAT PROJECT
Grace Peltier, Ryan Ashbaugh, James Seaton
Poster: 536
Mentor(s): Mark Reimers (Neuroscience)

Although there has been extensive research in constructing artificial decision networks for various purposes, and also extensive research in how the wiring of animal brains is constructed and modified, there has been almost no dialogue between these endeavors. We plan to bridge these fields. First the rough bauplan of connections is laid down by molecular markers, early in development; matching of pairs of markers determines whether connections are made. We simulate these by specifying variables that depend on location in the simulated brain, and the probability of connection depends on matching. Second the connections are refined by spontaneous synchronized activity in source regions, and exaggerated plasticity in target regions, to build corresponding maps. We plan to instantiate that mechanism by adjusting the parameters.

ACETYLCHOLINE BIOSENSING USING AMPEROMETRIC-BASED NEUROCHEMICAL MEASUREMENTS
Joseph Salatino, Emilie Gupta, Andrew Mecca, Phil Olson
Poster: 537
Mentor(s): James Galligan (Pharmacology & Toxicology), Greg Swain (Chemistry)

Acetylcholine is the most abundant neurotransmitter in the adult nervous system, where it is responsible for attention, arousal and memory in the central nervous system and neuromuscular function in the peripheral nervous system. Dysregulation of this neurotransmitter is causally linked to neurodegenerative conditions including Alzheimer's disease and dementia, as well as gastrointestinal tract motility disorders including chronic intestinal pseudo-obstruction disease (CIP), where all of these diseases currently have no cure. With the recent onset of neurochemical measurement techniques using microelectrodes, measurement of acetylcholine in vivo can provide a tremendous opportunity for approaching the diagnosis and treatment of these devastating neurological disorders clinically, as well as offer incredible promise for research applications to study the mechanisms and progression of these conditions. Here, we report the development of an enzyme-based biosensor for real-time measurement of acetylcholine using constant potential amperometry. Preliminary results demonstrate a linear relationship between step-wise changes in potential with known concentrations of acetylcholine.

APOLIPOPROTEIN E E4 INTERACTION WITH NEUROPSYCHIATRIC SYMPTOMS IN ALZHEIMER'S DISEASE AND MILD COGNITIVE IMPAIRMENT
Mehma Singh Michelle McKenna
Poster: 538
Mentor(s): Andrea Bozoki (Neurology and Ophthalmoloy)

OBJECTIVE: To examine whether the e4 allele of the apolipoprotein E gene (APOE4) differentially affects the prevalence or severity of neuropsychiatric symptoms (NPS) in patients with Mild Cognitive Impairment (MCI) and Alzheimer's Disease (AD). BACKGROUND: Previous studies have shown a relationship between higher NPI-Q scores and progression to dementia. In APOE4+ AD patients, apathy was observed at higher rates than in APOE4-, while depression was observed at higher rates in APOE+ MCI subjects. Prior work has focused primarily on examining NPS in AD and on individual symptoms. DESIGN/METHODS: We extracted genetic, diagnostic, and NPS data from the Alzheimer's Disease Neuroimaging Initiative (ADNI) Phase 1 database for 393 MCI (211 APOE4+) and 189 AD subjects (124 APOE4+). NPS were assessed using the Neuropsychiatric Inventory Questionnaire (NPI-Q), which measures the presence and severity of twelve behavioral disturbances. Individual NPI-Q symptoms were grouped into clusters based on common

psychopathologic characteristics and response to treatments; Psychosis (delusions, hallucinations, sleep disturbances), Hyperactivity (aggression, disinhibition, irritability, motor behaviors, elation), Affect (depression, anxiety), and Apathy (apathy, appetite change). A Student's t-test compared cluster severity between APOE4 groups, while a chi-squared test assessed differences in frequency. EXPECTED RESULTS: Based on previous studies, we predict the Affect cluster will be most frequent and severe in APOE4+ MCI subjects while the Apathy cluster will be most frequent and severe in APOE4+ AD subjects. These findings would lead to a better understanding of a potential relationship between APOE4 and NPS as well as behavioral differences between MCI to AD.

UNCOVERING THE P300: A LOW-COST APPROACH TO RECORDING EVENT-RELATED POTENTIALS

Kylie Smith
Time: 11:15 AM
Poster: 539
Mentor(s): Gregory Gage (Neuroscience)

In the field of neuroscience, years are dedicated to learning basic mechanisms of brain functions as well as how to use technology to measure this functioning. This makes for a small niche of people capable of competently operating an EEG and interpreting the results. The objective of this project is to use the Backyard Brains Heart and Brain SpikerShield, powered by an Arduino microcontroller, to elicit the well-known P300 signal via a do-it-yourself inspired oddball task and record it using laptop based Spike Recorder software. Appearance of a healthy P300 in comatose patients who were given a passive oddball task has been found to be an indication of the potential for recovery of consciousness. We intend for this technology, in the hands of the scientific layperson, to inspire thought and development in the field of neuroscience.

TRADEOFFS IN SENSORY BRAIN TISSUES ASSOCIATED WITH TEMPORAL NICHE TRANSITIONS

Ewelina Szewczuk
Poster: 540
Mentor(s): Laura Smale (Neuroscience)

The distribution of an animals' activity across a 24-hour day is heavily influenced by the environmental light and dark cycle. Diurnal mammals are active during the daytime when light is present, while nocturnal ones concentrate their activity at night. There are various sensory structures in the brain that contribute to an animal's ability to navigate, find food, and avoid predators, and those that process visual information may be of greater value to diurnal animals as they are most active when photic signals are intense; for nocturnal animal's auditory cues may be more important. Brain tissue is energetically expensive, suggesting that there may be tradeoffs in the investments animals make in different areas. Specifically, diurnal rodents may "invest" more than nocturnal ones in the lateral geniculate nucleus (LGN), a brain structure that interprets visual information, relative to the medial geniculate nucleus (MGN), which is responsible for processing auditory cues. To test this hypothesis, we trapped, collected, and sectioned the brains of two related species, the nocturnal Australian bush rat (Rattus fuscipes) and the diurnal Australian swamp rat (Rattus lutreolus) and stained for both cell nuclei and acetylcholinesterase. The volumes of the LGN and MGN were measured then compared. We are in the process of analyzing slides to determine whether there is a difference with respect to the volume of tissue the two species devote to visual and auditory processing. This study will shed light on evolutionary changes in brain structure that may have occurred as diurnal species diverged from nocturnal ones.

CHRONIC EFFECTS OF TETRAHYDROCANNABINOL ON NEUROGENESIS AND CELL DIFFERENTIATION IN THE DENTATE GYRUS OF ADOLESCENT MICE

Sean Watson

Poster: 541

Mentor(s): Colleen Hegg (Pharmacology Toxicology)

Endocannabinoids, endogenous ligands that bind to cannabinoid receptors, induce neurogenesis, the generation of new neurons from progenitor cells, in the embryonic, post-natal and adult nervous systems. However, the effects of endocannabinoids on neurogenesis in adolescents are under-studied. Moreover, long-term effects of tetrahydrocannabinol (THC), the psychoactive component in marijuana, on neurogenesis are unknown. It is critical to study this time period as cannabinoid abuse often begins in adolescence when the central nervous system is still developing. We hypothesize that neurogenesis will decrease and gliogenesis will increase in adolescents after chronic administration of THC. To test this hypothesis, tetrahydrocannabinol (THC; 10 mg/kg) or vehicle (5% cremaphor + 5% ethanol), was administered to anesthetized mice (4% isoflurane) aged 1 month (n=6/group) for five days per week for four weeks. At days 26-28, BrdU was given and tissue was collected one, eleven or nineteen days following the last BrdU administration. Immunohistochemistry will be performed using markers for proliferated cells (BrdU), neurons (NeuN), and glia (GFAP). Cell death will be measured with caspase immunoreactivity and the TUNEL assay. The number of neurons, glia and cells that incorporated BrdU will be counted by a researcher blinded to treatments. Significance will be assessed using two-way analysis of variance and Bonferroni post-hoc test. We anticipate that chronic exposure will negatively affect neurogenesis in adolescent mice, a critical time of brain development. Due to the recent legalization of marijuana, knowing the long-term effects of THC is critical.

NEUROSCIENCE
POSTER PRESENTATIONS, SECTION 3
ENGAGEMENT CENTER, 1:30 – 3:00 PM

CHANGES IN MYOTACTAL REFLEX LATENCIES IN RELATION TO UPPER TRAPEZIUS TENDER POINTS OF CHRONIC NECK PAIN AND PAINFREE SUBJECTS

Ishi Nalamolu Anisah Al-qadi, Hannah Weatherford

Poster: 544

Mentor(s): Annette Pantall (Neuroscience)

Neck pain is a common source of musculoskeletal pain, accounting for 1.3% of health care visits. Common diagnoses include myofascial pain syndrome, neck sprains, and postural syndrome. Osteopathic physicians frequently associate areas of abnormal tissue texture such as Jones' tender points with neck pain. Currently the pathophysiology of abnormal tissue texture is unknown. Analysis of the stretch reflex may elucidate some of the underlying mechanisms. Upper trapezius (UT), which exhibits a monosynaptic reflex bilaterally, has a delay in latency in healthy subjects of about 2.4 ms between ipsi and contralateral sides. The goal of this pilot study was to investigate the effect of chronic neck pain and tender zones in UT on the stretch reflex latency. The hypothesis was that there would be a longer delay in individuals with neck pain and tender points. Five chronic neck pain subjects (23 –59 years) and three painfree subjects (22-32 years) participated in the study. Electromyography (EMG) electrodes were placed bilaterally on the upper, middle and lower parts of upper trapezius (UT). About 30 mechanical taps were applied to the clavicular insertion of UT. The EMG signals were synchronized with the tap through a contact switch. The reflexes of ipsilateral and contralateral sides were filtered and analyzed. Early results indicate that subjects with neck pain have increased differences in latency between ipsilateral and contralateral sides. The increased latency indicates additional pathways, possibly supraspinal may be acting on the Ia/alpha motor neuron synapse. Further research is needed to clarify how neuronal pathways are affected.

ETIOLOGY OF PARKINSON'S DISEASE STARTING WITH ALPHA-SYNUCLEIN IN THE GASTROINTESTINAL SYSTEM

Alana O'Mara

Poster: 545

Mentor(s): Fredric Manfredsson (Translational Science & Molecular Medicine)

Parkinson's disease (PD) is a common neurodegenerative disease with marked motor symptoms and gastrointestinal dysfunction. The protein, alpha- synuclein (?-syn), is implicated in the toxicity seen in PD. Accumulations of ?-syn appear in both the central nervous system (CNS) and enteric nervous system. Our study aimed to elucidate whether exogenous forms of aggregated ?-syn were able to travel from the enteric nervous system neurons to the CNS, there causing the characteristic PD pathology. We injected rats' colons with pre-formed fibrils of ?-syn and characterized brain tissue and gut tissue 1 month, 6 months, and 12 months post-injection. We found no indication of ?-syn pathology in the gut. Additionally, neither ?-syn aggregation was seen in the central nervous system nor neuronal loss. These findings indicate that the appearance of ?-syn in the gut is merely an epiphenomenon with concomitant ?-syn pathology occurring in the CNS.

LANGUAGE ABILITIES AND NEURAL PROCESSES FOR SELECTIVE ATTENTION IN CHILDREN FROM LOWER SES BACKGROUNDS

Laney Roehl

Poster: 546

Mentor(s): Amanda Hampton Wray (Communicative Sciences and Disorders)

The impact of lower socioeconomic status (SES) on cognitive skills and brain functions of children and adults has been well documented. Growing up in a lower SES household has been found to be associated with reduced vocabulary and language abilities, literacy skills, and academic performance. These, and other deficits, often persist into adulthood. Furthermore, the incidence of language impairment (LI) in children from lower SES backgrounds is significantly higher compared to higher SES peers. Children with LI also exhibit reduced vocabulary and language skills, reading abilities, and academic performance. Thus, children from lower SES backgrounds with LI are at high risk for poor language and academic outcomes. Selective attention is a foundational cognitive skill that is reduced in both children from lower SES households and children with LI. Event-related potential (ERP) studies have demonstrated that selective attention is a highly malleable system that shows deficits in developmental disorders and in typically developing lower SES children. To date, brain functions underlying selective auditory attention in young children as a function of language abilities from lower SES environments have not been investigated. The current study evaluates relationships between language proficiency and effects of selective auditory attention on neural processes in preschool-age children from lower SES backgrounds using event-related brain potentials. The findings from this study will enhance our understanding of the relationships between language skills and selective auditory attention in young children at risk for language deficits.

IMPAIRED EXPRESSION OF BDNF AND NT-4 IN DISEASED MUSCLE OF TWO SBMA MOUSE MODELS

Leigh Ann Wahl

Poster: 547

Mentor(s): Cynthia Jordan (Neuroscience)

Spinal and Bulbar Muscular Atrophy (SBMA) is a heritable X-linked, late onset, neuromuscular disease that is androgen-dependent and affects only men. Both motoneurons and skeletal muscles are affected in this disease. Symptoms include muscle weakness, wasting, and cramping. Muscle-derived neurotrophic factors have been implicated in neuromuscular diseases. Such factors normally promote the growth and long-term survival and health of neuromuscular systems by regulating critical cellular and molecular mechanisms in motoneurons and skeletal muscles. Our lab finds that expression of brain derived neurotrophic factor (BDNF) in two limb muscles, the extensor digitorum longus and soleus, is reduced in diseased SBMA mice. To further examine the generality of this deficit in the present study, we used quantitative PCR to examine mRNA levels of BDNF and NT-4, another related factor, in a different muscle, the tibialis anterior of diseased

mice of two SBMA models in the lab. The so-called "AR 97Q" model ubiquitously overexpresses the full-length human androgen receptor with a 97-glutamine repeat, recapitulating the human expansion mutation causing androgen dependent motor dysfunction in males. Similarly, the so-called "myogenic" model presents with the same male-biased androgen-dependent motor dysfunction, but is caused by overexpression of the wild-type androgen receptor only in skeletal muscle fibers. We find significant deficits in mRNA for BDNF and NT-4 in diseased anterior tibialis of both SBMA models, suggesting that a loss in muscle-derived neurotrophic factors such as BDNF and NT-4 may be part of the causal chain of events leading to motor dysfunction in SBMA.

ENHANCING MESENCHYMAL STEM CELL HOMING TO GLIOMA USING A HYPOXIC MIMETIC PRETREATMENT

Alexander Wolf
Poster: 548
Mentor(s): Erik Shapiro (Radiology)

Glioblastoma multiforme is the most common primary brain tumor. Prognosis for this disease is grim, with the median survival rate under 15 months, mostly due to recurrence after first line therapy. To enable emerging second line treatments or more advanced targeted schemes, novel diagnostic approaches for detecting residual tumors or small distal foci are required. The aim of this work is to develop a method for identifying these remnant/small tumors. MSCs home to glioma cells in vitro and in vivo. MSCs can be labeled with magnetic microparticles, an MRI contrast agent, which enables single cell detection. Connecting these two concepts, we will harness the homing potential of MSCs to selectively deliver MRI contrast agents to the tumors, thus enabling their specific identification. In this work, we first determined the minimum number of glioma cells necessary to induce MSC homing. This was accomplished using a novel in vitro MRI-based 3D migration assay. This assay was performed by constructing an MRI-detectable migration assay composed within wells of a 96-wellplate with 4 layers of collagen: base, glioma (varying cell concentrations), intermediate and MSC layers. Samples were serially scanned by MRI and migration was analyzed by quantifying MSC movement into the intermediate and glioma layers. Second, we enhanced homing using a hypoxic mimicking pretreatment; 24h incubation with CoCl2. MSCs migrate due to the CXCR4/SDF-1 axis and this pretreatment increases CXCR4 expression. Additionally, we compared expression of CXCR4 using Western Blot between the control and pretreated groups. Improving glioma detection will positively impact patient outcome.

INVESTIGATION OF POSSIBLE PROTECTIVE EFFECTS OF LITHIUM AGAINST NEUROTOXICANT-INDUCED OXIDATIVE STRESS AND THE CONTRIBUTION OF AUTOPHAGY, THE UBIQUITIN PROTEASOME SYSTEM AND UCH-L1 IN MAINTAINING PROTEOSTASIS

Harue Zhang
Poster: 549
Mentor(s): Keith Lookingland (Pharmacology and Toxicology), Brittany Winner (Pharmacology and Toxicology)

Parkinson disease (PD) is characterized by selective loss of dopaminergic neurons in the substantia nigra, which results in a host of motor disturbances. Common pathological hallmarks associated with PD include the accumulation of intracellular toxic protein aggregates known as Lewy bodies. Due to decreased clearance of defective proteins observed in PD, the neuroprotective potential of mechanisms that enhance protein degradation needs to be explored. Two important pathways impaired in PD are the autophagy lysosome pathway (ALP) and the ubiquitin proteasome system (UPS). The ALP is an intracellular degradative process that clears dysfunctional proteins by autophagosome formation. In the UPS, proteins are tagged with polyubiquitin chains to signal degradation by the 26S proteasome. UCH-L1 (ubiquitin carboxy-terminal hydrolase L1) is a neuron-specific de-ubiquitinating enzyme that removes monomeric ubiquitin from protein substrates, allowing new substrates to be tagged. The ALP and UPS are lucrative targets for pharmacological enhancement of proteolytic pathways, which could slow or halt neurodegeneration in PD. Lithium is an FDA approved drug for psychiatric treatment that has recently been identified to have potential use in PD. Specifically; lithium could be protective against protein aggregation

and oxidative stress by inducing ALP. The effects of lithium on proteasome activity are unknown, but its protection against stress could be due to up-regulation of the ALP or both the ALP and UPS. A dopaminergic cell line (MN9D) will be used in this study to investigate the protective effects of lithium against neurotoxicant stress and determine the contribution of the UPS and UCH-L1 in maintaining proteostasis.

NEUROSCIENCE
POSTER PRESENTATIONS, SECTION 4
ENGAGEMENT CENTER, 1:30 – 3:00 PM

IDENTIFICATION OF ?FOSB GENE TARGETS IN THE HIPPOCAMPUS

Basma Al Masraf
Poster: 553
Mentor(s): AJ Robison (Physiology)

Regulation of gene expression in the hippocampus is critical for learning, but knowledge of the transcription factors and gene targets that drive this process remains incomplete. Our lab recently showed that the transcription factor ?FosB regulates hippocampal cell morphology and learning. We know of many ?FosB gene targets in other brain regions, but we do not know which genes it modulates in the hippocampus to control memory formation. In this presentation, I will detail my project designed to determine gene targets of ?FosB in the hippocampus. To address this, viral vectors were injected into the hippocampus to overexpress ?FosB, and RT-PCR of candidate mRNAs was used to determine whether ?FosB regulated their expression. However, this method did not reveal any regulation of candidate genes. Therefore, we sought to determine whether strong salient activators of the hippocampal ?FosB expression would regulate any of these candidates. We treated mice with chronic cocaine or the antidepressant fluoxetine, but again saw no regulation of candidate genes in the hippocampus. It is possible that ?FosB regulates completely different genes in the hippocampus than in other brain regions. Thus, we are now exploring an unbiased approach, Ribo-TRAP, a method in which a cell-type specific tagged ribosomes are used to purify mRNAs, allowing us to determine whether any novel gene targets are altered in expression by the presence or absence of ?FosB. Overall, this project generated mostly negative data that suggest that ?FosB regulates a very different subset of target genes in the hippocampus than in other brain regions

NEUROTENSIN-RECEPTOR-1 NEURONS IN THE VENTRAL TEGMENTAL AREA CONTROL DOPAMINE-MEDIATED BEHAVIOR AND BODY WEIGHT.

Hannah Batchelor
Poster: 554
Mentor(s): Gina Leinninger (Neuroscience)

Dopamine (DA) neurons in the Ventral Tegmental Area (VTA) modulate feeding, drinking, and locomotor behaviors, but the signals that regulate DA neurons to dictate a behavioral output remain unclear. We examined how the neuropeptide Neurotensin (Nts) could modulate DA-mediated behaviors. Nts signals via the G-protein coupled receptors Neurotensin receptor-1 and receptor-2 (NtsR1 and NtsR2). We found many NtsR1 neurons in the VTA that also contain tyrosine hydroxylase, and are therefore DAergic. By comparison, there were far fewer NtsR2 neurons in the VTA. Together, these data suggest that NtsR1 is the predominant receptor isoform in VTA neurons and is expressed on DA neurons. We further hypothesized that disruption of midbrain NtsR1 signaling would impair energy balance. We therefore injected adult *NtsR1*^{Cre} mice in the VTA with either a cre-dependent viral vector expressing GFP (generating *NtsR1*^{GFP} mice with intact NtsR1 neurons) or the A-subunit of the diphtheria toxin (DTA) to selectively ablate NtsR1 neurons (*NtsR1*^{DTA} mice). Sixteen weeks post-surgery, *NtsR1*^{DTA} mice exhibited increased locomotor activity, energy expenditure, and food/water intake compared to *NtsR1*^{GFP} controls. Despite their increased feeding, however, the *NtsR1*^{DTA} mice remain leaner than their *NtsR1*^{GFP} counterparts, suggesting improved metabolic efficiency. Intriguingly, *NtsR1*^{DTA} mice do not elevate their activity in response to psychostimulants that promote DA release, suggesting that their DA signaling system is maximally activated at baseline. Overall, these data reveal that

VTA NtsR1 neurons are crucial coordinators of DA-mediated locomotor activity and ingestive behaviors needed to maintain energy balance.

DETERMINATION OF THE ROLE OF VENTRAL TEGMENTAL AREA RICTOR EXPRESSION IN BASELINE AND STRESS-INDUCED VOLUNTARY CONSUMPTION

Rebecca Brunk
Poster: 555
Mentor(s): Michelle Mazei-Robison (Physiology)

Stress is a well-established mediator of addictive behavior, and those that suffer from stress-related disorders such as depression are at an increased risk of developing substance use disorders. To better understand how stress impacts drug reward, we use a preclinical mouse model of depression called chronic social defeat stress (CSDS). This model mimics many behavioral changes observed in depressed patients including changes in weight and appetite, as well as increased drug intake. Evidence from our lab suggests that knockout of the protein Rictor (rapamycin-insensitive companion of target of rapamycin) in the ventral tegmental area of the brain alters morphine reward. Further, we have recently found that Rictor knockout mice increase intake of water, sucrose, and morphine after CSDS. We are particularly interested in whether this difference is occurring during stress itself, and whether food intake is similarly affected. My goal is to monitor the water and food intake of control and Rictor knockout mice during CSDS. Following social avoidance testing, I will evaluate food and water intake, as well as differences in weight gain. Future studies include analysis of RNA/protein of ventral tegmental area samples from control and knockout mice and determination of whether similar intake behaviors are observed in female mice. Thus, the overall objective of my project is to identify the timetable for when stress-induced behavioral changes begin to occur, and how Rictor signaling influences these behaviors, as this may provide insight into how depression develops and what signaling changes in the brain underlie the disorder.

LOCALIZATION OF DIFFERENTIAL FOSB AND ?FOSB EXPRESSION IN TUBEROINFUNDIBULAR AND NIGROSTRIATAL DOPAMINE NEURONS FOLLOWING ACUTE NEUROTOXICANT EXPOSURE

Elizabeth Kim
Poster: 556
Mentor(s): Keith Lookingland (Pharmacology & Toxicology)

Parkinson's disease (PD), a neurodegenerative condition affecting the motor system, is characterized by the loss of nigrostriatal dopamine (NSDA) neurons, whose cell bodies are located in the substantia nigra (SN). However, tuberoinfundibular dopamine (TIDA) neurons, whose cell bodies are in the arcuate nucleus (ARC), remain unaffected in PD. Unlike NSDA neurons, TIDA neurons can recover from damage by the neurotoxicant 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP), which is used in animal models to simulate DA neuronal toxicity in PD. Upregulation of the gene parkin correlates to TIDA neuron recovery, as parkin mRNA and protein increase in the ARC but not the SN. Additionally, expression of AP-1 transcription factors FosB and its alternatively spliced isoform ΔFosB increases in the ARC but not the SN, suggesting FosB/ΔFosB is a transcription factor at the parkin promoter. Immunofluorescent staining of TH neurons in the ARC and SN was performed to localize expression of total FosB/Δ FosB protein and quantify the number of TH neurons expressing FosB. The results reveal that MPTP had no effect on the colocalization of TH and FosB in either region. This suggests MPTP-induced increases in ARC FosB expression (as determined by Western blot analysis) represents increases in expression within individual neurons, rather than a change in the number of TH neurons expressing total FosB. In further studying expression of FosB, ΔFosB, and other AP-1 transcription factors in TIDA and NSDA neurons, we hope to better understand potential neuroprotective mechanisms for use in treating PD.

VIRAL VECTOR TRANSDUCTION DEFICIENCIES IN THE AGED BRAIN

Sho Nakashima

Poster: 557

Mentor(s): Caryl Sortwell (Department of Translational Science and Molecular Medicine)

Viral vector-mediated gene therapy has proven to be a promising treatment in providing both symptomatic relief and modifying progression for age-related neurodegenerative diseases, such as Parkinson's Disease (PD). However, many pre-clinical trials have failed to account for age as a critical factor, possibly explaining the low success of clinical trials. My project sought to characterize the transduction of two viral vectors – rAAV 2/2 and 2/9 – in the striatonigral and nigrostriatal systems, implicated in PD, of young adult and aged rats. Two cohorts of rats, young adult rats (3 months old) and aged rats (20 months old), were injected in the striatum or substantia nigra with rAAV 2/2 GFP or 2/9 GFP, and then, sacrificed 1 month post-injection. To measure transduction of the viral vectors and compare GFP expression levels, western blots, in situ hybridization, and qPCR were performed, along with a number of immunohistochemical analyses. In this presentation, I will review the findings of previous studies on viral vector transduction efficiencies and describing the methods and results of my project, which revealed that the aged nigrostiatal system is resistant to transduction by rAAV 2/2, but not 2/9, while the aged striatonigral system showed resistant to transduction by both. This suggests that the rAAV capsid-mediated steps of transduction are involved in age-related transduction deficiencies in the nigrostriatal system, providing insight into the optimization of future gene therapy clinical trials for PD and other age-related neurodegenerative diseases.

A TRACTABLE LABORATORY EXPERIMENT FOR OBSERVING THE NEURAL BASIS OF SEXUAL DIMORPHISM IN MOTH PHEROMONE DETECTION.

Trevor Smith

Poster: 558

Mentor(s): Greg Gage (Neuroscience)

The domesticated silkmoth (Bombyx mori) use pheromone specific receptors in their antennae sensilla hair to find potential mates up to 11 kilometers away. The female moth excretes the pheromone bombykol to attract potential male suitors, whose antennae receptors contain more sensitive pheromone receptors than their female counterparts. The ability to detect the pheromone bombykol comes from very specific odor detecting cells that make up the majority of the sensilla hair on the antenna. I have evaluated responses to powerful odors such as lemon oil and peppermint extract in comparison to the pheromone bombykol. I recorded responses with a modified of the Backyard Brains SpikerBoxes and Arduino microcontroller mounted SpikerShields. I tracked both individual action potential units and broad receptor potentials using well-documented differential electroantennogram (EAG) recording methods to isolate the actions specifically in Bombyx mori antennae. Antennae respond to an array of stimuli, such as mechanical stimulation as well as chemical stimulation, which can be compared on the basis of size and length of both action potential units and receptor potentials. Delivery of odor stimulus is delivered through a constant air stream and using Arduino controlled solenoids for controllable and repeatable results. This study provides evidence that the receptors for the pheromone bombykol react with much more robust and unique action potential units and receptor potentials characteristics than any other potential stimulus, and a low-cost and open source means of investigating and educating about an integral sensory apparatus for many organisms, the antenna.

PHYSICAL SCIENCES

ORAL PRESENTATIONS, SECTION 1
ROOM 36, 11:00 AM – 12:45 PM

A NEW LASER-BASED TECHNIQUE FOR THE MEASUREMENT OF RARE NUCLEAR COLLISIONS

Kristen Parzuchowski

Time: 11:00 AM

Mentor(s): Jaideep Singh (Physics)

Certain collisions between atomic nuclei are the critical steps in the formation of the chemical elements inside of stars. Measuring the probability of these collisions allows us to explain the abundance and diversity of the chemical elements in our universe. Laboratory techniques for studying these rare nuclear collisions are very challenging since the probability of these collisions can be as low as once per day. The traditional approach is to perform these experiments indirectly under conditions that significantly increase the chances of collisions but are unrepresentative of true stellar environments. These indirect measurements are then extrapolated into more realistic stellar conditions. Our approach is to directly study these very rare nuclear collisions by building a more efficient, sensitive, and selective detector based on optical single atom detection. The idea is to capture the small number of products from the nuclear collisions in a cryogenically frozen thin film of neon. The captured products are then illuminated with laser light. Because of interactions between the products and the solid neon, the products re-emit the absorbed light but at a different color. This color-shifted light can then be isolated and detected by a very sensitive camera. This project focuses on the design and development of an optical single atom detector. In my presentation I will show the progress of the prototype assembly and the first optical studies of ytterbium atoms captured in solid neon, which is the very first step on the long road towards making measurements of nuclear collisions.

CHARACTERIZING HADRONIC COSMIC RAYS VIA JET SUBSTRUCTURE RECONSTRUCTION AND CLUSTERING TECHNIQUES

Ben Tamagne

Time: 11:15 AM

Mentor(s): James Linneman (Physics & Astronomy)

Cosmic rays (CR) consist of charge-neutral photons, and charged hadrons, i.e. massive particles such as protons. Upon entering Earth's atmosphere, these particles collide with other particles and form a cascade of interactions known as a CR shower. Showers initiated by very high energy hadron interactions produce discrete jets of fragment particles that can be observed as characteristically distinct from photon initiated showers. This analysis employs jet clustering software, used in high energy physics (HEP), to search for jet substructure and uses clustering algorithms to distinguish between electromagnetic and hadronic showers using ground-based observations. Patterns produced by a hadronic shower will typically have a larger, more diffuse footprint with multiple local maxima, as it is monitored by a detection array; this is in contrast to a smoother and more localized footprint produced by an electromagnetic shower. Using clustering software to distinguish between hadronic and electromagnetic showers is a new application in CR research of HEP jet analysis techniques developed at CERN and elsewhere. The successful characterization of showers aids in identifying distinct CR sources, as hadronic showers provide a significant background when identifying these sources.

THE BETA DECAY OF 32CL
Eric Aboud
Time: 11:30 AM
Mentor(s): Christopher Wrede (NSCL)

The unstable isotope Chlorine-32 undergoes beta decay to Sulfur-32, leaving Sulfur-32 in a nuclear excited state. Almost immediately, Sulfur-32 undergoes decay to the ground state by emitting gamma-rays. The gamma rays released during this "beta delayed gamma decay" of Chlorine-32 were recorded during a recent experiment at Michigan State University's National Superconducting Cyclotron Laboratory. The present work is an analysis of the data acquired during that experiment. The intensities of the gamma rays have provided the necessary information to build the decay scheme for Chlorine-32. Using the intensities of the gamma rays, the feeding from the beta decay of Chlorine-32 to various Sulfur-32 excited states was calculated. The identification of new transitions in the gamma decay of Sulfur-32 has revealed previously unknown Chlorine-32 beta decay transitions. Overall, this new analysis will provide new and more accurate data for the beta decay of Chlorine-32.

IMAGE ANALYSIS OF GAMMA-RAY SKY-MAPS
Christopher Jones
Time: 11:45 AM
Mentor(s): James Linnemann (Physics & Astronomy), Kirsten Tollefson (Physics & Astronomy)

Extensive air showers can be caused by gamma-ray collisions our atmosphere. As the shower develops, more and more particles are generated. The High Altitude Water Cherenkov (HAWC) Observatory measures air showers caused by gamma-rays from around 100 GeV to 100 TeV. Unlike optical telescopes, HAWC can view the universe in the higher frequency gamma-ray spectrum, enabling it to see objects and events that would otherwise be invisible. HAWC has already gathered extensive data, and constructed a sky-map of gamma-rays. I will be performing image analysis on this sky-map, with the goal of searching for potential TeV sources. To help do so, I will be using image processing tools like SExtractor and SFind to help analyze the sky-maps. These tools analyze groups of neighboring pixels and compare them with a profile given by the angular resolution of HAWC, helping us to differentiate between point sources (blurred by the angular resolution) and extended objects too wide for the angular resolution profile. They will help to define bright collections of related pixels in the map, which will be the primary method of identifying potential sources. Doing so will help to expand our catalog of candidate TeV objects, provide an opportunity to study them further, and learn more about their nature and function, thus expanding on our understanding of the universe.

ELECTROACTIVATED C-H ACTIVATION TO DEVELOP DEUTERATED COMPOUNDS AND ALKYLAMINES
Quentin Boll
Time: 12:00 PM
Mentor(s): Souful Bhati (Chemistry), James Jackson (Chemistry)

This work entails a mild and general procedure for the activation of C-H sites in alcohols and amines in a regioselective and stereoretentive manner. A series of substrates ranging from simple amines and alcohols to chiral compounds such as amino acids undergo stereoretentive hydrogen replacement by deuterium when they are exposed to our electrocatalytic conditions with >95% deuterium incorporation and enantiomeric excess of >99% in all cases. This concept was further extended to develop C-N bonds in the presence of amines as nucleophiles to make alkylamines. Alkylamines are significant as building blocks for surfactants and related cleaning agents, as pH adjusters, metal complexants, gas scrubbers, epoxy activators, as components of adhesives and coatings, and in many other applications. Most of the current approaches to nitrogen alkylation involve the use of potent alkylating agents such as alkyl halides or sulfonates. Compared to the method presented herein, such reagents are vulnerable to overalkylation, thereby making them less selective and atom economical. Amine formation by alkylation with alcohols has long been practiced under high temperature and pressure conditions. However, the present reaction takes

place under mild heating and at atmospheric pressure in a mix of water and the alcohol catalyzed by a heterogeneous, robust electroactivated catalyst.

A STATISTICAL ANALYSIS OF POSSIBLE VERY HIGH-ENERGY GAMMA-RAY SOURCES

Joshua Schroeder
Time: 12:15 PM
Mentor(s): James Linnemann (Physics & Astronomy), Kirsten Tollefson (Physics & Astronomy)

The High Altitude Water Cherenkov (HAWC) facility in Mexico detects gamma rays from our Galaxy and beyond. By looking at large areas of the sky simultaneously, HAWC can provide a more comprehensive list of very high-energy gamma-ray sources. Discovery of new sources will provide valuable information about the universe, advancing our understanding of physics and astronomy. HAWC looks at broad areas of the sky, while other experiments, such as telescopes, look at much smaller areas with more precision. Therefore, identifying new hotspots in HAWC's data will also inform present and future telescopes where to point to observe phenomena, and thus is of critical importance. Hotspots in the sky map may be undiscovered sources, or may be random fluctuations of the background. We ran a False Discovery Rate (FDR) analysis to accurately assess the probability that prospective sources could be such fluctuations. This gives us a quantitative measure of what should be included in a list of potential sources, and with what degree of certainty they can be said to be real. In this presentation, I will explain why FDR analysis is a suitable statistical method, how it was applied, and what results were found.

SIMULATIONS FOR A NEW DETECTOR OF LOW-ENERGY BETA DELAYED PROTONS AT NSCL

Madison Harris
Time: 12:30 PM
Mentor(s): Christopher Wrede (Physics & Astronomy)

In classical novae, a white dwarf star in a binary star system draws material onto its surface from its hydrogen rich companion star. This material is heated, and eventually hydrogen burning is ignited explosively. A sequence of proton captures and beta decays ensues, creating heavier isotopes. Our current understanding of classical novae is limited by uncertainties in certain key nuclear reaction rates. Of particular interest is the reaction rate of ³⁰P(p,?)³¹S (phosphorus-30 to sulfur-31), which is a potential nucleosynthesis bottleneck in classical novae. In order to reduce the uncertainty in that and other key reaction rates, a new detector is being designed at the National Superconducting Cyclotron Laboratory on the campus of Michigan State University. To aid in the design of the detector, simulations of this device have been run to determine the behavior of protons of different energies in a variety of gases and under different pressures. More specifically, we have investigated the energy deposition of protons as a function of position in the detector in order to study how various pad geometries affect efficiency and the background due to beta particles. Most recently, we have been optimizing the detector's geometry by examining how various pad sizes and an outer ring to veto high energy protons affect both efficiency and background.

PHYSICAL SCIENCES
POSTER PRESENTATIONS, SECTION 1
MOSAIC MULTIPURPOSE ROOM, 11:15 AM – 12:45 PM

ETHIOPIAN FLOOD BASALTS: INSIGHT TO EVOLUTION AND DEATH OF A MAGMA PLUMBING SYSTEM

Bodaniel Bradley
Poster: 562
Mentor(s): Tyrone Rooney (Geological Sciences)

East Africa, the premier locale for early hominid research, is dominated by a high plateau, which has had a profound impact on climate and human evolution. At the core of this plateau are the 30 million year old Ethiopian flood basalts. We have sampled a continuous series of flows that comprise the vast bulk of the

flood basalt sequence, and found distinct variations in the petrographic and geochemical characteristics of the flood basalt flows. The early eruptions were dominated by thick flows of primitive magma with no breaks between eruptions. Later, as the magma began tapping a shallower source, the flows became thinner, more evolved, and interspersed by short breaks in magmatism represented by thin paleosols. The late stages of eruption were similarly defined by thick, aphyric flows, but with large temporal breaks in magmatism represented by thick paleosols. The changes in thickness and composition of flows indicate a change in the source of the magmatism, and the increasing number and size of paleosols indicates a dying magma plumbing system. A paleosol at ~ 2000 meters is located near the change from thin, plagioclase-phyric flows to thick, aphyric flows. Studying samples near this paleosol can help to ascertain what lead to the change from shallow fractionation of plagioclase-phyric flows to deep fractionation of aphyric flows.

CDMNSE NANOCRYSTALS FOR SPIN POLARIZATION

Tyler Cochran
Poster: 563
Mentor(s): Remi Beaulac (Chemistry), John McGuire (Physics)

Cadmium selenide, manganese substituted, nanocrystals have been synthesized and their optical properties studied. These materials exhibit a strong interaction between manganese ions and photo-excited electrons/hole pairs. This leads to a quasi-particle known as an excitonic magnetic polaron, which highly splits normally degenerate spin states within the nanocrystals. This splitting is useful for exploring spintronics applications. Investigations into the dynamics of this phenomenon are being carried out.

CNO BREAKOUT IN NOVAE

Jason Emming
Poster: 564
Mentor(s): Edward Brown (Physics and Astronomy), Ryan Connolly (Physics and Astronomy)

White dwarfs in close binary systems can strip material from their companions and build an envelope, rich in hydrogen, around their cores. The ignition of this layer results in runaway thermonuclear burning i.e. a classical novae. The energy from such an event may be sufficient for breakout of the carbon-nitrogen-oxygen (CNO) cycle. The reaction ¹⁵O(?,?)¹⁹Ne is one of the breakout mechanisms that may significantly contribute to the observed abundances of proton-rich elements lighter than iron (Z<26). The uncertainties in this rate are not well constrained. To test its sensitivity on the production of proton-rich elements I created models to produce exceptionally high peak temperatures: a white dwarf with a mass of 1.33M_?, central temperature of 25MK, and an accretion rate equal to 10?9M_?y^{?1}. The highest temperatures reached were about 250 MK, below the 400 MK required for breakout. In order to achieve significant CNO breakout and test the ¹⁵O(?,?)¹⁹Ne rate at relevant temperatures, more extreme model parameters must be chosen that result in higher temperatures (>400 MK) during outburst.

FEEDING THE TRAPS: INSIGHT INTO LARGE-SCALE MAGMA ERUPTIONS AND THEIR INTERACTIONS WITH THE CRUST

Brett Flessner
Poster: 565
Mentor(s): Tyrone Rooney (Geological Sciences)

Flood basalts, rapidly erupting outpourings of lava that cover extensive tracts of our planet's surface, have had a profound impact on earth's environment. Mechanisms by which these flood basalts reach the surface, though poorly constrained, are associated with zones of weakness in the lithosphere. The 105-106 km3 Ethiopian Flood Basalt Province (Traps) comprises a large portion of the Northwest Ethiopian Plateau. Here we examined a series of 17 feeder dikes from an E-W transect west of Lake Tana on the plateau. Elemental compositions of these dikes are compared with known flows from the erupted traps in order to distinguish which flows are fed by which dikes/conduits. Previous studies have shown that other dike swarms in the region display an orientation controlled by Precambrian basement structures; for example the Serpent-God

Dike Swarm to the south of the traps exhibits an orientation (N055NE) congruent with the Tulu-Dimtu Shear Zone (TDSZ). It has previously been shown that as this shear zone continues north towards our study area, where it broadens and has been hypothesized to become almost N-S in orientation. Our studied dikes show a N008NE orientation, which confirms this hypothesis. While covered by basalts, our study shows that the TDSZ continues to the north and likely links with the N-S trending Baraka Ophiolite Belt north of the traps. Our data therefore demonstrates the fundamental control of existing structures in determining the orientation of the conduits that fed the Ethiopian flood basalts.

NEUTRINO/ANTINEUTRINO DISCRIMINATION IN THE ICECUBE NEUTRINO OBSERVATORY

Hannah Gallamore
Poster: 566
Mentor(s): Tyce DeYoung (Physics & Astronomy)

The neutrino is a nearly massless subatomic particle that is poorly understood. A better understanding of neutrinos could illuminate the physics behind the Standard Model of particle physics and explain the matter and antimatter imbalance in the universe. IceCube, a neutrino detector located at the South Pole, encompasses a cubic kilometer of ice with sensors spread out along vertical strings. A neutrino will enter the ice, collide with a proton or a neutron and produce various other particles, some of which are photons that the sensors detect. My goal is to determine whether the inelasticity, a measure of how much energy goes into the various particles produced during neutrino interactions, could be used to differentiate between neutrinos and antineutrinos. Separating neutrinos and antineutrinos would help us to determine the relative masses of different types of neutrinos. I will show that a neutrino or antineutrino enriched data sample can be formed based on their inelasticities.

UPGRADING OF FAST-PYROLYTIC LIGNIN BIO-OIL BY ELECTROCATALYTIC HYDROGENATION

William Yakah
Poster: 567
Mentor(s): Pengchao Hao (Chemistry)

The excessive consumption of fossil fuel poses numerous environmental challenges that have channeled people's attention to seek renewable, unexploited, low cost, alternative energy with high performance in energy conversion. Of particular interest is the lignin component of lignocellulosic biomass, as it is the most carbon and energy-rich fraction of biomass, making up 15-35% of its dry mass and has usually been viewed as a waste by-product, hence underutilized. This complex polymer consists of aromatic building blocks held together by several widely differing chemical linkages. By building models of each type of Lignin and testing various cleavage procedures, our research focuses on seeking efficient methods to disconnect linkages in Lignin to convert to fuel. We postulate that the mild condition of electrocatalytic hydrogenation and green aqueous phase reaction would be beneficial for industrial fuel production. We synthesized most of the abundant lignin linkage models and investigated with both fast-pyrolysis and electrocatalytic hydrogenation to examine the efficacy and also trying to understand the depolymerization mechanism of lignin upon fast-pyrolysis and bio-oil stabilization mechanism by electrocatalytic hydrogenation. On the other hand, the lifetime of catalysts used is crucial for any competitive industrial application. Recently, we have discovered a method to expand the lifespan of our Raney nickel catalyst, which will ultimately enable us to address the mechanistic aspect of surface reaction on the catalyst.?

PHYSICAL SCIENCES
POSTER PRESENTATIONS, SECTION 2
MOSAIC MULTIPURPOSE ROOM, 11:15 AM – 12:45 PM

SHORT ERUPTIONS, BIG IMPLICATIONS: INTERMITTENT EXPLOSIVE VOLCANISM OF THE ETHIOPIAN PLATEAU

Tyler Holmes
Poster: 570
Mentor(s): Tyrone Rooney (Geological Science)

Continental flood basalts are voluminous eruptions of mafic lava that cover large areas of land that have been linked to mass extinction and climate change in the past. Their origin and evolution is not well understood because they are poorly preserved due to the significant uplift and erosion that typically accompanies their emplacement. At 30 million years old, the Ethiopian flood basalt province is one of the youngest and best preserved in world. The province was formed from fissure eruptions fed by the African superplume, but the magmas have undergone differentiation in the crust. It is difficult to resolve the precise mechanisms that have affected the erupted CFBs because the geochemical signals preserved within them are often ambiguous. To more effectively constrain these different processes we must examine end-member lavas that have been most impacted by magma differentiation. In the Ethiopian province, flood basalts are interbedded with rare silicic horizons. We hypothesize that these silicic magmas are derived from the flood basalts through extreme fractional crystallization. We examine the geochemical characteristics of fragments of these magmas using laser-ablation inductively-coupled plasma mass spectrometry, then compare them to the flood basalts and surrounding volcanism to determine the evolutionary trends of magmas moving through the lithosphere. Our research will provide a new end-member for studies of the Ethiopian continental flood basalts and will facilitate studies of magma differentiation in the Ethiopian lithosphere.

EVALUATION OF AROMATICITY-MODULATED HYDROGEN BONDING

Madison Jenner
Poster: 571
Mentor(s): James Jackson (Chemistry), Tayeb Kakeshpour (Chemistry)

In a quantum chemical study, we have shown that pi-electron polarizations that perturb aromaticity or antiaromaticity of heterocycles upon hydrogen (H-) bonding can in return modulate their strengths. The current project quantifies the energetic and geometric consequences of the interplay between aromaticity and H-bonding by means of 1H NMR spectroscopy and X-ray crystallography, respectively. Our measurements show that H-bonding dimerization enthalpies (in kcal/mol) of compounds 1-methyl-1,3-dihydro-2H-imidazol-2-one (1) and 2,3-dihydro-1H-imidazo[1,2-a]imidazole (2), in C6D6, are respectively 2.4 ± 0.2 stronger and 2.0 ± 0.2 weaker than their corresponding reference compounds 1-methylimidazolidin-2-one (1') and 2,3,5,6-tetrahydro-1H-imidazo[1,2-a]imidazole (2'), lacking H-bonding/aromaticity coupling. While the strengthening in 1 vs. 1' could be attributed to its aromatic gain upon H-bonding, the weakened H-bond in 2 vs. 2' could be explained by its aromaticity disruption H-bonding. X-Ray crystallography structural information is also consistent with the above thermodynamic comparisons.

FRAGMENTS OF THE DEEP LITHOSPHERE

Andrew LaVigne
Poster: 572
Mentor(s): Tyrone Rooney (Geological Sciences)

Central to the plate tectonic paradigm is the concept that continents must break apart and form oceanic crust. The strength of the continental lithosphere is thus a key variable in understanding the dynamics of our planet. A curious yet unexplained feature of the continental lithosphere in rifted regions is the presence of what has been termed a magmatic underplate. This underplate, distinguished by high seismic wave

velocities at the lower crust, is representative of thick strong lithosphere, yet the composition of this material and its origin is unknown. In this study we explain the origin of pyroxenite xenoliths that we hypothesize are derived from a magmatic underplate beneath the Ethiopian plateau adjacent to the Ethiopian rift. We find that our thermobarometric calculations place the high density pyroxenites at precisely the same depth as the high velocity zone (HVZ), suggesting that these pyroxenites represent the mafic underplate. Our investigation of the xenoliths records a complex history that shows two magma sources. The difference in magma sources is revealed in the relative depletion or non-depletion of the heavy rare earth elements (HREE). The depletion of the HREE elements points to a deeper magma source, quite possibly the Afar superplume, while the non-depletion could be due to the earlier Pan-African orogeny. Petrographic analysis shows that the non-depleted samples are older than depleted group. This indicates that mafic underplates may not be emplaced in a single event but actually can be generated though a multi-stage process.

STUDIES TOWARD THE TOTAL SYNTHESIS OF AGELASTATIN A

Matthew Morrow
Poster: 573
Mentor(s): Babak Borhan (Chemistry)

The discovery and invention of new synthetic strategies is at the heart of total synthesis, a discipline which seeks to convert simple, commercially available starting materials into complex organic molecules for medical applications. Most total syntheses today focus on producing products found in nature because these compounds possess interesting biological properties. Agelastatin A is a marine alkaloid that exhibits remarkable cytotoxicity toward melanoma, bladder, and colon cancer cell lines. Further therapeutic studies of this potential anticancer medicine are hampered by low natural availability. The goal of our research is to make agelastatin A more easily accessible and less expensive to isolate than obtaining it from its natural source, a sea sponge. Previously our group reported an efficient route to chiral heterocyclic rings using a class of organocatalysts called Cinchona alkaloids. We are currently focused on demonstrating the usefulness of this reaction by constructing the C-ring of agelastatin A and all four of its asymmetric centers in a single step. By using catalysts to reduce the total number of steps in our synthesis, we hope to make agelastatin A in the most efficient manner possible and practical to large scale production. Our research has provided valuable lessons for opening a new synthetic pathway to agelastatin A and for the synthesis of related marine natural products.

ELECTROCATALYTIC UPGRADING OF LIGNIN MONOMERS PROBING SUBSTRATE SYNERGIES IN ACTIVATION OF RANEY™ NICKEL CATALYST

Adela Myles
Poster: 574
Mentor(s): Benjamin Appiagyei (Chemistry)

Electrocatalytic hydrogenation (ECH) achieves hydrogenation using electricity (from renewable energy sources such as wind, solar, geothemal etc.) at atmospheric pressure and below the boiling point of water (the electrolyte). In contrast, classical catalytic hydrogenation/hydrogenolysis (CH), has been studied over the years and employed by oil refining but requires harsher conditions. For instance, CH of benzene with H2 over Raney™ nickel requires 300oC and 20 atm, but a reasonable conversion can be achieved by ECH at 45oC. One concern is that ECH of more complex substrates or mixtures could form tar and occlude the catalyst surface. However, if the addition of additives like plane hydrocarbons eg. octane can trap water insoluble substrate to facilitate their reduction on catalyst then oligomerization would be disfavored. Again, if the presence of one monomer can activate the catalyst to facilitate another substrate's reduction (Demethylation or demethoxylation), then oligomerization would be disfavored too. Findings in this direction would also enhance mechanistic understanding of the ECH reaction.This study's goal is to probe for catalytic activation by one monomer as well as additives of the reduction of other monomers.

GEOCHEMICAL SIGNALS FROM YELLOWSTONE'S PAST ERUPTIONS AND IMPLICATIONS FOR FUTURE ERUPTIONS

Sarah Quattrochi
Poster: 575
Mentor(s): Guillaume Girard (Geological Sciences)

The Yellowstone caldera, formed by the Snake-River-Plain-Yellowstone hot spot, is located in both Wyoming and Idaho and is the largest supervolcano in North America. The active volcano's surrounding area is home to geysers and one of the largest volcanic degassing fluxes on Earth. Yellowstone is best known for three major rhyolite tuff eruptions 2.13, 1.26 and 0.64 million years ago. Large rhyolite lava flows have been the most common eruptions, and constitute the most likely future volcanism scenario. Lava flows would devastate the area surrounding the volcano while gas emissions would likely constitute major agricultural, health and environmental hazards. This research investigates the lava flows erupted between ~2.15 and ~0.65 million years ago and compares them with recent units (< 0.6 million years old). Glass and mineral trace element analyses by laser-ablation ICP-MS help shed light on the early stages of formation and evolution of this 'super'-volcano. Preliminary data suggest more complex mineral compositions and zoning patterns than those observed in younger lava flows. These complexly zoned minerals may be inherited from older phases of magmatic activity, and reveal the capacity of the Yellowstone magmatic system to remobilize old stored material such as those interpreted to be present today in the volcano's subsurface as crystal mush.

PHYSICAL SCIENCES
POSTER PRESENTATIONS, SECTION 3
LAKE HURON ROOM, 1:30 – 3:00 PM

SYNTHESIS OF PROTEASOME REGULATORS FOR THE TREATMENT OF NEURODEGENERATIVE DISEASES

Benjamin Heriford
Poster: 578
Mentor(s): Jetze Tepe (Chemistry)

To maintain homeostasis as well as other normal cellular functions, proteins are constantly synthesized and degraded. An integral intracellular component for this degradation occurs at the proteasome, which is responsible for breaking down misfolded or otherwise compromised proteins. Proteins can also be damaged by oxidizing agents that accumulate as one ages resulting in increased stress and demand at the proteasome for elimination. With the natural aging process however, there is a reduction in the activity of the proteasome. Consequently, damaged and oxidized proteins will begin to amass within cells. This inability to remove the unwanted proteins is a characteristic of many neurological disorders such Alzheimer's disease, Parkinson's disease, and Huntington's disease. Currently, there are not sufficient treatments that are capable of preventing or reversing the accumulation of compromised proteins. If small molecules can be utilized to reestablish the activity of the proteasome, this should enhance the ability to eliminate damaged protein and could lead to prevention of these neurological diseases. The goal of my research is focusing on the synthesis of small molecules that are capable of activating the proteasome in pursuit of preventing neurodegenerative diseases.

EFFECT OF PYRIDYL DONOR DISPOSITION AND LIGAND FLEXIBILITY ON DIMENSIONALITY IN LUMINESCENT AND NITROBENZENE-DETECTING CADMIUM ADAMANTANEDICARBOXYLATE COORDINATION POLYMERS

Cassi LaRose
Poster: 579
Mentor(s): Robert LaDuca (Lyman Briggs College)

Hydrothermal reaction of cadmium nitrate, 1,3-adamantanedicarboxylic acid (adcH2), and a hydrogen-bonding capable and conformationally flexible dipyridyl ligand has afforded three coordination polymers with differing dimensionalities and topologies. {[Cd(adcH)2(4-bpmp)]n (1, 4-bpmp = bis(4-

pyridylmethyl)piperazine) exhibits 1-D chain motifs with monodentate and protonated adcH ligands. {[Cd4(adc)4(3-bpmp)(H2O)2]n (2, 3-bpmp = bis(3-pyridylmethyl)piperazine) displays a 3D tetranodal {4462}3{446482} topology network, derived from a primitive cubic net with regularly spaced pillar vacancies. {[Cd2(adc)2(4-bpmt)2]·H2O}n (3, 4-bpmt = bis(4-pyridylmethyl) trimethylenedipiperidine) shows a decorated (4,4) grid 2D structure based on syn–syn bridged {Cd2(OCO)2} dinuclear clusters. Thermal and luminescent properties of these new phases are reported, along with surveys of their capability to serve as detectors for nitroaromatic compounds.

DIVALENT ION SEPARATION THROUGH POLYELECTROLYTE MULTILAYER FILMS CONTAINING METAL-BINDING LIGANDS IN ELECTRODIALYSIS

Maria Misovich

Poster: 580

Mentor(s): Merlin Bruening (Chemistry)

We achieved high monovalent/divalent cation selectivity through polyelectrolyte multilayer coated cation exchange membranes in electrodialysis. Currently, we aim to separate divalent ions in electrodialysis. Both 20nm alumina nanofiltration membranes and Nafion cation exchange membranes are employed in this project. Alternating layer-by-layer adsorption of poly(N,N'- dicarboxymethyl) allylamine (PDCMAA) and protonated poly(allylamine) (PAH) on membranes yields thin films with abundant Cu2+ - binding sites. (PDCMAA/PAH)_{3.5} modified alumina membranes demonstrate that Cu2+ /Mg2+ selectivity is ~ 10 at 0.6mA/cm² when feed solutions contain 0.1M Cu(NO₃)₂ and 0.1M Mg(NO₃)₂. In contrast, the unmodified alumina and Nafion membranes show selectivity ~ 1. We attempt to optimize the method to increase selectivity and current efficiency.

CROSS SECTIONAL AND TOPOLOGICAL ANALYSIS OF PEROVSKITE-BASED PHOTOVOLTAICS CELL USING SCANNING ELECTRON MICROSCOPE

Hananiel Setiawan

Poster: 581

Mentor(s): Per Askeland (Composite Materials & Structures Center), Carl Boehlert (Chemical Engineering & Materials Science), Pengpeng Zhang (Physics & Astronomy)

Solar energy has been one of the most promising alternative energy sources to solve the global energy crisis. The daily input of solar energy to the earth's surface is more than enough to supply human's electricity needs for a long time. And unlike other energy sources, such as coal or natural gas, converting solar energy to electricity is almost pollution-free. However, the traditional crystalline Silicon photovoltaic (solar) cell technology has a rather complicated fabrication process and thus expensive cost. More recently, much attention has been focused on the hybrid organic/inorganic perovskite-based solar cell as the possible next-generation solar cell technology due to its rapidly growing efficiency and its lower fabrication cost. Planar heterojunction perovskite-based solar cell has also been found to have diffusion lengths of over 1 ?m, which makes it possible to fabricate the devices with thicker active layers without negatively affecting the efficiency, thus reducing the complexity of the process. In this poster, we present our efforts to analyze the morphological and cross-sectional structure of perovskite polycrystalline films inside the solar cell using Scanning Electron Microscope (SEM). Specifically, we will focus on the orientation of the crystalline domains inside the film, which will proportionally affect the effectiveness of the cell, using the Electron Back-Scatter Diffraction (EBSD) SEM technology.

KAME DELTAS IN NORTH-CENTRAL LOWER MICHIGAN PROVIDE EVIDENCE FOR A PREVIOUSLY UNKNOWN, HIGH-LEVEL GLACIAL LAKE

Emma Treiber Ryan Fitton, Marion Goeddeke, Ryan Pearce

Poster: 582

Mentor(s): Randall Schaetzl (Geography)

In association with a 2015 Honors Seminar, we studied two small kame deltas (landforms that develop as glacial meltwater deposits sediments in lakes) in north-central Lower Michigan. The recently identified deltas

provide key evidence for a large and previously unknown proglacial lake, which we named Glacial Lake Roscommon. Our goal was to document and characterize the geomorphology of these deltas, and to determine the age of one of them. Students used augers to sample the upper 1.5 m of sediment across the deltas and obtained samples from one delta for luminescence dating. The 72 samples recovered from the South Branch Delta and the 48 samples from the Cottage Grove Delta were then analyzed for particle size. Spatial analysis of the data was performed using GIS software. The deltas are sandy, dry upland features, composed of well-sorted sands with little gravel with only small variations in texture across their surfaces. Nonetheless, the deltas do exhibit a general fining toward their outer margins. Gullies on the steeper, outer margins of the deltas postdate delta formation, having formed instead by runoff during a permafrost period, following lake drawdown. Because both deltas are tied to ice-contact ridges that mark former positions of the ice margin, luminescence ages constrain the timing of ice retreat in this portion of Michigan, for which no information currently exists. Other deltas, spits, and beach ridges associated with this lake provide opportunities for future research of the characteristics of Glacial Lake Roscommon, and its spillover effects onto nearby regions.

FREON REDUCTION AND ZINC ACTIVATION USING SODIUM AND ALUMINA

Justin Harris, Max Prawdzik

Poster: 583

Mentor(s): James Dye (Chemistry), Ned Jackson (Chemistry)

Freons, also known as chlorofluorocarbons (CFCs), have been known for years to play a major role in the depletion of the protective ozone layer of the earth's atmosphere. Due to this, it has become imperative that a clean and efficient method for eliminating these compounds from the atmosphere is discovered. Recently, a powerful reducing agent known as sodium alumina gel (NaAG) has been tested as a tool to solve this problem. Preliminary results show that NaAG can completely reduce Freons to salts and activated carbon, but it would be advantageous if Freons could be converted into useful organic materials. Hence, NaAG was tested as a practical reagent for the reduction of trichlorofluoromethane, a CFC, and it was discovered that this process worked in small amounts. Furthermore, NaAG has been more recently tested for its ability to reduce metals, such as Zinc, for the metal's use in improving classic reactions such as the Clemmensen or Reformatsky reductions. This process is still being explored, but initially, it has been observed that this new reduction method is more efficient for performing the classic reductions.

PLANT SCIENCES

POSTER PRESENTATIONS, SECTION 1
LAKE HURON ROOM, 9:00 – 10:30 AM

EFFECTS INDOLE-3-ACETIC ACID ON PLANT GROWTH

Lauren Bell

Poster: 586

Mentor(s): Aaron Garoutte (plant soil science)

Indole-3-acetic acid (IAA) is a plant growth hormone and is a huge contributor to successful plant growth promotion. Through collecting various root exudates from samples of Switchgrass, several bacterial isolates that are capable of producing IAA have been found. Administration of a bacterial isolate that produces the IAA hormone to a plant upon germination may yield an increase in the success of the plant's growth and development. Factors including physical appearance of foliage and root systems as well as the dry weight of the entire plant will be accounted for and provide further insight on the effects IAA has on plant growth and development.

DOES ANTICIPATED GLOBAL WARMING ALTER THE MUTUALISMS BETWEEN THE LEGUME PLANT PARTRIDGE PEA (CHAMAECRISTA FASCICULATES), THEIR SOIL BACTERIA (RHIZOBIA SPP), AND THE ANTS THAT PROTECT THEM FROM HERBIVORY?

Logan Brissette
Poster: 587
Mentor(s): Mark Hammond (Plant Biology), Jen Lau (Plant Biology)

Mutualisms are some of the oldest, most studied ecological interactions in the natural world. However, ecologists are currently challenged with investigating mutualisms in the context of a rapidly changing world due to human impacts, including climate change. In this experiment, we use the legume Partridge Pea (Chamaecrista fasciculates) plant and test its two mutualisms 1). nitrogen fixing soil bacteria (Rhizobia spp) and 2). protective ants under field conditions of anticipated global warming at Kellogg Biological Station. Ceramic heaters were used to increase the ambient air temperature by 3C and additional plots were used as controls with ambient field conditions. Our experimental treatments are temperature (Ambient or Elevated), Inoculation (Rhizobia bacteria or no bacteria), and Ants (with or without). The experiment was monitored regularly by counting the number of ants per plant, measuring plant growth and flowering, and fitness was measured at the end of season by counting fruits and seeds. We found anticipated global warming resulted in plants with earlier flowering and greater flower production. Inoculated plants grew larger than plants grown without Rhizobia. Lastly, plants allowed to grow in the presence of ants had higher fitness (produced more fruits). Since rhizobia is decreasing ant abundances in ambient temperature but not elevated temperature, it appears that there may be a trade-off between ants and rhizobia in ambient temperature. In elevated temperature, rhizobia availability does not influence ant abundance. This may be a result of decreased carbon limitation in elevated temperature.

FERULATE ADDITION TO ARABINOXYLAN IN MONOCOTS

Erica Gatchalian
Poster: 589
Mentor(s): Emily Frankman (Biochemistry)

The plant cell wall in monocots is composed of two layers, the primary cell wall (outside) and the secondary cell wall (inside). The secondary cell wall is built from cross-linking of hemicellulose components. The goal of this project is to identify the gene responsible for the addition of ferulate to arabinoxylan in monocots and how this addition affects the strength of the plant.

MORPHOLOGICAL CHARACTERIZATION OF SPORES IN DISCOVERED AND UNDISCOVERED SPECIES OF TRUFFLES AND FUNGI

Quinn Hanses
Poster: 590
Mentor(s): Gian Maria Niccolo Benucci (Plant, Soil and Microbial Sciences), Gregory Bonito (Plant, Soil and Microbial Sciences)

Fungi and truffles are some of the most overlooked organisms on Earth, yet the importance of these systems is impressive, as they are inseparable from the living processes that sustain almost every ecosystem on the planet. Scientists have recently found truffles act as a “fruit” underground by obtaining nutrients and water from the soil, enhancing the growing organisms around them. This project seeks to compare samples of two different truffle species, Tuber and Endogone, which are of high importance. Images from the Endogone family, Endogone flammicorona and Endogone lactiflua, will be shown describing the spore anatomy under the Environmental Scanning Electron Microscope. The Endogone flammicorona image scanned under the ESEM shown in this poster is soon to be published in the Encyclopedia of Life Sciences in March/April 2016. Presented along with Endogone images will be two undiscovered Tuber species—although these two truffles have not yet been named, they are most likely genus Tuber truffles and their morphology will be described in detail. All samples were collected locally by Michigan State research graduate students near Lake Lansing using a method of raking against dirt. By using an ESEM, instead of a SEM to scan these biological materials, no conductive coating was necessary because the ESEM utilizes a

low-pressure system that sustains the materials in order to transmit beautiful scans of the molecular structure of each species; the ESEM allows more accurate biology imagery than a standard SEM. Through observing the collected images, suggestions for their beneficial use can be made.

SWITCHGRASS VARIETY DIFFERENCES IN DIGESTIBILITY

Austin Whitted
Poster: 591
Mentor(s): Katherine Gross (Plant Biology), Karen Stahlheber (Plant Biology)

In 2014 alone the U.S. consumed about 137 billion gallons of gasoline, which is about 4% shy of the peak oil consumption of 142 billion gallons in 2007. It takes an extremely long time to replenish this natural resource that we take for granted, and usage of this resource is at a much higher rate than can be replenished in the environment. This isn't even considering the effects that these fuel emissions have on the planet in the form of global warming, air quality deterioration, oil spills, and acid rain. I worked with the Great Lakes Bioenergy Research Center, which was formed to investigate the production of more sustainable fuel. Switchgrass is a promising source of sustainable fuel because of its tolerance to many environmental factors, including drought and warm temperatures. Still, using switchgrass for the purpose of biofuels does have hindrances; the main problem is the difficulty of digesting different cell wall components (hemicellulose, cellulose and lignin). I compared 6 different varieties of switchgrass planted at Kellogg Biological Station (KBS) to see how the amount of these cell wall components differed. Thus far, I have found that total fiber concentrations do not differ among the varieties, and work comparing cellulose, hemicellulose and lignin specifically is ongoing. This project will inform how practical a certain variety would be for biofuel production, and illustrate the extent of genetic differences among varieties.

PLANT SCIENCES
POSTER PRESENTATIONS, SECTION 2
BALLROOM, 11:15 AM – 12:45 PM

IDENTIFICATION OF AN UNKNOWN MUTATION IN ARABIDOPSIS USING TRANSCRIPTIONAL DATA

Bianca Castaneda
Poster: 594
Mentor(s): Steve Van Nocker (Horticulture)

Gene transcription is an important foundation for the complexity of life. In eukaryotes, RNA Polymerase II and its associated cofactors are responsible for the transcription of protein-coding and noncoding genes. The Paf1C transcriptional cofactor has various roles in transcription including initiation, elongation and termination. In Arabidopsis, mutations in any of the genes encoding subunits of Paf1C define a distinct phenotype that is marked by early flowering and defects in flower and leaf development. The objective of this study was to identify the genetic mutation in an unknown mutant that shows a similar phenotype, and therefore may represent a Paf1C gene or gene associated with Paf1C function. In order to identify the mutation, RNA-based sequencing was used to generate transcriptional profiles for wild-type and mutant plants, and map-based transcript coverage of gene regions was compared using computational techniques. This approach identified transcriptional defects in a gene previously identified as Paf1, which is a central component of the Paf1C cofactor. This mutation is being characterized more extensively in order to understand its effects on expression of this gene.

WATER INFILTRATION ACROSS CROPPING SYSTEMS AND PLANT COMMUNITIES

William Davie
Poster: 595
Mentor(s): Kate Glanville (Plant, Soil and Microbial Sciences, Kellogg Biological Station), G Philip Robertson (Plant, Soil and Microbial Sciences, Kellogg Biological Station)

Water from rainfall or irrigation must first enter the soil for it to be used by plant roots and microbes. The speed at which water enters the soil is the infiltration rate. With low infiltration rates, the soil may be more prone to erosion. As erosion occurs, productive topsoil is lost to streams and rivers, leaving less nutrients for crop production. Infiltration rates may also influence leaching, the loss of nutrients through rain or irrigation. This is a concern when it contaminates groundwater. For example, nitrogen leaching can cause Methemoglobinemia, a kind of "Blue Baby Syndrome". My research project looks at the rate water infiltrates across cropping systems and plant communities of the KBS Long Term Ecological Research site. We predicted that more intensively managed systems would have lower infiltration rates. I was able to illustrate water infiltration by using a novel infiltrometer method using stainless steel cylinders and a Mariotte Bottle. The Mariotte Bottle was also filled with water and was placed on a scale so that movement of water into the soil could be quantified. These findings may motivate farmers and decision makers to alter their practices. Further study of how infiltration rates affect microbial activity, and how seasonal dynamics, crop rotations, rainfall variability, and topography affect infiltration would be valuable. ?

MAGNESIUM TOLERANCE IN CALIFORNIA FLOWER LEPTOSIPHON PARVIFLORUS ADAPTATION TO HIGH MAGNESIUM CONCENTRATION IN SERPENTINE SOIL

Anna Farrell
Poster: 596
Mentor(s): Doug Schemske (Plant Biology)

Plant species develop certain characteristics depending on the type of soil on which they grow. (Ghasemi, R., Chavoshi, Z. Z., Boyd, R. S., & Rajakaruna, N. 2015) The plant species Leptosiphon parviflorus, native to California, has two distinct populations, one adapted to serpentine soil, and one adapted to sandstone soil. High magnesium concentration in serpentine soil may be one of the environmental factors driving local adaptation for one L. parviflorus population. The effect of high magnesium in the soil was tested by conducting treatments of elevated magnesium concentration and measuring mortality and biomass distribution. Elevated magnesium was shown to increase mortality in both populations, with a greater effect on the serpentine population. Lower percentages of belowground biomass were found in the magnesium treatments than in the control, and serpentine plants within the magnesium treatment showed a higher ratio of aboveground to belowground biomass.

TESTING TRICHODERMA FOR BIOLOGICAL CONTROL ACTIVITY IN SUGAR BEETS

Hailey Haist
Poster: 597
Mentor(s): Linda Hanson (PSM)

The soil borne fungus Rhizoctonia solani is a widespread pathogen that can infect many different crop species. It can cause damping-off of seedlings and root rot in adult plants. Current management practices include using host resistance in crop species such as sugar beet, although this practice can result in a yield loss. Fungicides are widely used, but are costly and in some production areas they can't be used. They are difficult to use to control soil borne diseases because of the method of application. Crop rotation is limited because of the wide host range of R. solani. One additional option for management would be biocontrol. Because little is known about the interaction between Trichoderma and sugar beet seedlings we are testing several methods to examine the interaction between five different Trichoderma isolates (representing four different species). Plate tests will be done to examine antibiosis and mycoparasitism interactions between the two. Greenhouse screening of two sugar beet variety seedlings with Trichoderma isolates will be done to test the efficacy against Rhizoctonia damping-off as well as the potential for plant growth promotion in beet. In other crops Trichoderma can promote plant growth and increase yield even if no disease is present. If present in beets, this could potentially make Trichoderma an even more viable option to add to integrated pest management programs. The more we understand the better we can implement biocontrol in an economical and commercial setting.

NONSENSE & RUBBISH: IDENTIFYING ROLES OF NONSENSE-MEDIATED MRNA DECAY IN PLANTS

Magie Williams

Poster: 598

Mentor(s): Steve Van Nocker (Horticulture)

Proper growth and protein production relies on accurate transcription and translation of messenger RNA (mRNA). Accordingly, cells actively monitor mRNA structure to ensure that the mRNA has been synthesized correctly. In eukaryotic cells, one of the RNA surveillance pathways, called nonsense mediated decay (NMD), eliminates mRNAs containing premature termination codons. In previous work we used a genetic screen in the Arabidopsis plant to identify a conserved genetic component of NMD, designated UPF2. The objective of this study is to characterize the molecular roles of NMD in plants by analyzing the 'transcriptional rubbish' that accumulates in the upf2 mutant. We characterized genes misexpressed in the upf2 mutant through transcriptional profiling and RNA-based sequencing. We found that UPF2-dependent mRNAs/genes commonly have structural features expected to provide a target for NMD, including abnormally long 5′ and 3′ UTRs, and termination codons situated 5′ to an intron. We are currently analyzing NMD-targeted genes to identify other, unanticipated common features. We also hypothesize that NMD could be especially important to monitor transcripts containing 'fragile' stop codons (normally encoding an amino acid, but which are mutable to a stop codon with a single base change) and are currently evaluating this hypothesis through a genome-wide evaluation of codon usage. The single upf2 mutation analyzed to date confers relatively mild defects in gene expression. This mutation may be hypomorphic, obscuring other functions of NMD. To test this, we are creating transgenic Arabidopsis lines deleted for the UPF2 gene using a new procedure for targeted gene modification

PLANT SCIENCES
POSTER PRESENTATIONS, SECTION 3
BALLROOM, 11:15 AM – 12:45 PM

THE FIGHT FOR BIODIVERSITY: USING FUNCTIONAL TRAITS TO PREDICT ESTABLISHMENT DURING RESTORATION

Lindsey Kemmerling

Poster: 600

Mentor(s): Chad Zirbel (Plant Biology)

Biodiversity on Earth is at risk due to human destruction of natural ecosystems. Preservation and restoration are necessary to maintain a diverse and functioning planet. While preservation protects land that has escaped human impacts, restoration involves reimplementation of once existing ecosystems that have been destroyed. The goal of restoration is to establish an ecosystem that can function as it did before human use, and maintain biodiversity. Because of the conversion of prairies to farmland after the Americas were settled, prairies are one of these ecosystems largely at risk with only 0.1% remaining. Our objective is to improve the prairie restoration process to meet restoration goals. Seed sowing of native species is often used as a primary method for prairie restoration. Seeds need to overcome three critical challenges for survival: dispersal, establishment, and persistence. Knowing how seeds establish is useful to prairie restoration ecologists to understand ecosystem function(Weiher et al. 1999), and may be best understood using a functional trait approach. This approach focuses on phenotypic characteristics at the species level, and exposes general patterns in community ecology(McGill et al. 2006). Despite its importance, there is very little data available demonstrating correlations between the functional traits and species establishment during restoration. Therefore, our study focused on measuring how functional traits of seeds native to southwest Michigan prairies relate to their establishment, and answered two underlying questions: (1)What controls a species ability to establish? (2)Can functional traits be used to predict establishment success?

SPECIMENS AT THE CENTER: A TOOLKIT FOR THE SPECIMEN-LEVEL ANALYSIS OF GENE DATABASE DATA
Kasey Pham
Poster: 601
Mentor(s): Andrew Hipp (Plant Systematics)

Gene databases such as NCBI GenBank serve as records of biodiversity, providing a valuable resource for systematists and other scientists. These records can be used to construct phylogenetic trees and to investigate evolutionary relationships in groups of interest without having to undergo the lengthy and expensive process of extracting and sequencing DNA from tissue. Without these limiting factors, phylogenetic analyses using sequences mined from gene databases (supermatrix studies) tend to be far more inclusive and to utilize more genes than counterparts using sequences generated especially for the study. However, due to the difficulties of parsing and cleaning data mined from gene databases, no supermatrix studies have constructed phylogenetic trees using individual specimens for tips, as opposed to species. Analyses to the individual level allow systematists to verify the legitimacy of a species, determined by whether all individuals in a species belong to one complete evolutionary lineage, providing insight into global species diversity in a time when it is declining. In this study, we 1) present a toolkit developed in R programming language for constructing individual-level trees using gene sequences mined from a gene database, 2) demonstrate the workflow for this toolkit using the diverse flowering plant genus Carex as a case study, 3) discuss methods of improving the informativeness of the resulting trees, and 4) discuss the implications these trees have for the Carex genus. While tailored to Carex, our approach and code can be generalized to any taxonomic group.
Keywords: phylogenetics, supermatrix, monophyly, clade

TIMECOURSE MEASUREMENT OF GPT2 AND RRTF1 TRANSCRIPTS IN ARABIDOPSIS
Christopher Porzondek
Poster: 602
Mentor(s): Sean Weise (Biochemistry)

Plants acclimate when put into high light. This acclimation has been shown to be strongly affected by a glucose 6-phosphate/phosphate translocator (GPT2)(Dyson et al. 2015). Transcription factors such as redox responsive transcription factor1 (RRTF1) have also been shown to be upregulated in response to high light (Vogel et al. 2014). I used qPCR to measure mRNA levels of plants moved into high light. Arabidopsis from two wildtypes (background Colombia-0, Col-0, Wassilewskija, WS) were put into high light and samples were taken before and throughout the treatment. These data were plotted to obtain a graph of changing levels over time. RRTF1 mRNA increased faster than GPT2. Both RRTF1 and GPT2 increased more in WS than in Col-0. I speculate that the more modest increase of the transcription factor limited the increase in GPT2 expression and this might affect how well Col-0 acclimates to high light.

IMPACT OF THE TEMPERATE GRADIENT ON PLANT INVESTMENT IN POKEWEED (PHYTOLACCA AMERICANA)
Alyssa Trethewey
Poster: 603
Mentor(s): Carina Baskett (Plant Biology Lab), Doug Schemske (Plant Biology Lab)

The temperate gradient and latitudinal location are believed to have a great impact on different traits of plants, and specifically on how plants invest their resources. Greater investment in root development at higher latitudes could lead to a higher root to shoot ratio. This is due to the belief that colder temperatures found at higher latitudes and climates could impact the growing season, which limits resources for roots below ground. We used Phytolacca americana seeds from three locations spanning from Michigan (42°N) to Florida (27°N), and the roots and shoots from each plant were harvested, dried and weighed separately to obtain the root:shoot ratios for each population. All of the three latitudinal locations were found to be significantly different from one another in distribution of root biomass, where plants at the lowest latitude had the highest biomass. Shoot biomass varied only between the highest and middle latitudes, where 42°N

had a higher shoot biomass. Plants at the lowest latitude were found to contain the highest root: shoot ratio as opposed to the other two higher latitude locations. These findings contradict results seen in previous studies, and though it is unknown why this difference across latitudes occurs, we do know that there is an impact on plant investment between different latitudes.

COUNTING ARABIDOPSIS SEEDS BY IMAGE ANALYSIS

Eamon Winship
Poster: 604
Mentor(s): Shin Han Shiu (Plant Biology)

Assessing the number of seeds a plant produces is an important measure of the fitness of a plant. The plant used in our experiments is Arabidopsis thaliana, a widely used model organism. Arabidopsis thaliana seeds are numerous and small; this makes counting the seeds a time consuming and extremely tedious task. Additionally, counting the seeds by eye introduces variance into the process in the form of human error and the differences in interpretation between people. In order to develop a reproducible, accurate and more efficient method of counting the seeds we have developed a pipeline to automate the process through image analysis. In order to standardize the images for automated counting we use an acrylic template and a scanner. The standardized images are then processed using custom python scripts and particle analysis through ImageJ. Intensity, size and area are used to identify seeds and separate them from artifacts. The resulting pipeline can process 12 different samples with 20-80 seeds within two minutes with an average of one artifact and one miscount per sample set. We are continuing to develop the pipeline so it can function at higher seed counts and less stringent imaging procedures.

PLANT SCIENCES
POSTER PRESENTATIONS, SECTION 4
LAKE HURON ROOM, 1:30 – 3:00 PM

ROLE OF ARABIDOPSIS PARC6 PROTEIN IN PLACEMENT OF THE CHLOROPLAST DIVISION MACHINERY

Oliver Chen
Poster: 607
Mentor(s): Cheng Chen (Plant Biology)

Chloroplasts are evolved from ancient cyanobacteria through endosymbiosis. Reminiscent of their photosynthetic ancestor, chloroplasts division is driven by the constriction of the division complex in the middle of chloroplast. The division machinery is mainly composed of the inner FtsZ ring (Z ring) and outer DRP5B ring, which assembles on the surface of inner and outer chloroplast envelope membranes, respectively. The positioning of the division complex is established by Min system of proteins, which includes ARC3, MinD1, MinE1 and MCD1 in Arabidopsis. Recently, PARC6, an inner envelope membrane protein, is shown to coordinate the inner and outer division complexes during chloroplast replication. Moreover, the localization pattern and morphology of Z-ring in parc6 mutant suggest that PARC6 involves in the positioning of the division machinery as well. However, whether PARC6 functions independently or integrates in the context of the Min proteins to localize the division complex remains unknown. To determine the epistatic relationship between PARC6 and Min proteins, crosses between parc6 and individual Min mutants will be made, follow up the PCR-based genotyping technology to identify homozygous of the double mutants; chloroplast division phenotype will then be examined in these mutants. To further investigate the functional relationship with respect to the positioning of division complex, immunofluorescence staining of Z-ring in the obtained double mutants will be performed. The obtained data will provide a clue to the aforementioned question. Moreover, they will shed a light on the potential dual roles of PARC6 in the regulation of chloroplast division.

THE EFFECTS OF HABITAT FRAGMENTATION AND CORRIDORS ON POLLINATION AND REPRODUCTIVE OUTPUT OF NOLINA GEORGIANA

Madeleine Cleary
Poster: 608
Mentor(s): Lars Brudvig (Plant Biology)

Habitat fragmentation is a leading threat to biodiversity. One way fragmentation impacts biodiversity is through altered plant-animal interactions, which may impact plant populations of conservation concern. Conservation measures are needed to mitigate the negative consequences of fragmentation. Landscape corridors (habitat strips that connect fragments) are a popular way to mitigate fragmentation effects. However, controlled experiments that determine the cause and effect relationships between fragmentation and corridors are extremely rare. Using a large-scale controlled experiment, we studied the effects of habitat fragmentation and corridors on Nolina georgiana, an understory herb native to longleaf pine savannas of the southeastern US. Because Nolina georgiana is a dioecious species, with male and female flowers on separate plants, we were able to consider a key plant-animal interaction—pollination—by studying the rate at which flowers convert to fruits. We assessed the flower to fruit conversion ratio of 68 female Nolina georgiana plants that were transplanted into 8 replicate fragmented landscapes, containing connected and unconnected fragments, at varying distances to a fragment edge. We found that rates of pollination were not significantly affected by the distance a plant was from an edge or whether or not a patch was connected by a corridor. Pollination rates of Nolina georgiana are likely not influenced by fragmentation or corridors in our system. These findings add to a growing body of literature describing varying responses of plant-animal interactions to fragmentation and corridors.

FTSZ FUNCTIONAL CONSERVATION ACROSS THE RED AND GREEN PHOTOSYNTHETIC LINEAGES

Jacob Crabtree
Poster: 609
Mentor(s): Katherine Osteryoung (Plant Biology)

Chloroplasts arose by an endosymbiotic event in which a heterotrophic eukaryote engulfed an ancient cyanobacterium. Therefore, similar to modern-day cyanobacteria, chloroplasts divide by binary fission, where they constrict at the midpoint and separate into two daughter chloroplasts. This process is driven by a macromolecular complex, which forms multiple rings at the division site. FtsZ is a critical component of this complex which assembles into the FtsZ ring (Z ring) in the interior of the bacterial cell or chloroplast and likely contributes to the constrictive force. Cyanobacteria require only a single FtsZ to accomplish cell division, while plants and green algae require two functionally distinct FtsZ isoforms, FtsZ1 and FtsZ2. Similarly, red algae require FtsZA and FtsZB to carry out chloroplast division. Recently, Arabidopsis FtsZ1 and FtsZ2 filament morphology and steady-state turnover properties have been studied in the heterologous expression system Schizosaccharomyces pombe. However, there is little data characterizing FtsZ pairs from other organisms. In this study, we assess the filament assembly and turnover properties of FtsZA and FtsZB from Galdieria sulphuraria. The S. pombe system allows us to investigate the inherent properties of FtsZA and FtsZB in an isolated cellular environment, which lacks the native regulatory factors that influence FtsZ behavior. These data allow us to assess whether the distinct filament morphology and steady-state turnover properties observed in Arabidopsis FtsZ are representative of a wider variety of organisms which belong to both the red and green photosynthetic lineages.

ALTERNARIA LEAF BLIGHT

Neil Dharia
Poster: 610
Mentor(s): Mary Hausbeck (Plant, Soil, & Microbial Sciences)

Alternaria leaf blight, caused by Alternaria panax, is one of the most common fungal diseases in Ginseng plants. Another species, A. alternata, is commonly isolated from Ginseng plants; virulence of this species is unknown. Infection leads to lesions with yellow-green halos, dark brown margins, and light brown centers. If left uncontrolled, 100% plant loss can occur. Strobilurins, a class of fungicides, are good for Alternaria

control, but there is a high risk of resistance due to the fact that it targets a single site in the DNA of the fungus's mitochondria. We are monitoring the population of Alternaria spp. isolated from ginseng for resistance to this class of fungicides. If the resistance is found to be prevalent, recommendations will be made to rotate fungicides with different modes of action to ensure adequate control of this disease. Isolates were collected from the last several years from plots in Wisconsin. DNA was extracted from these isolates and then a forward primer with two reverse primers, ARR4 and ARF4, were used to perform PCR. Using these primers that are specific to the single base pair change, amplification will only occur under one set of primers: resistant (ARR) or sensitive (ARS). Gel electrophoresis was used to visualize this amplification. PCR has been performed on the majority of the isolates, but there are no significant results yet. It is expected that the ratio of sensitive and resistant isolates will differ by geographic location and whether the growers' spray histories.

EFFECTS OF SALT TREATMENT ON SFR2 EXPRESSION IN SOLANUM LYCOPERSICUM

Hope Hersh
Poster: 611
Mentor(s): Christoph Benning (PRL)

The basis of this project was to understand how Solanum lycopersicum's Sensitive To Freezing 2 (SFR2) gene expression was regulated when treated with NaCl. The NaCl is a stress to S. lycopersicum which we know affects the SFR2 gene that is responsible for S.l reactions to freezing and other plant stresses. Quantitative polymerase chain reaction was used on leaf tissue, where the phenotype was observed in tomato. No change in mRNA indicates that the SFR2 gene was active under standard conditions and also NaCl treated conditions of tomato.

THE EFFECTS OF HABITAT FRAGMENTATION ON HERBIVORY AND GROWTH OF CARPHEPHORUS BELLIDIFOLIUS

Meg Kargul
Poster: 612
Mentor(s): Lars Brudvig (Plant Biology)

Habitat fragmentation threatens biodiversity by isolating populations and disrupting species interactions. To mitigate these negative effects, corridors - strips of habitat used to reconnect fragments - are commonly employed in conservation. Our understanding of corridors remains incomplete which is problematic because corridors may promote negative interactions for certain organisms like increasing rates of herbivory on plants of conservation concern. This might occur if herbivores benefit from the connection provided by a corridor. We evaluated whether corridors affect plant-herbivore interactions within a large-scale fragmentation experiment at the Savannah River Site, SC, where seven experimentally-fragmented landscapes contain patches that are either connected by a long corridor or isolated from each other. We hypothesized that corridors would affect herbivory through influences on connectivity, patch shape (edge-to-area ratio), or distance to an edge. We tested this by studying herbivory and growth of the native forb Carphephorus bellidifolius. In 2015, we studied seedlings (more susceptible to herbivory) that had recruited from C. bellidifolius transplanted in 2007. Seedlings were identified, measured for size and herbivory (percent missing leaf area) midseason, then re-measured at the end of the growing season. We found that there was no effect of connectivity, patch shape, or patch type on herbivory. None of these corridor impacts or the level of herbivory a plant experienced affected the growth of C. bellidifolius seedlings. Our results demonstrate that corridors do not negatively impact C. bellidifolius through seedling-stage herbivory and add to literature illustrating the positive aspects of corridors can outweigh potential negative impacts.

PSYCHOLOGY

POSTER PRESENTATIONS, SECTION 1
LAKE HURON ROOM, 9:00 – 10:30 AM

FACTORS OF AGE DISCRIMINATION IMPACTING HIRING DECISIONS
Alya Jweihan
Poster: 615
Mentor(s): Ann Marie Ryan (Psychology)

Age discrimination in the workplace has been of increasing interest, particularly due to an aging workforce. Negative stereotypes associated with the older generation have served as a burden on those that are job-seekers. Recent research has shown that there is definite discrimination towards older job applicants. Although these findings are valuable, they are somewhat broad. There is little known about the concept of older workers applying to positions that fit their stereotypes versus positions that go against their stereotype. Along with this, we do not know much about how gender intersects and impacts these hiring decisions. This study will examine these ideas using resumes and photos of applicants applying for particular employment positions. Participants will review these, make a hiring decision, rate statements relating to older individuals and the data will be analyzed statistically using multivariance analysis of covariance (MANCOVA). The project will contribute more specific information about the factors affecting age discrimination in hiring, as well as highlight possible aspects affecting the hiring process that should be studied more in-depth.

ADHD TREATMENT ACCEPTABILITY AND MISCONCEPTIONS
Georgia Bayerl
Poster: 616
Mentor(s): Brooke Ingersoll (Psychology), Kristin Rispoli (CEPSE)

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common childhood neurodevelopmental disorder, yet there is great difficulty in accessing evidence-based treatments. There are many misconceptions surrounding the treatment options for ADHD (Müller & Asherson, 2012). Given the problems that occur when treatment options are so poorly understood, it is important to understand how knowledge and those misconceptions affect the acceptability of evidence-based treatments for ADHD, and how treatment misconceptions can be refuted. The goal of this study is to examine these factors and their impact on acceptability of treatment options. The researchers predicted that treatment acceptability will be altered more by refutational texts on common misconceptions than factual texts, and that prior knowledge will decrease the likelihood of misconceptions and increase the acceptability of evidence-based treatment options.

MENTALIZING, INTERPERSONAL PERCEPTION, AND MENTAL HEALTH
Taryn Stefanski
Poster: 617
Mentor(s): Evan Good (Psychology), Christopher Hopwood (Psychology), Alytia Levendosky (Psychology)

Mentalizing is a form of imaginative mental activity about others or oneself, namely, perceiving and interpreting human behavior in terms of intentional mental states (e.g. needs, desires, feelings, beliefs, goals, purposes, and reasons). Research and theory have identified mentalizing as an important attribute of mental health and interpersonal functioning. Mentalizing might influence positive adaptation in part because it contributes to accurate perceptions of other peoples' behaviors. In other words, if you understand what is going on in the mind of someone else, you may perceive her or his behavior more accurately, and perceiving others accurately might help you get along and get ahead in life. We are currently examining associations between mentalizing, interpersonal perception, and psychopathology among psychotherapy patients. Initial

results among the first 30 participants in our study indicate that higher mentalizing scores are positively associated with accurate interpersonal perception and mental health.

FIXED AND FUSED FRESHMAN: THE ROLE OF COGNITIVE FUSION IN THE RELATIONSHIP BETWEEN MINDSETS AND ANXIETY

Courtney Callahan
Poster: 618
Mentor(s): Jason Moser (Psychology)

Our beliefs about the malleability of anxiety influence the degree to which we experience anxiety. Those with a growth mindset, who believe anxiety can change, tend to be less anxious than those who believe it cannot change. Cognitive fusion, the tendency to buy into the literal meaning of thoughts, also influences the degree to which individuals experience anxiety. However, mindsets of anxiety and cognitive fusion have never been studied together before. Because mindsets and cognitive fusion both involve beliefs about thoughts and feelings, studying them in conjunction can potentially help us better understand the cognitive underpinnings of anxiety. This study tested the hypothesis that cognitive fusion moderates the relationship between mindsets of anxiety and anxiety symptoms. Results showed that although both cognitive fusion and fixed mindsets related to more anxiety symptoms, cognitive fusion did not moderate the relationship between mindsets of anxiety and symptoms. Thus, cognitive fusion and mindsets of anxiety each have a unique relationship to anxiety.

JUVENILE RISK ASSESSMENT: PREDICTING RECIDIVISM ACROSS GENDER

Kara England
Poster: 619
Mentor(s): William Davidson (Psychology)

The juvenile justice system is a social institution with patriarchal roots. Some believe that assessments and services were developed based on the needs and experiences of adolescent males entering the system. Previous research has investigated the ability of criminogenic risk assessment to equally predict future delinquency for male and female offenders. However, this body of research has produced conflicting findings. The current study will add to the literature by determining the extent to which a popular juvenile risk assessment, the Youth Level of Service/Case Management Inventory (YLS/CMI), accurately predicts future delinquency by gender. Currently, the YLS/CMI determines risk of reoffending for both male and female offenders using the same risk score criteria, although research has indicated gender-specific cut off scores may be more appropriate. The authors will explore the utility of creating gender-specific cut off scores for overall risk level (e.g., low, moderate, high). Developing unique cut off scores based on gender could potentially improve recidivism predictions for female offenders. Risk assessment data were collected on female young offenders from a juvenile court beginning in 2004. Preliminary results indicated that the YLS/CMI significantly predicts future delinquency for the total sample. Recommendations for future research and policy implications for gender-specific risk criteria are discussed.

EXPLORING THE RELATIONSHIP BETWEEN TRAUMATIC EXPERIENCES AND JUVENILE OFFENDERS' RISK OF REOFFENSE

Amanda Farhat
Poster: 620
Mentor(s): William Davidson (Psychology)

Some adolescents involved in the juvenile justice system have experienced trauma, triggering the development of mental health issues. Consequently, some juvenile courts use mental health screeners, such as the Massachusetts Youth Screening Instrument-2 (MAYSI-2), in order to identify the mental health needs of young offenders. This is important because research indicates that experiences of trauma may be related to an increased risk of reoffending. For example, Wanamaker (2015) found that experiencing abuse predicted future delinquency for both male and female juvenile offenders. In addition, the author found that witnessing family violence was significantly and positively correlated with juvenile reoffending. The current

study investigated the relationship between traumatic experiences, as measured by the Traumatic Experience subscale on the MAYSI-2, and level of risk of reoffense, as measured by the Youth Level of Service/Case Management Inventory (YLS/CMI). MAYSI-2 and YLS/CMI data were collected from a sample of young probationers from December 2014 to December 2015. Implications for case management concerning young offenders with traumatic experiences are discussed.

PSYCHOLOGY
POSTER PRESENTATIONS, SECTION 2
LAKE HURON ROOM, 11:15 AM – 12:45 PM

PERSONALITY TRAIT AND MOOD STATE DIFFERENCES BETWEEN MALE AND FEMALE COLLEGIATE STUDENT-ATHLETES

Brenden Cabana, Lauren Jackson, Shelby Weaver

Poster: 623

Mentor(s): Erica Beidler (Kinesiology), Tracey Covassin (Kinesiology), Jennifer Savage (Kinesiology)

Sports are an integral part of modern culture in many nations. There are more than 460,000 male and female student-athletes competing in National Collegiate Athletic Association sports in the USA. Although both sexes have a competitive nature, the sport culture and intrinsic characteristics of male and female student-athletes appears to differ. Understanding this variability of intrinsic traits and states could be beneficial for those interacting with student-athletes of both sexes. The purpose of this study was to investigate the personality trait and mood state differences between male and female collegiate student-athletes. Participants completed a 10-minute quantitative survey that included demographics, the Big Five Inventory (BFI) of personality traits, and the Brunel Mood Scale (BRUMS). There were 1,268 [male(n=710,56%);female(n=558,44%)] student-athletes from 28 collegiate sports included for statistical analyses. ANOVAs were completed to determine if there were differences in personality traits and mood states between male and female collegiate student-athletes. Results found that females had significantly higher mean(M) extraversion[F(1,267)=14.12, male M=3.47, female M=3.61, p=0.00, d=0.21], agreeableness[F(1,266)=66.73, male M=3.84, female M=4.08, p=0.00, d=0.46], conscientiousness[F(1,265)=28.74, male M=3.73, female M=4.00, p=0.00, d=0.30], neuroticism[F(1,266)=75.96, male M=2.44, female M=2.76, p=0.00, d=0.49], and openness[F(1,265)=6.79, male M=3.35, female M=3.43, p=0.01, d=0.15] BFI personality trait scores compared to males. Additionally, females also had significantly higher fatigue[F(1,246)=12.55, male M=2.35, female M=2.54, p=0.00, d=0.20], tension[F(1,248)=43.58, male M=1.99, female M=2.32, p=0.00, d=0.38], and vigor[F(1,247)=15.54, male M=3.50, female M=3.67, p=0.00, d=0.22] BRUMS mood state scores compared to males. Overall, male and female collegiate student-athletes have different personality and mood profiles.

THE RELATIONSHIP BETWEEN POSITIVE AND NEGATIVE SYMPTOMS OF SCHIZOPHRENIA IN PATIENTS UNDERGOING TREATMENT FOR EARLY PSYCHOSIS

Alyssa Cleland

Poster: 624

Mentor(s): Katy Thakkar (Psychology)

Positive and negative symptoms are generally viewed as distinct and separate manifestations of schizophrenia. Positive symptoms are distortions of normal behavior (e.g., hallucinations and delusions), whereas negative symptoms represent the absence of normal functioning (e.g., apathy, low social drive). Understanding the temporal aspects of these symptoms, including onset, frequency, and relationship with each other over time may help reveal aspects of their underlying causes as different partially competing mechanistic theories of the illness make different predictions about the relationship between them. Previous studies have not found a significant relationship between these symptom clusters across individuals (i.e. patients who have severe positive symptoms do not necessarily have more severe negative symptoms), leading researchers to conclude that they are independent and arise from different mechanisms. However, analysis of within-individual changes in symptoms over time gives us more insight into putative

relationships. Indeed a recent study in a chronic sample of patients with schizophrenia did show a relationship between positive and negative symptoms' severity. The goal of the current study is to investigate how positive and negative symptoms relate over time, within individuals. Analyses will be performed on the data of 37 clients of an early psychosis treatment program. Measurement includes a clinician rating of the severity of various psychiatric symptoms, including both positive and negative symptoms, which was conducted at each of the clients' visits (approximately monthly). These data will provide a unique glimpse into the relationship between clusters of symptoms over time, potentially shedding light on biological mechanisms of the illness.

RELATION BETWEEN RHYTHM PRODUCTION AND SPEECH UNDERSTANDING IN NOISE

Alyssa Cleland, Stacey Rowland, Vixey Silva, Audrianna St Germain

Poster: 625

Mentor(s): Devin J McAuley (Psychology)

The temporal structure of events enables people of all ages to predict when future events will occur. This informed our hypothesis that individual differences in rhythmic ability may relate to the ability to perceive speech in difficult listening conditions, such as a noisy restaurant. Specifically, we hypothesize that individuals who are more accurately able to synchronize to a beat as well a wider range of tempos are better able to understand speech in the presence of background noise. To test this hypothesis we looked at the relation between individual differences in rhythm production and speech perception, while controlling for basic cognitive and auditory capabilities. Participants completed a five-session experiment in which they performed a number of tasks including measures of auditory and cognitive capabilities as well as a number of unpaced and paced tapping measures of rhythm production. Unpaced measures were spontaneous motor tempo, which assessed preferred tapping speed, and tempo limits, which assessed fastest and slowest tapping rate while maintaining a regular rhythm. The paced measure was synchronize and continue, in which participants tapped in synchrony with a beat at different tempi, and then continued tapping at that rate after the beat stopped. Preliminary rhythm production results will be presented in relation to measures of speech understanding in noise from a sample of approximately 30 college-aged participants with normal hearing. This study is part of a larger NIH supported project, which will include approximately 1,000 participants aged 18 to 30, in collaboration with Indiana University.

THE EFFECTS OF SOCIOECONOMIC STATUS ON EXECUTIVE FUNCTIONING IN YOUNG CHILDREN

Zachary Favreau

Poster: 626

Mentor(s): Emily Durbin (Psychology)

The role of socioeconomic status (SES) on individual differences in child executive function will be explored. The importance of executive functioning for a wide variety of health and life outcomes is well documented. Socioeconomic status has been proven to be predictive of similar outcomes. The association between the two has also been examined. However, few researchers have examined the importance of socioeconomic components separately and studied the role of potential mediators and moderators. The current study aims to explore the relationship between family socioeconomic status and family home environment factors to predict executive functioning capabilities in youngsters, and to test whether home and familial characteristics are potential mediators of associations between SES and child executive functioning. Two-hundred and seventy-one children were recruited from 220 families with diverse SES backgrounds. Child executive functioning was measured using laboratory and neuropsychological tasks, as well as experimenter rating of executive functioning following the laboratory visit. Family SES and home environment was established through the use of questionnaires and supplementary United States Census data. Regression analyses will determine if differences in executive function can be predicted by family SES. Variation in these differences will be examined to see if performance is moderated by the home environment variables of family stress, single parenthood, and child parent relationships.

RELATIONSHIP BETWEEN CANNABIS USAGE AND CLINICAL STATUS IN INDIVIDUALS RECEIVING TREATMENT FOR EARLY PSYCHOSIS

Ryley Mancine
Poster: 627
Mentor(s): Katy Thakkar (Psychology)

Schizophrenia is a particularly devastating and complex neuropsychiatric illness - it has no established primary cause, it has a vast constellation of symptoms, and it has no cure. Standard pharmacological treatments rarely return affected individuals to their previous level of functioning. Researchers everywhere are therefore ardently searching for clues that may prevent or delay the onset of schizophrenia. Recently, a potential link between schizophrenia and cannabis usage has emerged. Research has shown that cannabis abuse over time does have a mild but appreciable impact on future risk for schizophrenia; however, causal estimates may have been substantially overestimated. Longitudinal data might help to clarify this relationship. For the current study, we are using data from an early psychosis treatment clinic. Clinicians gathered information about clients' self-reported cannabis use and rated symptom severity from 37 individuals at each of their visits, which took place approximately once per month. The goal of this study was to investigate the relationship between cannabis usage and schizophrenia symptom severity across and within individuals. These data have the potential to reveal whether cannabis usage is related to clinical status over time, potentially helping to elucidate the murky relationship between cannabis and psychosis.

LONGITUDINAL STUDY OF INSIGHT AND SYMPTOMATIC CORRELATIONS OF FIRST-EPISODE SCHIZOPHRENIA PATIENTS

Paige Suttles
Poster: 628
Mentor(s): Katy Thakkar (Clinical Psychology)

Schizophrenia is a psychotic disorder that effects an individual's touch on reality due to impaired thinking, emotions, and behaviors. Approximately 25% of first-episode schizophrenia patients experience lack of insight into their illness. That is, they may not acknowledge their illness or the need for treatment. Given that insight is a predictor of positive clinical outcome, there has been a recent surge of interest in this aspect of the disorder. With regards to the relationship between insight and clinical status, small negative correlations have been observed with depression as well as positive and negative symptoms across individuals. Positive symptoms are behaviors that are not typically present such as delusions or hallucinations, while negative symptoms are the lack of feelings or behaviors that are usually intact. The aim of this study was to use longitudinal data to potentially shed light on how levels of insight might fluctuate over time and whether they are related to clinical status within individuals. To this end, we analyzed data from 37 individuals being treated for early psychosis. At each visit, clients were asked to report on their level of insight by responding to a question regarding whether they believed they had an illness that required treatment. In addition, clinicians rated psychiatric symptom severity. Correlations between insight and symptoms over time will be computed. Results as they relate to the impact of insight on schizophrenia patient's overall psychological well-being, the stability of insight over time, and how these results might impact treatment will be discussed.

PSYCHOLOGY
POSTER PRESENTATIONS, SECTION 3
LAKE HURON ROOM, 11:15 AM – 12:45 PM

ASSESSING THE CONTRIBUTIONS OF ATTENTION AND AROUSAL TO RESPONSE INHIBITION IMPAIRMENTS IN SCHIZOPHRENIA: A PUPILLOMETRY STUDY.

Kassidy Fifer
Poster: 630
Mentor(s): Katharine Thakkar (Psychology)

Schizophrenia is a neuropsychiatric disorder in which a patient experiences an assortment of positive symptoms including separation from reality and negative symptoms such as loss of speech and movement control. Disabling cognitive deficits are also common in schizophrenia, particularly in the domain of executive functioning, which refers to those cognitive functions involved in the higher-level control of behavior. These deficits are related to social disability and poor occupational outcome. One important aspect of executive functioning is response inhibition. Previous studies have shown that patients with schizophrenia are less efficient at inhibiting themselves from executing a planned eye movement, which is related to unemployment. The mechanisms of this inhibition impairment are unclear, but can possibly be connected with general attention and arousal and possibly norepinephrine release, which is associated with attention. One way of indexing arousal and attention is with pupil sizes as pupils dilate when aroused, stimulated, or during concentration. In addition, pupil size correlates with norepinephrine release. In the current study, we will assess the role of attention, arousal, and possibly norepinephrine release, during an oculomotor inhibition task in patients with schizophrenia and healthy controls by analyzing pupil dilation during an oculomotor inhibition task. This information might contribute to our understanding the mechanisms of cognitive impairments in schizophrenia. Given the link between response inhibition impairments and impulse control problems (e.g. substance use) and unemployment, these findings have potential clinical relevance.

HEDONIC HALLUCINATIONS IN A MOUSE MODEL OF NEUROPSYCHIATRIC ILLNESS

Ryan Gifford Marley Bright
Poster: 631
Mentor(s): Alex Johnson (Psychology)

Hallucinations are a core symptom of schizophrenia and are encountered in mood disorders, Alzheimer's disease and Parkinson's disease. Sufferers of hallucinations experience distortions between reality and what stimuli are being cognitively perceived. Pavlovian learning offers a possible mechanism of investigation through "impaired reality testing", through which a Pavlovian cue can evoke a detailed sensory representation of an appetitive outcome (e.g., sucrose solution), despite the outcome not being presented. We have developed a paradigm to examine 'hedonic hallucinations' in a mouse model of neuropsychiatric illness—disrupted in schizophrenia 1 (DISC1). These mice express putative dominant negative DISC1 under expression control of the prion protein promoter (DN-DISC1), resulting in expression throughout the central nervous system. In our study, DN-DISC1 mice were trained to respond to an extensively and minimally trained cue, both paired with a reward of sucrose solution. At the test stage, we replaced the sucrose solution with water and exposed the mice to either the extensively or minimally trained cue. We found indications of "hedonic hallucinations", with DN-DISC1 mice responding to water in a manner somewhat consistent with how they responded to sucrose. These results suggest that it's possible to examine impaired reality testing in mice, and using a genetic mouse model of neuropsychiatric illness, these 'hedonic hallucinations' appear to be particularly prevalent. Thus, this study provides the foundation for examining the neurobiological pathology underlying hallucinations, which to date has been restricted to functional neuroimaging studies in humans, as hallucinations have traditionally been viewed as a uniquely human phenomenon.

QUOTING MEMORABILITY AND DIFFERENTIAL NEURAL NETWORKS

Mohan Gupta Karah Smith
Poster: 632
Mentor(s): Natalie Phillips (English)

Literary neuroscience is an emerging field that has produced research with many implications regarding how we view reading and language processing. Previous studies have shown that certain characteristics of words can modulate attention and memory, like length, number of syllables, familiarity, and concreteness. In other studies, these factors were shown to have different effects on the neural networks certain words activate. In this study, English PhD candidates read the second chapter of Jane Austen's Mansfield Park in an fMRI scanner where functional imaging was taken measuring the blood oxygen level-dependent (BOLD) signal. Participants were asked to use two different levels of attention for specific sections of the text alternating between close (analytical) reading and pleasure reading. After the scan, participants wrote literary essays on sections they close read in the scanner and surprisingly quoted sections of the text verbatim from memory. This implies that certain words and phrases within the text were more memorable than others. We aim to explore the differences in neural activity while reading quoted blocks vs unquoted blocks between participants, and also evaluate what level of attention the subject was using during the blocks that were quoted. We hypothesize blocks that were quoted from will have different neural activation than blocks which were not quoted from. This will give insight to what neural networks are used for attentional and memory processes. In the future we hope to pair this with eye tracking data to make correlations between fixations on words to neural activation and memory.

INDUSTRIAL/ORGANIZATION

Chelsea Hull
Poster: 633
Mentor(s): Courtney Bryant (Psychology), Ann Ryan (Psychology)

Event Systems Theory proposes that an event external to the work environment can cause changes in the behavior of employees if the event is novel, disruptive and critical. Behavioral changes between individuals lead to differences in efficiency in many environments. In a professional setting, co-workers' relations are also related to their degree of similarity. Similarity theory shows that in work environments those who are more similar have higher levels of trust, leader member exchange efficiency and confidence. Therefore, if an event external caused behavioral changes we predict it would affect coworker relations and these effects will be moderated by similarity. We are testing this theory through an online cross-sectional research questionnaire of social media behavior and work/life integration preferences. This online survey will explore the phenomena of external events in a social media context. By conducting surveys on social media behavior and work/life integration preferences, we will be able to see how personal preferences affect the robust impact of external events. A critical incident recall will allow the participants to elaborate on their personal experiences with social media creating changes in their professional environment. We hypothesize that those with strict, conservative social media preferences and low work/life integration preferences will report more changes in their behavior towards coworkers, after an experience where a social media event affected perceived similarity of their co-worker. This study adds new literature on how social media can cause problems in the workplace.

THE ROLE OF TECHNOLOGY IN STEM LEARNING

Diana Jasser, Adithya Bala, Kristen Lidwell
Poster: 634
Mentor(s): Kimberly Fenn (Psychology)

There is a growing concern in the United States that STEM (science, technology, engineering, and math) education needs improvement in order to successfully empower students in a technologically advanced society. Although programs have been designed to increase interest in the STEM fields, little is known about how students effectively acquire information via different sources or media. As technological advances pave the way for new educational approaches, an evaluation of these methods should be explored to better

understand the most effective way students learn. In the current study, we investigated how technology influences actual and perceived learning. Undergraduate participants read biological facts about animals from either an Internet website or a traditional printed book designed to look identical to the website. Subsequently, participants answered free response questions about the information using either a computer (Internet survey) or paper. Afterwards, participants completed a questionnaire judging hypothetical learning if given the opposite source. Given previous findings, we predicted that participants would recall more facts when information was learned from the Internet than from the book. However, participants learned equally well from the Internet source and the book source. Interestingly, participants who read the information on the Internet believed they would have learned significantly more using the book. These results indicate a discrepancy between perceptions of learning and actual performance, suggesting that, although participants may prefer traditional book sources, learning via an online environment may be just as effective as learning from a more traditional environment.

PREDICTORS OF PROVIDER USE OF AN EVIDENCE-BASED SOCIAL COMMUNICATION INTERVENTION FOR AUTISM SPECTRUM DISORDER IN COMMUNITY SETTINGS
Kate Bailey, Amanda Kilgore
Poster: 635
Mentor(s): Brooke Ingersoll (Psychology)

Project ImPACT is an evidence-based, parent-mediated intervention that supports parents in teaching social communication skills to their young children with autism spectrum disorder (ASD). The present study attempts to better understand the variables related to providers' use of Project ImPACT in community settings following their participation in a Project ImPACT community workshop. Participants in this study included community providers (N=143) who attended a 3-day Project ImPACT workshop to learn and practice the intervention strategies. As part of the workshop, providers completed standardized measures prior to their workshop participation (T1), immediately following the conclusion of the workshop (T2), and 6-months following their participation in the workshop (T3). For our study, we used T1 and T2 assessments to measure providers perceptions of Project ImPACT, their anticipated barriers to using Project ImPACT, and their intent to use Project ImPACT following their completion of the workshop. We also will be examining how these T1 and T2 variables are associated with providers' actual use of Project ImPACT in community settings (T3).

PSYCHOLOGY
POSTER PRESENTATIONS, SECTION 4
LAKE HURON ROOM, 11:15 AM – 12:45 PM

PERSONALITY AND MOTIVATIONAL DETERMINANTS OF JOB SEARCH OUTCOMES
Aiya Jweihan, Casey Wood
Poster: 638
Mentor(s): Abdifatah Ali (Psychology), Ann Marie Ryan (Psychology)

College graduating seniors engage in job searching behaviors in order to secure full employment in their respected fields post-graduation. These job search behaviors include contacting companies, setting up interviews, and generally researching relevant prospective employers. Doing these activities while simultaneously attempting to finish their degree can often impact an individuals' psychological well-being. The purpose of this study is to examine personality and motivational antecedents to job search behaviors and effort. Our study employs a three-week daily dairy design to examine the effects of distal antecedents on job search process variables. Specifically, our study design is comprised of a baseline measure that captures demographic and personality variables, a morning survey that captures motivation and emotion variables, and evening survey that captures job search outcomes. Our study will examine the impact of temporal focus—the attention individuals devote to the past, present, and future—and job search motivation—external versus internal—on psychological and motivational factors and subsequent job search behaviors. Our goal is that our study may shed light on the role of personality and motivational antecedents

during job searching. Our findings will contribute to university career counselors who advice students looking for work as well as job seekers more broadly.

MAPPING FUNCTIONAL READING ON THE HUMAN BRAIN
Michel Kabbash, Jasdeep Bathla
Poster: 639
Mentor(s): Natalie Phillips (English)

A major aim in the field of cognitive psychology is to capture how literary stimuli are processed in the brain. Previously, fMRI studies of reading have used simple one-word or short phrase stimuli. Our experiment is the first to investigate functional "natural reading" by allowing subjects to read an entire chapter of text at their own pace. This is innovative in that the design advances understanding of the true cognitive processes dictating this daily task. English PhD candidates (n=18) were tasked with reading chapter two of Jane Austen's Mansfield Park utilizing two different modes of attention - close (analytical) and pleasure reading. Our data includes literary essays written by participants on the sections they close read, as well as BOLD fMRI data. These data allowed us to determine peak activity in specific regions of the brain, yielding multiple regions of interest (ROIs). Variation in ROIs between conditions and across subjects allow us to further examine how the brain processes and understands literary stimuli. Our current project focuses on using FreeSurfer to map neural activity onto whole brain maps, which provides us with a holistic visualization of the reading process and better indicate individual differences across subjects. By visualizing how subjects discussing a wealth of topics in their behavioral essays ranging from feminism to architecture from reading a text that is strongly diverse in concreteness and abstractness of language and other semantic properties, we can better understand how narrative stimuli influences connections in the brain, and taps into our own individuality.

GENDER AS A MODERATOR OF FAMILY TRANSMISSION OF PSYCHOPATHOLOGY
Amanda Kilgore
Poster: 640
Mentor(s): Emily Durbin (Psychology)

This study tested whether child and/or parent gender moderate associations between parent psychopathology and child behavior problems, and whether these patterns varied across disorder category (mood, anxiety, substance use). Participants included community children aged 3-7 (N=277) and their biological parents, recruited from the Mid-Michigan community as part of a study on child temperament. Parental lifetime psychopathology was assessed using a phone interview. In addition, parents completed several dimensional self-report measures of their mental health and reports of their child's internalizing and externalizing problems. The effects of parental psychopathology on child behavior problems were not moderated by child gender. However, there were interactions between parent sex and child internalizing and externalizing problems, where maternal disorders accounted for 3% of the variance, higher than the corresponding value for paternal disorders (1.8% of the variance). Maternal depression was associated with higher levels of internalizing and externalizing problems in children while paternal depression was only associated with higher levels of externalizing problems. Maternal anxiety was associated with higher levels of internalizing and externalizing problems in children but paternal anxiety had no effect. There were no main effects of parental substance abuse on child psychopathology. These findings suggest that maternal mental illness may be an important predictor of child behavior problems.

THE ROLE OF PARENTAL EMOTION MINDSET IN THE INTERGENERATIONAL TRANSMISSION OF DEPRESSION

Katelyn Kulesa
Poster: 641
Mentor(s): Jason Moser (Psychology)

Mindsets, or beliefs about oneself, have been studied in the context of trait-like attributes. Research revealed long-term benefits of utilizing a growth mindset (the belief people can change their circumstances), in comparison to a fixed mindset (attributing one's circumstances to the self). Studies of the emotion mindset, or beliefs about the malleability of emotions, find that endorsing a growth mindset relates to less psychological distress. Understanding risk factors for depression in children is essential, given that younger age of onset is associated with poorer prognosis. Although it is known that certain parenting styles relate to youth depression, less is understood about how parental mindsets impact children's symptoms. These beliefs may promote problematic parenting practices. The present study examined relations between parent's emotion mindsets and children's depression. Parental emotion mindset was unrelated to children's depression across the whole sample(β = -.11, p = .20). However, gender of the child was a significant moderator of the relationship between parent emotion mindset and children's depression. Parental emotion mindset was unrelated to girl's depression(β= -.01, p = .92), but significantly related to boy's depression(β = -.23, p = .047) such that relatively more growth-minded parents reported less depression in their children. Taken together, parental emotion mindset predicted only boys' depression symptoms (i.e. boys of more growth-oriented parents were less depressed). Additionally, parental depression was associated only with boys' depression. This may suggest that, although parental depression may be a risk factor for boys' depression, emotion mindset may also be protective.

EFFECTS OF A SHORT-TERM TRAINING TARGETING EFFORTFUL CONTROL IN PRESCHOOLERS

Milena Lai
Poster: 642
Mentor(s): Catherine Durbin (Psychology), Sharon Lo (Psychology)

Effortful control (EC) develops most rapidly between the ages of 4-5 years and is characterized by the ability to consciously regulate attention and adjust behavior to meet environmental and situational demands (Rothbart, 1991). Research suggests that early individual differences in EC predict concurrent and later outcomes related to academic and social-emotional functioning (e.g., Moffit et al., 2011), making early EC an important intervention target. However, few interventions have been designed to target EC in this age period and rarely use a multimethod approach. This study aims to evaluate the effects of short-term training targeting EC in children aged 4-5 years using informant-reported, behavioral, and neural assessments of EC. Twenty children rated by their parents as exhibiting low-to-moderate EC skills were randomized into short-term training (5-day, 3-hour per day training targeting EC) and no-training groups. Results suggested that the short-term training group exhibited improvements in near- and far-transfer behavioral tasks such as Tower of Hanoi (d = 1.63) and Simon Says (d = 0.87) compared to the no-training group. A neural measure thought to index EC known as the error-related negativity (ERN) was significantly larger (d = 1.18) following training in the short-term training group compared to no-training, suggesting increases in the ability to engage in EC skills. Lastly, parents reported significantly fewer problem behaviors 3 months following training related to anxiety (d = 1.62), depression (d = 1.59), attention (d = 1.47), and rule breaking (d = 1.34) in children who participated in training groups compared to no-training.

EFFECTS OF AEROBIC EXERCISE ON DECLARATIVE MEMORY

Noble Lewallen Kayla Bryant
Poster: 643
Mentor(s): Kimberly Fenn (Psychology), Matthew Pontifex (Kinesiology)

Society has seen an increase in sedentary lifestyles and obesity rates. Sedentary lifestyles not only affect health but also impact cognition. Prior literature has shown a relationship between long-term aerobic exercise and long-term memory such that individuals with poorer cardiorespiratory fitness levels exhibited

poorer long-term memory retention (Pontifex et al., 2014). The present study investigated whether an acute bout of aerobic exercise would impact declarative memory. Undergraduate participants learned 48 semantically related word pairs in the morning and were tested twelve hours later in the evening. During the twelve-hour retention interval, aerobic activity for each participant was recorded via a heart rate monitor. After test, participants completed a VO2 Max fitness test to determine aerobic fitness level. Data analysis is still ongoing for the project. However, a previous study conducted in our lab found that participants who completed at least ten minutes of moderate to vigorous exercise (i.e. heart rate >120 beats per minute) during the day showed less memory loss than individuals who did not achieve ten minutes of exercise, not controlling for fitness level. Therefore, we predict that participants who completed at least ten minutes of aerobic exercise during the day would outperform participants who participated in no aerobic exercise, even after controlling for overall fitness.

PSYCHOLOGY
POSTER PRESENTATIONS, SECTION 5
LAKE HURON ROOM, 11:15 AM – 12:45 PM

FAIRNESS PERCEPTIONS OF WORKPLACE ACCOMMODATIONS FOR THOSE WITH DISEASE RELATED DISABILITIES

Ashlyn Lowe
Poster: 646
Mentor(s): Ann Marie Ryan (Psychology)

This study was designed to investigate fairness perceptions of those who receive accommodations in the workplace for disease related disabilities (such as cancer and diabetes). By observing how co-workers feel about other employees receiving accommodations based on whether or not the accommodation is perceived as controllable (i.e. cancer may be viewed as an uncontrollable disease whereas diabetes may be seen as more controllable), we can better understand perceived inequalities in the workplace.

EFFECTS OF INDIVIDUAL PREFERENCE ON SKILL ACQUISITION

Abbie Marsh
Poster: 647
Mentor(s): Brooke Ingersoll (Psychology), Kate LaLonde (Special Education)

The utilization of behavioral interventions to increase skill acquisition rates for children with autism spectrum disorders (ASD) has received increased attention in recent years. Researchers have documented success in intensive, behavioral education across learning operants in many children with autism. It is considered useful to examine and identify the extent to which variations in intervention type moderate the rate at which skills are mastered, or if individual preferences in learning influence acquisition rates more significantly in these children. This research involves a case study of a 10 year-old child with ASD that received early, intensive intervention based in applied behavior analysis. Sessions were conducted during in-home teaching and included naturalistic environment training (NET; Weiss, 2001) and discrete trial training (DTT; Smith 2001). This study suggests that skill mastery rates are correlated with individual preference, suggesting that a child's ability to master a skill is influenced by his most preferred operant.

THE POTENTIAL RELATIONSHIP BETWEEN RACE AND WELL-BEING

Taylor McFarland
Poster: 648
Mentor(s): Joseph Cesario (Psychology)

The potential relationship between race and subjective well-being will be measured. 300 participants will answer an 18 question survey. Well-being has the potential to be measured in objective and subjective indicators. The subjective aspect, the participant's evaluations of their own life satisfaction, will be the focus. The survey will identify their race, age, and gender. Each individual will take the 5-item Satisfaction with Life

Scale from 1-7, 1 being strongly disagree and 7 being strongly agree. They will also take Rosenberg's self-esteem scale from 1-4, 1 as strongly disagree and 4 as strongly agree. The participant will be compensated .50 cents. A t-test will be performed once the data is collected. It is predicted that non-white individuals will have a lower rating of subjective well-being. Implications of the results in regards to race and subjective well-being will be discussed.

THE EFFECTS OF B-VITAMINS AND CAFFEINE ON COGNITIVE FUNCTION

Kelsey Pagorek, Trusha Patel
Poster: 649
Mentor(s): Kimberly Fenn (Psychology)

Many energy supplements marketed as cognitive enhancers contain caffeine and B-vitamins. However, few studies have compared the cognitive effects of the B-vitamins in these beverages to caffeinated beverages that do not contain such vitamins. In this study, we examine the role B-vitamins have in energy supplements and how these vitamins may interact with caffeine to affect cognitive functions like attentional vigilance, working memory, and short-term memory. We predict that B-vitamin intake, in conjunction with caffeine, will benefit these functions more than intake of either B-vitamins or caffeine alone. A double-blind, placebo controlled design was utilized in this study. Participants were randomly assigned to one of four drink conditions: a sugar-water placebo; sugar-water and caffeine; sugar-water and B-vitamin complex; or a mixture of sugar-water, caffeine, and B-vitamin complex. Approximately one half-hour after consuming the drink, participants completed a Mackworth Clock Paradigm task to measure attentional vigilance, an N-Back task for working memory, and a Word Recall task for short-term memory. Although results are still being collected, we hypothesize that participants who consumed both B-vitamins and caffeine will have better cognitive function than those who consumed B-vitamins alone or caffeine alone.

I BELIEVE I CAN CRY: EMPATHY BELIEFS MODERATE THE EMPATHY-AGGRESSION RELATIONSHIP

Brianna Preiser, Arti Gandhi
Poster: 650
Mentor(s): Jason Moser (Psychology)

Empathy is crucial in maintaining healthy interpersonal relationships. Indeed, there is an established inverse relationship between dispositional empathy and social aggression. We examined the moderating effect of empathy mindsets- or the extent to which one believes empathy can change- on the empathy-aggression relationship. 1,005 participants completed the Subtypes of Antisocial Behavior measure, the Interpersonal Reactivity Index, and the Implicit Theories of Empathy Scale. Correlations indicated that dispositional empathy was negatively related with social aggression ($r = -.17$, $p < .001$). Beliefs of malleable empathy were slightly related to less social aggression ($r = -.08$, $p = .01$), and unrelated to self-reported empathy ($r = .04$, $p = .22$). Using a multiple linear regression, we evaluated empathy beliefs as a moderating variable and concluded both dispositional empathy ($\beta = -.17$, $p < .001$) and malleable empathy beliefs ($\beta = -.10$, $p = .003$) predicted unique variance in social aggression. A significant interaction between dispositional empathy and empathy beliefs ($\beta = .08$, $p = .02$) suggested low dispositional empathy was more related to social aggression among individuals who believed empathy was fixed ($\beta = -.24$, $p < .001$) compared to those who believed it was malleable ($\beta = -.10$, $p = .03$). Although our results suggest that individuals with low empathy and a belief that empathy is fixed are more likely to socially aggress, empathy can change. Thus, if people are lead to believe that empathy can be acquired, they may be encouraged to hold a more dynamic view of empathy.

NEUROPEPTIDE MODULATION OF NEURAL CIRCUITRY: IMPLICATIONS FOR FEEDING AND OBESITY
Lauren Raycraft
Poster: 651
Mentor(s): Alex Johnson (Psychology)

While the cause of obesity remains multifaceted, the influence of the environment on appetite regulation likely plays a significant role. Given the obesogenic nature of our environment, environmental food cues may contribute to non-homeostatic eating through learned associations. This study examines the role of two orexigenic lateral hypothalamus (LH) neuropeptides, Melanin-Concentrating Hormone (MCH) and hypocretin/orexin (ORX) in a mouse model of cue-potentiated feeding (CPF). During training, mice received presentations of one auditory conditioned stimulus (e.g., tone) paired with sucrose (CS+), while a second stimulus (e.g., noise) was unpaired with sucrose delivery (CS-). During testing, mice received presentations of the CS+ or CS- cue under conditions of satiety. Presentation of the CS+ lead to significant overeating of the sucrose, relative to CS- tested mice. To examine the underlying neuropeptidergic basis of this CPF effect, immunohistochemistry was utilized to identify MCH and ORX cells expressed in the LH. In addition, we stained for FOS, which is a marker of neuronal activity. This dual-immunofluorescent staining of FOS/MCH and FOS/ORX allowed identification of LH neuropeptides (i.e., MCH & ORX) that were active in mice tested with either the CS+ or CS-. Quantification utilized immunofluorescent microscopy, and revealed a tendency for enhanced activation of MCH and ORX LH cells in mice tested with the CS+ (relative to CS- tested mice), suggesting that both of these neuropeptides play a critical role in CPF. These results provide a novel characterization of the neurobiology underlying the influence of the environmental food cues on the dysregulation of appetite control.

PSYCHOLOGY
POSTER PRESENTATIONS, SECTION 6
LAKE HURON ROOM, 11:15 AM – 12:45 PM

MENTAL HEALTH NEEDS AND CRIMINOGENIC RISK FACTORS IN THE JUVENILE JUSTICE SYSTEM
Julissa Rios
Poster: 655
Mentor(s): William Davidson (Psychology)

In recent years, there has been a growing concern over the type of treatment offered to juvenile offenders with mental illness. It is important to understand the unique needs of justice-involved youth living with mental illness, as they may have criminogenic risk profiles that require specific services and guidelines for case management. During the intake process, many juvenile courts use risk assessment to assess the likelihood that a youth will commit a future delinquent act. As well, courts may use screeners to assess a young offender's mental health needs. Risk assessment tools and mental health screeners can help juvenile courts determine the types of services that should be provided to youth based on their level of risk to re-offend and severity of mental health symptoms. The current study aimed to compare the criminogenic risk profiles of young offenders who reported moderate to severe mental health symptoms and those who reported having no symptoms. The Massachusetts Youth Screening Instrument-2 (MAYSI-2) was used to assess frequency and severity of mental health symptoms and the Youth Level of Service/Case Management Inventory (YLS/CMI) was used to measure risk of re-offending. The MAYSI-2 and YLS/CMI data were collected from the delinquency division of a Midwestern juvenile court between December 2014 and December 2015. Preliminary results indicated differences in risk scores across the two groups. Research and practice implications for providing services to young offenders with severe mental health symptoms were discussed.

ATTENTIONAL CONTROL AND MINDFULNESS MEDITATION INTERACTION: EVALUATING POOR ATTENTIONAL ABILITIES

Sean Roberts
Poster: 656
Mentor(s): Jason Moser (Psychology)

Working memory, or the ability to temporarily store and process multiple pieces of information, is an important factor in successful academic and workplace performance. Recent studies have shown that attentional control, which is highly related to working memory, may underlie working memory capacity. Mindfulness meditation, the practice of focusing attention on physical and psychological experiences, has been found to improve attention. Consequently, the present study sought to determine whether meditation induced changes in attention would improve working memory. 30 female STEM major participants completed 8 sessions of a mindfulness meditation course (n = 15) or a control nutrition class (n = 15). Participants completed a working memory task before and after the intervention course. The working memory task required participants to recall a sequence of letters while completing simple mathematics problems. Participants also completed the Attention Control Scale (ATTC) questionnaire, a self-report measure of attentional control. Findings show that, across the intervention, meditation participants improved their working memory score compared to control condition participants. Interestingly, a negative correlation was found between change in working memory and change in attentional control scores; individuals who improved their working memory reported reduced attentional control. This may suggest that during the initial evaluation, participants were misperceiving their own attentional abilities due to their inability to notice when their attention failed—a core skill cultivated during meditation. As such, lower scores may paradoxically reflect increased present moment awareness, which then corresponded to improved working memory.

TELEVISION EXPOSURE DOES NOT INFLUENCE COGNITIVE ABILITIES IN EARLY CHILDHOOD

Seth Rowles, Georgia Bayerl, Elizabeth Giaimo, Abbie Marsh
Poster: 657
Mentor(s): Brooke Ingersoll (Psychology), Brooke Slawinski (Psychology)

Cognitive abilities are necessary for the acquisition and understanding of knowledge, formation of beliefs and attitudes, decision making, and problem solving. These abilities are diverse in nature and can be influenced by numerous factors, including genetic disposition, upbringing, social interaction, and activities engaged in during development, which may enhance or impair cognitive abilities. Increased television exposure has been found to have a negative effect on general cognitive ability, but it is unknown whether this effect is equally strong in boys and girls or whether it persists across various domains of cognitive ability. To answer these questions, this study examined whether the relationship between hours of television watched per day and cognitive abilities was moderated by sex in young children three to seven years of age (N=117). Maternal report of hours exposed to television were obtained using the Home Screening Questionnaire (HSQ). Cognitive abilities were assessed using the Wechsler Preschool and Primary Scale of Intelligence (WPPSI-IV) and the National Institute of Health (NIH) Toolbox, and included measures of cognitive flexibility, receptive language, inhibitory control, memory, and visual-spatial reasoning. To our surprise, the results from a moderated regression analysis indicated that there was no relationship between television exposure and cognitive abilities for boys or girls after demographic factors were controlled for. This results suggest that television exposure may not significantly influence cognitive abilities to the extent that other factors, like income and ethnicity, do.

FAILURE ATTRIBUTIONS IN INTERVIEWS

Casey Wood

Poster: 658

Mentor(s): Courtney Bryant (Psychology), Ann Marie Ryan (Psychology)

The Leader Categorization Theory states that when evaluators are thinking about a target person as a leader, they use a recognition-based process to compare that target person with a preexisting prototype of a leader. This process of aligning a leader with a prototype affects leadership perception and leadership ratings across gender, culture, politics, and race. However these results have only been found when measuring good behavior and success. This study aims to go beyond success and show how the demographics of leaders can affect perceptions of failure as well. We hypothesize that the past failures of minority job candidates will be judged harsher than non-minorities due to their race. We will test this by creating a laboratory experiment in which we present the LinkedIn profile of a job candidate, manipulating race/ethnicity in a between-subjects design. Participants will be shown a transcript of a job interview of the previously presented job candidate, including a question that addresses being fired from a previous job to serve as the failure. In the answer, the type of response is manipulated with either an excuse or a justification to investigate the most ideal way to present a failure. Lastly, we will evaluate participants' perceptions of failure of the job candidate. The results will be analyzed using ANOVA, comparing attributions of failure to job candidates' race and ethnicity. This study is important because it could shed light on the minority employment gap in higher levels of management.

ATTENTIONAL CHANGE AFTER MINDFULNESS MEDITATION INTERVENTION PREDICTS STEREOTYPE THREAT PERFORMANCE: AN ELECTROPHYSIOLOGICAL INVESTIGATION

Alec Bruchnak, Grant Burton, Sean Roberts

Poster: 659

Mentor(s): Jason Moser (Psychology)

Previous lab-based research shows that females exhibit suboptimal performance under gender stereotype threat. Such underperformance may extend to important real world evaluations such as the Graduate Record Examination (GRE) and contribute to the wide gender disparity in STEM fields. The present study sought to address this important issue by examining whether mindfulness meditation can buffer against the pernicious effects of gender stereotype on test performance. Specifically, we investigated whether mindfulness-induced changes in attentional processing, as indexed by an electrophysiological index of attention to mistakes (the error positivity; Pe), would lead to superior performance under stereotype threat in female STEM majors. Female STEM majors completed 8 sessions of a mindfulness meditation course. The Pe was measured before and after the course during a speeded reaction time task to capture attentional processes. Following the meditation course, participants completed two GRE mathematics practice tests: the first test under no manipulation and the second test under stereotype threat. Results revealed that, in this sample, females tended to perform better under stereotype threat than under a no-threat condition. Notably, larger changes in Pe across the intervention predicted better performance under stereotype threat compared to performance during the no-threat condition ($r = .65$, $p = .01$) confirming that meditation-induced attentional changes enhanced performance. This relationship was notably absent in a control intervention group ($r = .03$, $p = .93$), verifying that the effect is specific to meditation only. Ultimately, our study shows that meditation may benefit attention in ways that extend to practical academic situations.

GUIDING ATTENTION

Kirah Vaughan Ryan Wujcik

Poster: 660

Mentor(s): Mark Becker (Psychology)

During visual search, it is thought that people represent the target in working memory (WM). This representation is used to guide attention toward objects that are likely targets and is used to verify that a fixated object is a target. Questions remain, however, about the precise contents of the representation that are used during the search and verification processes. Malcolm and Henderson (2009) cued people with

either a picture or text description of the search target and then eye-tracked people during search. They found faster search times for picture than verbal cues. In addition, eye tracking was used to distinguish between search guidance and verification processes. They found that both processes were improved with a picture cue and concluded that a high fidelity representation of the target is used to during both the guidance and verification phase. However, we know that color information is very helpful for guidance (Williams, 1968). Picture cues contain color information but verbal cues usually do not. To determine whether search guidance improves with pictures cues because guidance uses a high fidelity representation, or simply because the cue includes color information we ran the a similar search study. However, we included four cue conditions (color picture, black and white picture, text with color, and text only). This method allows us to determine the extent to which color information verses a high fidelity representation is responsible for improved search and/or verification processes.

PSYCHOLOGY
POSTER PRESENTATIONS, SECTION 7
LAKE HURON ROOM, 1:30 – 3:00 PM

AND HOW DO YOU MAKE THAT FEEL?
Rebecca Avila, Lauren Straley
Poster: 663
Mentor(s): Natalie Phillips (English)

Individual emotional states infiltrate every aspect of daily life, and they can seriously alter the vantage point from which we consider a task or situation. The Digital Humanities and Literary Cognition lab collaborated with New York University in a study of aesthetic pleasure in poetry. For the purposes of the study, we defined aesthetic pleasure as anything pleasing, powerful, or moving. The study asked that individual participants rank their specific reactions, both positive and negative, to 16 different sonnets. The sonnets were broken up by category (8 Elizabethan and 8 Petrarchan) and participants gauged their continuous pleasure or displeasure of the sonnet by highlighting moments of aesthetic pleasure in green and moments of aesthetic displeasure in red. This project is interested in examining this continuous pleasure rating data alongside the post-study surveys that indicated complicated layers to the states of mind of the participants. There seems to be an interest in the connection between the post-test surveys and the highlighting patterns of each subject. We hypothesize that the participants' negative emotional states expressed in the surveys will have an inverse relationship with the amount of highlighted words, but not with the participant's overall enjoyment of the poem. This research lends itself to further investigation into the amount of influence one's emotional state has over their enjoyment of artistic works.

FUNCTIONAL CONNECTIVITY AND ATTENTION IN READING
Lana Grasser, Jacob Sock
Poster: 664
Mentor(s): Natalie Phillips (English)

Various imaging studies have examined higher level cognitive functioning via increases in activity of certain neural regions during a task from baseline. However, especially with attention, the ability to both enhance activity as well as suppress activity provides even greater ability to attend to certain stimuli and carry out executive functions. To examine natural reading and different methods of attention in reading 18 PhD candidates read chapter 2 of Jane Austen's Mansfield Park at their own pace in an fMRI scanner. They were asked to read half of the sections of text for close reading - i.e. bringing analytical methods of attention to the text. For the other half, they were allowed to read for pure enjoyment - pleasure reading, with a much more relaxed focus. The current investigation focuses on the use of an ROI-based model to evaluate how suppression of neural activity differentiates the neural networks involved when two different attentional methods are brought to the same task. By investigating suppression of activity, we may see how while a task may require similar regions of the brain to be active, different methods of attention brought to such a task may influence how the brain sculpts out the most functionally relevant system to process information.

Analyzing the cognitive process of reading and how it may be shaped by the level of attention a reader brings to a text may pave the way towards improving how reading itself is taught, and how we may shape our texts to improve learning.

FACEBOOK FRIENDS VS. WORK FRIENDS

Azza Kineish
Poster: 665
Mentor(s): Ann Marie Ryan (Psychology)

The purpose of this study is to understand how external events, when introduced into the work environment, can affect co-worker relations. The event system theory explains how events in the external environment will have top-down effects on coworker relations if they are considered novel, disruptive, and critical. To test this theory, a laboratory study was created in an online survey format. Qualtrics was used to pair participants to a fake partner that was manipulated to be perceived as similar or dissimilar. The participants then viewed a controversial or non-stimulating Facebook post from the fake team member and afterwards completed a task that involved a combined effort. Participant reactions to the team member were measured through helping behaviors during the task and the overall reaction and impressions were captured through questions at the end of the study. Reactions were analyzed in comparison to perceived similarity and the event presented using the ANOVA statistical model. We hypothesized that the harsh opinion of a significant and controversial event communicated through social media would affect the helping behaviors the participant has towards their coworker. The findings of this study contribute to the understanding of how individuals create boundaries with the inevitable integration of social media and the work place. Valuable interpretation of the types of effects this merging has on the work place is discussed as well as practical implications for breeding a healthy co-worker environment where productivity can flourish.

THE RELATION BETWEEN RHYTHM PERCEPTION AND SPEECH UNDERSTANDING IN NOISE

Ian MacDonald, Courtney Cox, Klea Doko, Riley Ingell
Poster: 666
Mentor(s): Lauren Amick (Psychology), Elisa Kim (Psychology), J Devin McAuley (Psychology)

The ability to understand speech in noise deteriorates in older listeners, even in those without physiological hearing loss. While the degree of hearing impairment can account for some of the differences in listeners' ability to understand speech in noise, other factors may be involved. One such factor contributing to these differences may include rhythm perception abilities. This study hypothesized that individual rhythmic perception capabilities are related to the ability to understand speech in noise. Because speech is inherently rhythmic, we expect that increased ability to accurately discriminate rhythm will be related to a higher ability to understand speech in noise. To test this, college-aged students with normal hearing completed a set of tests that assessed rhythm perception abilities and the ability to understand speech in the presence of competing background sounds. These tests also controlled for individual differences in cognitive ability. Preliminary results support this hypothesis, indicating that increased ability to discriminate rhythm is correlated with the ability to accurately understand speech in noise.

SHOULD ALL WOMEN "MAN UP"?: EXAMINING THE INTERSECTION OF RACE AND STRATEGY

Nicole Racine
Poster: 667
Mentor(s): Danielle King (Psychology), Ann Marie Ryan (Psychology)

In this study, we examined the effectiveness of verbal identity management (IM) strategies in interviews when individuals' intersecting social categories – ethnicity and gender -- are considered. Prior research has indicated that women who present themselves as more agentic (assertive) are evaluated more positively for leadership roles, but this research did not consider whether ethnic minority women are evaluated similarly. We studied the use of more agentic (assertive) approaches in interviews across ethnic groups of African American women and Caucasian women. Our sample consisted of 819 students at a Midwestern University whose mean age was 19 years old. Of that sample, 72% were female and 71% were members of the ethnic

majority. Participants watched videos of actors answering interview questions when applying for either a female dominated leadership role (social work manager) or a male dominated leadership role (senior engineering manager) using an agentic identity management strategy or neutral identity management in a control condition. Participants then completed measures of our outcome variables of interest. African American women were rated higher on fit for the position for the male dominated leadership role using an agentic IM strategy; Both African American and Caucasian women's' fit scores were higher in the agentic condition compared to the control condition. Caucasian women were rated higher on fit score for the female dominated leadership role using an agentic strategy. In this presentation we will further discuss results, implications, and conclusions of this study.

SEX MODERATES THE RELATIONSHIP BETWEEN TELEVISION EXPOSURE AND SOCIAL SKILLS IN EARLY CHILDHOOD

Seth Rowles, Georgia Bayerl, Elizabeth Giaimo, Abbie Marsh
Poster: 668
Mentor(s): Brooke Ingersoll (Psychology), Brooke Slawinski (Psychology)

Developing proper social skills is vital for young children because it enables them to successfully connect with others through verbal and nonverbal means, which are necessary for proper social and cognitive development. As technology, particularly television, becomes increasingly intertwined with our lives, many have raised concerns regarding its effect on child development. Previous research has been limited to television in bedrooms and has not examined television exposure more broadly, whether demographic factors moderate the relationship between television and social skills, or the influence of television on specific types of social skills. Therefore, the purpose of this study was to analyze whether the relationship between hours of television watched per day and social abilities were moderated by sex in children three to seven years of age (N=117). Maternal report of hours exposed to television were obtained using the Home Screening Questionnaire (HSQ). Social abilities were assessed using the Social Skills Improvement System (SSIS) and the Social Responsibility Scale (SRS-2), and included measures of overall social skills, social problem behaviors, social awareness, social cognition, social communication, and social motivation. Moderated regression analysis revealed that sex moderated the relationship between hours of television and social skills such that the relationship between increased television viewing and social skills deficits was stronger in girls than boys. These results suggest that television exposure may differentially influence the social behavior of boys and girls, which could indicate cognitive and neurological developmental differences in the acquisition of social skills.

DOES NEIGHBORHOOD POVERTY MODERATE THE RELATIONSHIP BETWEEN PARENT-CHILD CONFLICT AND DISORDERED EATING IN MIDDLE CHILDHOOD?

Samantha Zohr, Janine Mator
Poster: 669
Mentor(s): Alexandra Burt (Psychology)

Previous research indicates that parent-child relationships, but not socioeconomic status, is predictive of disordered eating behaviors in children. However, this body of research is largely limited to clinical cases from middle- to upper-middle class Caucasian families, and it is therefore unclear whether these conclusions can generalize to more diverse samples. Therefore, the goal of this study was to examine the interaction between parent-child conflict and neighborhood poverty on disordered eating behaviors in a diverse, population-based sample of children residing in disadvantaged neighborhoods. Parent-reported and child-reported parent-child conflict was assessed using the Parent-Environmental Questionnaire, and child-reported disordered eating behaviors were assessed using the Minnesota Eating Behavior Survey. Neighborhood poverty rates were collected from 2008-2012 data provided by the United States Census Bureau. A multiple regression analysis will be conducted to determine whether the relationship between parent-child conflict and disordered eating is moderated by neighborhood poverty and child sex. These results will aid in determining whether parent-child conflict and/or neighborhood poverty are risk factors for disordered eating behaviors in ethnically diverse children living in low-income neighborhoods.

SOCIAL SCIENCE: GENERAL

ORAL PRESENTATIONS, SECTION 1
TOWER ROOM, 9:00 – 11:15 AM

CULTIVATING GLOBAL CITIZENS: BEST PRACTICES TOWARDS INTERCULTURALISM FOR 21ST CENTURY STUDENT PUBLIC HEALTH ORGANIZATIONS

Trish Abalo

Time: 9:00 AM

Mentor(s): Jeanne Gazel (Student Affairs & Services)

This research studies the structure and curriculum of the Michigan State University Multi-Racial Unity Living Experience (MRULE) & Intercultural Aide (ICA) Program to derive, articulate, and amplify intercultural practices and perspectives. Using an action research approach, the goal is to understand how interculturalism may be cultivated through student-run organizational vision, structure, and practice for public health student organizations. Building social consciousness is particularly essential to modern public health advocates in an increasingly dynamic and intersectional intercultural world. There are several public health student organizations at MSU. These student-run organizations embody student interest, initiative, and engagement; often times, providing innovative and crucial development for individuals and communities. This research, then, seeks to explore and envision new ways to expand on this development by infusing best practices intended to promote the social consciousness needed for twenty-first century global citizens and advocates.

AFRICANA WOMANISM: AN ALTERNATIVE TO BLACK FEMINISM

DaShayla Bradford

Time: 9:15 AM

Mentor(s): Tamara Butler (English/African and African American Studies)

In juxtaposition to the feminism structure, Black feminism was created to combat and prioritize the dilemmas of racial oppression within feminism and be representative as the core of self-empowerment of Black women. However, Hudson Weems (2000) states that “While many other black women naively adopted feminism early…because of the absence of an alternative and suitable framework for their individual needs as Africana women…parts of their [feminism] paradigm have been lifted from their theoretical construct, appropriated and reshaped into a revised form of black feminism by those established in the [academic] field.” Black Feminism has been structured upon a framework that is fixed in the struggles of gender oppression while completely ignoring racial dilemmas that Black women encounter. However, it is important for Black women, and her race, to have opportunities to produce and establish frameworks that apply to the concerns of the Black race. In response, Weems coined, Africana Womanism, “a theoretical concept designed for all women of African descent. Its primary goal…to create [Africana women's] own criteria for assessing their realities, both in thought and in action”(Hudson Weems 2000). Unfortunately, Weems’ interpretation of womanism neglects to include our Black gender fluid and/or queer people and it is significant that we work as a collective to ensure Black liberation. By conducting focus groups with Black women, I will explore the understanding and new definitions of Africana Womanism as a framework in relation to certain outlets (i.e. Natural Hair Movement, gender fluidity, literature) of social empowerment and identity formation.

THE CUBAN HEALTH CARE SYSTEM AND ITS VIEWS
Akhil Damidi
Time: 9:30 AM
Mentor(s): Gerald Urquhart (Fisheries and Wildlife)

The Cuban health care system is almost a mystery to many Americans but is revered in Latin America as a shining example for its positive health outcomes. Few Americans have had much exposure or information about the Cuban health care system, and what little knowledge exists is based on conjecture. I researched the basic workings of the healthcare system while exploring the perspectives of doctors and patients. I conducted surveys that included some questions about the functioning of the health care system and some questions that addressed its opinions and views. This information can be used to analyze the strengths, weaknesses, and methods that could be applied in other countries. There is much to learn from the Cuban system because in spite of its economic status, the Cuban health care system is ahead of many developed countries. We can use the functioning and opinions of our health care system here in America to see which system is more favorable for doctors, patients, and which suits a country as a whole.

HIP-HOP IN CUBA
Jacob Frazier
Time: 9:45 AM
Mentor(s): Donna Kaplowitz (Arts and Humanities)

Dialogue around music is full of complexity because it connects to the formation of identity, and the culture of hip-hop in Cuba is no different. In order to contribute to the understanding of hip-hop music, I collected information by interviewing people and collecting observations. I interviewed shopkeepers, people on the street, and attendees at a hip-hop concert, asking them how they viewed the music and whether they saw in it a racial element. I found that the majority of listeners view the music as a Cuban cultural phenomenon, instead of a specifically Afro-Cuban one. Additionally, people tend to disagree about whether the music resists the status quo politically and racially. These disagreements are indicative of the racial situation in Cuba because in the social and musical spheres, people deny the issues facing Afro-Cubans. These findings illuminate the attempts to fix racism in Cuba, and the fact that in order for the issue to be resolved it must first be acknowledged by the government and the people. Further investigations may look at ways to raise awareness about the presence of racial discourse within hip-hop, and by extension raise awareness about the racial difficulties the island faces.

THE EFFECTIVENESS AND EFFICIENCY OF THE CUBAN HEALTHCARE SYSTEM
Akshay Damidi
Time: 10:00 AM
Mentor(s): Gerald Urquhart (Fisheries and Wildlife)

Cuba has a significant lack of resources in comparison to developed countries, yet their health care system produces very positive outcomes. The Cuban economy has become a confounding factor in its health care due to their dual currency system that causes professionals to have a significantly lower income than those working in the tourism industry. Despite this economic crisis and lack of resources in comparison to first world countries, Cuba is still widely recognized as the one of the best health care systems in the world. I studied the effectiveness and efficiency of the Cuban health care system by employing surveys to patients and doctors and making observations in a hospital in Havana while visiting the country. My results support the published the statistics and facts about Cuba's healthcare system and affirm its success. By visiting and observing the medical services that take place in Cuba, their effectiveness and efficiency can be explained. The majority of the results from this study are observational and qualitative.

EVOLVING ALTRUISM IN THE ITERATED PRISONER'S DILEMMA

Lee Wang

Time: 10:15 AM

Mentor(s): Jubin Cheruvelil (Lyman Briggs College)

The iterated prisoner's dilemma is a standard model for the evolution of cooperative behavior with relevance in both the social sciences and the biological sciences. Previous studies have demonstrated that stochastic interactions (Chen 2008), spatialization (Grim 1996), and colonization (Sober1988) may exert selection pressure in favor of altruistic behavior. We present a generalized framework for the simulation and visualization of the evolutionary iterated prisoner's dilemma on arbitrary interaction graphs. We proceed to simulate the iterated prisoner's dilemma on randomized interaction graphs generated from the stochastic block model, which favors the generation of communities, and the Barabasi-Albert model, which generates scale-free networks similar to observed social networks. We report the implications of randomized interaction graphs on the evolution of altruism in the iterated prisoner's dilemma.

RE?DEVELOPMENT OF THREE KEY PLAZAS IN OLD HAVANA

Jacob Blythe

Time: 10:30 AM

Mentor(s): Rene Hinojosa (Urban & Regional Planning)

Havana's beautiful city design and diligent preservation efforts makes it one of the premier Latin American destinations and a source of cultural pride for the Cuban people. This situation is especially true for the municipality of Old Havana, the core of the original city. This area has experienced extensive restoration several times, notably with United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site designation in 1982. This project discusses the history, current state, and development of three key plazas in Old Havana: Plaza Vieja, Plaza de Armas, and Plaza de la Catedral and considers the sustainability of Havana's urban development. The research questions are should investment have been concentrated in these plazas, and what is the most effective means of distributing urban development funds in countries with this economic profile? While on a research study abroad to the city, I analyzed information on the history and significance of the plazas, recorded observations on the character and use of the plazas as well as of the areas surrounding them, and interviewed stakeholders on the issue. Using explanations of the importance of the plazas and demonstrations of how the character of the development changes in and outside of the plazas, this research lends insights on the sustainability of how Havana has executed aspects of its urban development strategies.

DO STARTUP DIVERSIFY THE ECONOMIC BASE? AN EVOLUTIONARY PERSPECTIVE

Matthew Suandi

Time: 10:45 AM

Mentor(s): Ahlin Christian (Economics), Elizabeth Mack (Geography)

Economic geography scholars have long debated the extent that specialization or diversity yield greater benefits for firms in urban environments. This debate has been characterized as a tradeoff between two types of externalities, those pertaining to specialization and localization economies or Marshall-Arrow-Romer (MAR) externalities, and those pertaining to diversity or urbanization economies (Jane Jacobs externalities) (Glaeser et al., 1992). Scholars have suggested that one way in which diversification of the industrial base occurs over time is by the infusion of new businesses into the regional economy (Jacobs, 1969). This would suggest that businesses are different to some extent from those that comprise the industrial base. While entrepreneurship research has evaluated the extent that industrial diversity promotes entrepreneurial activity (Glaeser and Kerr, 2009), the extent that new businesses are associated with more diverse industrial bases is comparatively underexplored. To examine this aspect of diversity, this study will use panel econometric models to evaluate the extent that startup businesses promote the diversification of the industrial base. Metrics of related and unrelated variety from the evolutionary economic geography literature (Frenken et al., 2007) will be computed and inserted into panel econometric models to determine

whether startups of a related or an unrelated variety nature impact industrial diversity more. It is anticipated that startups that represent unrelated variety will do more to diversify the base than are those of a related variety nature. Implications of models results for regional and local economic development policy will be discussed.

TOWARD A TYPOLOGY OF ENTREPRENEURIAL ECOSYSTEMS

Grace Hough
Time: 11:00 AM
Mentor(s): Elizabeth Mack (Geography)

For many years, entrepreneurship scholars have endeavored to uncover the attributes of regional economies that help foster new business creation. More recently, the idea that entrepreneurs operate and interact within ecosystems has been offered as a means of characterizing the regional environments in which new ventures are curated. To date, work on entrepreneurial ecosystems (EE) has emphasized inventories of components in an effort to understand the supportive attributes of these environments. This body of work has suggested that the importance of these attributes varies over time, as does the vitality of ecosystems. Work also suggests variation in the types of ecosystems in which entrepreneurs operate. Due to these sources of variation Stangler and Bell-Masterson (2015) offer suggestions for comparative metrics to begin to more objectively compare EE. More work is needed to get a more complete picture of differences in EE components, and their fluctuation in strength over space and time. The goal of this paper is to leverage the conceptual frameworks offered by Isenberg (2011) and Spigel (2015) to design comparative metrics of EE components to provide a more objective basis for comparing EE over time. These metrics will then be used to compare select EE in U.S. metropolitan areas over a range of geographic locations to develop a typology of ecosystem types. Combined, the goal of these comparative metrics and typology is to more objectively compare the evolutionary and interdependent characteristics of EE over time and space.

SOCIAL SCIENCE: GENERAL
POSTER PRESENTATIONS, SECTION 1
LAKE HURON ROOM, 9:00 – 10:30 AM

DOES CULTURE INFLUENCE CHILD LANGUAGE DEVELOPMENT THROUGH PARENTING STYLES? COMPARING THE U.S. AND CHILE

Rachel Nelson, Simone Alhagri
Poster: 674
Mentor(s): Claire Vallotton (Human Development and Family Studies)

This study investigates the effects of parenting styles (authoritative, authoritarian) (Baumrind, 1966), on child's language development at 12 and 30 months, across two cultures: the U.S. and Chile. Previous research has shown that the quality of parenting has an effect on child language development concurrently, and also as the child matures (Hart & Risley, 1992; Landry et al., 2010). While there does not seem to be any conclusive evidence that culture has a strong effect on language development (Pungello et al., 2009), we found evidence to suggest that race, ethnicity, and culture influence parenting styles (Julian et al., 1994). Therefore, we hypothesize that culture affects parenting styles, thus influencing child language, leading to an indirect relationship between culture and early language development. We measured this relationship by administering the Bayley Scales of Infant and Toddler Development (Bayley, 2006) to families in both countries when children were 12 and 30 months old. We used the parent's score on the Sensitivity Scale (Santelices et al, 2012) of parent-child interactions to assess the authoritative and authoritarian parenting styles. Our results showed that overall the parenting style assessed at 12 months was a significant predictor for expressive and receptive language at 30 months. After controlling for socioeconomic status, child language development at 12 months, and parenting styles, we concluded that culture does not predict receptive language development between 12 and 30 months, but does predict expressive language development.

SOCIAL MEDIA AND CIVIL CONFLICT: HOW ONE TWEET CAN CHANGE THE WORLD

Nina Capuzzi
Poster: 675
Mentor(s): Scott Schopieray (Academic Technology)

Social media has played an increasingly important role within the last ten years in our society. Mostly, we use social media to connect with our friends and collagenous and to communicate messages about our lives. However, the rise of unrest and recent civil conflicts in the world today has lead to social media to become a tool of revolution. Tweets from individuals in these conflicts show videos of the current cultural climate within the country first hand, YouTube videos spark outrage that leads to physical violence and Instagram posts are used as recruiting tools for terrorist organizations, I am interested in just how important social media has become in civil conflicts in the 21st century and whether these "tools of revolution" create more positive outcomes or if they are simply making these conflicts more heated and violent. My research will focus on the primary use of certain social media platforms, more specifically Twitter, YouTube, and Instagram and how these platforms were used during recent violent conflicts and revolutions such as the Arab Spring and the Syrian Civil War. Who uses these platforms, how are they used, and are these messages primarily sent across using text, video, or images are questions that I want to focus on answering within my research. This research will give a clearer picture on how important social media is within civil conflicts and whether or not certain uprisings or wars can be predicted by looking at trends on these platforms.

ARE GENDER AND CULTURE DIFFERENCES IN EMOTIONAL EXPRESSION SOCIALIZED IN EARLY CHILDHOOD?

Sahithi Chinnam, Kaitlin Morain
Poster: 676
Mentor(s): Claire Vallotton (HDFS)

Background: This study explores emotional gender socialization across cultures in nonverbal interactions of parent-child dyads. Maternal socialization strategies toward children are associated with their quality of friendships later in life (Blair, 2014) and American mothers are more responsive to their sons' emotional expressions than their daughters' (Malatesta, 1982). Intensity of emotional expression varies across culture, with Chinese subjects expressing less intense emotion than Americans (Davis, 2012). Are there gender differences in nonverbal expression of emotion developed during early childhood, and if so do these differences vary across culture? Methods: A series of frustration and pleasure eliciting tasks were administered to 130 subjects, all 12 months of age from either the U.S. or Chile. Results were analyzed from video data to find the subject's most intense positive and negative expressions. Intensity was coded based on position and movement of individual facial features and body parts. We created a variable for intensity of expression by adding the individual scores of facial and body features used to express each emotion.Analyses and results: Using T-Tests, we analyzed the percentage of boys and girls who expressed emotion in both the U.S. and Chile separately. Out of the children who expressed emotion, we analyzed the mean intensity of their expression. Our results indicated cultural differences, but not differences in gender by culture. While Chilean children were more likely to express frustration than U.S. children, U.S. children were significantly more intense in their expression of both frustration and pleasure than Chilean children.

THE CONNECTION OF INTERVIEWER QUESTION FRAMING AND PARTICIPANT'S RESPONSE WITH RACE

Erica Dalzell
Poster: 677
Mentor(s): Merry Morash (Criminal Justice)

Interviewing participants of a research study for qualitative research purposes places importance on the structure of the interview, framing of interview questions, and the interviewer to collect the intended data from the designed questions. The proposed research builds on a prior analysis of the relationship between how an interviewer asks a series of research questions and the detail and length of the participant's response. In the new analysis, the match between the race of the participant and interviewer will be

examined as an independent variable. The research will use existing coding for variation in the presentation of the research question and how that impacts the response detail for 50 women on community supervision in Michigan. The sample is stratified based on interviewer and participants with common (N=25) and differing (N=25) race. The outcomes of this research could have an impact on how participant and interviewer are paired together based on race.

SOCIALIZATION OF BLACK URBAN YOUTH AT PREDOMINANTLY WHITE INSTITUTIONS

Jina Edusei
Poster: 678
Mentor(s): Tamara Butler (English)

Despite progressive US policies such as Affirmative Action (1961), which was supposed to be egalitarian in helping marginalized groups gain entry into institutions of higher education, students of color, specifically Black students, currently make up a small portion of the student population in these spaces. Students of color also have lower retention and graduation rates when compared to their White peers, as well as other minority groups. The question that guides this project is: how do Black students from urban areas (which often lack the same resources and funding as suburban areas) socialize themselves when they attend a Predominantly White institution (PWI)? I will address the question through the lens of critical race theory, and will use qualitative research methods. Qualitative research methods such as university archival research, database research and interviews with faculty members and students at a PWI located in the Midwestern United States will be used in this project. Such research is important to the field of African American & African Studies because finding concrete solutions to help black students thrive in PWI's will help in furthering black individuals in society. Research on what PWIs are doing solve issues of disparity, is vital to how scholars in the field of Higher Education accommodate and assist students from disadvantaged backgrounds in reaching their full potential.

IMPACTS OF TREATMENT COURTS AND IMPLICATIONS IN CRIMINAL JUSTICE

Kaitlin Powers
Poster: 679
Mentor(s): Clifford Broman (Sociology)

This research focuses on mental health, substance abuse and involvement in the criminal justice system. Treatment courts address the issues of mental illness and substance abuse and are examined here as a way to improve outcomes in the criminal justice system. Treatment courts aim to provide individuals with mental illness, substance abuse or co-occurring disorders with treatment and community resources rather than incarceration. This project examines the impacts of treatment courts on recidivism rates and outlines benefits of treatment courts for individuals, communities, and the criminal justice system as a whole. Findings will have significance in policy implications within criminal justice.

SOCIAL SCIENCE: GENERAL
POSTER PRESENTATIONS, SECTION 2
LAKE HURON ROOM, 11:15 AM – 12:45 PM

SOCIAL MEDIA MARKETING: LUXURY VS. NON-LUXURY BRANDS

Annie Hilt, Kelsie Donaldson, Morgan Ketola, Torey Redmond, Margo Rodriguez
Poster: 682
Mentor(s): Constantinos Coursaris (Media and Information)

The purpose of this research is to explore how social media marketing messaging strategies may impact consumers' purchase intentions and brand loyalty of luxury brands. The objective is to identify the differential effect of messaging strategies between luxury and non-luxury brand. It is often difficult to find the right balance between accessibility and exclusivity while maintaining the particular experience and the intense universe related to luxury brands. Social media marketing messaging is utilized by brand managers

to enhance consumer relationships. It allows the brands to reach the consumer and create the opportunity to build a relationship through consumer engagement on brand Facebook Pages, that can further lead to sales for the brand. Consumers enter these kinds of relationships when they perceive that they can benefit from them, where main benefits are principally categorized as informational, hedonic, or social. This 2x2 between-subject research study focuses on the luxury sector of the apparel industry. Through the comparison of perceived benefits elicited by communications from Calvin Klein and American Eagle, luxury and non-luxury respectively, this study reports on the effects of three key messaging content categories (i.e., engagement, product awareness, and seasonal). Community managers use these types of posts to evoke consumers' perceptions of benefits which in turn affect their intention to engage on the brand Facebook Page and their loyalty to the brand. A convenient sample of 200 undergraduate students was used to obtain support for hypotheses. Findings and implications for both theory and practice will be presented at UURAF.

BLACK MALES AND MENTAL HEALTH
Kateria Hines
Poster: 683
Mentor(s): Tamara Butler (English)

Suicide is the third leading cause of death amongst young Black men between the ages of 15-24 (Suicide Prevention Resource Center, 2013). For the past 50 years, suicide rates among Black American males have increased by nearly 30% (Ward & Collins 9). Mental health illness among Black males is not seen as a serious issue in the Black community solely because people perceive it as being a problem for the weak. Strength is admirable in the Black community and being weak or vulnerable is frowned upon, especially for Black males. The stigma of mental illness is doing more harm to Black males than good. Less than 50% of Black men seek treatment for mental illness due to prior beliefs and attitudes (Ward). In my research, I will explore the way in which Black males cope with mental illness. I will look at the affects early childhood has had on their current mental health by conducting one-on-one interviews. In addition, I want to explore the how some Black males battle with depression and articulate their coping strategies using music. I will do this by analyzing lyrics from artists that have written about their experience with depression. Through this project, I hope to shed light on this growing epidemic of mental in Black males.

BLACK MALE RESILIENCE AT PREDOMINANTLY WHITE INSTITUTIONS
Janae Jones
Poster: 684
Mentor(s): Tamara Butler (African American and African Studies)

What contributes to the resilience of black males ages 18-24 at Predominantly White Institutions? Past literature conveys a narrative in which black males in higher education are incapable, disadvantaged, and at-risk to fail. This research explores a counter-narrative to explain Black male experiences at PWI's and the ways in which these students thrive academically despite adversities surrounding race, culture, mental health, and socioeconomic background.

ETHNIC AND REGIONAL INEQUALITIES IN OUTDOOR SMOKEFREE SPACES
Christopher Lowrie
Poster: 686
Mentor(s): Amber Pearson (Geography)

The enactment of policies restricting cigarette smoking in public spaces has been found effective in decreasing smoking prevalence and exposure to secondhand smoke, thereby improving community health. This research investigated ethnic and regional differences in coverage by outdoor smoking policies in the United States, with a specific focus on public spaces often used by children. Predominantly Black zip codes were found to have the lowest levels of coverage for schools, parks, restaurants, and comprehensive policies compared to predominantly White, Asian, and Hispanic zip codes. Significant differences ($p = 0.001$) between predominant races in the existence of policies covering all public spaces, with predominantly Asian

jurisdictions having the highest percentage of coverage and predominantly Black jurisdictions having the lowest. Significant differences (p = 0.001) were also found in the existence of outdoor public place policies by region, with Alaska, Hawaii, and the Southeast having the lowest percentage of coverage. This research found evidence of ethnic and regional inequalities in policy protection against smoking for outdoor public areas across the United States.

USING VIDEO EXEMPLARS IN TEACHER PROFESSIONAL DEVELOPMENT

Derek Morgan, Cassidy Wesenberg

Poster: 687

Mentor(s): Hope Gerde (Human Development and Family Studies)

Using video exemplars is an effective way to demonstrate high quality teaching practices and promote teachers' use of such practices (Pianta et al., 2008; Powell, Diamond, Burchinal, & Kohler, 2010). Video exemplars can be used meaningfully in both face-to-face and online service delivery of teacher professional development (Gerde, Duke, Motts, Spybrook, & Shedd, 2014; Powell et al., 2010). The present study includes an exhaustive review of the research literature on the use of video exemplars in education. From this review, the team identified a set of recommendations for developing quality video exemplars. The research team collected video data from early childhood classrooms. The identified recommendations were used by the researchers to create a set of video exemplars. Next the research team will engage in a feasibility study with the videos imbedded into their content on the webpage. The researchers will use a structured interview methodology to examine the feasibility of the video exemplars for use in the webpage and identify initial problems to their use. Second the team will examine how participants used the videos in the training and what they identify as strengths and weaknesses of the videos. Results will be added to the recommendations document prepared by the researchers. Recommendations for practical use of video exemplars in educative practice will be discussed.

SOCIAL SCIENCE: GENERAL
POSTER PRESENTATIONS, SECTION 3
LAKE HURON ROOM, 11:15 AM – 12:45 PM

THE CUBAN INTERNATIONAL DRUG EXPORTATION INDUSTRY AND ITS DOMESTIC EFFECTS

Muthu Jayatissa

Poster: 690

Mentor(s): Rene Hinojosa (Urban & Regional Planning), Jim Lucas (Undergraduate Education)

My presentation will be about Cuba's pharmaceutical industry, the exportation of drugs, and the effects the exportation has on the local industry. The questions I asked the local pharmacists whether they would change anything about the industry as a whole, what they thought would be the potential effects of the embargo lift, and whether the domestic pharmacies were affected at all by the international distribution of Cuban-developed drugs. I asked a doctor about their personal experiences with pharmaceutical research, and I asked members of the general public about their experiences with the pharmaceutical industry and services. These interviews were how I gathered my primary research, while I gathered my secondary research from books, articles, and limited research papers. Overall, many of the subjects were satisfied with the industry as a whole, and that only good things would come from the embargo between the US and Cuba being lifted. However, they all also expressed some discontent at the fact that the focus on drugs being made for exportation was taking away from the resources that were available for the production of drugs needed domestically. As of now, the conclusion I've reached with this data is that the focus on the exportation of drugs is very beneficial to the Cuban economy, but has had a few negative effects on the domestic population and research industry.

THE CROSS-CULTURAL EFFECT OF PARENT LANGUAGE CONTENT ON CHILD LANGUAGE DEVELOPMENT
Unzel Nadeemullah, Maggie Ribick
Poster: 691
Mentor(s): Claire Vallotton (Human Development & Family Studies)

Parents' interactions during book sharing predict children's pre-literacy skills; e.g., language delays in preschoolers are influenced by parents' language content during book sharing (Van Kleeck & Vander Woude, 2003). Though studies have looked at frequency of questions and comments during book sharing, they have not looked at quality of content, or compared findings cross-culturally. Another study found that literacy development is not a primary focus in Chilean culture (Strasser, 2009), which may result in lower language skills, but this hypothesis has not been tested. Based on the studies of Strasser (2009), and Van Kleeck and Vander Woude (2003), we will further analyze the book sharing language used by Chilean and American parents by coding features of talk (causal talk, links to the child's life, factual talk, and talk about internal states such as emotion, cognition, physical states, attributes, and desires), total word count. We hypothesize that parents in the United States use richer language content than those in Chile, and this results in higher language skills, indicating greater pre-literacy skills. The Bayley Scales of Infant Development (receptive and expressive) were used to examine language development of 40 different children ranging from 12 to 30 months. We conducted regression analysis to examine whether parents language input predicts children's language skills; family SES was controlled. U.S. and Chilean parents used the same richness of talk, and higher frequencies of rich talk by parents predicted greater growth in child receptive language between 12 and at 30 months.

THE RELATIONSHIP BETWEEN CHILD INHIBITION AND EXPRESSIVE LANGUAGE: DOES DELAY OF SELF-SOOTHING RELATE TO COMPLEX LANGUAGE SKILLS?
Vito Agrusa
Poster: 692
Mentor(s): Haruka Konishi (Human Development & Family Studies), Kyla McRoy (Human Development & Family Studies), Lori Skibbe (Human Development & Family Studies)

Self-regulation encompasses working memory, inhibitory control, and task-switching (Morrison, Ponitz, & McClelland, 2010). Research has shown that preschool levels of inhibition uniquely predict kindergarten language comprehension (Blair & Razza, 2007). However, less is known about the relationship between child inhibition and expressive language skills. The present study aims to fill this gap by investigating the relationship between self-regulatory behaviors that children display during a narrative task and their productive language knowledge. Twenty-seven 4-to 6-year-old children were told a story from a wordless picture book and then asked to retell the story to an assessor. We examined children's inhibition skills by first identifying repeated self-soothing behaviors (e.g. fidgeting, rocking), then determined the onset of this behavior by finding the point at which the child first displayed the behavior. Children's language skills were measured via the narrative task. We found that there is a positive correlation between the onset of self-soothing behaviors and the number of modified noun phrases (e.g., the little dog) that children produce ($r=.54$, $p=.003$). These results suggest that the longer children can delay or inhibit self-soothing behaviors, the more they can focus their attention on producing complex language. Findings of this study contribute to a growing body of research demonstrating the importance of self-regulation for early academic success. Further analyses will explore whether other aspects of language correlate with child inhibition.

HEALTH BEHAVIORS AMONG DUAL SMOKER COUPLES
Gabrielle Oehring
Poster: 693
Mentor(s): Seung Hee Choi (Nursing)

Dual-smoker couples where both partners smoke are at higher risk for smoking-related morbidity and mortality due to exposures related to their own and their partner's smoking; yet they show fewer quit attempts, lower quit rates, and higher relapse rates compared with single-smoker couples. This evidence

demonstrates the need for cessation interventions for dual-smoker couples, albeit their smoking behavior is poorly understood in the literature. This study aims to explore in-depth smoking behavior among dual-smoker couples. This was a cross-sectional online survey study with a convenience sample of 115 smokers in a dual smoker partnership. Mean age was 33.6 years old. Almost half were females (55.4%) and 78.4% were White followed by Black/African American (14.4%). On average, participants smoked 16.7 cigarettes per day for 15.0 years. Two thirds (67.0 %) were interested in quitting within 30 days or 6 months. However, 58.4% reported no quit attempts during the past year. Among those who reported quit attempts, 45.2% quit on own, 19.1% used pharmacotherapy, and 17.4% used the buddy system. Sixty percent always allowed smoking at home and 52.0% shared ?50% of their smoking time with their partner. Almost half reported they would be extremely likely or likely to quit if their partner supported them in quitting. Our findings indicate high levels of motivation among dual-smoker couples; however, most did not use quit-therapy, leading to low success of quit attempts. This evidence shows the need for smoking cessation interventions for dual smoker couples.

EFFICIENCIES IN REGIONAL PARTNERSHIPS: OPERATIONS OF REGIONAL UNITY IN MICHIGAN'S CAPITAL REGION RECYCLING PROGRAMS

Noelle Porter
Poster: 694
Mentor(s): Louise Jezierski (James Madison College)

As our world becomes increasingly interconnected through growing access to linking technologies and expansion of communities into suburban sprawl, the need to plan on the regional level has become even more essential. No longer confined in their urban boundaries, citizens are now utilizing the resources and assets of other nearby communities to satisfy their needs. In the Capital Region of Michigan this trend towards regional interconnectivity can be witnessed. Everyday, people in the Tri-County area interact with one another and rely on each other for employment, education, entertainment, and service delivery. These blurred boundaries and interdependence create an ideal environment for regional policy and cooperation. Not only can municipalities save money by uniting to provide resources to their constituents, but they can build systems that are both beneficial and far more efficient than systems constrained by small spatial jurisdictions. This project studies the theory behind regional planning in the Capital Area through the case study of recycling, a public service that is becoming increasingly regionalized following the 2015 Municipal Agreement between Lansing and East Lansing. The examination of this agreement and its implications for future regional recycling initiatives provides a framework to study regionalism and regional assets in the Tri-County Area in order to give suggestions for capacity building in Greater Lansing and to promote regional planning as an effective response to service delivery, not just in the Capital Area, but also in other communities.

A TALE OF TWO LENDING MODELS: THE DECLINE OF JOINT LIABILITY LENDING IN MICROFINANCE

Matthew Suandi
Poster: 695
Mentor(s): Christian Ahlin (Economics)

Microfinance institutions ("MFI"s) have come to affect the lives of millions of the impoverished over the past four decades. Much of the success of MFIs has been credited to group liability, a contract feature in which borrowers self-form lending groups in which each borrower is responsible for the others' loans. Theoretically, group lending improves repayment rates through peer screening, monitoring, and enforcement, resolving problems of adverse selection and moral hazard. In recent years, major MFIs, including Grameen Bank of Bangladesh and BancoSol of Bolivia, moved away from joint liability toward individual lending. Furthermore, recent research by Giné and Karlan as well as Ahlin and Townsend scrutinize the efficacy of group lending. This raises the following questions: what explains the recent movement from joint liability toward individual lending, and why is this movement only occurring now? I hypothesize that broadly improving macroeconomic and macro-institutional conditions contribute toward MFI provision of individually liable loans. To test this hypothesis, I will update a 373 MFI dataset created by Ahlin et al. for a 2011 publication with data on contract form through 2014. I will then perform regression

analyses to assess the relationship between an MFI's propensities to favor one contract form over another and macroeconomic as well as macro-institutional indicators. Given the lack of empirical studies on the macro-level determinants of contract form, this research proposal aims to resolve a significant gap in the literature concerning group liability, and sharpen researchers' evaluation of MFIs and their role in the development process.

SOCIAL SCIENCE: GENERAL
POSTER PRESENTATIONS, SECTION 4
BALLROOM, 1:30 – 3:00 PM

COPARENTING AND TODDLER CHARACTERISTICS RELATED TO BEHAVIORAL PROBLEMS

Rikki McClelland, Alixandra Vanbuskirk

Poster: 698

Mentor(s): Holly Brophy-Herb (Human Development & Family Studies)

Negative characteristics of the coparenting relationship, particularly triangulation, are related to toddlers' behavior problems (Murphy, 2015). These effects may also vary by child temperament and gender. In our study, eighty-three mothers and fathers of toddlers (M_{age} = 30) were interviewed separately about triangulation in the coparenting relationship and toddlers' temperament and behaviors as part of a study of parents' emotional socialization practices. Triangulation refers to conflictual parenting relationships when a parent attempts to pit the child against the other parent. Temperament was assessed as negative affect. Behavior problems referred to toddlers' internalizing and externalizing behavior problems. For fathers, toddler's negative affect, β = .46, p = .000, and mothers' reports of triangulation, β = .28, p = .009, were related to toddlers' behavior problems, explaining 30% of the variance in fathers' ratings of child behavior, F (4, 78) = 9.864, p = .000. For mothers, child gender (boy), β = -.15, p = .088, negative affect, β = .46, p = .000, and mothers' reports of triangulation, β = -30, p = .005, were associated with behavior problems, explaining 39% of the variance in mothers' ratings of child behavior. We also examined interactions between toddler gender and triangulation hypothesizing that triangulation would have a greater impact on girls' behaviors. Although the effects were small, mothers of girls perceived fewer behavioral problems when triangulation was low. F (5, 77) = 13.24, p = .000. Results suggest the importance of the quality of the coparenting relationship to children's behaviors, particularly girls.

WATCHING THE SUN SET ON THE BRITISH EMPIRE

James Murray

Poster: 699

Mentor(s): Michael Colaresi (Political Science)

This project seeks to measure the foreign policy interests of the United Kingdom, and how they have evolved over time, by analyzing the mentions of named-geographic entities by elites over the last two hundred years. This time period covers both the height and fall of the British Empire, as well as both World Wars. Our conjecture is that frequent mentions of geographically distant and diverse places is an observable implication of great power status and grand strategic interests, relative to the frequency of mentions of proximate locales. To explore this idea, we parse the Hansard, a long-running legislative record of the House of Commons and House of Lords, to extract place names that were mentioned in speeches. The names were then associated with geographical points on the globe and these were mapped. Our project then uses the changing constellation of these mentions over time to track and visualize the specific vectors of elite UK interests and the contraction of attention over time. We also explore the regional distribution of these mentions and validate them against known events that were co-occurring. The project provides a potential new measure of previously unobserved great power interests and strategic aims, that could be usefully applied to other countries and contexts, including political speeches over time in the US, Russia/USSR, and China.

CANDIDATE-CENTRIC NOMINATION CYCLES
Mikaylah Heffernan
Poster: 700
Mentor(s): Corwin Shmidt (Political Science)

The purpose of this research is to identify what a candidate-centric presidential nomination cycle is and then examine whether or not there is an effect upon monetary donations and voter turnout. The first phase of the project involves looking at presidential nominations from 1980-2012 to define a breakout candidate using a coding system developed to show marked differences in candidate characteristics. The next phase involves separating candidate-centric nomination cycles from non candidate-centric cycles. Afterwards, I will then examine the amount of donations and escalation in voter turnout occurring during the primary cycle to see if candidate-centric nominations have any effect on citizens' behavior. By identifying breakout candidates, and in turn candidate-centric nominations, I will illustrate the effect that diversifying candidates can have upon presidential nominations.

STATE INTERVENTION WORKS…EXCEPT WHEN IT DOESN'T
Warren Rothe Kyle Goldstein, Emily Jenks, Taylor Rogers
Poster: 701
Mentor(s): Joshua Sapotichne (Political Science)

State interventions into municipal financial distress vary tremendously across states. Our paper seeks to categorize these approaches to intervention and their effectiveness based on the issue of the municipality. We categorize two types of financial distress, structural, i.e. long term and outside of the city's control, and behavioral, i.e. corruption or mismanagement. Further, we identify two state approaches to intervention, structural or behavioral, which fail to line up oftentimes with the causes of financial distress. The paper uses the case studies of two cities within both Pennsylvania and Michigan. The State of Pennsylvania has a structural approach to state intervention, which worked in the City of Reading, but failed in the City of Harrisburg. Whereas the State of Michigan takes a behavioral approach, which was successful in the City of Allen Park, and a failure in the City of Flint.

USING INTERNALIZED ATTITUDES TO EXPLAIN GENDER DIFFERENCES IN ANTISOCIAL BEHAVIORS
Dayna Spisak
Poster: 702
Mentor(s): Sheila Maxwell (Criminal Justice)

Past research that examined youth antisocial behaviors often mention gender differences in who exhibits these behaviors. However, few criminological studies have looked at why gender is a factor in antisocial behaviors. In the current study, data taken from youth in the Philippines is examined to explore these gender differences. The current project is a re-analysis of data that was collected in the Philippines to assess antisocial behaviors. In this project, 526 of the original grade-school student's cases were followed-up for a second-wave of interviews. The purpose of this study is to determine the link between gender and antisocial behaviors, and assess whether the link can be explained away by internalized attitudes, particularly of guilt and shame. The study hypothesizes that girls have higher levels of guilt, which explains their lower levels of antisocial behaviors. The data uses variables that are self-reported by the youth, except for the variable antisocial behavior, which is measured by teacher's assessments of the youth. Studying internalizing attitudes helps to fill the gap of information between gender and antisocial behaviors.

SELF-ESTEEM AND FACEBOOK STATUSES: A DIRECT REPLICATION OF FOREST & WOOD

Danielle Stewart, Lindsey Beaver, Jaazaniah Catterall, Steven Epstein, Katie Solomon

Poster: 703

Mentor(s): Richard Lucas (Psychology)

Among the 1.23 billion Facebook users, 82% are between the ages of 18 to 29, and a majority (70%) use Facebook on a daily basis (Pew Research Center, 2015). Given the prevalence of Facebook use among college-age adults, it is important to understand how online social behavior is related to personality and well-being. Forest and Wood (2012), for example, found that individuals with low self-esteem perceived Facebook to be a valuable platform for self-disclosure. However, these individuals tended to post less positive and more negative statuses, which elicited negative responses from others. The potential negative consequences of this among low self-esteem individuals are important to understand. The present project, in an attempt to contribute to the replicability of psychological research, will conduct a direct replication of this self-disclosure finding as part of the Collaborative Research and Education Project (CREP; https://osf.io/wfc6u/). The outcome of this project will shed light not only on the role of self-esteem in college-age Facebook usage, but also on the importance of conducting high-quality, replicable research.

SOCIAL WORK

POSTER PRESENTATIONS, SECTION 1
LAKE HURON ROOM, 9:00 – 10:30 AM

EXPLORING HOW SCHOOLS OF SOCIAL WORK USE NEW MEDIA TO SHOWCASE THEIR STUDY ABROAD PROGRAMS

Christina Callton

Poster: 706

Mentor(s): Cristy Cummings (Social Work), Edita Milanovic (Social Work), Daria Shamrova (Social Work)

Education related to international social work and global context is important for students in the United States for many reasons, including an increase in U.S. immigration, connections between local problems and international context, and reduction of social workers' biases. Despite this recognition that international social work education is valuable to students, some students may not be aware of the international potential of a social work degree. Social work programs must be more proactive in stimulating students' interest in international content, for example, through offering study abroad programming. For this study, 221 schools of social work (SSW) were examined in various forms of new media. Three sources new media sources were chosen for data collection: (1) the SSWs' websites, (2) SSWs' Facebook page (when available) and (3) SSWs' Twitter feeds (when available). In addition, the dataset data from Carnegie Foundation for the Advancement of Teaching and U.S. News and World Report Education Rankings and Advice were extracted and merged with new media data. It was found, that 18.1% of schools offered a form of an international trip or class—study abroad; and, interestingly, 8.2% of the international trips were from the Great Lakes and Southeast regions of the US. Moreover, other data that will be further explored will look at how schools used new media to display their study abroad, and where these study abroad trips are occurring.

BARRIERS TO DENTAL HEALTH TREATMENT AMONG MIGRANT HEAD START CHILDREN IN MICHIGAN

Rosa Castanon

Poster: 707

Mentor(s): Kyunghee Lee (Social Work)

Migrant Head Start programs provide comprehensive intervention services for children. Federal regulations require that all migrant and seasonal farmworker (MSFW) Head Start children receive adequate dental health care. However, MSFW children are reported to have the lowest levels of dental care, particularly

treatment, compared to other subgroups including regular Head Start children. The current study examines the barriers to access dental health care based on Michigan Migrant Head Start data. Children who were 3 years or older (n = 941) were examined for their dental health exam status and dental health treatment status. The specific research questions are: (1) what are the child, family and school characteristics for children who were identified for having dental problems through professional dental exam? (2) Among children diagnosed dental problems, what are the barriers to receiving dental treatment at individual, family, and school characteristics? Child characteristics (age, disability status, health insurance status at enrollment, other health problems, days of attendance), family characteristics (income, reliable transportation), and school characteristics (number of health professionals, staff's educational levels, staff and child ratios, parental health education provision and parental participation) were also examined as possible determinants. Additionally, differences in local sites (county level) were compared whether there is any geographical differences in dental health outcomes. Findings suggest that 1) MSFW children needs to be cared at an earlier age with a longer duration, 2) MSFW children's dental health outcomes needs to be intervened not only individual-family levels but also school-community levels.

TRAUMA EXPOSURE, BEHAVIORAL AND EMOTIONAL INDICATORS IN TEEN COURT YOUTH

Sadie Crunk
Poster: 708
Mentor(s): Cheryl Williams-Hecksel (Social Work)

The goal of this research is to assist the Ingham county Teen Court, a program of Child and Family Charities, in implementing trauma screening as a component of becoming trauma informed. Teen Court is a restorative justice program that works with youth referred by a prosecuting attorney or the local school district. Each client served by Teen Court is screened for trauma exposures and certain emotional and behavioral indicators. The trauma screening is done using the CTAC Trauma Assessment tool. Clients that have 4 or more trauma exposures combined with 2 or more emotional or behavioral indicators meet the minimum threshold for those that should be referred for further trauma services. There is a correlation between this number of exposures and emotional and behavioral indicators with the presence of trauma symptoms. Children whose trauma symptoms are not addressed are more likely to fail school, have anxiety, depression, and PTSD like symptoms, engage in substance abuse, and exhibit violent behavior. I will assess the progress of Teen Court in implementing trauma screening by compiling data on the percentage of clients who meet the trauma threshold, the top 5 emotional and behavioral indicators, and the top 5 trauma exposures. I will also find the percentage of clients that meet the trauma threshold and are being referred for further trauma assessment. This information will be used to adjust program procedures, write grants, and ensure client needs are met.

IMMIGRATION AND LATINO YOUTH IN SOUTHEAST MICHIGAN

David Havens
Poster: 709
Mentor(s): Pilar Horner (Social Work)

In 2013, the Latino population was estimated at 436,358, or 4.2 percent of the total Michigan population. In Southeast Michigan, Latinos reside in each of the seven counties but are most numerous in three counties: 1) Wayne County, especially in Detroit; 2) Oakland County, especially in Pontiac; 3) and Macomb County. The Latino population is likely to continue to grow more than non-Latino populations in the coming decades, mostly due to a combination of demographic processes including a higher fertility rate, lower mortality rate, and an immigration rate lower than previous years from Mexico and other Latin American countries.Methods: This work analyzed qualitative data collected during 2014-2015, as part of the Latino Community Needs Assessment (LCNA). The 15 focus groups that were conducted with young adults, older adults, and community leaders. We targeted three areas of the region in which to conduct the focus groups: Southwest Detroit, Pontiac and Auburn Hills, and the downriver communities of Allen Park, Lincoln Park, Melvindale and Taylor. For this study we focused on youth and their perceptions of immigration law enforcement. Results: Our data indicates that youth in Southeastern Michigan are dramatically impacted by immigration laws and enforcement and live in a culture of fear. In particular issues of safety, education, gang

activity, social cohesion, and access to health care arose. Our findings suggest that new policies must address the dynamic realities of Latinos in Michigan and in the U.S.

REPORTING SEXUAL VICTIMIZATION DURING INCARCERATION

Haley Hildebrand Brittiany Compton

Poster: 710

Mentor(s): Kathleen Darcy (Social Work), Sheryl Kubiak (Social Work)

Sexual assault is a reality many women face while incarcerated. In 1996 a class action lawsuit, Neal v. MDOC, was filed against the Michigan Department of Corrections on behalf of Tracey Neal and five other female prisoners, who represented over 800 women who were victimized during incarceration. For this study, our research question was "what is the process like for women who report sexual victimization while incarcerated?" To obtain information regarding experiences of reporting sexual assault in prison, we analyzed qualitative data that we extracted from the prison files of three women, as gathered by legal staff for litigation purposes. We used the information from the historical documents to compose case studies to compare the three cases regarding their experiences of reporting sexual abuse during incarceration. Their experiences were found to likely play a role in reporting. Preliminary results suggest that prior sexual abuse may influence the likelihood of women reporting as well as to whom she reports. In at least one case we saw that a woman's history involving sexual assault may have led her to seek a safe place to confide about her experienced abuse with her counselor instead of MDOC staff. Our goal for these studies was to see whether the women's experiences and histories prior to and during incarceration influenced their experiences with reporting the sexual misconduct. The findings suggest that there is a need for improvements in reporting policies within the prison and policies that provide protection for those that do report.

THE INFLUENCE OF NEIGHBORHOOD CONTEXTS ON PARTICIPATION IN EARLY CHILDHOOD EDUCATIONAL PROGRAMS BY LATINO AND AFRICAN AMERICAN CHILDREN

Amy Schaafsma

Poster: 711

Mentor(s): Anna Maria Santiago (Social Work)

For more than a decade, school readiness of urban low-income, minority children has been one of the top educational priorities in the United States. While disparities in children's early learning opportunities associated with family SES, educational background, ethnicity and language have been well documented, less is known about the role that neighborhood factors play in shaping access to these opportunities. Recent literature suggests that neighborhood conditions experienced by children early in life exert significant influence on educational outcomes later in life. Little is known about the effects of other neighborhood contexts or the processes by which neighborhoods influence young children's participation in early childhood education (ECE). This study examines how neighborhood contexts are associated with participation in ECE for a sample of 390 low-income, Latino and African American children. The study addresses the following questions: (1) What neighborhood contexts make it less likely for children to participate in ECE? (2) What neighborhood contexts enhance participation?; and (3) Do these neighborhood contexts vary by ethnicity or gender? Logistic regression models with clustered robust standard errors were estimated to predict the odds of participating in ECE. Only 42% of the children in the sample had participated in ECE programs. The findings suggest that Latino girls and boys had 65% lower odds of participating in ECE. Lower odds of participating in ECE was associated with caregiver age and residence in neighborhoods with higher levels of social vulnerability, occupational prestige, foreign born residents, and violent crime rates.

SOCIAL WORK
POSTER PRESENTATIONS, SECTION 2
LAKE HURON ROOM, 9:00 – 10:30 AM

BARRIERS THAT OLDER ADULTS EXPERIENCE IN CARE TRANSITIONS: A REVIEW OF THE LITERATURE

Alec DeNuccio, Kailey Hindes
Poster: 714
Mentor(s): Anne Hughes (Social Work)

Older adults face a unique set of barriers when moving between different levels and settings of healthcare. Due to comorbid conditions, intricate monitoring plans, and weak social networks, older adults require particular attention in order to decrease the likelihood of their condition(s) worsening as well as their potential for readmission. By examining specific barriers that older adults experience, social workers can better formulate and implement medical services that aim to assist this marginalized population. The researchers engaged in a literature review of relevant articles by focusing on the issues that older adults experience when transitioning between various levels and settings within the context of the United States healthcare system. In addition, the perceptions that patients, families, primary care physicians, as well as other related medical staff (nurses, social workers, etc.) have about these issues are also included.

INTIMATE PARTNER VIOLENCE AND HELP SEEKING STRATEGIES IN COLLEGE STUDENT RELATIONSHIPS

Ryan Kunz, Aleya Williams
Poster: 715
Mentor(s): Hyunkag Cho (Social Work)

Intimate Partner Violence (IPV) is victimization and perpetration of violence between any two romantic partners which includes psychological, physical, and sexual violence. The purpose of this study was to view IPV through the lens of college specifically the help seeking behaviors that may occur as well as the satisfaction of said help. Literature reviews were performed in order to assess the literature currently out on IPV. Research has shown that cumulative violence starting at a younger age affects physical and mental health, which eventually affects help seeking behaviors. We studied factors of help seeking, the type of help seeking and the satisfaction with that. Literature shows minorities tend to have lower professional help seeking attempts and lower satisfaction with the help outcomes. With this literature, college students did not seem to be represented well. College students being a large population where IPV can occur, causes there to be a gap in what researchers have presented. This gap established the need to be filled by more information on college students of all backgrounds with their IPV experiences, as well as their help seeking actions and satisfactions. A survey will be sent out in March 2016 to 24,000 random students at Michigan State through the Registrar. This survey will be conducted through the online survey provider, Survey Monkey, and so results will follow after responses are received.

MSU CHANCE AT CHILDHOOD

Lakota Laferty
Poster: 716
Mentor(s): Kimberly Battjes (Social Work), Joseph Kozakiewicz (Social Work), Delanie Pope (Social Work)

I will be presenting a poster relaying and explaining the results gathered from three online surveys. The surveys were related to the work the MSU Chance at Childhood program does, particularly work with the courts; one survey was about the self-help services, one about the guardianship review services, and one about the Friend of the Court services. The information was gathered in order to see how well the program is doing in reaching its goals, and reveal any possible areas that could use improvement. The goal was to gather information that will help Chance at Childhood better serve the county and the courts.

BUILDING AN EVIDENCE-BASED SOCIAL WORK PRACTICE
Emily Mayer
Poster: 717
Mentor(s): Joanne Riebschleger (Social Work)

An Honors College social work student explored the stages of building an evidenced-based practice as applied to a case study of a specific program called the Youth Education and Support program (YES). The YES program is a program under-development with the aim of increasing mental health knowledge and social support to children who have a parent with a mental illness. Expected program outcomes were that children who participated in the program increased their knowledge of mental health disorders and increased their coping skills from pre to post intervention. The student explored background criteria required for application and/or nomination to be considered for levels of evidence-based practice data base inclusion. She became familiar with the YES program by working with the curriculum revisions, studying the instruments to assess outcomes, and reading articles on published program outcomes. The student compared the evidence-based practice site inclusion data to the YES program development, especially evidence for effectiveness of the program. She identified future steps to make the YES program eligible for specific levels of review as an evidence-promising or an evidence-based program. The student shared what she has learned about developing an evidence-based program, as well as specific recommendations for YES program data base entry.

EXACTING A POUND OF FLESH: HOW NEIGHBORHOOD ENVIRONMENTS CONTRIBUTE TO CHILDHOOD OBESITY
Isaac Orr
Poster: 718
Mentor(s): Anna Maria Santiago (Social Work)

Childhood obesity has been a steadily growing issue in the United States. In 2012 the Center for Disease Control (CDC) estimated that over one-third of America's children were considered overweight or obese. Children who are overweight or obese are more likely to have other health issues, such as; high blood pressure, high cholesterol, diabetes, social and physical impairment, and breathing difficulty. Recent work has focused on the importance of neighborhood environments on the prevalence and onset of obesity. Using data from a natural experiment in Denver for 1,621 low-income Latino and African American children, this study addresses the question: For Latino and African American children, are there significant differences in the prevalence and age of onset of childhood obesity that can be attributed to differences in their neighborhood environments? Cox Proportional Hazards (PH) cumulative risk models with clustered robust standard errors were estimated to predict the risk of being diagnosed as overweight or obese during childhood. Approximately 5% of the children in the sample were diagnosed as overweight or obese during childhood. The primary risk factors associated with a diagnosis of obesity were food insecurity and neighborhood access to healthy foods, resources and walkability. Relative to African American children, Latino children had 45% lower odds of being diagnosed as obese after controlling for differences in caregiver, household and neighborhood characteristics. Children who lived in households with higher caregiver risk factors or household risk factors, had lower odds of being diagnosed as obese.

STATEWIDE DIVERSION PILOT PROGRAM: EXPLORING THE IMPACT OF CIT
Sierra Baker
Poster: 719
Mentor(s): Sheryl Kubiak (Social Work), Edita Milanovic (Social Work)

Due to the increase of mentally ill persons involved in the criminal justice system in Michigan, the Michigan Department of Health and Human Services awarded grants for pilot project to eight counties. These pilot projects are to implement jail diversion programs. The objective is to decrease incarceration, increase officer safety, and divert persons with mental illness to appropriate mental health services. One County in Michigan, implemented a Crisis Intervention Team (CIT) in which patrol and dispatch officers were trained in recognition of mental health problems, de-escalation skills, and knowledge of community-based treatment

options. An important aspect of the CIT program is the availability of a 24-hour drop-off site in which officers can bring individuals who may benefit from mental health treatment as an alternative to jail; a 24-hour crisis mental health center serves this purpose. Evaluation of the effectiveness of CIT training indicates that after training, officers have higher levels of knowledge about psychiatric treatment options within the community and an increase in de-escalation skills. In addition, the number of individuals who were brought to a crisis center by officers increased after the CIT training, demonstrating an increase in awareness of this resource in the community. These outcomes are hopeful indicators that diversion of persons with mental illnesses are congruent with officer CIT training and the availability of 24-hour crisis centers.

SOCIAL WORK
POSTER PRESENTATIONS, SECTION 3
LAKE HURON ROOM, 1:30 – 3:00 PM

ANTECEDENTS OF RUNNING AWAY AND HOMELESSNESS EPISODES FOR LOW-INCOME LATINO AND AFRICAN AMERICAN YOUTH

Sage Casselman
Poster: 722
Mentor(s): Anna Santiago (Social Work)

Each year, an estimated 1 to 1.7 million children and youth are homeless. Negative outcomes associated with these episodes of homelessness during childhood include exposure to violence, substance abuse, risky sexual behavior, poor mental health, and poor educational outcomes. To date, very little is known about any of the risk factors preceding such episodes. This study addresses these gaps by examining the following questions: (1) What are the risk and protective factors associated with episodes of homelessness during childhood?; (2) Do these vary by ethnicity or gender? Using data from the Denver Child Study, this study examines individual, family and neighborhood factors and their association with episodes of homelessness during childhood. Accelerated failure time (AFT) models with frailties were estimated to examine the timing of episodes of homelessness during childhood for a sample of 721 low-income Latino and African American youth. Approximately 8% of Latino and African American youth experienced an episode of homelessness. Episodes of homelessness occurred earlier for youth who lived in households where caregivers were more educated or who lived in neighborhoods with older housing. Episodes of homelessness were delayed for youth who lived in households where caregivers were older, had higher incomes, or experienced more residential mobility. African American youth who lived in neighborhoods with higher levels of social vulnerability also experienced delays in episodes of homelessness. Greater neighborhood affluence as well as higher fractions of foreign born residents delayed episodes of homelessness for both Latino and African American youth.

THE INTERGENERATIONAL EFFECTS OF MATERNAL DEPRESSION ON CHILDREN'S DEPRESSIVE SYMPTOMS

Carmen Elias, Carolina Vazquez
Poster: 723
Mentor(s): Daniel Velez Ortiz (Social Work)

Depression, according to the World Health Organization, will be the second cause of disability worldwide. Depression affects female more than male. Maternal depression has been found for its adverse impact on positive children's developmental outcomes. However, its impact on young adult children has less examined. The present study examined effects of maternal depression on their children's depressive symptoms, based on the National Longitudinal Survey of Youth 79. Depression scores were measured by the Center for Epidemiologic Studies Depression (CES-D) were used for both mothers and their young adult children. Approximately, 4,000 pairs were selected for the study sample (Whites = 1937, blacks = 1319 Blacks, and Hispanics =853). Baseline variables (maternal race, age, education, marital status, the Armed Forces Qualification Test, urban/rural region/poverty status, employment) were also included. Specific questions are: 1) What are the individual and environmental determinants for maternal depression? 2) Do maternal

depression affect their adolescent (youth) children's depression? Preliminary analysis indicates that various individual and family factors affected young adult children's depression. Most importantly, young adult children's depression was significantly affected by their maternal depression scores, even after controlling for other baseline variables. A significant implication might be that extensive intervention needs to be done to enhance maternal depression for its inter generational effects.

EVALUATION OF A PROJECT-BASED FIELD PLACEMENT MODEL FOR MSW STUDENTS IN THE ORGANIZATION AND COMMUNITY LEADERSHIP CONCENTRATION

Margaret Hannaford
Poster: 724
Mentor(s): Cheryl Williams-Hecksel (Social Work)

Evaluation of a Project-based Field Placement Model for MSW Students in the Organization and Community Leadership Concentration Social work students have to complete a field placement course as part of their degree. MSW students in the Organizational and Community Leadership (OCL) concentration may complete a project at their place of employment to complete this requirement. These are called project-based placements (PBP). Through qualitative methods (interviews and a focus group), we evaluated this model. The research began with interviewing 7 past students about the placement process, the impact their project had on the organization and themselves, personal learning and outcomes, and their satisfaction level. The methodology included analyzing the interview transcripts and identifying themes that were used for the focus group. The focus group involved 5 of the 7 students and a power point with the identified themes and student comments to see if they agreed with them. It's important to evaluate this model for program improvement. We discovered that PBP students were non-traditional. They have extensive professional experience and are working full-time jobs. They reported that PBP is an important placement option because it provides students with a high quality learning experience, while being flexible for working students. In this presentation I will share the results of the evaluation, which include student satisfaction, the outcome, and student learning. In addition, I will demonstrate the effectiveness of this model. Finally, I will present how the participants had very positive experiences and identified it as being impactful on the organization or community.

THE DOCTOR NEVER LISTENS: OLDER BLACK MEN, PATIENT-PROVIDER COMMUNICATION AND THE ROLE OF SOCIAL WORKERS

Chloe Hiner
Poster: 725
Mentor(s): Jaclynn Hawkins (Social Work)

Effective patient-provider communication can play a critical role in both the delivery of meaningful care and positive health outcomes in minority communities. African Americans report less satisfaction with patient-provider communication and less shared decision-making when compared to Whites, however, little is known about factors that influence patient-provider communication among African American men. The objective of this study was to identify sociodemographic and other factors that influence patient-provider communication among African American men. Methods: This study uses baseline data of 1666 men from a longitudinal patient navigation intervention of older African American adults enrolled in Medicare. Bivariate and logistic regression analysis were used to analyze the data. Results: Participants older than 75 (OR= 1.476; $p<0.05$). Men who were married or partnered (OR=1.918; $p<0.001$), those reported feeling downhearted or blue most of the time (OR=1.930; $p<0.001$) and men who had a big problem with getting health care (OR=12.146;$P<0.001$) experienced more communication problems. Reporting trouble with mobility was also moderately significant (OR=1.318; $p<0.1$). Conclusion: More research is needed to examine what factors influence patient-provider communication in African American men. Implications for social work practitioners in health care settings are also discussed.

EXPLORATORY STUDY OF INDICATORS OF 'GENDER-SPECIFIC' SERVICES ON WEBSITES OF SEXUAL ASSAULT SERVICE ORGANIZATIONS IN MICHIGAN

Carolyn Mirretti

Poster: 726

Mentor(s): Cummings Cristy (Social Work), Kubiak Sheryl (Social Work)

Survivors of sexual assault face many barriers to seeking support. Due to societal expectations and norms, male survivors may face additional barriers to help-seeking than female survivors. Rape myths and gender stereotypes may contribute to the challenges organizations face in providing 'gender-specific' services for male survivors and men may not perceive these organizations as offering services for them. As the internet is a primary way to access information about services, this study seeks to assess the websites of Michigan sexual assault service organizations for characteristics associated with being welcoming to male survivors. An exploratory content analysis of these websites (N=21) was conducted. State sexual assault and domestic violence coalitions were chosen for inclusion in analysis on the basis of 2014 grant awards through the Office on Violence Against Women. Items of analysis included grant awards, program type, services provided, gender neutrality of language, staff gender, and populations served. Additionally, the name of an organization as a barrier to males seeking services was assessed, as well as how "welcoming" the websites were to male survivors. Despite gender neutral language referencing survivors on the majority of websites (90.4%) and indicators that survivors of all genders are served (85.7%), less than half (38.1%) of the organizational websites provide resources for male survivors or specifically reference male survivors. This incongruity between reported populations served and actual web content may point at a larger issue of lack of access or utilization of these services by male survivors.

MENTAL HEALTH LITERACY IN CHILDREN OF PARENTS WITH A MENTAL ILLNESS

Angela Terranova, Maria Perkins

Poster: 727

Mentor(s): Daniel Cavanaugh (Social Work), Joanne Riebschleger (Social Work)

Mental health literacy (MHL) is an individual's level of knowledge and attitudes about mental health conditions and their ability to prevent, recognize, and manage these conditions^{1,2}. Researchers have applied MHL programs to improve adaptive coping skills and control stressors for children of parents with a mental illness (COPMI)^{3,4,5,6}. School-based programs often provide MHL programs due to their access to youth in familiar environments ⁷. The team addressed three research questions with an extensive six-month literature review using ProQuest and Google Scholar databases: (a) What do COPMI need to know about parental mental illness and recovery; (b) What measurement instruments are currently available for measuring COPMI knowledge of parental mental illness; and (c) What prevention programs currently exist for COPMI? Then a thematic analysis of the literature was conducted with standardized article review forms to summarize and code each article. An Excel database was built to collaborate with an international research cooperative from Australia and Europe. Emerging themes identified in the analysis were; (a) using educational programs to improve MHL; (b) differences in MHL constructs and; (c) The use of poorly refined scale based measures to assess MHL in COPMI. This project is related to Joanne Riebschleger's work developing the prevention-focused Youth Education Program (YES) to educate COPMI about MHL. The outcome of this research will be utilized to enrich YES's curriculum and to refine the scales used to measure the effectiveness of the YES program. An abstract has been submitted to present these findings at a conference in Switzerland.

TOXICOLOGY

POSTER PRESENTATIONS, SECTION 1
BALLROOM, 1:30 – 3:00 PM

DO PERIVASCULAR ADIPOCYTES STORE NOREPINEPHRINE USING VESICULAR MONOAMINE TRANSPORTER?

Maleeha Ahmad
Poster: 730
Mentor(s): Stephanie Watts (Pharmacology & Toxicology)

Activation of the sympathetic nervous system, and the subsequent release of the neurotransmitter norepinephrine (NE), causes contraction of blood vessels and an increase in blood pressure. Our lab has previously shown that perivascular adipose tissue (PVAT) is a functional reservoir for catecholamines, including NE, but has not yet addressed how NE is stored in PVAT. In neurons, NE is known to be concentrated by vesicular monoamine transporter (VMAT) in synaptic vesicles, where it is stored temporarily. We hypothesize that perivascular adipocytes also use VMAT to concentrate and store NE. Immunofluorescence experiments (N=6) were used to test for the presence of both VMAT1 and VMAT2 in the PVAT of normal male rat superior mesenteric artery and mesenteric resistance vessels. The resulting data supports our hypothesis that VMAT1, but not VMAT2, is indeed present in the cytosol surrounding the lipid droplet of the PVAT adipocytes around these vessels. We are currently developing an experiment using a false fluorescent neurotransmitter for rodent VMAT, Mini202, as a functional VMAT dye for freshly isolated rat adipocytes. This would provide evidence for functional VMAT1 in adipocytes by allowing us to image fluorescent VMAT signal in live cells and then eliminate it with a VMAT inhibitor, tetrabenazine. A better understanding of the mechanisms involved in NE uptake and storage in PVAT is crucial to further research on obesity-related hypertension. This is a relevant pathology when considering the growing prevalence of obesity and cardiovascular disease nationally.

REGULATION OF STROMAL-DERIVED FACTOR-1 IN HEPATOCYTES BY HYPOXIA-INDUCIBLE FACTOR-1A

Dominique Garrison
Poster: 731
Mentor(s): Bryan Copple (Pharmacology & Toxicology)

Stromal-derived factor-1 (SDF-1) is important for activation of the stem cell compartment in the liver after injury. Studies have shown that SDF-1 is expressed by several cell types in the liver, including hepatocytes. The mechanism by which SDF-1 is upregulated in the liver after injury, however, is not known. In the present studies, we tested the hypothesis that the transcription factor, hypoxia-inducible factor-1a (HIF-1a), regulates SDF-1 in hepatocytes. To test this hypothesis, primary mouse hepatocytes were cultured in room air or 1% oxygen (i.e, hypoxia) to activate HIF-1a. Exposure of hepatocytes to hypoxia upregulated SDF-1 after 72 hours. Upregulation of SDF-1 was largely prevented in hepatocytes isolated hepatocyte-specific HIF-1a knockout mice. We recently showed that upregulation of several genes in hepatocytes by hypoxia requires autocrine release and activation of transforming growth factor-b (TGF-b). To determine whether TGF-b is required for upregulation of SDF-1 by hypoxia, hepatocytes were treated with the TGF-b receptor inhibitor, SB-431542, prior to exposure to hypoxia. Pretreatment with SB-431542 completely prevented upregulation of SDF-1 by hypoxia. Furthermore, treatment of hepatocytes with TGF-b1 upregulated SDF-1. Upregulation of SDF-1 by TGF-b1 did not require HIF-1a, suggesting that TGF-b1 is downstream of HIF-1a activation. Consistent with these finding, we showed previously that hypoxic hepatocytes activate latent TGF-b1 by a mechanism that may depend upon HIF-1a dependent upregulation of matrix metalloproteinases or thrombospondin-1. Collectively, these studies demonstrate that hypoxia activates HIF-1a in hepatocytes which leads to activation of latent-TGF-b1. TGF-b1 then acts in an autocrine fashion to upregulate SDF-1.

IDENTIFICATION OF FUNCTIONAL IL-17 RECEPTORS ON HEPATOCYTES

Dominique Garrison

Poster: 732

Mentor(s): Bryan Copple (Pharmacology & Toxicology)

Introduction: Cholestasis is a condition caused by drug toxicities, genetic defects, hepatic malignancy, or biliary tract obstructions. Cholestasis occurs when bile acid excretion from the liver is slowed or blocked, which leads to its accumulation in the liver, hepatic injury and inflammation. The innate immune response/inflammation is initiated during cholestasis by activation of macrophages, neutrophils, and lymphocytes. Cytokines and their receptors are key players in the development of this process during inflammation. Our previous studies demonstrated that the cytokine, Interleukin-17 (IL-17), promotes hepatic inflammation during cholestasis. However, it is not clear whether hepatocytes are a target of IL-17 and what receptor is involved. Hypothesis: Hepatocytes express the receptor for IL-17A and produce cytokines when exposed to IL-17A. Methods/Results: Multiple assays were conducted to identify whether hepatocytes express the IL-17A receptor subunits: IL-17RA and IL-17RC. Real time PCR showed that hepatocytes express the mRNAs for both IL-17RA and IL-17RC. Western blot analysis indicated the presence of IL-17RA on hepatocytes, and immunohistochemical staining of liver sections showed expression of IL-17RA and IL-17RC on hepatocytes. Treatment of mouse hepatocytes with IL-17A increased expression of the inflammatory mediator macrophage inflammatory protein-2, indicating that the IL-17 receptor is functional in hepatocytes. Conclusion: An increase in IL-17A induces hepatic inflammation leading to liver complications. Hepatocytes express the IL-17A receptor, which may be targeted therapeutically to reduce inflammation and liver injury during cholestasis.

EFFECTS OF PRENATAL EXPOSURE TO BISPHENOL-A ON TISSUE SPECIFIC INSULIN RESISTANCE

Lindsay Hannah

Poster: 733

Mentor(s): Almudena Veiga-Lopez (Animal Science)

Endocrine disrupting chemicals (EDC) are hormonally active compounds which have been proven to interfere with the proper function of the endocrine system. EDCs are known for modifying endocrine function and can be found in both natural and synthetic forms. A particular EDC of interest is the synthetic, xenoestrogen bisphenol A. BPA is a compound used to manufacture plastics and epoxy resins of consumer products, such as plastic bottles and lining of food cans. Recently, BPA has been found in amniotic fluid and cord blood, stressing the need to address consequences of this exposure on the developing organism. Prenatal BPA exposure is proven to cause insulin resistance in mice. Insulin resistance is a precursor for the metabolic disease, type 2 diabetes. As a result of these findings, one could speculate the potential regarding BPA exposure and the development of insulin resistance in other mammals, including humans. If there is a better understanding of its interactions, preventive strategies may be developed in the future to protect individuals from the harmful effects of BPA exposure. In order to extend upon the current knowledge of bisphenol A, we used sheep as an animal model. We hypothesized that a relevant exposure dose of BPA during the prenatal window would lead to tissue-specific insulin resistance in a large animal model. The effect of BPA on the expression of the insulin receptor signaling pathway in fetal liver was examined in western blot analyses.

STRAIN-DEPENDENT DIFFERENCES IN OZONE-INDUCED AIRWAY ALLERGY OF MICE

Lucas Hotchkiss

Poster: 734

Mentor(s): Jack Harkema (Pathobiology and Diagnostic Investigation), Daven Jackson-Humbles (Pathobiology and Diagnostic Investigation), Ryan Lewandowski (Pathobiology and Diagnostic Investigation), James Wagner (Pathobiology and Diagnostic Investigation)

Epidemiological studies suggest that elevated outdoor concentrations of ozone, the most common gaseous air pollutant in photochemical smog, are associated with activation of eosinophils in the airways of children. Our laboratory has recently reported that mice repeatedly exposed to ozone develop airway eosinophilic

inflammation, mucous cell metaplasia, and type-2 immunity that are dependent on innate lymphoid cells, and not other lymphoid cells (i.e., innate-type allergy, rather than adaptive-type allergy). The present study was designed to further elucidate murine strain-dependent differences (genetic variability) in ozone-induced innate-type allergy. C57BL/6 and BALB/c male, 8-week-old, mice were exposed to 0 ppm (filtered air) or 0.8 ppm ozone for 9 consecutive weekdays (4 h/day). One day after the end of the inhalation exposures, mice were sacrificed and bronchoalveolar lavage fluid (BALF) was collected for cellular and biochemical analyses. Lung tissues were processed for histopathologic examination and morphometric analysis. Ozone-exposed C57BL/6 mice had significantly greater amounts of BALF eosinophils and airway epithelial mucus (classic pathologic features of innate-type airway allergy), approximately 4 and 5 fold, respectively, as compared to similarly exposed BALB/c mice. Control mice, exposed only to filtered air, had no or minimal BALF eosinophils or airway epithelial mucus in their lungs. Our findings in different strains of mice suggest that activation of eosinophilic inflammation and type-2 immunity in the lungs of children exposed to ozone may be dependent on genetic as well as environmental factors. This research was supported with funds from the U.S. Environmental Protection Agency's Clean Air Research Center grant RD 83479701.

THE FUNCTION OF THE ACUTE PHASE RESPONSE IN TCDD-ELICITED NON-ALCOHOLIC FATTY LIVER DISEASE

Colleen Joseph
Poster: 735
Mentor(s): Timothy Zacharewski (Biochemistry & Molecular Biology)

2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is a persistent environmental contaminant which elicits time- and dose-dependent hepatic lipid accumulation, inflammation, and fibrosis indicative of non-alcoholic fatty liver disease (NAFLD). Stressors such as tissue injury and inflammation are known to initiate the acute phase response (APR) within the liver in an attempt to re-establish homeostasis. However, persistent APR activation may contribute to hepatotoxicity through altered immune signaling, catabolism, and amyloidosis. To investigate the temporal and dose-dependent changes in the APR following TCDD exposure, male C57BL/6 mice were orally gavaged with sesame oil vehicle or 30 μg/kg TCDD and sacrificed 2, 4, 8, 12, 24, 72, or 168 hours after dosing, or every 4 days for 28 days with sesame oil vehicle or 0.01-30 μg/kg TCDD. RNA-Seq analysis revealed unique hepatic expression patterns of genes involved in the APR. For example, Orm2, Orm3, Saa1, Saa2, Saa3, and Lcn2 were induced in a time-dependent manner in the time course study, while repression was observed in the dose-response study, suggesting negative feedback. ChIP-Seq analysis revealed that the majority of these genes lack aryl hydrocarbon receptor (AhR) enrichment, indicating that these changes in gene expression are not directly AhR mediated. This project further examines the time- and dose-dependent changes in serum acute phase protein levels using capillary electrophoresis (Wes ProteinSimple) in order to investigate APR regulation in TCDD-elicited NAFLD.

EXPLORATORY STUDY OF PEPTIDES AS ENHANCERS OF ADRENERGIC RECEPTOR ACTIVITY

Miah Turke
Poster: 736
Mentor(s): Robert Root-Bernstein (Physiology)

In 2014 Dr. Robert Root-Bernstein and Dr. Patrick Dillon published a paper on their discovery that ascorbate, tartate, and various other compounds can act as enhancers of adrenergic and histaminergic receptors. A common structural motif was found amongst these compounds and was proposed to permit them to bind specifically to the second and third loops of adrenergic and histaminergic receptors. In the course of other studies, it was discovered that the dipeptide seryl-serine has the same enhancer motif. This led to the exploration of various short peptides acting as enhancers. There are three steps to characterizing these enhancers: 1) they bind to adrenergic or histaminergic receptors, 2) they bind to either the first or second extracellular loop regions of the adrenergic or histaminergic receptors, and 3) they increase the activity of any adrenergic or histaminergic agonist at sub-maximal concentrations in a tissue or whole animal assay. The first and second steps are currently being revisited in the laboratory of Dr. Robert Root-Bernstein using

these small peptides, and the third step is soon to follow. The potential enhancement of adrenergic and histaminergic receptors using simple peptides could lead to the improvement of a number of medications such as those for asthma. These potential enhancers could increase the potency of the drug; allowing patients to take less of it, while having the effects of it last longer.

ROLE OF NANOG IN ADIPOSE TISSUE-INDUCED TRANSFORMATION OF MOUSE EPIDERMAL JB6 P+ CELLS

Ellen Weise

Poster: 737

Mentor(s): Jamie Bernard (Pharmacology & Toxicology)

The obesity pandemic is causing worldwide morbidity and mortality. Recent research suggests that obesity (increased adiposity) is a key player in the pathogenesis and prognosis of many common cancers. However the molecular changes induced by adipose tissue that enhance cancer development are poorly understood. Our laboratory has demonstrated that adipose tissue stimulates epidermal cell transformation in vitro and ultraviolet light B (UVB)-induced skin tumor promotion in vivo. Preliminary data demonstrate that hepatocyte growth factor (HGF) and fibroblast growth factor-2 (FGF-2) released from adipose tissue stimulate transformation in mouse BALB/c skin epithelial JB6 P⁺ cells. This cell line is a well-characterized model for neoplastic transformation that is responsive to tumor promoter-induced transformation growth in soft agar. The objective of my Professorial Assistantship is to elucidate the mechanism by which HGF and FGF-2 released from adipose tissue stimulate JB6 P⁺ cell transformation. One pluripotency factor, NANOG, promotes the formation of squamous cell carcinomas (skin tumor malignancy) and is induced by HGF in glioblastomas. Therefore, we hypothesized that growth factor-induced transformation is dependent on the induction of NANOG. Quantitative real-time PCR analysis demonstrated that HGF and FGF-2 induce NANOG mRNA levels in JB6 P⁺cells. Future studies will examine if HGF and FGF-2-induced transformation is dependent on the induction of NANOG and the downstream signaling events that lead to transformation. Our studies may lead to the discovery of new therapeutic targets for the prevention or reversal of obesity-associated epithelial cancers.

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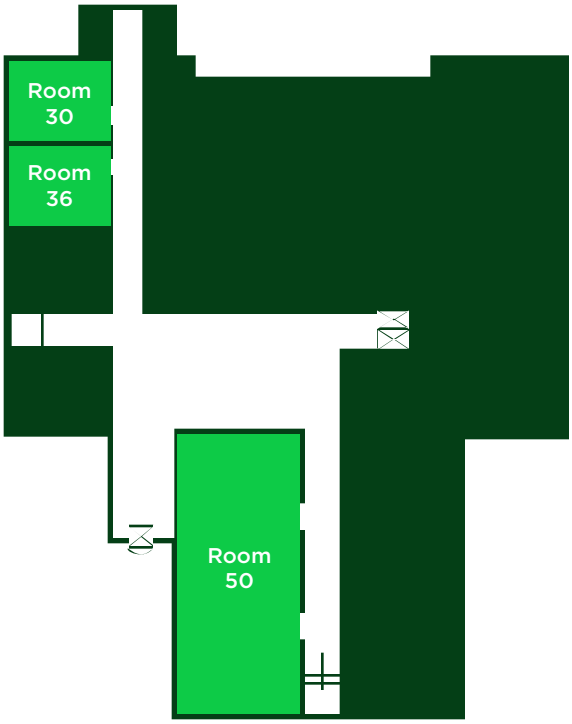

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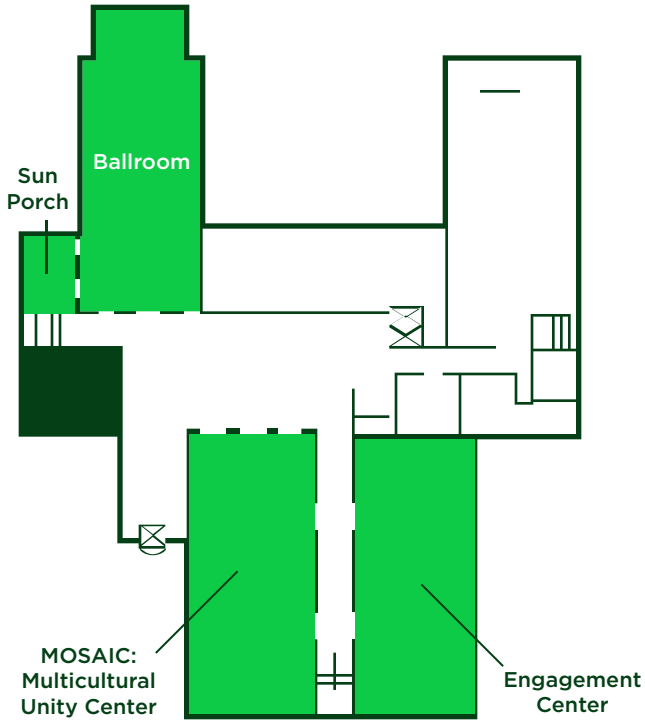

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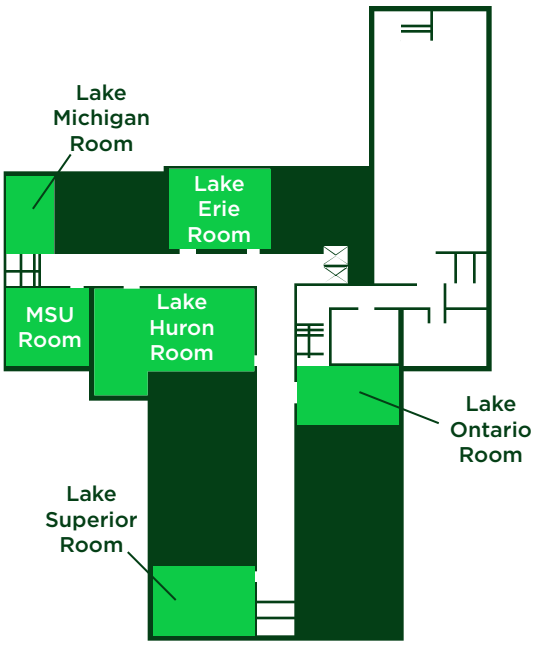

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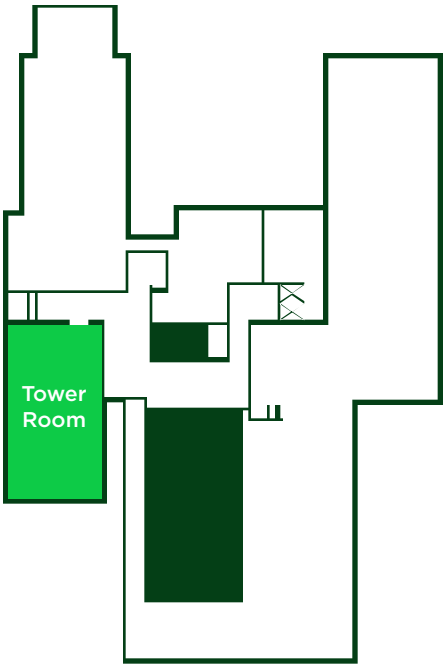

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