university UNDERGRADUATE RESEARCH & ARTS forum

04.8.2011

Michigan State University
April 8, 2011

Welcome to the thirteenth annual 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. Approximately 520 students from 14 different colleges are participating in today's event. These students were mentored by 265 faculty members.

As one of the nation's leading research institutions, MSU offers a breadth of experiences and opportunities that actively engages 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.

We encourage the student participants, faculty members, mentors and our guests 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.

Acknowledgements

We acknowledge President Lou Anna K. Simon and Provost Kim Wilcox's continued support of undergraduate education and research at Michigan State University. 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, and Dr. Korine Wawrzynski, Director of 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 offer special thanks to the UURAF Team—Robert Coffey, Brian Moore, and Nick Drew—all 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 Ashley Madau,'12, a Media and Communication Technology major.

Awards Ceremony

To recognize exemplary scholarly achievements, monetary prizes will be awarded. One first-place award ($100)* will be given in each poster and oral presentation category. 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 research paper on their UURAF program topic and an electronic version of their poster or oral presentation. The Editorial Board 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.

Please join us at 4:00 PM for the awards presentation in Parlors BC 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.

*Students working together in groups of four or less will each receive the award money independently (i.e., If a group of 4 students wins a first-place award, each member will receive $100 each). 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. If the student does not have any unpaid bills, a check will be sent at the end of the semester.

Table of Contents

2011 UURAF Schedule of Events

All events occur in the MSU Union

Event/Time	Location
MORNING REGISTRATION 8:15 AM – 9:15 AM—Registration for morning oral and poster programs	2nd Floor Concourse
ORAL PRESENTATIONS, 9:00 AM – 12:30 PM 8:30 AM – 9:00 AM—Download PowerPoint presentations onto computers 9:00 AM – 12:30 PM—Presentations delivered throughout morning	Parlors A, B, and C Green Room Lake Erie Room Lake Huron Room Lake Superior Room Tower Room
POSTER DISPLAYS, 9:30 AM – 11:30 PM 8:30 AM – 9:30 AM – Set up posters in assigned location 9:30 AM – 11:30 AM – Display and judging time for posters 11:30 AM – 12:00 PM – Students take down posters	Ballroom Gold Rooms A & B
Morning Snack Break: 8:30 AM – 11:00 AM in the 2nd Floor Concourse	
Break to Reset Rooms for Afternoon Sessions 12:00 PM – 1:00 PM	
AFTERNOON REGISTRATION 12:00 PM – 12:45 PM — Registration for afternoon oral programs 12:45 PM – 1:15 PM — Registration for afternoon poster programs 12:30 PM – 3:00 PM — Registration for performance demonstrations	2nd Floor Concourse
ORAL PRESENTATIONS, 1:00 PM – 3:30 PM 12:30 PM – 1:00 PM —Download PowerPoint presentations onto computers 1:00 PM – 3:30 PM — Presentations delivered throughout afternoon	Parlor A & B Green Room Lake Erie Room Lake Huron Room Lake Superior Room Tower Room
POSTER DISPLAYS, 1:00 PM – 3:30 PM 12:45 PM– 1:30 PM – Set up posters in assigned location 1:30 PM – 3:30 PM – Display and judging time for posters 3:30 PM – 4:00 PM – Students take down posters	Ballroom Gold Rooms A & B
PERFORMANCE DEMONSTRATIONS, 1:00 PM – 3:15 PM Performances throughout afternoon	Parlor C
Afternoon Snack Break: 2:00 – 4:00 PM in the 2nd Floor Concourse	
AWARD CEREMONY, 4:00 PM All UURAF participants, faculty, and guests are encouraged to return for the awards ceremony.	Parlors B & C

Poster Presentation Room Assignments

Morning Posters will be displayed from 9:30 AM – 11:30 AM.

Location: Ballroom	Location: Gold Room
Agriculture & Animal Science	Engineering, Computer Science, & Math-Group 1
Biochemistry & Molecular Biology	Environmental Sciences & Natural Resources-Group 1
Cell Biology, Genetics & Genomics-Group 1	Physical Science-Group 1
Cell Biology, Genetics & Genomics-Group 2	Psychology-Group 1
Humanities & Performing Arts-Group1	Social Science-Group 1
Microbiology-Group 1	Social Science-Group 2
Microbiology-Group 2	

Afternoon Posters will be displayed from 1:30 PM – 3:30 PM.

Location: Ballroom	Location: Gold Room
Cell Biology, Genetics & Genomics-Group 3	Communication Arts & Sciences
Cell Biology, Genetics & Genomics-Group 4	Education
Health, Food, & Wellness	Engineering, Computer Science, & Math-Group 2
History, Political Science, & Economics	Environmental Sciences & Natural Resources-Group 2
Humanities & Performing Arts-Group 2	Physical Science-Group 2
Microbiology-Group 3	Psychology-Group 2
Microbiology-Group 4	
Social Science-Group 3	

Oral Presentation Room Assignments

Morning Oral Presentations begin at 9:00 AM and run continuously until 12:30 PM.

Category	Room Location
Communication Arts & Sciences	Lake Huron
Digital Media-Group 1	Lake Erie
Education	Tower Room
Environmental Sciences & Natural Resources	Parlor C
Health, Food, & Wellness	Parlor A
History, Political Science, & Economics-Groups 1 & 2	Parlor B
Humanities & Performing Arts-Group 1	Green Room
Social Science-Group 1	Lake Superior
Psychology	Lake Huron (from 10:30 AM -11:30 AM)

Afternoon Oral Presentations begin at 1:00 PM and run continuously until 3:30 PM.

Category	Room Location
Agriculture & Animal Science	Parlor A
Cell Biology, Genetics, & Genomics	Parlor B
Digital Media-Group 2	Lake Erie
Engineering, Computer Science, & Math	Lake Huron
Humanities & Performing Arts-Group 2	Green Room
Microbiology	Tower Room
Performance Demonstrations	Parlor C
Social Science-Group 2	Lake Superior

Room locations and presentation times are subject to change. Please check the registration area for the most accurate program information. A map of the Union is on the inside back cover.

Abstracts

Abstracts are organized by discipline and then by presentation time or poster number within each category. Oral presentations are listed first followed by poster presentations. An index of student presenters is located at the back of the program book.

Agriculture and Animal Science

Oral Presentations

OSSEOUS LESIONS IN THE EQUINE SPINE WITH A FOCUS ON VERTEBRAL PATHOLOGY
Rachel Wright
Location: Parlor A, 1:00 PM
Category: Agriculture and Animal Science, Oral
Mentor(s): Hilary Clayton (Large Animal Clinical Sciences), Narelle Stubbs (Large Animal Clinical Sciences)
Osseous lesions within the vertebral column can be caused by many disease processes including those related to the mechanical forces imposed on the spine. Structures affected include the intervertebral disc and vertebral body, dorsal spinous process, and facet joints. Spondolytic lesions are a specific form of osseous pathology that involves two adjacent vertebral bodies and the intervertebral discs. Due to the difficulty diagnosing the severity of these lesions using non-invasive techniques, there is limited knowledge of their existence in horses as well as what may stimulate their production. The purpose of the study was to determine the prevalence of thoracolumbar vertebral spondolytic lesions in the horse. The horses used for this study were euthanized for reasons other than back pain. At necropsy, all soft tissues were macerated and the intervertebral discs transected, permitting the disarticulation of each vertebra from T1 (thoracic) to S1 (sacral). Following maceration, the spines were boiled in order to remove any remaining soft tissues. The location and type of osseous pathology were described and related to the age, size and occupation of the horses. Preliminary results will be presented.

FEED INTAKE AS INFLUENCED BY BODY CONDITION SCORE, OUTSIDE TEMPERATURE, AND DURATION OF STAY IN A TEACHING HOSPITAL IN HEALTHY ADULT HORSES
Jeremy Shaba
Location: Parlor A, 1:15 PM
Category: Agriculture and Animal Science, Oral
Mentor(s): Brian Nielsen (Animal Science)
Feed intake in horses can be influenced by many factors: including the demands associated with maintaining body energy reserves, alterations in environmental temperatures, and changes in housing. In a research setting, ensuring continuous intake of feed is critical to providing consistent results, however, the extent to which such outside factors influence feed consumption is not always known. As part of a larger study, the aims of this project were to evaluate how the body condition score (BCS) of a horse, external temperature prior to being brought inside, and the duration of stay inside environmentally controlled housing can influence intake with the hypothesis being that all of these factors influence intake. Seventeen adult stock-type mares of similar management background were obtained for this study. Horses were weighed on a calibrated weighbridge and their BCS was determined prior to the start and at intervals throughout the duration of the study. Horses were fed one of three common diets twice daily (all hay, hay plus a carbohydrate-rich concentrate, hay plus an oil and fiber-rich concentrate). A modified Latin square design consisting of three 6-wk feeding periods was implemented with a third of the horses rotating into each feeding period every two weeks. This study did not show any effect of BCS, external temperature prior to being brought into environmentally-controlled housing, or duration of stay in such housing on feed intake; thus demonstrating that the variables measured do not appear to have an effect on intake in a research setting.

RUMEN FILL SCORE IS NOT USEFUL TO PREDICT FEED INTAKE RESPONSE OF COWS IN THE POSTPARTUM PERIOD TO A LESS FILLING DIET
Kari Kurtz
Location: Parlor A, 1:30 PM
Category: Agriculture and Animal Science, Oral
Mentor(s): Michael Allen (Animal Science)
Cows in the postpartum period are often fed diets with higher fiber concentrations to maintain health as they transition from pregnancy to lactation. However, as lactation progresses, feed intake becomes limited by ruminal distension and cows must be switched to a less filling diet. We conducted a switchback design experiment with 30 multiparous lactating cows (7-27 days postpartum) to determine if a visual scoring system for rumen distention (1= least, 5 =greatest) can be used to predict intake response to a less filling diet. We hypothesized that DMI of cows with a higher rumen score when fed a higher fill diet (HF, 34% NDF) would respond more positively to a lower fill diet (LF, 29% NDF). Treatment diets were fed for 3 d in the sequence HF-LF-HF for 9 d per block. Rumen score was observed daily before feeding (RS-BF) and 8 h later (RS-AF) in period 1. Rumen score ranged from 1.3 to 3.1 for RS-BF, and from 1.7 to 4.1 for RS-AF. Response of feed intake to diet was determined for LF (period 2) minus the mean for HF (periods 1 and 3) and ranged from -3.4 to 2.8 kg/d (dry matter basis). Rumen score (RS-BF, RS-AF, or their difference) explained less than 19% of the variation in response to treatment ($P<0.05$) among cows and relationships were quadratic indicating different mechanisms controlling feed intake among cows. Further research is needed to assess the potential of rumen score for predicting response to diet changes as lactation progresses.

IDENTIFICATION OF THE PHYSIOLOGICAL SOURCE OF RESISTANCE OF PRUNUS SPP TO ARMILLARIA OSTOYAE
Cory Outwater
Location: Parlor A, 1:45 PM
Category: Agriculture and Animal Science, Oral
Mentor(s): Ray Hammerschmidt (Plant Pathology)
Armillaria root rot is a severe disease that significantly impacts the Michigan tart cherry industry. There are currently no effective chemical controls available for this disease; therefore, the best control option resides in development of resistant rootstocks. Results from a previous resistance bioassay revealed that Prunus maackii exhibited high levels of resistance to Armillaria ostoyae. This study was conducted to determine the type of P. maackii tissue associated with resistance and determine if antimicrobial compounds might be involved in resistance. Initially, the periderm and cambial stem tissues of 12 Prunus spp. were screened for their ability to inhibit growth of two A. ostoyae strains. Two tissue layers, periderm and a combination of cambium/phloem were removed from two year-old branch segments. Tissues were ground to a course consistency, incorporated into culture medium and inoculated with a mycelial plug of A. ostoyae. Cultures were incubated for six weeks at 25 C with mycelial growth recorded at one week intervals after inoculation. Based on initial screenings, P. maackii, P. serotina, and P. mahaleb were selected for further studies. The tissues from the three Prunus spp. were evaluated in three independent experiments against two A. ostoyae strains. Tissues from P. serotina and P. mahaleb did not inhibit fungal growth. While periderm of P. maackii significantly ($P<0.05$) reduced mycelial growth by 84-100% relative to controls for both strains of A. ostoyae. Further investigation is needed in planta to evaluate P. maackii as a potential source of resistance for Prunus spp. rootstock development.

IDENTIFICATION OF A CANDIDATE GENE FOR THE GREEN-STRIPE LOCUS OF TOMATO
David Hufnagel
Location: Parlor A, 2:00 PM
Category: Agriculture and Animal Science, Oral
Mentor(s): Cornelius Barry (Horticulture)
Color is a key determinant of fruit quality and color variants in horticultural crops can attract premium prices. The green-stripe (gs) mutant specifically alters fruit color in the skin of tomato fruits. Developing gs fruits are characterized by irregular longitudinal dark green stripes on the epidermis that eventually turn golden during ripening resulting in ripe fruits that are bi-colored. The gs mutation has been incorporated into several tomato cultivars including the heirloom varieties Green Zebra and Tigerella. The physiological and molecular basis of the gs mutation is unknown but classical linkage mapping has placed the gs locus on long arm of chromosome 7. As a starting point to isolating the gs locus, an interspecific F2 population segregating for the gs mutant allele was generated from a cross between S. lycopersicum (gs/gs) X S. pimpinellifolium (GS/GS). Initially, linkage to a 2 cM interval on chromosome 7 was established using a population of 160 F2 individuals. Subsequently, utilizing a population of 759 F2 individuals the map position of the gs locus was further refined and a single candidate gene identified. Progress on the characterization of this gene from wild type and gs mutant backgrounds will be presented.

QTL MAPPING OF COAT COLOR TRAITS IN AN F2 DUROC X PIETRAIN PIG RESOURCE POPULATION
Chelsea Pike
Location: Parlor A, 2:15 PM
Category: Agriculture and Animal Science, Oral
Mentor(s): Juan Steibel (Animal Science & Fisheries and Wildlife)
Many quantitative trait loci (QTL) in pigs linked to coat color, spotting, and hair density traits are also linked to skin disease and other abnormal skin conditions, such as melanoma and albinism. The objective of this study was to map QTL for coat color, hair density, and spotting traits in a pig resource population. To accomplish this, a genome scan was preformed on 510 pigs from the Michigan State University Duroc x Pietrain F2 pig resource population using 124 microsatellite markers genotyped across the 18 autosomes with an average marker spacing of 24 cM. Pigs were digitally photographed and evaluated for coat color, spotting and hair density. A line cross model, a half sibling model and an epistasis analysis were performed in GridQTL (http://www.gridqtl.org.uk/) to find regions significant at a 5% genome-wide level. This resulted in 8 putative QTL regions on chromosomes 1, 3, 6, 8, 13, 15, 16 and 17. Of these regions, 6 were novel regions for the traits studied, and 3 (overlap on SSC6 for 1 trait reported, 1 novel) correlated with previously reported regions for color traits. In addition, a potential epistatic interaction was observed between chromosomes 1 and 8 for spot size. Future efforts will focus on investigation of association of these QTL with economically important traits and identify potential candidate genes within these QTL genesand explore potential applications of the pig as a model for human health.

EFFECT OF FRITO LAY BYPRODUCT ON THE FEEDING BEHAVIOR AND PRODUCTION PARAMETERS OF LAYING HENS
Sarah Fraley
Location: Parlor A, 2:30 PM
Category: Agriculture and Animal Science, Oral
Mentor(s): Elizabeth Karcher (Animal Science)
The increased interest in becoming 'green' for consumers and companies is driving groups to develop innovative ways to become more efficient and reduce their waste. Foods past their expiration dates are large sources of waste and are causing companies that manufacturer food to develop strategies for waste disposal. Integrating by-products of these companies into animal diets, specifically that of laying hens, could be significantly more cost effective for the human food manufacturers and egg producers. The objective of this study is to evaluate Frito Lay byproduct, consisting mostly of potato chips that are past expiration dates, in laying hen diets and the impact on hen performance and feeding behavior. One hundred and ninety two White Leghorn laying hens (37-39 weeks old) were selected from the MSU Poultry Farm. Hens were housed in conventional cages (3 birds/cage) and received one of four diets for 6 weeks: 1) industry standard corn-soybean meal control 2) control with 3% byproduct 3) control with 6% byproduct and 4) control with 9% byproduct. Diets were formulated to be isolcaloric and isonitrogenous. Performance data, feed consumption, body weight, and egg weight are currently being measured. Diet impact on egg quality, weight, yolk color, specific gravity, and taste will also be evaluated. We hypothesize that the addition of the Frito Lay byproduct will not have a negative effect on hen egg production, feed intake, or egg quality.

KEY ANTIOXIDANT GENES IN WEANLING PIGS FED ORGANIC AND INORGANIC ZN FOR 35 D
Renee Wangler
Location: Parlor A, 2:45 PM
Category: Agriculture and Animal Science, Oral
Mentor(s): Gretchen Hill (Animal Science), Patty Weber (Veterinary Medicine)
Pharmacological Zn in nursery diets was shown by our laboratory to alter gene expression. It is not known if Zn at physiological levels will affect gene expression similarly. Increased hepatic Zn from excess Zn may increase the need for antioxidant enzymes. Therefore, the objective was to evaluate the effect of Zn at recommended NRC levels from organic and inorganic sources on the expression of Metallothionein (MT), Peroxiredoxin 4 (PRDX4), Glyoxalase (GLO1), and Aminoacylase 1 (ACY1) in weanling pigs. At weaning, 18 pigs were allotted to 3 pens. Each pen was fed either 1) basal diet meeting nutrient needs except Zn, 2) basal diet + 100 ppm Zn Bioplex, or 3) basal diet + 100 ppm Zn sulfate. At 10 and 35 d, 3 pigs from each pen were killed and liver samples collected. RNA was isolated and RNA purity, integrity, and quantity were determined. RNA samples were then converted to cDNA. Quantitative Real Time Polymerase Chain Reaction was used to measure expression levels of MT, PRDX4, GLO1, ACY1 and Î²-Actin. Expression differences were determined between treatments. There was a main effect (P = 0.003) of day upon hepatic PRDX4, with PRDX4 expression greater at d 10 than d 35. The expression of MT, GLO1 and ACY1 were not different by day (P = 0.90, P = 0.61, and P = 0.19) or by diet (P = 0.07, P = 0.97, and P = 0.28). Therefore, it appears that gene expression of these antioxidant genes is not increased with adequate Zn.

LOCALIZATION OF THE INSULIN-REGULATED GLUCOSE TRANSPORTER GLUT4 IN THE JEJUNAL MUCOSA OF THE HORSE
Alexandra Buckley
Location: Parlor A, 3:00 PM
Category: Agriculture and Animal Science, Oral
Mentor(s): Nathalie Trottier (Animal Science)
Pituitary pars intermedia dysfunction (PPID) is the most common endocrinopathy of horses and is associated with poor nutritional status and cellular insulin resistance. In humans, the small intestinal mucosa (SIM) is a quantitatively important site of blood glucose clearance via the arterially supplied basolateral membrane (BLM) in Metmorphin-treated type II diabetes patients. We proposed that horses with PPID have reduced ability for blood glucose clearance. We showed previously lower mRNA abundance of genes encoding for insulin receptor and insulin-dependent glucose transporter GLUT4 ($P < 0.01$) in SIM of PPID horses compared to healthy horses. We hypothesized that GLUT4 protein is localized to the epithelium of the SIM and is in lower abundance in PPID horses compared to healthy horses. Eight adult horses (4 PPID-diagnosed and 4 healthy horses) were used. Following euthanasia, SIM was sampled for GLUT4 protein abundance, and whole intestinal jejunal sample was collected for immunohistochemical staining with rabbit polyclonal primary antibody for GLUT4. Muscle served as a positive control. Immunohistochemical staining revealed GLUT4 in the jejunum enterocytes and muscularis mucosa, which was also supported by visualization of a single band expected to be GLUT4 in all horses tested on Western blot. So far, these results shed additional light on the role of the small intestine in blood glucose clearance. Final densitometry analysis and normalization of the Western blot bands with a loading control will allow determination of whether PPID horses have lower abundance of GLUT4 compared to healthy horses.

EFFECT OF SIRE TYPE ON THE VALUE OF MARKET WETHERS FOR COMMERCIAL FARMS
Erika Pearson
Location: Parlor A, 3:15 PM
Category: Agriculture and Animal Science, Oral
Mentor(s): Gretchen Hill (Animal Science)
The objective of this study was to determine if terminal sire rams could increase the profitability of the sheep industry based on the carcass of the lamb. We compared crossbred wethers sired by a Suffolk ram, with Polypay sired wethers, dams were Dorset-based ewes. Wethers were weaned at 60 d of age and adjusted to a concentrate diet. Terminal sired (n = 11) and maternal sired (n = 11) wethers were mixed, group housed in two pens, and fed a 15 % crude protein concentrate only. Ultrasound data were collected and adjusted to a market weight of 61 kg. Percent boneless closely trimmed retail cuts (BCTRC) was calculated using adjusted numbers and body wall thickness. Data was analyzed using Proc Mixed (SAS). Terminal sired wethers had a larger LEA (20.45 cm2) than the maternal sired wethers (17.37 cm2; P = 0.005). The carcass value of terminal sired was $4.57 more per 100 kg than the carcass value of maternal sired (P = 0.004). On a live basis, the difference was $2.29 more per 100 kg (P = 0.004). The 48.48 % BCTRC of the terminal sired was greater than the maternal sired (46.78 %; P = 0.004). The 12th rib fat thickness of the terminal sired was 0.57 cm and less than the maternal sired (0.67 cm; P = 0.086). In conclusion, a producer will increase profit by selling terminal sired lambs because of their higher live weight and carcass value.

Poster Presentations

DEVELOPMENT OF AN IN VITRO BIOASSAY TO SCREEN PRUNUS SPP FOR RESISTANCE TO ARMILLARIA OSTOYAE
Emmie Warnstrom
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Agriculture and Animal Science, Poster, 1383
Mentor(s): Ray Hammerschmidt (Plant Pathology)
Armillaria root rot is a fungal disease of stone fruit trees within the genus *Prunus*, and *Armillaria ostoyae* is the most prevalent species of these pathogens infecting tart cherry in Michigan. Resistant rootstocks must be developed to reduce the decline and loss of tart cherry orchards in Michigan due to Armillaria root rot. An *in vitro* bioassay was developed to screen *Prunus* spp. for resistance to *A. ostoyae*. Twenty-nine *Prunus* spp. were evaluated for resistance to six strains of *A. ostoyae*. Branch segments (3 cm) from two year-old wood were placed adjacent to the leading edge of a 14 day-old *A. ostoyae* culture grown on yeast malt peptone glucose medium. The bioassay plates were incubated for 10 days at 25 C and then evaluated for the colonization by the fungus. The branch segments were cut longitudinally, and the periderm and cambial

layers were peeled back to reveal the extent of colonization of the fungal mycelial fans. The distance of the penetration by the fungus was measured with a digital caliper. All *Prunus* spp. tested with the exception of *P. maackii* allowed mycelial colonization of 10-19 mm, whereas *P. maackii* exhibited an average growth of 3.72 mm. Based on these results, *P. maackii* exhibited the highest level of resistance to *A. ostoyae*. Our data corroborate with previous research findings from *Prunus* spp. tree screening for resistance to Armillaria. This *in vitro* bioassay shows promise as a quick and reliable screen of all tree species to determine susceptibility to Armillaria.

THE IMPORTANCE OF ISOTOPICALLY DIFFERENT HABITATS TO PREY ITEMS OF BOTTLENOSE DOLPHINS (TURSIOPS TRUNCATES) FROM SARASOTA BAY, FLORIDA

Ramona Beckmann

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1435

Mentor(s): Peggy Ostrom (Zoology)

The analysis of stable isotopes such as ^{13}C and ^{15}N in ecosystems has become an invaluable method of conducting long-term studies on food webs throughout the animal kingdom. They provide information on a consumer's diet, habitat and also environmental impacts on the web. Carbon isotope values for seagrass habitats in West Central Florida, $\delta^{13}C$ = -10 ‰, differ from those of mangrove s,-24 ‰ , and open bay sites,-19 ‰. Bottlenose dolphins resident to Sarasota Bay, Florida, are the focus of a study lasting four decades, in which foraging behavior related to the dolphins' preferred habitats in Sarasota Bay has been analyzed. The study is not only based on observational data or stomach content analysis but also on stable isotope analysis. The focus of this project is to determine the importance of seagrass carbon to pinfish (*Lagodon rhomboids*) and pigfish (*Orthopristis chrysoptera*), two main prey items of Sarasota Bay bottlenose dolphins. I analyzed muscle tissue of pinfish and pigfish from 8 seagrass sites, 1 mangrove site and 2 open bay sites. Preliminary data showed that differences in carbon isotope values of pinfish depend on the habitat (t-test, $p<0.01$). The outcome of this project will give a more comprehensive understanding of the importance of different habitats to prey items of bottlenose dolphins from Sarasota Bay. Moreover, the carbon isotope values of the prey can be used to assess the importance of seagrass carbon to dolphins.

FECAL PHYTATE PHOSPHORUS DISAPPEARANCE IS NOT ALTERED BY THE ADDITION OF PHYTASE TO EQUINE DIETS

Katherine Korman

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1437

Mentor(s): Brian Nielsen (Animal Science)

Phytate-P is a form of phosphorous found in plant tissues that is bioavailable to ruminants because the microorganisms found in the foregut produce phytase. However, it is generally thought that horses, as non-ruminants, lack phytase and the ability to use phytate-P as a phosphorous source. The addition of supplemental phytase in the diet would theoretically make phytate phosphorous bioavailable in horses. Since the amount of phosphorous absorbed would increase, that which is excreted would thus decrease and phosphorous levels in the manure would be reduced. In a duplicated 3x3 latin square design, phosphorous balance was examined in 6 mature geldings. The horses were pair-matched based by breed, weight and age, and randomly received each diet treatment in 2-week intervals: a control diet that meets NRC phosphorous requirements, a phosphorous deficient diet at 70% of the requirement, and a phosphorous deficient diet with addition of supplemental phytase. A 3-day total collection of feces and urine was performed after a control diet adaptation period and each diet treatment. Analyses included total phosphorous in all samples and feed, and phytate-P in feed and fecal samples. Disappearance of phytate-P was high, ranging from 82.85 to 91.30%; however, disappearance of phytate-P ($p = 0.701$) and total phosphorous ($p = 0.9985$) were insignificant between the phosphorous deficient diet and the deficient diet with added phytase. This suggests that horses may be able to absorb phytate-P liberated by the hindgut microbial population and that phytase supplementation would provide no additional benefits in the horse.

PUBLICLY DEVELOPED GM CROPS IN THE DEVELOPING WORLD: A SOUTH AFRICAN CASE STUDY

Brendan Lammers

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1488

Mentor(s): Johan Brink (Institute of International Agriculture), Dan Dutkiewicz (Institute of International Agriculture)

Genetically modified crops have been touted as potential method of boosting crop yields and enhancing food security in the developing world. While many transgenic crop varieties have been widely adopted and successful, including in developing countries, they were all created by multinational companies to fit the needs of large-scale farmers in the developed world. Public sector research institutions can fill a major gap by researching and commercializing GM crop varieties which are targeted at the most pressing needs of small-scale farmers in developing countries. South Africa is a particularly interesting case study, as it contains both the scientific capacity to successfully developed transgenic crops as well as population in need of greater food security and poverty alleviation. This research project is the result of over a year of researching and writing, in addition to a three-week research period in South Africa where prominent research scientists, advocacy groups, and public officials with experience on GM crops were interviewed. The objectives of this study are to: 1. To study the current status of public sector developed GM products in South Africa by interviewing developers/scientists at Universities and Science Councils. 2. To examine the constraints (e.g., financial barriers) that public sector institutions face in developing GM products in South Africa. 3. To examine the policy issues (biosafety, intellectual property rights, trade, etc.) impacting approval and adoption of GM products in South Africa.

EFFECTS OF INTRAVENOUS LIDOCAINE ON PAIN SCORE AND HEART RATE AFTER ISCHEMIA OF THE EQUINE LARGE COLON

Sarah Schmidt

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1476

Mentor(s): Vanessa Cook (Large Animal Clinical Sciences)

Colic is one of the leading causes of death in horses, and surgical correction is the only option for those that suffer from one of the most severe forms, a strangulating large colon volvulus. Intravenous lidocaine is believed to improve survival after colic surgery by reducing inflammation

and expediting healing. The objective of this study was to test the hypothesis that horses treated with intravenous lidocaine after ischemia of the large colon will experience less pain and have lower heart rates than horses treated with lactated ringers solution (LRS). 12 healthy horses were separated into four groups (n=3/group) and underwent surgery to restrict blood flow to a portion of the colon. Group 1 and Group 2 experienced one hour of ischemia and were treated with LRS or lidocaine. Group 3 and Group 4 experienced two hours of ischemia and were also treated with LRS or lidocaine. Pain scores and heart rates were taken before surgery, 4 hours, 8 hours, and 18 hours post surgery. Preliminary results suggest that pain scores were significantly lower in horses treated with lidocaine 18 hours after surgery compared to horses treated with LRS ($p=0.04$). Pain scores were significantly increased after surgery in all treatment groups at all times ($p<0.01$). Heart rates were also significantly increased after surgery in horses that underwent two hours of ischemia in comparison to one hour of ischemia, regardless of treatment ($p<0.021$). With these results, it is possible to conclude that intravenous lidocaine may improve animal comfort after colic surgery.

LAKE TROUT EGG AND FRY ANALYSES

Joe Parzych

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1489

Mentor(s): Cheryl Murphy (Fisheries and Wildlife)

Environmental factors play a large role in the size of larval lake trout fry. Predation, water quality, and nutrient availability can play a crucial role in how many nutrients a mother lake trout is able allocate to her eggs. It is unknown, however, which of these nutrients control larval fry sizes. I explored the possibility that lipids within the eggs cause the variability in fry size, and attempted to link egg lipids to physical factors of the mother fish in an effort to better understand how the mother fish controls the growth of her offspring. Lipids were extracted from the eggs using the procedure from Bligh and Dyer (1959), modified by Morbey (2006), and that data was added to a preexisting data set of the same lake trout. All data was collected from lake trout raised in the Codrington Fishery Research Station, Codrington, Ontario, Canada. Patterns and trends were explored both within individual stocks and across multiple stocks. The relationships between physical factors of the mother fish, characteristics of the eggs, and the larval fry size are important for a complete understanding of how mother lake trout control the size of their offspring.

INTEGRATING PORK PRODUCTION WITH ORGANIC CROP PRODUCTION

Allison Bunting

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1538

Mentor(s): Dale Rozeboom (Animal Science), Laurie Thorp (RISE)

A study with the goal of integrating pork production with organic vegetable production was conducted at the MSU Student Organic Farm (MSU SOF). Twelve Yorkshire x Duroc barrows were born and raised to 50 pounds live weight at the MSU Swine Farm and moved to the MSU SOF May 3, 2010. Portable, metal housing sheds were used for housing and dry straw bedding was provided. Hogs were rotationally grazed on clover, rye, and post-harvest brassica fields using a three-strand electric fence to contain pigs. Pigs were conditioned behaviorally using “clickers” to facilitate easier movement between grazing plots and onto scales. Water was provided via a nipple water system and pigs were supplemented with a corn-soybean meal diet during the study. An experimental design to collect data on vegetation consumption and effect of swine on organic soil ran from day 106 to day 117. On day 122 of the study the 5 largest pigs were taken to harvest, and on day 143 the remaining 7 pigs were taken to harvest. All pork was sold at $5.00/lb to the MSU SOF Community Supported Agriculture group and MSU Culinary Services. Live weight was measured biweekly and average daily weight gain was 1.63 lbs./day. Vegetation consumption was measured in the experimental plots using the Daubenmire method. There was minimal evidence of internal parasites at harvest. A continuation of this study in 2011 will include data collection on crop yield following flash grazing, organic certification, and possible expansion to farrow-to-finish operation.

FORMATION OF NEUTROPHIL EXTRACELLULAR TRAPS IN LACTATING DAIRY COWS

Laura Turek

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1562

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

Neutrophils are important cells of the innate immune system that protect the body against invading microorganisms. These white blood cells perform their function by engulfing and degrading microorganisms or by releasing web-like structures called neutrophil extracellular traps (NETs) that capture and kill bacteria outside of the neutrophil. NETs may help to fight bacterial infections that cause diseases such as mastitis. Mastitis is a common problem in the dairy industry and costs producers thousands of dollars every year. Mastitis is most prevalent in early lactation. During this time, NET formation may be impaired thus, contributing to an increase in the incidence of this disease. Therefore, the objective of this research project was to determine if NETs are decreased during early lactation in dairy cows. To accomplish this blood was collected from eighteen multiparous cows for neutrophil isolation on day 1, 21, 42, 63, and 84 of lactation. Isolated neutrophils were then treated with Escherichia coli to stimulate NET formation. The amount of DNA released into the culture media was determined as a measure of NET formation. Reactive oxygen species (ROS) was also measured under these conditions because ROS is believed to affect NET formation. Results from the current study show that DNA release was significantly lower on day 21 and 42 of lactation as compared to day 1. However, ROS levels did not change over the experimental period. In conclusion, neutrophil extracellular killing ability is impaired in early lactation and ROS may not be a regulator of this process.

LOCATION OF AN ACTIVE INFESTATION OF RHAGOLETIS JUNIPERINA MARCOVITCH ON A RED CEDAR TREE (JUNIPERUS VIRGINIANA L) ON THE MSU CAMPUS

Megan Frayer

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1590

Mentor(s): Jim Smith (Entomology)

Rhagoletis juniperina Marcovitch (Diptera: Tephritidae) infests juniper trees (Juniperus spp.) across a wide range in North America. Rhagoletis juniperina is of interest to scientists because it may be a link between North American and European Rhagoletis. Locally, R. juniperina infests the Eastern Red Cedar (Juniperus virginiana L.). Our lab had a known locality from which we could collect these flies, but the tree was cut down during a construction project. Thus, one objective of my research was to find a Red Cedar tree in the East Lansing area with an active R. juniperina infestation. Fruit was collected from trees located at 5 sites around East Lansing between September 22 and October 27, 2010. The fruit were held over vermiculite for 3-4 weeks to allow larvae to emerge and pupate. The vermiculite was sifted and isolated pupae and fruit were counted in order to determine infestation rates. Rhagoletis-like pupae were found at two sites (Meijer and Farm Lane Bridge). While we observed a very low infestation rate at the Meijer site (0.15%), we found a surprisingly high rate of R. juniperina infestation at Farm Lane Bridge (26.4% on 10/6/10). To establish the identity of the pupae collected from the Farm Lane Bridge site, DNA was isolated from four pupae and the mitochondrial COII gene amplified using PCR. DNA sequences were obtained from these four pupae and all four yielded sequences that were > 99% identical to the R. juniperina sequence (U53243) present in GenBank.

MITIGATING STEERS DIETS TO REDUCE GREENHOUSE GAS EMISSIONS IN CONFINED SYSTEM

Natalie Palumbo

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1607

Mentor(s): Wendy Powers (Animal Science)

Nitrous oxide (N2O) and ammonia (NH3) emissions are directly affected by the amount of nitrogen (N) available in the diet. Our hypothesis is that a reduction in the amount of N available will result in decrease of N2O emissions and NH3. The objective was to determine the effect of dietary crude protein levels on N2O and NH3 emissions from cattle housed in confined settings. Twelve 900-lb Holstein-cross steers were fed one of two diets (low or high crude protein (CP); 6 replications per diet) for a period of 14 d. The steers were housed in environmental chambers at the Animal Air Quality Research Facility allowing for continuous emission measures of N2O and NH3. Emissions were measured for at least a two to three week period. Diets were fed for a 10 to 14-d period prior to the measurement period to allow for diet acclimation. Daily body weight (BW) gain was affected by the CP level of the diet; however we did not see effect of the diet over daily dry matter intake. It was verified that an increase in N available amount in the diet increases NH3 emissions, although it does not affect N2O emissions. Management of diet crude protein levels of confined cattle can be a mitigation option for NH3 emissions. Further research is needed to identify an efficient management practice for N2O emissions reduction.

ANTILISTERAL PROPERTIES OF WHEY PROTEIN BASED EDIBLE FILMS CONTAINING LIQUID SMOKE

Allen McGee

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1674

Mentor(s): Zeynep Ustunol (Food Science & Human Nutrition)

Since the 1990s the safety of imported collagen has been a concern due to bovine spongiform encephalopathy or mad cow disease, as a result whey protein based films has been proposed as an alternate to collagen films. Due to consumer demands in ready-to eat foods a renewed interest in edible films has risen. A large number of food recalls in the United States result from post processing contamination such as packaging. Majority of these recalls in meats are promoted by contamination with Listeria monocytogenes. Edible films can serve as carriers for antimicrobials which can reduce microbial growth, improve product safety and extend shelf life. Liquid smoke have been shown to have some antimicrobial and antioxidant activity, as well as adding color and flavor to products. The objective of this research was to determine if whey protein based edible films can be used as a carrier for liquid smoke used in meat processing, and investigate the effect of liquid smoke on the inhibition of Listeria monocytogenes. Data will be presented from several different liquid smoke varieties available to the meat industry.

DIFFERENTIAL ATTRACTION OF MALE AND FEMALE EMERALD ASH BORER TO TRAP COLOR

Rachel Posavetz

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1677

Mentor(s): Deborah McCullough (Forestry, Entomology)

The prevalence of invasive species in the United States devastates countless critical habitats and has been known to inflict heavy research and restorative costs on governments. In the United States, a comprehensive research effort has been aiming to understand and control the spread of *A. planipennis* Fairmaire, the Emerald Ash Borer, which has destroyed ash trees throughout the Midwest and Canada. Current research on trapping *A. planipennis* has provided evidence for divergence in trap color preference between the sexes. My research involves analysis of *A. planipennis* sex ratios throughout the season with respect to trap color preference and population density across field sites. I hope to provide strong statistical evidence for trap color preference based on sex, as well as evidence for seasonal sex ratio and density changes across my target sites in Lower Michigan. Results of this work would provide insight into the development of more efficient traps to draw in and capture *A. planipennis* from infested areas. Such information is crucial for not only strengthening restoration efforts of our forests, but also preventing the spread of this invasive species into uninfected territories.

GALACTO-OLIGOSACCHARIDES MODULATED NATURAL KILLER CELL POPULATIONS AND ACTIVITY AND REDUCES THE SEVERITY OF COLITIS IN SMAD3 DEFICIENT MICE

Anita Gopalakrishnan

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Agriculture and Animal Science, Poster, 1684

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

Inflammatory bowel disease (IBD) is an important risk factor for colon cancer. Gut microbiota play an essential role in stimulating intestinal immunity. Prebiotics, including galactooligosaccharides (GOS), are fermentable fibers that beneficially affect the host by stimulating the growth of specific microbial populations and inhibiting the growth of pathogenic bacteria. We investigated the effect of GOS supplementation on colitis development and immune parameters in SMAD3 deficient mice treated with the pathogen, H. hepaticus. Mice were supplemented daily with 5000 mg GOS/kg body weight 2 wks prior to infection and 4 wks post-infection, a time period where colitis severity peaks. Mice were sacrificed pre-infection and at 3, 7, and 28 days post-infection to evaluate immune parameters in the Spleen, Peyer's patches, and mesenteric lymph nodes by flow cytometry. Colon and cecum samples were collected for histopathology. Fecal samples were collected prior to infection to measure relative changes in bifidobacteria and lactobaccilli by semi-quantitative Real-Time PCR and mucosal secretion of IgA via ELISA. Total bifidobacteria increased 2-fold in GOS-supplemented compared to control mice. GOS supplementation significantly reduced colitis compared to control. GOS enhances NK cell number and activity pre and post-infection compared to control mice. In addition, pre-infection, GOS increased natural killer activation as measured by 1) NKp46 induced proliferation; 2) gamma interferon stimulation and 3) granzyme B release compared to no GOS controls. These data suggest that GOS supplementation reduces colitis and modulates NK cells and may provide a novel therapeutic strategy for individuals at risk for colitis or colon cancer.

Biochemistry and Molecular Biology

Poster Presentations

THE FACTOR X MEDIATED MODULATION OF PSEUDO RESPONSE REGULATOR 7 (PRR7) AND ITS ROLE IN ARABIDOPSIS CIRCADIAN RHYTHM
Tomomi Takeuchi
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1349
Mentor(s): Eva Farre (Plant Biology)
The circadian clock is a significant component to many organisms because it enables them to anticipate daily and seasonal environmental changes. The previous findings indicate that the TIMING OF CAB homologues, the PSEUDO RESPONSE REGULATOR 9 (PRR9) and PRR7 proteins play a roll in transcriptional regulatory loops with the core clock components CIRCADIAN CLOCK ASSOCIATE and LATE ELONGATED HYPOCOTYL. The aim of this project is to identify the regulators involved in PRR7 stability using Arabidopsis lines expressing a PRR7-Luciferase translational fusion. These lines were mutagenized and screened for changes in PRR7 levels. Two types of mutations were induced: an activation tag by the insertion of the 35S enhancer and point mutations using ethyl methanesulfonate. M2s and T1s were selected based on short hypocotyl length and basta resistance respectively. The luminescence levels of these plants were measured after treatment with luciferin using a luminometer. T1 seedlings with lower luminescence and M2s with higher luminescence as compared to the average were then selected and transferred to soil. A total of about 2265 T1s and 4128 M2s were screened. Of these, 80 T1s and 48 M2s were selected. The RNA and protein expression levels of T2s and M3s were then analyzed by qPCR and Western blot respectively. The subsequent analyses of luminescence, RNA and protein levels of T2s and M3s confirmed the change in PRR7 stability. The selected mutants are likely to point to the regulators involved in PRR7 stability.

FRUA AND GENE CASCADES IN MYXOCOCCUS XANTHUS- A FIRST LOOK
Ben Labbe
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1387
Mentor(s): Lee Kroos (Biochemistry and Molecular Biology)
Myxococcus xanthus is a rod shaped soil bacterium that forms protected spores under starvation conditions. The Kroos lab studies the signalling pathways that lead to the formation of spores. Two major proteins are responsible for the beginning of the sporulation process, MrpC and FruA. My research this year has been focused on FruA, identifying sequestration using GFP(green fluorescent protein)-tags and identifying proteins that it binds using histidine tags. By finding where FruA is localized in the cell and the proteins it interacts with, we will be able to better understand how M. xanthus decides that it is the right time to sporulate.

THE EFFECT OF DEV PROMOTER REGION MUTATIONS ON FRUA AND MRPC2 BINDING
Ashleigh Campbell
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1392
Mentor(s): Lee Kroos (Biochemistry and Molecular Biology)
Myxococcus xanthus is a rod-shaped, gram-negative bacterium which is used as a model to study development. Under starvation conditions, M. xanthus cells aggregate together to form fruiting bodies. During the formation of fruiting bodies, dense ridges of cells move in traveling waves that grow and shrink over several hours. An extracellular signal known as the C-signal coordinates the processes of aggregation and sporulation. Two central proteins in this pathway are the DNA-binding response regulator FruA and MrpC. FruA and a cleaved form of MrpC called MrpC2 are transcription factors known to bind upstream of the dev promoter, which governs expression of several genes important for sporulation. Currently I am investigating the role of the dev operon in development by creating mutations upstream of the promoter and measuring the lacZ expression. It was hypothesized that any mutations made in a region (-75 to -40) would disrupt the cooperative binding of FruA and MrpC2, leading to a loss of promoter activity. Currently seven mutations have been made in the -75 to -40 region and promoter activity has been severely diminished in several of the mutant strains, providing evidence that MrpC binding is required for dev promoter activity in vivo. In addition, three 5' deletions in the dev upstream region have been constructed to test the hypothesis that another MrpC binding site in this region is a positive regulatory element.

ASMASE ACTIVITY AS A POSSIBLE INDICATOR OF CELLULAR MEMORY IN HRVE CELLS
Matthew Faber
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1450
Mentor(s): Julia Busik (Physiology)
Diabetic retinopathy is a complication associated with diabetes, a disease that afflicts approximately 7 % of the population of the United States. Diabetic retinopathy leads to visual impairment and blindness. Vascular dysfunction is central in the pathology of diabetic retinopathy. Human retinal vascular endothelial (hRVE) cells composing the vasculature of the retina are the focus of this study. An increase in pro-inflammatory cytokine levels is associated with an increased rate of endothelial cell death. Previous studies have linked increased expression of pro-inflammatory cytokines with increased acid sphingomyelinase (ASMase) activity in hRVEs. ASMase is an enzyme responsible for the conversion of sphingomyelin to ceramide. Both of these lipids play a role in membrane dynamics and cytokine signaling. ASMase activity was compared in non-diabetic vs diabetic donors. Treatment of hRVE cells with insulin increased the ASMase activity in the cells from diabetic and non-diabetic donors; treatment with IGF-1 decreased the ASMase activity in non-diabetic donor cells and increased ASMase activity in diabetic donor cells. RT-PCR results indicated no significant changes in mRNA expression between diabetic and non-diabetic donor cells indicating that differences exist outside the level of gene transcription. Increased basal level ASMase activity persisted in cells from diabetic donors even after being

cultured in medium containing normal glucose levels for numerous passages. These findings indicate that diabetes induces epigenetic changes in hRVE cells that impose a cellular "memory". Our studies indicate that pharmacologically reducing ASMase activity in hRVE cells may improve the outcomes of diabetic retinopathy.

MELANIN PRODUCTION AND PLANT THERMOTOLERANCE
Halli Gutting
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1493
Mentor(s): Mary Hausbeck (Plant Pathology)
The three way symbiosis is constructed of a fungus inhabiting a plant while a virus is within the fungus, and all three components are needed in order to provide a plant with thermotolerance. Once it was discovered that the fungus Curvularia protuberate along with the Curvularia Thermal Tolerance Virus relationship was crucial to the plant's survival under stressful conditions, it led to questions of how the fungus and virus were providing tolerance. The objective of this research was to investigate if melanin production within the fungus/virus was providing thermotolerance to tomato plants, as previous studies have indicated the possibility of melanin production within the fungus/virus and melanin has been proven to provide many species with tolerance to a variety of stresses. It first needed to be determined if the CThTV virus, the fungus, or if the fungus with CThTV was producing melanin under heated conditions. Visual and quantitative measurements were taken daily while incubating the cultures at 40oC, finding no substantial differences between the strains. Next tested was melanin providing tomato plants with thermotolerance by overexpressing the Scytalone dehydratase gene in C. protuberate. This process began with cloning the SCD gene into a fungal vector, then transforming it into a virus-free fungus and performing thermotolerance assays with the fungi overexpressing SCD.

POTENTIAL INVOLVEMENT OF POSTTRANSLATIONAL AND POSTTRANSCRIPTIONAL REGULATION OF CBF IN COLD ACCLIMATION
Lisa Pinkava
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1567
Mentor(s): Sunchung Park (MSU-DOE Plant Research Lab), Michael Thomashow (MSU-DOE Plant Research Lab)
Freezing tolerance in many plants is shown to increase after exposure to low non-freezing temperatures, a process called cold acclimation. Our lab showed that CBF 1, 2 and 3 transcription factors play a crucial role in cold acclimation of Arabidopsis. In response to cold, CBF transcripts levels rapidly peak after 2h in the cold while their target genes peak 12-24 hours later. Even though CBF transcripts quickly diminish after their peak, their target genes transcript levels remain relatively high even 7 days later. Since CBF proteins control the target gene expression, this result suggests the possibility of posttranslational regulation of CBF proteins in the cold, a process which is not understood well in Arabidopsis. To understand potential roles of posttranslational regulation, transgenic plants with the CBF genes fused to a MYC or GUS tag under control of its endogenous promoter were generated. Interestingly, the CBF2-GUS line had high levels of transcripts at warm temperatures whereas the CBF2-MYC line behaves similarly to that of native CBF2 transcripts levels. Since both transgenes have the same promoter, posttranslational regulation of CBF mRNA may play a role in CBF cold induction. Preliminary data has shown under cold treatment CBF2-GUS protein level peaks at 24h, while CBF2-GUS transcript levels peak at 3h. This result also suggests posttranslational regulation of CBF mRNA in the cold, which could be appropriately tested by CBF-MYC protein expression since CBF-MYC mRNA behaves more like native CBF. Finding an effective MYC antibody for CBF-MYC protein experiments are still under way.

GENETIC RELATIONSHIPS BETWEEN TRIACYLGLYCEROL LIPASE DELETION AND OTHER LONGEVITY PATHWAYS
Pan Li
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1572
Mentor(s): Min-Hao Kuo (Biochemistry and Molecular Biology), Xiaobo Li (Biochemistry and Molecular Biology)
The Baker's yeast Saccharomyces cerevisiae is used as a model system for aging study. Yeast chronologically ages by losing the ability of division. During the last decade, several mutants with genes deleted have been reported to live longer than wild-type yeast. Among those genes is the famous SCH9, which encodes a kinase. Recently, our group found the mutant disrupted in the triacylglycerol lipase TGL3 lives four times longer than wild-type. This triggers us to study the genetic relationship between this pathway and the pathways reported. sch9Δ and tgl3Δsch9Δ were created by homologous recombination with our lab strain. sch9Δ exhibits a longer life-span as reported before. Compared with sch9Δ, tgl3Δ is slightly longer-lived. The double mutant tgl3Δsch9Δ, however, exhibits a life span not only shorter than either of the single mutants, but also shorter than wild-type. Thus, SCH9 deletion and TGL3 deletion are not independent, nor are they on the same pathway. The mechanism will be discussed in details in the poster. More deletion mutants will be created to study the genetic relationships between tgl3Δ and other longevity mutations. Besides the study of genetic interactions, we are interested in whether the longevity in tgl3Δ is caused by the increasing triacylglycerol or fat content. The triacylglycerol synthesis gene DGA1 was cloned into a yeast vector and expressed under the control of a constitutive promoter. Fat contents and life spans will be analyzed for the over-expression strain versus the empty vector control.

IMIDAZOLINES/QUINOLINES AND THEIR THERAPEUTIC ACTIVITIES; A SUMMER OF RESEARCH
Jake Claes
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1573
Mentor(s): Jetze Tepe (Chemistry)
A main focus was the synthesis of novel imidazolines in contribution of the Structure Activity Relationship (SAR) study of the lead imidazoline by altering functional groups at particular carbons to improve water solubility and NFKB pathway inhibition. NFKB is a mutated target protein pathways in many cancers and inhibition will force the cell in cell cycle arrest. Testing for NFKB inhibition of synthesized imidazolines and imidazolines synthesized by graduate student leading the project and another undergraduate student. NFKB activity was assessed by HeLa luciferase reporter assay. In addition to testing imidazolines, Chk2 inhibitors and Dr. Odom's novel quinoline compounds were assayed. The quinolines showed activity in the reporter assays therefore activity was confirmed with cell death assays and quenching assays. Western Blots

using THP1 cells is underway will hopefully show the quinoline's target protein. This had lead to my research to an SAR study of these novel compounds using 3 component coupled Titanium catalyzed synthesizes.

EXPRESSION AND PURIFICATION OF AN ECTODOMAIN CONSTRUCT OF HIV-1 GP41
Kaitlin Young
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1578
Mentor(s): David Weliky (Chemistry)
The gp41 protein is found on the surface of Human immunodeficiency virus (HIV) and aids in entry of the virus into a host cell. Fgp41 refers to fusion peptide and a portion of the ectodomain of the protein and has been previously characterized through NMR studies. The cDNA for Fgp41 fragment 2 (Fgp41f2), containing the fusion peptide and the entire ectodomain, was obtained from human patients and inserted into a vector for E.coli expression. Two rare E.coli codons were observed in the DNA sequence and were mutated individually using polymerase chain reaction (PCR). The mutation were confirmed by DNA sequencing. The DNA was transformed into BL21(de3) E.coli cells. Next, the resulting transcribed protein will be purified by sonification, centrifugation, and immobilized metal ion affinity chromatography (IMIAC) with cobalt. The purification protocol for this protein construct is currently under development. The purified protein will be used to assay activity of this larger construct and study the structure in association with lipid membranes.

IS FAT BAD?
Hao Nguyen
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1596
Mentor(s): Min-Hao Kuo (Biochemistry and Molecular Biology), Xiaobo Li (Biochemistry and Molecular Biology)
Triacylglycerol or fat is the universal storage lipid for animals, fungi, plants and prokaryotes. In human beings, obesity is often correlated with the appearance of diabetes and cardiovascular diseases. The theory behind is that fat enters and clogs the circulation system. An unsolved question, however, is whether intracellular fat is harmful to the cell. To answer this question, we deleted the triacylglycerol lipase TGL3 to create an obese yeast strain with higher cellular fat content. Surprisingly, this mutant strain lives longer than wild-type in terms of chronological aging defined by loss of viability. To find out whether the increasing fat is causing the longevity, mutant deleted in triacylglycerol synthesis genes dga1Δlro1Δ and the triple mutant dga1Δlro1 Δtgl3Δ have been constructed. The former one is abolished in triacylglycerol synthesis and dies earlier than wild-type, supporting the role of fat in extending life span. The triple mutant is currently under analysis. This research will shed light on how intracellular fat affect cell health and provide a new perspective on the treatment of certain human diseases.

CHRONOLOGICAL LIFE SPAN OF YEAST DEFICIENT IN TRIACYLGLYCEROL BIOSYNTHESIS
Hao Nguyen
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1597
Mentor(s): Min-Hao Kuo (Biochemistry and Molecular Biology), Xiaobo Li (Biochemistry and Molecular Biology)
The construction of the yeast strain is made by deleting the two triacylglycerol biosynthesis genes DGA1 and LRO1. DGA1 and LRO1 deletion was done by PCR where the primers used for gene replication have a homologous ends similar to DGA1 or LRO1. DGA1 was deleted and replace with Kanmx, an antibiotic resistence gene to G-418. LRO1 was deleted and replace with URA3 gene. These new genes were transformed into yeast during heat shock and plated on YPD. The insertion and deletion was later confirmed with genomic PCR. After the confirmation, the yeast was place in a test tube with YPD and test for their viability. What we are aiming for from studying yeast is to see if triacylglycerol plays an affect in how cells age and relate this to how humans age. We hope to prove that triacylglycerol does play a role in allowing our cells to be healthier.

POSITIVELY CHARGED AMINO ACID MOTIFS CRUCIAL TO ARABIDOPSIS JAZ3 FUNCTION AND JASMONIC ACID SIGNALING
Nathan Johnson
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Biochemistry and Molecular Biology, Poster, 1651
Mentor(s): Sheng-Yang He (Plant Research Laboratory), John Withers (Plant Research Laboratory)
Jasmonic Acid (JA) is a plant hormone involved in growth, development, and defense against pathogens and herbivores. Several pathovars of the bacterial plant pathogen Pseudomonas syringae modulate host susceptibility by producing the compound coronatine, a structural mimic of the active form of JA, Jasmonoyl-L-Isoleucine (JA-Ile). Coronatine catalyzes the binding of JAZ-family transcriptional repressor proteins to COI1, leading to degradation via the 26s proteasome and induction of JA-response genes, aiding in the pathogenicity of P. syringae. JAZ proteins interact with AtMYC2, leading to the repression of JA-response genes. This study focuses on JAZ-family structure-function, analyzing particular positively charged amino acid residues within the C-terminal Jas-domain of JAZ3, the domain responsible for binding with these proteins. Two Jas-domain motifs, RK 305-306 and KRK 315-317, were mutagenized, replacing varying combinations of one to three acids in a motif with alanine, a small and uncharged side-chain. Yeast Two-Hybrid (Y2H) assays were used to determine the effect of Jas-domain mutations on interactions between JAZ3 and COI1 or MYC2. All mutations that included R316A disrupted the interaction with AtMYC2. The JAZ3-COI1 interaction was disrupted by mutations including R305A, K315A or K317A, demonstrating the importance of both motifs for interaction with COI1. In addition, transgenic A. thaliana over-expressing the wild type and mutant forms of YFP:JAZ3 were generated and confocal microscopy used to analyze sub-cellular localization. Mutant variants showing coronatine insensitivity could prove important for the formation of pathogen resistant plants.

CONSCIOUS SEROTONIN

Anthony Lack

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Biochemistry and Molecular Biology, Poster, 1675

Mentor(s): Susan Barman (Neuroscience, Pharmacology)

Modern biochemical and molecular neuroscience in conjunction with network theory proposes a model of consciousness based on fluidly recruited ensembles of neurons stereotyped by complexity. Neuronal pools are selected by diffuse modulatory systems (adrenergic, serotonergic, cholinergic, etc.) based on the concentration of neurotransmitters released from pre synaptic terminals. Also dependant on levels of transmitters is the deterministic behavior of the assembled neuronal aggregate, i.e. EEG recorded frequencies such as alpha, theta, and gamma, which are manifested from the probabilistic behavior of individual neurons. Lysergic Acid Diethylamide is a partial agonist primarily active at 5HT-2A receptors and one of the most potent consciousness modifiers known to man. LSD is also very safe and non toxic making it a uniquely well suited molecule for the controlled study of altering brain dynamics. A large array of biochemical, molecular, and electrophysiological changes have been recorded post administration of LSD. An example of molecular behavior is the induction activity at 5HT-2A within 5HT-2A/mGlur2 heterodimeric complexes similarly found in schizophrenics. An electrophysiological example is the decrease of alpha wave power which is of interest due to the correlation between increased alpha power and increased ability to gate external stimuli. This research seeks to provide a framework for the exploration of consciousness via the serotonergic systems of the brain by showing how modified biochemistry translates into new behavior at the molecular, cellular, and global level in the brain.

Cell Biology, Genetics, and Genomics

Oral Presentations

NANOWIRE FORCE MEASUREMENTS OF GROWTH CONE ACTIVITY
Andrew George
Location: Parlor B, 1:00 PM
Category: Cell Biology, Genetics, and Genomics, Oral
Mentor(s): Kyle Miller (Zoology)
There are two models currently under consideration for the mode of axonal elongation, the tip growth model and the stretch and intercalation model. The stretch and intercalation model is based on the observed force generation by the growth cone, a specialized region at the distal portion of a growing neuron. Studies examining this phenomenon, however, have only measured tension and forces throughout the entire axon as opposed to within the growth cone itself or at individual points along the axon. Techniques to measure subcellular forces are currently lacking. Here we develop a technique to measure subcellular forces by growing Drosophila melanogaster neurons on gallium-phosphide nanowires. We report physiologically relevant force measurements which coincide with previous estimations. This technique can be used to more directly measure forces associated with the stretch and intercalation model.

THE ROLE OF DNA-PKcs IN DOUBLE-STRAND BREAK REPAIR PATHWAY CHOICE
Jessica Rice
Location: Parlor B, 1:15 PM
Category: Cell Biology, Genetics, and Genomics, Oral
Mentor(s): Katheryn Meek (Microbiology and Molecular Genetics)
DNA double strand breaks are extremely harmful DNA lesions that are repaired by at least two main pathways, called homologous recombination (HR) and nonhomologous end joining (NHEJ). The DNA-dependent protein kinase (DNA-PK) is a large serine/threonine kinase that is critical for the non-homologous end joining pathway. DNA-PK is an extremely abundant protein, as a result direct competition between HR and NHEJ is not likely, as NHEJ would, without fail, win. Thus, there must be some method by which the cell inhibits NHEJ or allows HR. Phosphorylation is a method in which both eukaryotic and prokaryotic cells regulate protein function, which can be activated or deactivated by a conformational change elicited by the addition or removal of a phosphate molecule on specific sites within the protein. Previous studies revealed numerous functionally important autophosphorylation sites in DNA-PK, one specific cluster of sites is called PQR. Another site of interest is the catalytically imperative lysine at amino acid 3752. Previous studies have indicated that a phospho-blocking mutant at the PQR sites increases HR. Thus, it would follow that phospho-mimicking mutants of these sites might decrease HR. In this study, the effect of phospho-mimicking at the PQR site and its affect on HR will be examined. In addition to a phospho-mimicking mutation at PQR, the effect of the kinase inactivating lysine mutation will also be analyzed in combination with the phospho-mimicking mutation.

CHARACTERIZATION OF HYDROGEN METABOLISM IN VOLVOX CARTERI FOR POTENTIAL BIOTECHNOLOGICAL APPLICATION
Robin Green
Location: Parlor B, 1:30 PM
Category: Cell Biology, Genetics, and Genomics, Oral
Mentor(s): Eric Hegg (Biochemistry and Molecular Biology)
As the human population continues to expand, there is an increasing demand for energy. Rapidly depleting sources of fossil fuels and natural gas has sparked an interest in investigating potential sources of alternative energy. An exciting field of research involves the investigation of microbial pathways resulting in the production of hydrogen gas. Many microbes have been shown to contain enzymes, called [FeFe]-hydrogenases, capable of producing hydrogen from the reduction of protons. If these hydrogenases and their role in an organism are better understood, then that organism could have the potential to be used a source for commercial hydrogen gas production. Currently I am investigating Volvox carteri, a multicellular chlorophyte alga closely related to Chlamydomonas reinhardtii. C. reinhardtii has been demonstrated to have hydrogen metabolism and analysis of the V. carteri genome has shown two genes that have sequence homology to the two hydrogenases found in C. reinhardtii. Preliminary in vivo hydrogen assays have shown hydrogen metabolism in V. carteri, which could indicate that these two genes encode [FeFe]-hydrogenases. Current data of purified enzyme seems to indicate the two homologs posses hydrogenase activity. Further studies investigating the differential expression of hydrogenase genes as well as localization to specific cellular organelles is currently being done. Collected data suggest possible diverse expression and activity of hydrogenase genes not seen before in green algae. This project has the potential to provide a better understanding of hydrogenase function in diverse green algae for possible biotechnological applications.

IDENTIFICATION OF F2853S MUTATION OF PKD IN S9 CELLS USING SITE-SPECIFIC PRIMERS IN PCR AND GEL ELECTROPHORESIS
Joy Burrell
Location: Parlor B, 1:45 PM
Category: Cell Biology, Genetics, and Genomics, Oral
Mentor(s): Douglas Luckie (Lyman Briggs/Physiology)
Autosomal dominant polycystic kidney disease (ADPKD) is an inherited disease that causes multiple fluid-filled kidney cysts ultimately leading to renal failure. This disease is associated with at least 200 mutations in the PKD-1 and PKD-2 genes on chromosome 16. These mutations affect the polycystin-1 and polycystin-2 proteins which function in regulating cell growth and proliferation. The F2853S mutation is a point mutation on Exon 23 of PKD-1 and affects Polycystin-1. A diagnostic assay for this mutation was designed using allele-specific primers in PCR to determine if DNA contained the F2853S mutation. The hypothesis was that the primers would bind only to the targeted region of the PKD-1 gene because two mismatches between the primers and non-target DNA decreases non-specific binding. Site-directed mutagenesis was used to insert the F2853S mutation into wild-type DNA from S9 cells. Two forward primers, one reverse primer and one control primer were designed.

These allele-specific primers were designed to amplify products that could detect whether the DNA contained the mutation. The two forward primers were designed using the Yaku method to bind to either mutant or wild-type DNA. Agarose gel electrophoresis was used to analyze the PCR product. The target mutant and wildtype DNA were predicted to have bands at 922 base pairs when correctly paired with their primer. A control primer was predicted to amplify fragments of 500 base pairs.

A TRI-PRIMER ASPCR OF ACHODROPLASTIC DNA IN HOMO SAPIENS TO DETECT THE COMMON FGFR3 G380A MUTATION
Laura Collins
Location: Parlor B, 2:00 PM
Category: Cell Biology, Genetics, and Genomics, Oral
Mentor(s): Douglas Luckie (Lyman Briggs)
About 1 in15,000 births result in achondroplasia (ACH), the most common form of dwarfism. The disease occurs as the result of a G380R mutation of the FGFR3 gene which affects the transmembrane protein FGFR3, or fibroblast growth factor receptor 3, that regulates ossification. About 98% of achondroplastics genotypically exhibit a G-A point mutation at the 1138th nucleotide at codon 380 of the FGFR3 gene, resulting in the amino acid substitution of glycine with arginine. The purpose of this study is to test the efficacy of using primers containing a C-A intentional mismatch at the third most 3' base pair to detect the ACH point mutation by allele-specific PCR. A tri-primer design created using the Yaku method is predicted to amplify and detect the FGFR3 gene's G380A point mutation in achondroplasia DNA. The intentional mismatch in the primers will prevent non-complementary binding that could occur with the single mutation. We predicted a band at 322 base pairs would be produced by primer amplification of complementary DNA because this distance has presented positive results in previous studies.

DIABETIC BONE MARROW NEUROPATHY OR SURGICAL BONE MARROW DENERVATION LEAD TO THE DIMINISHED RETINAL VASCULAR REPAIR AND DIABETIC RETINOPATHY
Priyanka Pandey
Location: Parlor B, 2:15 PM
Category: Cell Biology, Genetics, and Genomics, Oral
Mentor(s): Julia Busik (Physiology)
The diabetic metabolic insult leading to retinal vascular degeneration is proposed to involve the well-described initial endothelial cell damage due to low-grade chronic inflammation; that is then inadequately repaired due to compromised availability and functionality of bone marrow derived endothelial progenitor cells (EPCs). Migration to the site by these circulating bone marrow-derived EPCs participates in the retinal vascular repair process. The purpose of this study was to test the hypothesis that surgical bone marrow denervation without diabetes would contribute to ischemic retinal vascular damage.The femoral nerves of Male Sprague-Dawley were sectioned close to their exit from the spinal cord as described earlier. Sham surgery was performed on a control group. Retinal ischemia-reperfusion (I/R) was used as an accelerated model of non-proliferative diabetic retinopathy. Retinal vascular permeability was measured 48 hours after I/R. Leaky endothelial junctions associated with endothelial cells death and inability to replace the cells in diabetes. Vascular permeability increase in the retina is a well-documented parameter of vascular damage in DR 32-37 and it has been shown to be increased after only one week of diabetes 31,35,38. We did not find any difference in retinal vascular permeability between rats with denervated bone marrow and control rats. However, when bone marrow denervation was coupled with retinal ischemia, we observed significant increase of vascular permeability in animals that underwent surgical denervation as compared to controls. These data support the hypothesis that bone marrow neuropathy could play an important role in the diminished repair of retinal blood vessel damage.

Poster Presentations

DIAGNOSIS OF DUCHENNE MUSCULAR DYSTROPHY USING PCR TO ISOLATE THE 45TH EXON OF THE DMD GENE
Kaitlyn Buhlinger, Steve Muresan, Andrea Parker, Jose Zamora-Sifuentes
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--1, Poster, 1498
Mentor(s): Douglas Luckie (Biological Sciences)
In the dystrophin (DMD) gene, located on Xp21.2, large deletions account for 60% of all Duchenne muscular dystrophy cases. Deletions typically occur around non-random hotspots in the gene sequence. The mutation used in our experiment involved complete deletion of the 45th exon. To isolate and amplify this particular segment of DNA, we designed primers within the adjacent introns to surround the deleted exon. Polymerase chain reaction and gel electrophoresis were performed to diagnose the disease. We hypothesize that with appropriate annealing conditions, we will be able to correctly identify a deletion in the 45th exon of DMD, and diagnose Duchenne muscular dystrophy. We predict that our methods of testing for the deletion will allow us to see the mutation further down on the electrophoresis gel, because there should be a difference in base pair length of the diseased DNA and our control, a healthy DNA strand. Understanding the socio-psychological influence a disorder like DMD has on a patient is an essential element to fully comprehending a disease. We will take on a 30-day challenge in which we experience some of what the disease entails. This data will enhance our perception of the effects the disease has on patients and their families, and help us understand the impact our research could have on their lives.

THE ROLE OF ESP IN TYPE 1 DIABETES INDUCED BONE LOSS
Alyssa Fedorko
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--1, Poster, 1552
Mentor(s): Laura McCabe (Physiology)
Type 1 (T1) diabetes is characterized by hyperglycemia and little to no insulin production. This disease affects about 1 million people in the US. A complication of T1-diabetes is bone loss, which is due to decreased bone formation by osteoblasts. Mature osteoblasts secrete a protein called osteocalcin. Osteocalcin is deposited onto bone mineral but also circulates in the blood and can influence insulin secretion. ESP, a

receptor-like protein tyrosine phosphatase, regulates osteocalcin function. ESP induced γ-carboxylation of osteocalcin increases its binding to bone mineral and decreases its effects on the pancreas. Little is known about what regulates ESP expression and if its expression is altered in metabolic diseases such as T1-diabetes. Our study is the first to address this. ESP RNA levels were measured in cultured osteoblasts and in mice with diabetes. ESP was significantly decreased (by 43%) in the bones of T1-diabetic mice compared to controls. Similarly, in osteoblasts cultured with glucose (to simulate diabetes conditions) or mannitol (an osmotic control), ESP expression was significantly decreased (by 30% and 27% respectively), suggesting that the hyperosmolar environment produced by the diabetic hyperglycemic may contribute to the regulation of ESP. Interestingly, co-culture of diabetic bone marrow and osteoblasts also leads to suppressed ESP levels, a result that is prevented by the addition of anti-TNFα; this suggests that TNFα also participates in ESP regulation. In summary, my data suggests that T1-diabetes associated hyperglycemia/hyperosmotic stress and inflammation contribute to the suppression of ESP expression in osteoblasts which could influence bone and body metabolism.

DETECTION OF MUSCLE SATELLITE CELL ACTIVATION IN VIVO USING MR MICROIMAGING
Thereseann Huprikar, Natasha Ahmed, Kenneth Less, Jessica Wummel
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--1, Poster, 1589
Mentor(s): Robert Wiseman (Physiology/Radiology)
Skeletal muscle growth and repair from acute injuries such as eccentric exercise, blunt trauma and tears involves a necessary cascade of physiologic processes that eventually result in the activation of nascent myonuclei (satellite cells) to proliferate and differentiate. These cells can either form new myofibers or fuse to the damaged fibers to repair them (Charge and Rudnicki, 2004). Skeletal muscle repair mechanisms and their time course can be affected by many diseases including Duchenne muscular dystrophy (Walter et al., 2005) and type II diabetes (Hu et al., 2010). This study will evaluate muscle repair using MR microimaging techniques to evaluate normal skeletal muscle regeneration in mice. Bupivacaine will be injected into the tibialis anterior (TA) muscle of the hindlimb, and saline will be injected into the contralateral TA as a control. MicroMRI will be used to detect the proliferation of satellite cells, and track their incorporation in vivo using a 9.4T vertical bore instrument and spin echo sequences. Histological analysis of the muscles will be used to confirm the findings of the MRI. Future experiments will be performed to evaluate this time course in mice with metabolic disorders such as diabetes.

IDENTIFICATION OF THE HAEMOCHROMATOSIS PROMOTING C282Y MUTATION USING ALLELE SPECIFIC PRIMERS ON HUMAN DNA
Jordon Van De Velde
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--1, Poster, 1616
Mentor(s): Douglas Luckie (Biology)
Haemochromatosis is an autosomal recessive blood disorder that is promoted by the presence of the C282Y mutation. The mutation itself is the direct result of a base pair mismatch, later translating its corresponding codon into a defective HFE protein. This accelerates the intake of iron into cells, producing an overwhelming amount of iron in the body. (Neghina, 2010) The disease can cause many health related issues including chronic fatigue, arthritis, cirrhosis of the liver, diabetes, and heart related conditions. We hypothesized that by using allele specific primers along with the proper annealing temperatures and salt concentration, we would accurately and efficiently be able to use PCR to detect the presence of the point mutation, C282Y, given any sample of human DNA. The PCR and gel electrophoresis assay were performed using both wild-type and mutant C282Y+ DNA. Five distinct primers were used, including two Yaku-Bonczyk to increase specificity. The results showed that we were successfully able to amplify a 436-bp sequence with or without the C282Y mutation based on which primers were used. (Smillie, 1997) In addition to this research, a member of our research group volunteered to experience what it could be like living with haemochromatosis for a week. He started off by donating blood to represent the phlebotomies that a typical patient would have to receive, and then went on a low iron diet to experience both physical and emotional challenges that may occur when living with the disease.

CHARACTERIZATION OF MUTANT ACTINS WITH KNOWN ACTIN BINDING PROTEINS USING A YEAST 2 HYBRID APPROACH
Melissa Sartain
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--1, Poster, 1626
Mentor(s): Meghan Drummond (Microbiology and Molecular Genetics), Karen Friderici (Microbiology and Molecular Genetics)
Mutations in γ-actin are known to cause autosomal dominant non-syndromic sensorineural hearing loss in DFNA20 families. γ-actin interacts with many proteins, however, my lab has identified 5 using a yeast 2-hybrid screen: gamma-actin (ACTG), beta-actin (ACTB), ubiquitin E2i ligase (UBE2I), cofilin-2 (CFL2), and cyclase associated protein 2 (CAP2). I hypothesize that there will a deficiency in the interaction between mutant γ-actins and the identified prey. To test this hypothesis, I have chosen to use a directed yeast 2-hybrid experiment. In this experiment, a bait and prey of interest are co-transformed into yeast and growth is monitored on selective media. If the prey is unable to interact with the mutant bait then the yeast will fail to grow. I generated bait constructs by ligating mutant γ-actin into the pGBKT7 bait vector. We co-transformed mutant bait vectors with the 5 prey proteins previously identified. Growth is measured using nutritional selection. These experiments are currently underway.

CHARACTERIZATION OF PPR27 PROTEIN IN TRYPANOSOMA BRUCEI
Katrina Stephenson
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--1, Poster, 1632
Mentor(s): Donna Koslowsky (Microbiology and Molecular Genetics)
The parasite Trypanosoma brucei, is the eukaryotic protozoan that causes African sleeping sickness, which is spread by the bite of an infected tsetse fly. Sleeping sickness threatens millions of people in 36 countries in sub-Saharan Africa. The people most exposed to the disease are in rural populations dependent on agriculture, fishing, and hunting. Humans are not the sole reservoir for Trypanosomes; they also infect domestic and wild animals, which not only poses a health threat, but a significant economic threat to African countries that rely on agriculture.

What makes Trypanosomes unique is that they possess the ability to regulate their energy metabolism using RNA editing. Editing involves inserting and deleting uridines to the pre-mRNA transcripts in the mitochondria creating the sequence needed for protein translation. The sequence changes are guided by small RNAs called guide RNAs (gRNAs). Very little is known about how the gRNAs and pre-mRNAs are transcribed and processed. A particular protein family, called pentatricopeptide repeat proteins (PPR), are known to regulate polycystronic RNA processing, translocation and stability of transcripts in organelles. In this project, we have identified a PPR protein, PPR27 and have used Western blots to characterize it, in order to understand its role in RNA biology in trypanosomes.

THE ROLE OF ACTIVATOR PROTEIN-1 IN CANCER PROGRESSION
Scott Osinski
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--1, Poster, 1644
Mentor(s): Michele Fluck (Microbiology)
Activator Protein-1(AP-1) is transcription factor that is involved in gene regulation of growth related cellular process. Most importantly AP-1 has been shown to be involved in regulating many proto-oncogenes including those involved in angiogenesis by means of VEGF, cell cycle progression by means of cyclin D1 and metastasis through MMP-1. AP-1 is a desirable target to treat cancer progression because it's involved in so many crucial processes. Our therapeutic strategy is to introduce an oligodeoxyribonucleotide(ODN) into cancerous cells. The ODN contains the specific binding sequence for AP-1, TGA(G/C)TCA, and effectively provides competition for AP-1 with host binding sequences; this will result in greatly reducing the level of these proto-oncogene products. To analyze this mouse tumor cells that have been transformed by the wild type middle T antigen from the murine polyomavirus (Met cells) that over express AP-1 were transfected with the ODN and a plasmid that contains a luciferase reporter under the control of multiple copies of AP-1 binding sequences. The plasmid acts as an analog of host genomic sequences. The more luciferase produced, the higher the concentration of free AP-1 in the cell. To measure this we introduce a substrate that reacts with the luciferase to produce light which we can directly measure. If our theory is supported by these experiments further investigations will be required but ultimately we may be able to treat certain cancers that are highly AP-1 dependent by means of ODN therapy.

THE INTERACTIONS BETWEEN RETINOBLASTOMA PROTEIN AND THE COP9 SIGNALOSOME
Ryan Blower
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--1, Poster, 1683
Mentor(s): David Arnosti (Biochemistry)
The COP9 signalosome is composed of eight subunits (CSN 1-8) and was first identified in Arabidopsis as a repressor of light-induced development. Retinoblastoma family proteins aid in the control of the cell cycle and also in gene regulation during development. Previous research has shown drastic changes in the progression of the cell cycle when COP9 has been knocked-down. This research aims at showing direct interactions between Retinoblastoma family members and the subunits of the COP9 signalosome and how this interactions affects the cell cycle.

MOLECULAR CHARACTERIZATION OF THE TOMATO TRICHOME MUTANT INQUIETA
John McRoberts
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--2, Poster, 1369
Mentor(s): Jin-Ho Kang (Plant Research Labs)
Trichomes are hair-like structures on the aerial surface of many plant species. Trichomes are well characterized for their role as physical and chemical barriers for defense against herbivore attack. Here, we describe the characterization of a monogenic recessive mutant of tomato (Solanum lycoperisicum) called inquieta (ini). All trichome types produced on ini plants show distinct morphological defects, including swelling, bending, and stunted development. Genetic mapping experiments positioned the Ini locus within a 1.5 cM interval on chromosome 11. We used the tomato genome sequence to identify candidate genes in this region that might be responsible for the ini phenotype. One gene (called ARPC2A) in this region was of particular interest because it encodes a protein involved in formation of the actin cytoskeleton. Previous studies with the model plant Arabidopsis thaliana showed that mutations in ARPC2A cause swelling and aberrant development of trichomes, similar to that observed in the tomato ini mutant. Use of ARPC2A as a molecular marker in mapping experiments showed that this gene strictly co-segregates with the target locus in a population of 135 F2 plants. Moreover, reverse transcriptase (RT)-PCR experiments showed that ARPC2A is expressed in wild-type but not in the ini mutant. These results support the hypothesis that altered trichome development in the ini mutant is caused by a defect in ARPC2A and actin cytoskeleton formation.

BONE MINERAL DENSITY, BONE ADIPOSITY, AND DIABETES
Colleen Victor
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--2, Poster, 1384
Mentor(s): Lindsay Coe (Physiology), Laura McCabe (Physiology)
Type I (T1) diabetes is characterized by low insulin and high glucose levels. This is because beta cells in the pancreas that produce insulin are destroyed by the patient's own immune system. Low blood insulin levels lead to increased glucose in the blood. It has been discovered that T1 diabetes is linked to bone loss and osteoporosis. In mice with T1 diabetes, both decreased bone mineral density and increased bone marrow adiposity have been observed. This study addressed whether this correlation is seen in humans. Bone density, marrow adiposity and serum lipid and bone marker levels were measured in 28 participants, 12 as controls and 16 diagnosed with T1 diabetes. SPSS was used for statistical analysis. General parameter measures indicated that diabetic patients have significantly elevated HbA1c levels compared to controls (7.65±1.55 vs. 5.45±0.45), but most other values did not differ between groups. However, Pearson's coefficients identified relationships between variables. The most interesting finding was that bone marrow adiposity positively correlated with serum lipid levels: HDL, cholesterol, LDL, triglycerides, and the ratio between cholesterol and HDL ($r=0.480, 0.429, 0.487, 0.464, p<0.05$). While glycated hemoglobin levels negatively

correlated with femur neck bone mineral density (r= -0.417, p<0.05), we did not observe an association with marrow adiposity. In conclusion, Type 1 diabetes is associated with bone loss but not marrow adiposity in human subjects. Interestingly, marrow adiposity strongly correlates with serum lipid levels.

REGULATION OF IRF6 EXPRESSION BY SEVERAL TRANSCRIPTION FACTORS
Tianli Du
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--2, Poster, 1385
Mentor(s): Brian Schutte (Microbiology and Molecular Genetics)
Interferon regulatory factor 6 (IRF6) is a crucial gene in cranial facial development. Lack of IRF6 is associated with cleft lip and palate disease. The aim of my project is to test whether and how IRF6 expression is regulated by several transcription factors, including cMyc, dHand, Twist, p63, MafB and E47. My hypothesis is that IRF6 can be regulated by these transcription factors, cMyc downregulates IRF6, Twist, dHand, p63, MafB and E47 upregulate IRF6. I have overexpressed and underexpressed some of these genes in Human embryonic kidney epithelial cells (HEK293) respectively by transfecting the cells with plasmids and siRNA. Then I measured the mRNA level of these genes and IRF6 gene by RT-qPCR. I will also perform western blot analysis to verify the consistency between mRNA level and protein level. So far, my results shows decrease of MafB and dHand expression leads to the decrease of IRF6 expression respectively, decrease of p63 and Twist mRNA level leads to the increase of IRF6 expression respectively, and increase of Twist expression leads to increase of IRF6 expression. My conclusion so far is that Twist and p63 downregulates IRF6 expression, dHand and MafB upregulates IRF6 expression.

A SUCCESSFUL PCR ASSAY FOR THE MICROSATELLITE REPEAT STATUS OF THE FMR1 GENE IN HOMO SAIPAN SUSPENDED EPITHELIAL CELLS
Kelsey Leicht
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--2, Poster, 1388
Mentor(s): Douglas Luckie (Lyman Briggs College)
The trinucleotide CGG repeat on the Fragile X mental retardation gene (FMR1) causes the genetic sex-linked disease, Fragile X (Dodds et al, 2009). In order to differentiate between mutant and wild-type DNA, the polymerase chain reaction (PCR) technique was used on human S9 cells. Two primers were created with the same annealing temperatures that would bind to both the mutant and the wild-type DNA templates since the same base pairs of the sequences were used. We hypothesized that the FMR1 gene could be amplified using allele specific primers that anneal to both the wild type and mutated DNA. The amplified products of the wild-type DNA would be shorter fragments than those of the mutated DNA and therefore, when run through gel electrophoresis, the mutant product would show up as a band closer to the well. When PCR products were ran through a 0.8% agarose gel and electrophoresis was performed, there was differentiation between the amplified mutant DNA and the wild-type DNA, as the mutated DNA produced a longer segment due to the additional CGG repeats (Filipovic-Sadic et al, 2010). A 30-day sociological experiment was also run where the participants wore or carried attention-grabbing accessories, such as a helmet or giant stuffed animals. This led to unwanted attention that is relatable to the negative attention Fragile X patients often receive.

HORMONAL CONTROL OF PROGESTERONE RECEPTOR A AND B EXPRESSION IN POSTMENOPAUSAL HUMAN BREAST TISSUE
Kim Nguyen
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--2, Poster, 1396
Mentor(s): Mark Aupperlee (Physiology), Sandra Haslam (Physiology)
Hormone replacement therapy (HRT) is used to ease menopausal symptoms in postmenopausal women. However, studies have linked the hormones used in HRT to a higher risk of breast cancer. Specifically, progesterone (P) is implicated in the etiology and development of breast cancer. P acts through two isoforms of the progesterone receptor (PR), PRA and PRB. Changes in the expression of PRA and PRB have been tied to early breast cancer development, but their regulation is poorly understood. This study focuses on the hormonal regulation of PR expression in archival postmenopausal human breast tissue. The tissue was collected from women who were categorized into three HRT treatment groups: no HRT, estrogen (E) alone HRT, or E+progestin HRT. Immunohistochemistry was performed using an anti-PRA antibody and an anti-PRB antibody to examine PR expression and colocalization. PRA and PRB were predominantly colocalized in all treatments and were still significantly expressed in postmenopausal women who received no HRT. Expression of PRA and PRB significantly increased in breast tissue in women who received either E or E+progestin HRT. The addition of progestin with E showed only minimal effects on the PR isoform. These results suggest that PRA and PRB are coordinately regulated by E and that there is sufficient E present in the postmenopausal not receiving HRT breast to maintain PRA and PRB expression. Further studies are needed to fully understand how regulation may differ during the progression of breast cancer.

DETECTION OF 1510 BP BAND USING PCR AND GEL ELECTROPHORESIS TO DIAGNOSE E6V SICKLE CELL ANEMIA IN HUMAN GENOMIC DNA
Kristina Knirk, Nicole Arcy, Tyler Ash, Jonathon Walters
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--2, Poster, 1428
Mentor(s): Douglas Luckie (Biology)
We hypothesize that two primers, complimentary to mutant and wild-type human genomic DNA for the E6V mutation, will successfully discern between these genotypes due to their specificity permitting amplification via PCR only if proper binding to complimentary DNA occurs. Gel electrophoresis will be conducted on PCR products to unveil the presence or absence of illuminated bands 1510 bp in length, indicating the presence or absence of the E6V mutation. Predetermined lambda DNA gel results will be used as a positive control by running lambda cocktails during sickle cell PCR. The purpose of this study is to create an assay that can quickly and accurately reveal the presence or absence of sickle cell in individuals. A successful assay can be implemented as a genetic diagnostic for prenatal testing, facilitating improved quality of life and decreased mortality rate due to early detection benefits and programs. Sociological surveying of MSU students within Lyman Briggs investigated if, due to negativity associated with genetic diseases, students tend to be more pessimistic regardless of their knowledge of sickle

cell anemia. No correlation was found under a regression model. Additionally, sickle cell anemia dietary costs were compared to standard costs with the prediction that the sickle cell diet will cost more than a typical diet because the sickle cell diet requires more protein, vegetables, and fruits, which are priced higher than cheaper and unhealthier food eaten in a typical diet. Costs were found to be higher for the sickle cell diet.

THE COORDINATION OF ORGAN GROWTH IN DROSOPHILA MELANOGASTER
Nathan Parker, Andrea Lazzari
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--2, Poster, 1469
Mentor(s): Alexander Shingleton (Zoology)
The ability for an organism to develop from a single cell into a complex set of organs is one of the most remarkable events in biology. An important but poorly elucidated aspect of this development is an organism's ability to coordinate the growth of its constituent parts in order to generate a correctly proportioned body. We have previously shown that perturbing the growth of the developing wing in Drosophila larvae causes a systemic reduction in the growth rate of the other developing organs. This result suggests that organs are able to coordinate their growth throughout development in order to produce a correctly proportioned adult, a novel observation. Our investigations have revealed two candidate signaling pathways that may regulate this coordination. The first is the insulin-signaling pathway, which canonically regulates growth with respect to nutrition in a systemic manner. The second is the ecdysone-signaling pathway, which canonically regulates the timing of larval molting and metamorphosis but has also been implicated in growth regulation. Here we present data elucidating the roles that these signaling pathways play in coordinating organ growth in larvae where one organ is growth perturbed.

CHARACTERIZATION OF A CANDIDATE REGULATOR OF A HOST-CELL CONTACT REGULATED GENE IN NEISSERIA GONORRHOEAE
Joseph Karpinsky
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--2, Poster, 1477
Mentor(s): Cindy Arvidson (Microbiology and Molecular Genetics)
Neisseria gonorrhoeae is a strict human pathogen and infects by attaching to and colonizing mucosal epithelial cells. Our research focus is to understand the mechanism by which NG1684, a gene induced in gonococci adherent to epithelial cells, is regulated at the level of transcription. This will be done using a transcriptional fusion of the NG1684 promoter to a lacZ gene to examine the effects of various candidate regulators of N. gonorrhoeae on NG1684 expression. Previous research in the lab has identified a pair of genes, NG1516-NG1517, that encode proteins with potential to be involved in the control of NG1684-lacZ expression. NG1517 is located upstream of NG1516 and analysis of the locus suggests that the genes are co-transcribed. To construct this mutant, an antibiotic resistance determinant (ErmR) will be introduced into NG1517 via in vitro transposon mutagenesis. The mutated gene will be transformed into gonococci, selecting for resistance to erythromycin, resulting in a replacement of the wild-type allelle with the mutated gene. The mutation will then be moved into a strain containing the NG1684-lacZ fusion. β-galactosidase assays will then be done to determine the effects of the mutation on expression of NG1684 in vitro. The ultimate goal will be to determine its effect on NG1684 expression and on gonococcal interactions with epithelial cells. Since NG1684 is induced in adherent gonococci and is necessary for invasion of epithelial cells, we hypothesize that a regulator of NG1684 would also be important for invasion.

GENOTYPIC IDENTIFICATION OF THE W1282X MUTATION IN CF HUMAN IB3 CELLS AIMS TO YIELD EFFECTIVE PCR ASSAY
Emily Schmitt-Matzen, Jacob Aubry, Jillian Harold, Soo Hur
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Cell Biology, Genetics, and Genomics--2, Poster, 1571
Mentor(s): Douglas Luckie (Physiology)
The W1282X mutation causing Cystic Fibrosis results from a single nucleotide substitution in exon 20 of the CFTR gene. The codon ACC encoding for tryptophan is replaced with a stop codon when the first Cytosine is replaced with Thymine . To determine the presence of CF, DNA extraction from human IB3 cells containing the W1282X mutation was completed. After conducting PCR the amplified target DNA will be examined with gel electrophoresis; the band lengths present will distinguish genotypes. The purpose of this experiment is to create an assay detecting the W1282X mutation. We hypothesized that by altering the salt concentrations and annealing temperatures throughout various PCR trials, and using Yaku-Bonczyk designed primers, the results will unambiguously determine the presence of the W1282X mutation and correctly diagnose CF in patients. It is predicted, that when Fprimer2 is run with mutant DNA a band length of 1648bp will occur; a band length of 1647bp will occur when Fprimer1 and wild-type DNA are present. To create a positive control for our assay, PCR on E. coli will present a band at 1500bp revealing that the cocktail and PCR worked correctly. Furthermore, a sociological study was completed and the lifestyle of a CF patient was mimicked. From the data collected, a t-test posted a value of P<.0001 revealing our data to be statistically significant. Overall, these methods will result in a more efficient diagnosis of CF, allowing more treatment time for young individuals.

AS-PCR OF CALU-3 IN SUCCESSFUL IDENTIFICATION OF C282Y MUTATION
Raef Fadel
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--3, Poster, 1354
Mentor(s): Douglas Luckie (Biology)
The C282Y mutation of the HFe gene accounts for 80% of Hereditary Hemochromatosis cases (Drakesmith and Townsend, 2000). This single base pair mutation involves a guanine-to-adenine substitution at nucleotide 845. This alters the protein sequence by substituting an amino acid cysteine for a tyrosine at position 282 of the protein product (Hanson et al, 2001). We plan to create such allele specific primers that will be used to determine whether desired strands of HFe DNA, ranging from nucleotides 4691 – 5696, contain the C282Y mutation. This specific sequence (nucleotides 4691 – 5696) is believed to contain the C282Y mutation (Drakesmith and Townsend, 2000). We hypothesize that with successful purification and extraction of human HFE DNA from whole blood, accurate determination of the annealing temperatures of allele-specific primers, proper application of AS-PCR on human HFE gene, and successful PCR product analysis by agarose gel electrophoresis, AS-PCR

techniques could be coupled with gel electrophoresis analysis to successfully determine whether the C282Y mutation is present, or absent, on the HFE gene (Donohoe et al, 2000; Wu et al, 1989). Depending on which primer is used, we predict that the successful amplification of a desired region approximately 1,006 base pairs in length will suggest the presence or absence of the C282Y mutation (Takeuchi et al, 1997). In addition to primer design, we hope to conduct a sociological experiment in order to better our understanding of Hemochromatosis, along with the general awareness among students of Michigan State University regarding the disease.

COMPARING RIBOSOMAL AND PROTEIN PHYLOGENIES
Donovan Watza
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--3, Poster, 1360
Mentor(s): Richard Triemer (Plant Biology)
The purpose of this study was to incorporate protein coding genes into euglenoid phylogenies and compare the results with those of ribosomal genes. The psbO gene, a nuclear encoded plastid targeting gene involved in oxygen evolution, and the HSP90 gene, a nuclear encoded heat shock gene that codes for a molecular chaperone, were sequenced for 69 euglenoid taxa representing the genera Euglena, Euglenaria, Eutreptia, Eutreptiella, Monomorphina, Cryptoglena, Colacium, Trachelomonas, Strombomonas, Phacus, Discoplastis, and Lepocinclis. Nuclear SSU, LSU, (nSSU, nLSU) and chloroplast SSU (cp SSU) rDNA sequences were obtained for 63 of the 69 euglenoid taxa from previous ribosomal studies (Triemer et al. 2006). The phylogenies inferred from nuclear SSU, LSU, and cp SSU resulted in trees that resolved all but three minor clade relationships and resolved major generic relationships among the euglenoids (posterior probability >95%). In contrast, the phylogenies inferred from psbO and HSP90 alone resulted in trees that resolved very few clades, but resolved many deeper relationships among species within the same genus. When the data from the 5 genes were combined into a single dataset, the five gene phylogeny was far more robust than either the ribosomal or protein phylogeny alone.

A COMPARISON OF ANTIBIOTIC RESISTANT BACTERIA FROM BEEF AND VENISON
Caitlin Kirby
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--3, Poster, 1375
Mentor(s): Jim Smith (Biology)
The presence of antibiotic resistant bacteria is a growing concern to scientists and public health officials. The purpose of this study is to identify bacteria that are resistant to common antibiotics. Antibiotic resistance in ground beef was predicted to be more prevalent than in venison steak due to antibiotics in the food supply of cattle. Chi-square values for ampicillin and tetracycline were significant ($p<0.05$) in support of this prediction, but the kanamycin result was insignificant ($p>0.05$). Gram identity tests were used to determine characteristics of three ampicillin resistant strains, B2S10, V1S7, and V2S9, wherein all results suggested they were gram-negative. Plasmid isolations were carried out with each strain, and B2S10 isolates were digested with BamHI and EcoRI enzymes. E. coli served as host bacteria for an unsuccessful transformation. The 16S rRNA regions of the three bacterial strains were sequenced by sending PCR products to the Michigan State University's Research Technology Support Facility (RTSF). The strains V2S9 and B2S10 showed nucleotide sequences that matched with the genera Pantoea and Staphylococcus, respectively.

THE ROLE OF CELL-TO-CELL CONTACT IN HYPERGLYCEMIA-INDUCED CASPASE-1 ACTIVATION IN RETINAL MLLER CELLS
Brooke Boer
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--3, Poster, 1406
Mentor(s): Susanne Mohr (Physiology)
Purpose: Diabetes leads to sustained caspase-1 activity in the retina promoting the development of diabetic retinopathy. How caspase-1 becomes activated under hyperglycemic conditions is unknown. Recent reports have suggested that pannexin and connexin channels (gap junction channels) might play a role in caspase-1 activation. Therefore, this study focused on the necessity of cell-to-cell contact in hyperglycemia-induced caspase-1 activation. Methods: Transformed rat retinal Müller cells (rMC-1) were incubated in medium containing 5mM (normal) or 25 mM (high) glucose in the presence or absence of the pannexin channel inhibitor Probenecid (100 mM) for 24 hours. To measure intracellular caspase-1 activity, an assay was developed measuring caspase-1 activity levels and location in live cells using the fluorescent caspase-1 specific substrate CaspaLux. Analysis of caspase-1 activity and cellular location was done by immunohistochemistry. Results: The number of rMC-1 being positive for autofluorescence under the study conditions was 0.93±2.8%. In normal glucose, 0.79±2.4% of rMC-1 cells showed caspase-1 activation. High glucose significantly induced caspase-1 activity in 33.52±15.6% of rMC-1. Interestingly, caspase-1 activity occurred only in cells that had contact with other cells. Individual cells did not exhibit caspase-1 activity under these conditions. When the pannexin inhibitor, Probenecid, was added to high glucose conditions, caspase-1 activity significantly dropped, with only 7.9±10.64% of rMC-1 showing caspase-1 activity. Conclusion: Cell-to-cell contact seems to be essential for caspase-1 activation by hyperglycemia in retinal Müller cells. Our studies indicate that gap junction channels like the pannexin and/or connexin channel(s) might play an important role in the process of caspase-1 activation.

STOP AND GO TRAFFIC: THE TARGETING OF CHLOROPLASTIC MEMBRANE PROTEINS TO EITHER INNER ENVELOPE OR THYLAKOID MEMBRANE
Eric Vanderpool
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--3, Poster, 1410
Mentor(s): John Froehlich (MSU-DOE Plant Research Lab)
Chloroplasts are multi-compartmented organelles consisting of three separate membranes: the outer envelope membrane(OEM), the inner envelope membrane (IEM), and the thylakoid membrane(TM). This complexity makes investigating the targeting of nuclear derived membrane proteins to various membrane sub-compartments challenging. For instance, one unresolved question is how are membrane proteins with multiple transmembrane-domains(TMD) correctly targeted to the IEM? Do they use the stop transfer pathway or the conservative sorting

pathway for their insertion into the IEM? We intend to address this question by performing time course assays of the import with the IEM proteins, Tic20 and RPH1. We will monitor the import of radio-labeled Tic20 and RPH1 and determine their subcellular location using fluorography and SDS-PAGE gel analysis. Another unresolved question is why proteins with multiple TMDs that are targeted to the TM are allowed to pass through the translocon while other membrane proteins are retained at the IEM? One theory is that the first TMD contains features that dictate when a membrane protein will be either halted or allowed to cross the IEM. To test this hypothesis, we will perform TMD swapping experiments by replacing the first TMD of two thylakoid proteins, LHCP and PsbS, with a TMD derived from an IEM protein in order to a create novel hybrid proteins that will allow us to determine what role the first TMD may play in the targeting of a membrane protein to either the IEM or TM.

HUNTINGTONS DISEASE DETECTED IN HOMO SAPIEN CALU LUNG EPITHELIAL CELLS BASED ON CAG MICROSATELLITES IN MHTT VIA PCR
Anthony Lai
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--3, Poster, 1464
Mentor(s): Douglas Luckie (Lyman Briggs Cell and Molecular Biology)
Huntington's disease is a neurodegenerative disorder characterized by many physical as well as psychological symptoms including uncontrolled movements, speech impairment, abnormal reflexes, and depression. Huntington's is caused by the trinucleotide repeat CAG that is 36 to 120 repeats long at chromosome 4p16.3 on exon 1. PCR will be utilized to detect the presence of a mutation in the Huntington gene, HTT. We compared samples from both humans with purifed wildtype DNA as well as purified mutant DNA and will determine whether the mutation is present on the Huntington (mHTT) gene. It was hypothesized that the designed primer would be able to determine if someone has Huntington's disease. Once the PCR products are analyzed on agarose gel by UV spectrophotometry, the bands in the gel will allow the calculation of DNA length in bp. The base pair length of the CAG repeats for mutant DNA is predicted to be seen at approximately 203 to 287 bps which is indicative of trinucleotide CAG being 36 to 120 repeats long based on the results from a previous study. A social experiment will be carried out in order to feel the symptoms of Huntington's disease. This experiment will consist of walking on crutches during our daily routines in order to portray a lack of mobility. We recorded and compared our results with the Quality of Life Scale.

DEVELOPMENT OF A FUNCTIONAL GENOMICS PLATFORM FOR EXPLORING TROPANE ALKALOID BIOSYNTHESIS IN ATROPA BELLADONNA
Matthew Bedewitz
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--3, Poster, 1535
Mentor(s): Cornelius Barry (Horticulture)
Alkaloids are a diverse group of natural molecules united only through the possession of a basic nitrogen atom that is not incorporated into a peptide or an amide bond. The group contains around 12000 compounds of diverse biochemical origins. These molecules show a wide variety of biochemical activities that give them special importance in pharmacology. For example, alkaloids include the opiate morphine, the anti-malarial compound quinine, and the stimulant caffeine. The tropane alkaloids, scopolamine and hyoscyamine are synthesized by several members of the Solanaceae family including the Atropa and Hyoscyamus genera. Scopolamine and hyoscyamine are antagonists of the acetylcholine receptor and serve as the active components of several drugs used to treat gastrointestinal disorders. Despite their medicinal importance, the biosynthesis of hyoscyamine and scopolamine is not fully understood, limiting the ability to engineer their production and to synthesize novel derivatives. This project seeks to develop a functional genomics platform to identify the missing steps in tropane alkaloid biosynthesis in A. belladonna. An A. belladonna transcriptome has been assembled from a combination of normalized cDNA and tissue specific libraries using the Illumina GA2 platform. The transcriptome contains all of the known genes involved in tropane alkaloid biosynthesis and measurements of transcript abundance indicate that these genes are preferentially expressed in secondary roots. Hierarchical clustering and data mining has identified approximately twenty additional co-expressed genes that encode enzymes that may be involved in the missing steps of tropane alkaloid biosynthesis. Progress on functional characterization of these candidate genes will be presented.

COMPUTATIONAL PREDICTION OF INTERGENIC TRANSCRIBED SEQUENCES WITH TRANSLATIONAL EVIDENCE
Alex Seddon
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--3, Poster, 1551
Mentor(s): Shinhan Shiu (Plant Biology)
The genome of Arabidopsis thaliana contains large intergenic regions which are believed to be, by definition, devoid of genes. However, recent studies suggest that transcripts originate from these intergenic regions and that these Intergenic Transcribed Sequences (ITS) encode novel genes. It is often speculated that ITSs are non-coding. However, the coding potential of the ITSs is usually not rigorously studied. The purpose of this study was to discover the proportion of ITSs that were protein coding, and to determine if protein coding ITSs were unannotated because they were not predicted by a computationally gene finder. We identified a set of putative coding ITS (pcITS) which had evidence of translation, based on proteomic evidence and/or ribosome association. We then explored how well these pcITS were predicted by computational gene finders. We used four gene finder programs: Augustus, GlimmerHMM, GenScan, and sORF finder. We found that ~49 % of the pcITSs were predicted by at least one gene finder. The gene finders preferentially identified pcITSs as protein coding as compared to ITSs without translational evidence. These findings suggest that the pcITSs' lack of annotation is not the result of being missed by a gene finder. We also found that the most simplistic gene finder program, sORF Finder, was better able to predict pcITSs. This suggests that stripped down gene finders may be more appropriate when looking for protein coding genes in intergenic regions.

EFFECTS OF GRNA POLY-U TAIL ON GRNAMRNA HYBRIDIZATION

Jasmine Lucas, Lei Sun

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Cell Biology, Genetics, and Genomics--3, Poster, 1560

Mentor(s): Donna Koslowsky (Microbiology and Molecular Genetics)

Trypanosomes are protozoan eukaryotic parasites that cause African Sleeping Sickness, Chagas disease and Leishmaniasis; all of these parasitic diseases can be fatal. Together, these parasites affect approximately 550 million people in the developing world. Trypansomes are able to regulate their energy metabolism using a unique RNA editing mechanism that may be a good target for drug development. Editing of mitochondrial mRNA in Trypanosomes is done through uridylate insertion or deletion and up to 50% of an mRNA can be created post transcriptionally. The insertion and deletion is done by a complex of proteins called the editosome and is directed by small RNAs called guide RNAs (gRNA). One mRNA is edited by multiple gRNAs in a sequential fashion that suggests extreme evolutionary pressure for high efficiency and accuracy for successful editing. All known gRNAs in Trypanosomes have a polyuridylate tail. This study investigates how the polyuridylate tails of gRNAs contributes to the editing process. Using electrophoretic mobility shift assays (EMSA), we determined that the presences of a poly-U tails significantly increased the affinity between a gRNA and its target mRNA. To understand the affects of the U-tail on the kinetics of the bimolecular interaction, we used competitive EMSA to determine the mRNA/gRNA dissociation rate. Using the formula Kd=k on/k off we can calculate the on rate to determine how the U-tail contributes.

TXNIP (THIOREDOXIN INTERACTING PROTEIN) UPREGULATION AND THE ACTIVATION OF CASPASE-1 BY DIFFERENT SUGARS

Jacob Russell

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Cell Biology, Genetics, and Genomics--3, Poster, 1586

Mentor(s): Susanne Mohr (Physiology)

Hyperglycemia leads to increased activation of caspase-1 in retinal Müller cells by an unknown mechanism. Recent studies have suggested that TXNIP (Thioredoxin- Interacting Protein), a known glucose response element, is involved in caspase-1 activation via interaction with inflammasomes that are crucial for the caspase-1 activation. This study focused on investigating the role of TXNIP in caspase-1 activation by different types of sugars. Human retinal Müller cells (HMC) were treated with one of the following medium: 5mM glucose, 25mM glucose, 25mM fructose, or 25mM galactose for 24 hours. Western blot analysis was used to examine TXNIP expression. Caspase-1 activity was determined using a specific caspase-1 fluorescence substrate (YVAD-AFC, 2.5µM). Cell viability was measured by trypan blue exclusion assay after 96 hours of treatment. Our results demonstrate that 25 mM glucose induced TXNIP 1.07 fold compared to control (5 mM glucose). 25 mM galactose and 25 mM fructose increased TXNIP levels 1.14 and 1.08 fold, respectively. Caspase-1 activity was strongest in HMCs treated with galactose 120.95 ± 18.43 pmol AFC/mg/min compared to control (106.55 ± 1.85 pmol AFC/mg/min). High glucose and high fructose increased caspase-1 activity to 117.38 ± 8.43 and 115.01 ± 7.23 pmol AFC/mg/min, respectively. Elevated glucose and galactose levels led to cell death after 96 hours of treatment contrary to fructose which did not induce cell death. Activation of caspase-1 in retinal Müller cells by different sugars seems to be mediated by TXNIP. Further studies need to determine the importance of the TXNIP/caspase-1 pathway in hyperglycemia-mediated retinal cell damage.

DIAGNOSING A HUMAN CELL WITH HUNTINGTONS DISEASE BY USING PCR TO IDENTIFY THE NUMBER OF CAG EXPANSIONS

Sean Benner

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Cell Biology, Genetics, and Genomics--4, Poster, 1484

Mentor(s): Douglas Luckie (Biology)

The purpose of our project is to be able to use PCR and electrophoresis to determine the number of CAG expansions that a genome contains in order to diagnose a cell with Huntington's disease. There is much significance in experimenting with Huntington's disease because there is no current cure for the disease. By doing this study, advances can be made in the diagnosis of Huntington's with the potential of discovering a cure. For our experiment we will use PCR to replicate the CAG expansions, then we will use gel electrophoresis to count the number of expansions to see if a cell contains Huntington's disease. We hope that the primers we designed will work in our PCR cocktail as evident by bands made by gel electrophoresis. We will be able to determine the number of base pairs based on a control band at 360bp from PCR product of the enamelin gene. With the knowledge of the amount of base pairs we will calculate the number of CAG and CCG repeats, determining if the cell contains the disease or not. We predict that the cell we obtain that contains the disease will show over 360 base pairs on the gel because in order for a person to be diagnosed with Huntington's Disease they must have over forty CAG repeats with an estimated seven CCG repeats after the CAG repeats since ninety percent of diseased cells contain seven CCG repeats (Watts and Koller, 2004).

POSITIVE PCR AMPLIFICATIONOF MUTATED CAG REPEAT ON HTT GENE AND SOCIAL STUDY OF HUNTINGTON'S DISEASE PATIENTS

Daniel Buhlinger, Shelbe Vollmer

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Cell Biology, Genetics, and Genomics--4, Poster, 1564

Mentor(s): Douglas Luckie (Physiology)

Huntington's Disease (HD) affects 1 in 10,000 people with involuntary movement, cognitive deterioration, and eventually death (Andrew et al., 1993). A mutation in the IT15 gene on the short arm of chromosome-4 causes a CAG trinucleotide repeat expansion, which interferes with microtubule structure and intercellular transportation (Sadri-Vakili and Cha, 2006; Imarisio et al., 2008). Allele-specific polymerase chain reaction (PCR) was used to determine the presence of HD in DNA from wild-type IB3 epithelial cells and mutated cerebellum cells. Using protocol by Qiagen Inc., DNA was extracted from the cells for PCR. It was hypothesized that proper primer design and a diagnostic length of 35 CAG repeats could correctly diagnose HD in DNA, based on previous successful identification of CAG repeat lengths (Goldberg et al., 1993). It is predicted that the wild-type band on gel electrophoresis will have between 645 and 670 base pairs, because healthy people have between 10 and 35 repeats (Stine et al., 1993). Whereas it is predicted that the mutated band will have between 702 and 954, because HD patients have between 36 and 120 repeats (Vuillaume et al., 2000). Also, a sociological experiment was run to provide data on the perception of the disease

and allow our team to appreciate the impact our research will have on the lives of HD patients. This included surveying HD patients as well as attempting to experience HD symptoms ourselves. Our research will enlighten the community on the struggle faced by patients with crippling diseases such as HD.

THE TOXIC EFFECTS OF ENDOCRINE DISRUPTORS, METHOXYCHLOR AND VINCLOZOLIN, ON IN VITRO BIOMARKERS OF TUMOR PROMOTION
Rajus Chopra
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--4, Poster, 1593
Mentor(s): Brad Upham (Pediatrics and Human Development)
Pesticides, methoxychlor (insecticide) and vinclozolin (fungicide) are endocrine- disrupting chemicals, which have been demonstrated to induce reproductive toxicity and transgenerational epigenetic effects. We investigated effects of methoxychlor and vinclozolin on established in vitro markers of epigenetic toxicity and tumor promotion, i.e., inhibition of gap-junctional intercellular communication (GJIC) and activation of mitogen-activated protein kinases (MAPKs), in rat liver epithelial cells WB-F344. Both chemicals induced rapid dysregulation of GJIC with complete inhibition achieved at 25 □M of methoxychlor and 30 □M of vinclozolin after a 10-min exposure (these doses of chemicals were not cytotoxic within 24 h). The inhibition of GJIC induced by methoxychlor and vinclozolin was reversible and the communication recovered when the cells treated with chemicals for 30 min were transferred into to the chemical-free medium. Methoxychlor and vinclozolin induced rapid activation of MAPKs ERK1/2 and p38. Although the activation of MAPKs has been implicated in the dysregulation of GJIC, inhibition of GJIC by methoxychlor and vinclozolin was independent of ERK or p38 activation. However, inhibition of phosphatidylcholine-specific phospholipase C (PC-PLC) prevented the inhibition of GJIC by methoxychlor or vinclozolin suggesting that methoxychlor and vinclozolin inhibited GJIC via a PC-PLC dependent mechanism similarly to lower molecular weight polycyclic aromatic hydrocarbons, non-coplanar PCBs or DDT. Our study identified a new in vitro mechanism of toxicity of methoxychlor and vinclozolin; inhibition of GJIC and activation of MAPKs, which could be potentially involved in their transgenerational epigenetic in vivo effects and/or indicate their in vivo tumor promoting properties.

GENE HAPLOSUFFICIENCY
Nirzari Pandya
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--4, Poster, 1640
Mentor(s): Patrick Venta (Microbiology and Molecular Genetics)
Genes were classified into quantitative mode of inheritance rather than being dominant or recessively inherited. Correlation between the mode of inheritance and age of onset of genes ranging from 1 through 5 was analyzed. It was hypothesized that most of the haploinsufficient genes would occur during the early age of onset or age of onset 1. From the Fisher's exact test, the p-value for age of onset 1 and 2 and 1 and 4 was reported to be 0.0833 that failed to reject the null hypothesis that there was not a significant difference between haplosufficiency and haploinsufficiency in correlation with age of onset. The p-value of .0265 for age of onset 1 and 3, however, rejected the null hypothesis and showed that there is a significant difference between haplosufficiency and haploinsufficiency in correlation with the age of onset. Overall, the hypothesis was rejected as no strong correlation was seen between the quantitative mode of inheritance and the increasing age of onset. The reason for the age of onset not correlating with the quantitative mode of inheritance may be due to the very small sample size of only 5 genes per age of onset.

THE ROLE OF JUVENILE HORMONE IN THE REGULATION OF BODY PROPORTION IN DROSOPHILA
Sasha Makohon-Moore
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--4, Poster, 1642
Mentor(s): Alexander Shingleton (Zoology)
Juvenile hormone (JH) is known to play an important role in insect development and metamorphosis, but little is known about how it effects body proportion The goal of this research is to elucidate the role of JH in the developmental regulation of proportion. *Methoprene-tolerant* (*Met*) is a putative component of the JH reception complex in *Drosophila melanogaster. Met* mutants are believed to have a non-functional protein, thus reducing JH reception. Using mutation and the UAS/Gal 4 system, we up- and down-regulated expression of *Met* in various tissues and assayed the impact on body proportion, specifically the relationship between wing and body size. Results indicate that flies mutant for *Met* show a reduction in overall body size but not in wing size; that is flies had proportionally larger wings. Reducing expression of *Met* in the prothoracic gland alone (which synthesizes the molting hormone ecdysone and is negatively regulated by JH) reduced both body and wing size equally. Reducing expression of *Met* in the wing alone slightly increased the size of the body but decreased the size of the wing; that is flies had proportionally smaller wings. These data suggest that JH plays a role in the regulation of body proportion in *Drosophila*, although this role appears to involve a complex combination of both systemic and organ autonomous effects.

IDENTIFICATION OF MUTATIONS CAUSING CHLOROPLAST ALTERED NUMBER (CAN) PHENOTYPES IN ARABIDOPSIS
Tiara Ahmad
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Cell Biology, Genetics, and Genomics--4, Poster, 1645
Mentor(s): Katherine Osteryoung (Plant Biology)
Chloroplasts are plant-specific organelles that mainly perform photosynthesis. Similar to their prokaryotic ancestors, chloroplasts replicate by binary fission, involving many proteins of both prokaryotic and eukaryotic origin. Although many chloroplast division proteins have been characterized, some factors remain unknown. In a screen of ethyl methanesulfonate (EMS)-mutagenized Arabidopsis Col-0 plants, 13 viable, fertile mutants were found to have aberrant chloroplast morphology, termed chloroplast altered number (can). Compared to wild-type, mesophyll cells of can8, can12, and can13 mutants have fewer chloroplasts of various sizes. In this study, the causative mutations in these plants are determined using two methods. In the first method, mutants are crossed to wild-type Ler-0 plants, and the F2 generations of each cross serve as mapping populations. The chromosomal location of each mutation is determined by analyzing linkage to SSLP genetic markers

distinguishing the Col-0 and Ler-0 accessions. Rough mapping data indicate can8 is located on the right arm of chromosome five while can12 is on the left arm of chromosome one. Fine mapping of these mutations is in progress and will be followed by DNA sequencing as well as complementation analyses. The second method is to test for allelism. The can mutants are crossed to known chloroplast division mutants with similar phenotypes. This study will reveal the mutations responsible for can8, can12, and can13, specifying amino acid residues essential for correct functioning of their corresponding proteins in chloroplast division, and may reveal new genes involved in the division process.

BONE PATHOLOGY AND ANTI-INFLAMMATORY MEDICATION IN DIABETIC BONE

Jeffrey Denison

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Cell Biology, Genetics, and Genomics--4, Poster, 1646

Mentor(s): Lindsay Coe (Physiology), Laura McCabe (Physiology)

The autoimmune disease type I diabetes results in a myriad of effects, most notably the elimination of insulin production. Disease complications include bone loss, increased marrow adiposity, and inflammation. To test the role of inflammation in mediating bone loss in T1-diabetes, mice were grouped into control and diabetic mice (by streptozotocin injections) and treated or not treated every three days with aspirin to reduce inflammation. Seven mice were in each group. Tibias were isolated, fixed, sectioned, and stained for tartrate-resistant acid phosphatase (TRAP) activity to identify osteoclasts (OC). Sections at 25X magnification of bone and cell surfaces were measured with Image Pro-Plus. From these measurements a % surface area for each cell type was calculated. Data analysis revealed that OC% coverage on trabeculi increased in diabetic mice compared to controls (16.7 ± 1.5 % versus 11.8 ± 2.7 %, respectively). Aspirin treatment did not affect OC% in control mice, but increased OC% to 23.9 ± 1.3 % in diabetic mice. Consistent with past studies, adipocyte number per mm2 was higher in diabetic compared to control mice (0.84 ± 0.21 versus 0.61 ± 0.11 #/mm2). Aspirin did not affect control marrow adiposity but increased marrow adiposity in diabetic mice compared to diabetic un-treated (3.19 ± 0.74 versus 1.57 ± 0.40 #/mm2). Treated control mice had no significant difference. Osteoblasts (OB) are still being analyzed. In conclusion, aspirin increased OC surface and marrow adiposity, compounding the negative bone pathology in diabetes.

INVESTIGATION OF CLUMPLED CHLOROPLAST FUNCTION IN ARABIDOPSIS

Yi Liu

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Cell Biology, Genetics, and Genomics--4, Poster, 1650

Mentor(s): Katherine Osteryoung (Plant Biology)

I studied a novel mutant of Arabidopsis thaliana, clumped chloroplast 1 (clmp1), identified as part of an NSF Arabidopsis 2010 project to study chloroplast function and morphology. The mutant has a T-DNA insertion in the gene At1g62390 but the function of this gene is unknown. Chloroplasts are clumped together in the mutant. The phenotype is chloroplast-specific which is caused by abnormal connections between the chloroplasts. The mutant has a transient phenotype which is more distinct in younger tissues. I performed promoter:GUS analysis and found out that CLMP1 promoter activity was developmentally regulated, because the GUS staining in some tissues was only observed at a young stage. To investigate the function of CLMP1, an overexpression line of CLMP1 was identified, but no obvious phenotype was observed. In addition, two homologs of CLMP1 were identified and T-DNA insertion mutants were studied. No obvious phenotypes were found in single or double mutants. However, the triple mutant between clmp1 and homozygous mutants of the two homologs was generated. I will select the triple knockout plants and check their phenotype because the homologous genes may have functions to similar CLMP1. To further characterize the physiological consequences of the mutation, chlorophyll measurements were done. They showed that mutant plants contained less chlorophyll than wild type, which might be caused by light inhibition of clumping chloroplasts. The abnormal chloroplast morphology in the clmp1 mutant suggests there may a defect in plastid lipid synthesis; therefore, I also plan to analyze lipid composition in the mutant.

MRI MICROIMAGING STUDIES OF STRUCTURAL ALTERATIONS IN LOADED PATELLAR TENDON EX SITU

Natasha Ahmed, Thereseann Huprikar, Kenneth Less, Jessica Wummel

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Cell Biology, Genetics, and Genomics--4, Poster, 1654

Mentor(s): Steven Arnoczky (The Laboratory for Comparative Orthopaedic Research), Michael Lavagnino (The Laboratory for Comparative Orthopaedic Research), Robert Wiseman (Radiology, Physiology)

Imaging techniques provide an elegant, non-invasive way to assess structural alterations in vivo. A previous study loaded cadaveric patellar tendon samples to 15% strain and, through ultrasound imaging, determined that structural alterations occurred in 3 out of the 5 specimens. The current study is utilizing these same cadaveric specimens to determine whether magnetic resonance (MR) imaging can be used to detect alterations in tissue microstructure that coincide with corresponding histology sections of the tendons. MR images were acquired using a high field 9.4-T magnet using a T2-weighted spin-echo sequence. In tendons, undamaged according to ultrasound, the MR images showed normal isotropic arrays of collagen fibrils and no cellular abnormalities. In contrast, tendons damaged according to ultrasound showed structural damage within collagen fibers which included anisotropic fiber orientation, physical damage to the fibers themselves and large acellular foci. These findings were confirmed with histology where it will be shown that graded levels of damage within the MRI image slices coincide with the histologic presentation of the tissues. It is hoped that findings from this study using higher field MR instrumentation can eventually translate to a clinical protocol using low-field magnetic resonance instruments available for human studies.

MYO7A AS A POSSIBLE CAUSE IN NONSYNDROMIC HEARING LOSS

Meghan Parrott

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Cell Biology, Genetics, and Genomics--4, Poster, 1679

Mentor(s): Karen Friderici (Microbiology and Molecular Genetics), Ellen Wilch (Microbiology and Molecular Genetics)

The DF5 kindred in this study has a high frequency of prelingual hearing loss. The cause of hearing loss in many individuals has been determined to be a result of a mutation in the GJB2 gene. However, the cause for some has still not been determined. In the case of one

young girl, we have already ruled out mutations in GJB2 and pendrin. As a result, we are currently investigating Myo7A located on chromosome 11 as it has been associated both with nonsyndromic hearing loss and, more commonly, Usher Syndrome, which has multiple affects including hearing loss and retinitis pigmentosa (which results in loss of vision). Our strategy was to pick the next most common site of mutations causing hearing loss (Myo7A). First, we assessed the inheritance at that gene locus since we have DNA from both her parents and one sibling, all unaffected. The hypothesis was that we can rule out Myo7A if both the proband and the unaffected sibling inherited the same allele from their parents. To do that, we sequenced selected exons and flanking intronic sequence and assessed heterozygous variants. Our results showed that the proband and the unaffected sibling did not inherit the same allele from the parents so we are unable to rule out Myo7A as a possible cause. Also, the proband is heterozygous for at least one nucleotide, showing that there is no wholesale deletion of that gene on either of the chromosomes.

Communication Arts and Sciences

Oral Presentations

FOOD FUTURES: A DOCUMENTARY
Alisha Green
Location: Lake Huron Room, 9:00 AM
Category: Communication Arts and Sciences, Oral
Mentor(s): Bonnie Bucqueroux (Journalism)
Ask an American where their food comes from, and they might first envision the local supermarket. We are largely a culture that has come to think of food as part of an industry – something that involves chemicals, large machines and shiny packages gleaming on shelves – rather than a natural resource. This separation from such a vital element of human life also represents the vulnerability of the industrial system we have created for our food. If – and when – disaster strikes, food can become a scarce commodity in areas where most of the grocery market is stocked from farms that are hundreds or thousands of miles away. We have already seen, with food riots around the world, how a scarcity of a vital resource can send a society into panic. The documentary series Food Futures highlights the struggles that could result from the fragility of the current food system in the U.S., but it also emphasizes the ways we can still build a better structure for feeding ourselves. By looking at the adverse effects of our industrialized, large-scale food production, we can realize the benefits of small-scale, sustainable agriculture systems. The documentary focuses on what people in Michigan are already doing to show sustainable farming is a viable reality for producing our food.

THE COMMUNICATION TRIAD
Courtney Griffin
Location: Lake Huron Room, 9:15 AM
Category: Communication Arts and Sciences, Oral
Mentor(s): Constantinos Coursaris (Telecommunication, Information Studies, and Media)
The purpose of this research is to explore the importance of the phenomenon of technology on culture and interpersonal communication. Technology, through communication channels like the internet, personal computers and cell phones influence culture and interpersonal communication each time they are used. Culturally, the way people relate to each other is changing due in part to the popularity of nonverbal communication, namely emailing, texting and instant messaging. These alternative modes of interpersonal communication are alleviating the need for verbal face to face connections. Internet dating and social networking via cyberspace are examples of technology based innovations that impact our cultural and interpersonal communications. Technology is important because it aids and affects the way people interact with each other in both verbal and nonverbal situations.

MOLTEN LIGHT: THE INTERTWINED HISTORY OF STEEL AND PHOTOGRAPHY
Kelly Caldwell, Alexandra Ghaly, Josh Rickert
Location: Lake Huron Room, 9:30 AM
Category: Communication Arts and Sciences, Oral
Mentor(s): Howard Bossen (Journalism), Eric Freedman (Journalism)
Steel defined the industrial age, both as a material and a way of life, and the photographic history of the industry reveals the poignancy, difficulty, and ultimately raw beauty of steelmaking. The planned exhibition, Molten Light: The Intertwined History of Steel and Photography, is a comprehensive examination of the work of photographers who have shaped the way steel is envisioned by the public in aesthetic, social, political and historical terms. In addition to the photographic exhibition, the project includes two books, development of curricular material and Web content. In previous years, our research team worked on bibliographic and database development, organizational tasks, researching specific photographs and photographers, and assisting in preparation of grant applications. This year we are beginning to shape the final exhibition. Our current research topics include photographer access to steel mills, photographer censorship by corporations, and the Monroe steel strike. We are synthesizing the material found in years of Professor Bossen's photographer interviews to extract information on access, digitizing microfilm to provide Professor Bossen and Professor Freedman with relevant excerpts on the Monroe steel strike for an upcoming scholarly article, and we are continuing to compile more than ninety photographer biographies. Ultimately, our goal as a team is to help put a set of photographs into perspective for audiences, focusing especially on steel's relationship to global social and political issues and how steel photographers reconciled them. Our presentation will focus on several of these tasks and how they contribute to the project as a whole.

DIFFERENT PERSPECTIVES: MEDIA CRITICISM AND ISLAM
Mallory McKnight
Location: Lake Huron Room, 9:45 AM
Category: Communication Arts and Sciences, Oral
Mentor(s): Salah Hassan (English)
This research addresses how news stories focusing on Islam are covered and commented on in the American media. For the past year, the Islam, Muslims and Journalism Education Website of MSU has maintained a media criticism blog devoted to analyzing Islam-related coverage in the mainstream media. In addition to compiling the blog posts, a paper will be included detailing the challenges and methodology of writing media criticism about coverage of Islam from the western perspective. Additionally, interviews with two journalists from print and broadcast backgrounds will be presented in podcast format detailing their guiding ethical principles when reporting two big news stories relating to Muslim issues. Overall, the research will be a cross-medium analysis of approaching Islamic issues from a western perspective.

Poster Presentations

INCREASING DONOR REGISRATION THROUGH SYNCHORONIZED SOCIAL IDENTITY AND SOCIAL NETWORKING
Rebecca Gidley
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1340
Mentor(s): Sandi Smith (Communicaton)
A 2008 concern for the low numbers of organ donors between the ages of 18-24 in the State of Michigan led to a federally funded campaign to help motivate young people to sign up on the donor registry. In order to improve Michigan's ranking as the state with the second lowest percentage of total residents signed up as organ donors, an inter-campus challenge was created between The Ohio State University and The University of Michigan to motivate students through competition to help this altruistic cause. In consideration of the impact of social media on this generation, Facebook ads targeted to individual students were used in the first wave of the campaign (2009). In the second wave of the campaign (2010) Facebook ads, Facebook fan pages, and widgets were used as sharing strategies to further increase awareness and effectiveness of the campaign. The expected levels of effectiveness were hypothesized to rise incrementally and significantly from 2008 (control year) to 2009 (individual focus year) to 2010 (sharing strategy year). Effectiveness was measured in terms of the numbers of young people between the ages of 18-24 who enrolled on the State of Michigan Organ Donor Web Registry in each of those years for the time periods of the campaign. This research reports on the tests of these hypotheses.

COMPARISON OF MOTHERS' VOWEL PRODUCTION IN SPEECH TO CHILDREN WITH AND WITHOUT HEARING LOSS
Claire Carpenter, Dana Flowerday
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1362
Mentor(s): Laura Dilley (Communicative Sciences and Disorders)
The exaggerated speech that is often used by caregivers addressing infants has been linked to enhanced speech perception skills among these children. Previous research has shown that the extent of exaggeration of mothers' speech varies depending on characteristics of the listener (e.g., whether the listener is a child or an adult). One way this exaggeration may be measured is by the degree of vowel clarity. This is commonly calculated using the area created by graphing resonant frequency coordinates of the three "point vowels" /a/, /i/, and /u/ which are representative of the frequency space for English. However, little research has examined how mothers' speech is characterized when speaking to children with hearing impairments or how this input changes over time. The present study investigated the characteristics of vowel spaces produced by mothers interacting with their hearing-impaired children with hearing aids (HAs) or cochlear implants (CIs), compared to those produced when interacting with another adult. Mothers were recorded interacting with their children at 3- and 6-month intervals, as well as in semi-structured interviews with another adult. HA and CI children were compared to normal-hearing (NH) controls based on both chronological age and amount of hearing experience. Preliminary findings suggest that the vowel space is acoustically expanded to a similar degree in speech to hearing-impaired infants and children relative to adults. Understanding early speech exposure holds implications for intervention strategies aimed at improving speech and language skills for children with hearing-impairments.

A META-ANALYSIS OF HUMAN-COMPUTER INTERACTION PUBLICATIONS
Sarah Deighan
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1366
Mentor(s): Constantinos Coursaris (Telecommunication, Information Studies, and Media)
Human-Computer Interaction (HCI) is an emerging interdisciplinary field that is integral to the design of both software and hardware. Over time, more and more research is being performed on topics relevant to this field. This research project is an analysis of the existing publications on three leading HCI journals in order to determine the most influential works, authors, institutions, and countries in the field and the most productive authors, institutions, and countries in the field. The influence of a work, author, institution, or country was quantified by the number of times which it was cited in any article's bibliography. The productivity of an author, institution, or country was measured through an assignment of a point value for each work published. The results identified over 5000 individual authors published over 2800 distinct papers in the journals that we have reviewed from their inception to mid- 2010. The meta-review of the HCI literature yielded several interesting results which reveal a great deal about the nature of scholarship in HCI, as opposed to other scientific research areas. The objective of the poster is to provide an illustration of the atmosphere of the HCI research field, which would prove useful to those developing the area in technological or engineering research programs. The addition of HCI into the mainstream areas of study would greatly improve the usability and accessibility of the generations of software and technological devices to come.

AN ANALYSIS OF INTERNET ADDICTION RESEARCH
Chelsea Schutz, Matt Eiswerth, Siong Wong
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1373
Mentor(s): Robert LaRose (Telecommunication, Information Studies, and Media)
Internet addiction is a popular and controversial topic in research on the effects of new media. However, most of the existing research is on normal populations of college and K-12 students where pathological cases are extremely rare. The question becomes what does Internet addiction research teach us about the media usage and media habits of normal populations? This question is explored in a meta analysis that summarizes the results of over 100 studies of Internet addiction. We examine the relationship of measures of Internet addiction to demographic characteristics, psychological well-being, and media usage.

CONSONANT PRONUNCIATION VARIATION IN SPEECH TO NORMAL-HEARING AND HEARING-IMPAIRED INFANTS
Amanda Millett, Erin Dixon
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1382
Mentor(s): Laura Dilley (Communicative Sciences and Disorders)
How children learn language is a puzzle; knowledge of acoustic details of speech input received as infants can shed light on the process. Little work exists on consonant variability in speech directed to infants, especially those with hearing impairment. In two studies, we examined the frequency of assimilation in infant- and adult-directed speech. Assimilation is a type of speech variation where the pronunciation of words ending with the consonant sounds /t/, /d/, or /n/ changes, depending on the following word, so that "green ball" can be pronounced "gree[m] ball." The first study examined mothers' speech to normal-hearing infants, while the second looked at speech to infants with a hearing impairment. Tokens of word-final /t, d, n/ were classified into one of four categories to determine how hearing status and age impacts speech to infants. The frequency of assimilation was estimated in assimilable contexts (i.e., before word-initial /b, p, m, g, k/ sounds). Next, the second formant (F2) of the vowel preceding the word-final sound was analyzed for acoustic evidence of any change in pronunciation. Results indicate variability in infant- and adult-directed speech is similar regardless of age or hearing status. Understanding early speech exposure provides information relevant to the development of normal and disordered speech and language in children of all hearing abilities, which can have implications for clinical practice.

YOUNG ADULT WOMEN AND SHOPPER MARKETING INFLUENCES
Laura Hammer
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1386
Mentor(s): Patricia Huddleston (Retailing)
Manufacturing and food retail firms are always looking for new ways to influence shopper decisions in order to generate sales and build loyalty. With increased competition among these companies, many have recently increased their shopper marketing efforts, attempting to enter the minds of consumers at the very point where they are most influenced. However, the term shopper marketing is not clearly defined. Some define shopper marketing as any marketing efforts aimed at the shopper during the path to purchase, not only marketing tactics used in the store. It is estimated that companies will increase their shopper marketing expenses by 26% annually. It is important to understand where marketers might effectively reach consumers with their message and evaluate whether these tactics actually resonate with the consumer. Our study aims to see how these efforts may influence consumers specifically young adult women. Through personal interviews with ten young adult women ages 18-25, we will analyze the factors that influence them while grocery shopping. Our questions focused on gaining an understanding of how young women prepare to go grocery shopping, how they shop while they are in the store, the importance of price while shopping, who they shop with and the influence of marketing tactics on their purchase decisions. Since young women today will be the future core consumer group for food retailers and their suppliers, it is important for them to understand this group in order to target their shopper marketing efforts effectively.

PITCH AND TIMING CHARACTERISTICS OF INFANT-DIRECTED SPEECH: A LONGITUDINAL STUDY
Evamarie Cropsey
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1405
Mentor(s): Laura Dilley (Communicative Sciences and Disorders)
Studies show that acoustic characteristics of Infant-Direct Speech (IDS) differ from those of Adult-Directed Speech (ADS) in measures that include average pitch, size of pitch changes, and length of pauses between phrases. In spite of these findings, much remains to be understood regarding how speakers use prosody (e.g., pitch changes, stressed syllables, rhythmic patterns, and perceived speech boundaries) in IDS as compared to ADS. To investigate this issue, longitudinal recordings of mothers reading a storybook to their typically-developing infants and to an experimenter were made when the infants were approximately 3, 6, and 9 months old. Trained analysts labeled syllables as metrically strong and identified phrase boundaries, rhythmic regularity, and pitch changes that added to syllable stress. Preliminary analyses showed that talkers produce fewer words per phrase in IDS versus ADS, and trends were observed toward greater use of both syllable stress and pitch changes in IDS than ADS, as well as greater use of pitch changes with children near 6 months than 3- and 9-month-old children. Future work will include acoustic analyses of the encoded speech samples, as well as investigation of how mothers' speech affects both normally-hearing and hearing-impaired children's success in learning speech and language skills.

YOU ARE NOT ALONE: UNDERSTANDING STIGMA IN ORDER TO INCREASE THE USE OF MSU COUNSELING CENTER SERVICES
Sarah Sheff, Laura Fournier
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1418
Mentor(s): Kami Silk (Communication)
The adjustment to college life is wrought with challenges for many first-year students. Students may not understand that stress and anxiety can evolve into larger problems, and may not be aware of MSU Counseling Center services. Barriers, such as stigma, may prevent individuals from seeking these services and should be researched in order to understand how the MSU Counseling Center might reach those who need help. This project utilized focus groups with college freshmen and sophomores to examine message concepts aimed at encouraging students to: 1) recognize problematic coping and 2) seek assistance from the MSU Counseling Center. The sample consisted of 45 MSU students (females, n = 32; males, n = 13). To recognize effects of stigma, focus group transcripts were coded. Coding revealed that stigma was a concern for participants, but could be overcome. Students responded positively to the fact that the MSU Counseling Center was open to anyone. Similarly, analysis found that students desired concepts that made them feel like they weren't alone, or "abnormal" for seeking professional assistance. Anonymity in seeking help was also important, as most students favored the idea of using a website so they could research the counseling services anonymously. These results demonstrate that stigma is a barrier, but may be overcome through messages which express counseling is

available for everyone, as well as protecting individual anonymity. The implications of these results can be applied to future campus campaigns promoting counseling services.

BROADCAST STORY FORMATTING DURING PRESIDENTIAL ELECTION CYCLES
Seth Beifel, Eric Slenk
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1479
Mentor(s): Geri Zeldes (Journalism)
Presidential election cycles not only aim to reshape our nation, but they shape the way our media presents information. During the previous three election cycles, there has been a noticeable change in the way that news telecasts relay information regarding election coverage. This project evaluates nightly news broadcasts for NBC, ABC, and CBS and the different story structures that they present. This particular research is part of a larger study addressing the varying levels of coverage of minority groups on nightly news broadcasts during the 2000, 2004, and 2008 presidential election cycles. The importance of this research focuses around how media outlets aim to improve their coverage for presidential election cycles. In the accumulated research, it is clear that each of the stations has changed the format of their news coverage solely for the election coverage. Each of the three stations changed the format of their election coverage to simplify the material for the general public. To gather results, the main story formats for each of the stations over the three cycles were taken. Those stories were then analyzed in order to assess how the story formatting has changed. Stories were assessed to see how the formatting changes improved or worsened the newscast. The findings from this research indicate the impact that presidential election cycles have on media coverage. From the results, there is an opportunity for future research in preparation for the upcoming 2012 presidential election to see how media outlets plan to present election coverage.

EXAMINING RAPE MYTHS AND INCIVILITY ONLINE: THE IMPLICATIONS OF A LACK OF EMPATHY
Jacqueline Weber, Lindsey Alberty
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1592
Mentor(s): Kelly Morrison (Communication)
In 1980 Martha Burt defined rape myths as prejudicial, stereotyped, or false beliefs about rape, rape victims, and rapists. Over thirty years later, many of these false beliefs about rape still exist. Despite the fact that these beliefs appear stagnant, the society surrounding and supporting these beliefs has changed dramatically, specifically in the area of technology. This research suggests that rape myths need to be examined in online settings, as online settings allow for anonymous environments that function with reduced cues for feedback and empathy. A content analysis of reader comments in response to an online news article reporting an alleged sexual assault was completed. Comments were coded for rape myths, civility, whether or not the alleged victim's perspective was supported, and other categories. Implications for reducing rape myths in an increasingly online society are discussed.

PATIENT-DOCTOR PRENATAL CARE STUDIES
Jaclyn Talon
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1617
Mentor(s): Jenn Anderson (Communication), Maria Lapinski (Communication)
Reducing social stigma associated with medicalized prenatal care creates more beneficial relationships between physicians and patients. Dual identities of biomedical and indigenous health practices should mesh into a cross-cultural understanding producing a prenatal care system that benefits women and children. Prenatal care is important to consider because it has direct impacts on the newborn. The goal of this research was to create an intervention to improve clinical prenatal care experiences for pregnant mothers in Playa del Carmen, Mexico. The intervention materials are based on data collected from pregnant women in Playa del Carmen that identified pregnant women's current prenatal care beliefs and behaviors. The design is a monthly guide to prenatal behaviors that can be utilized by pregnant women at home and in clinical visits with physicians. This guide should provide key prenatal care information during the according to specific developmental stages and also help guide physician-patient interaction so that it is more effective from both the physician and patient perspectives. The content of the guide includes visual information and basic Spanish text that gives knowledge and guidance about physical activity, nutrition, and overall lifestyle behaviors recommended to be adopted during a prenatal care regimen. In addition to providing the guide to pregnant women, physicians and promotoras associated with local clinics will be trained in how to use the guides during clinical and home visits with pregnant women to facilitate more open and effective communication about prenatal care.

DEVELOPING A BETTER SOLUTION FOR PATIENT INFORMATION OF PRESCRIPTION DRUGS
Douglas Furgason
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Communication Arts and Sciences, Poster, 1618
Mentor(s): Laura Bix (Packaging)
The FDA aims to promote safety by providing patients with the information needed to correctly take the given prescription and understand the possible risks and side effects that may occur. The FDA has initiated development on the Patient Medication Information (PMI) leaflet, a concise one page summary with standardized content and format to be included for patients as part of the packaging of prescribed medications. At this time there is still a great need for meaningful research to be done to determine if the goals of the FDA can be reached by evaluating which proposed format of the PMI generates the greatest amount of patient comprehension. In working with Dr. Laura Bix, it is a common goal to generate significant data of great interest from the FDA that would properly evaluate the effectiveness of the proposed formats. In using the technology available to the School of Packaging and its students, the head mounted optics eye tracking device will be utilized to collect data directly tied to whether the medical information is being received by the patient. In evaluating the data of a diverse population of patients,

meaningful data can be provided to the FDA on the effectiveness of the four proposals. The work of this research will provide quantifiable data on a distinct packaging problem that has the potential to improve patient compliance and reduce medical errors.

Digital Media

Oral Presentations

THE GREENING OF FLINT
Alyssa Firth, Jared Harburn, Natasha LaGrone, Michael Tetrick
Location: Lake Erie Room, 9:00 AM
Category: Digital Media--1, Oral
Mentor(s): Geri Alumit Zeldes (Journalism)
Beginning in the summer of 2010, the four of us have each contributed to the Greening of Flint project and film in our own way. Alyssa has created the website promoting the film, as well as traveled to Flint a number of times in order to do research, shoot, etc. Natasha has traveled to Flint, contacted news sources, and done research for the film. Mike and Jared have traveled to Flint to shoot for the final product, "The Kings of Flint." With the guidance and assistance of Dr. Zeldes, we have contributed to the making of this film and we will present our website and short videos in our presentation.

THE MAKING OF THE FICTION FILM
Josh Michels, Ryan Groendyk, Ryan Sundberg
Location: Lake Erie Room, 9:15 AM
Category: Digital Media--1, Oral
Mentor(s): Robert Albers (Telecommunication, Information Studies, and Media)
"Creating the Fiction Film," a class that brings together the English and Telecommunication departments, presents students with an experience that greatly surpasses that of the traditional classroom setting. This short documentary looks at what is required to create a fiction film and describes the process that the group of seventeen students went through over the past two semesters. Behind the scenes footage, interwoven with interviews of the cast and crew provides an exclusive glimpse into the making of this year's film "American Terrorist."

DOCUMENTARY FILM CLUB
Ryan Frederick, Mark Bearss, Patricia Cashen
Location: Lake Erie Room, 9:30 AM
Category: Digital Media--1, Oral
Mentor(s): Robert Albers (Telecommunication, Information Studies, and Media)
The Documentary Film Club provides students with in the field experience capturing and editing Documentaries.

American Terrorist: Student Independent Short Film
Gregory Capoccia
Location: Lake Erie Room, 9:45 AM
Category: Digital Media--1, Oral
Mentor(s): Robert Albers (Telecommunication, Information Studies, and Media), Jeff Wray (English)
The Inaugural MSU Fiction Film Specialization Independent Film for TC/ENG 435A+B: "American Terrorist" recounts the final days of a university plant biology professor, who, overwhelmed by societal flaws and personal heartbreak, reaches his breaking point and does the unimaginable.

SPARTAN TV
Katherine Masters, Chloe Hill
Location: Lake Erie Room, 10:00 AM
Category: Digital Media--1, Oral
Mentor(s): Troy Hale (Telecom, Information Studies & Media)
Spartan TV is a student-run web-based television organization. We meet every week to write, edit, produce, and anchor live news and sports shows. Our shows go out live on the web at Spartantv.cas.msu.edu. We work with the Journalism and DMAT programs in the College of Communication Arts and Sciences along with the RHA and ASMSU organizations on campus. We have worked for college producing TV shows for the dean of the college. As a student producers, Chloe and I recruit students, provide content, attend meetings and act as the liaisons between the college and our group.

PAINTED FAIRYTALE
Carrie Frazier
Location: Lake Erie Room, 10:15 AM
Category: Digital Media--1, Oral
Mentor(s): Amol Pavangadkar (Telecommunication, Information Studies, and Media)
"Painted Fairytale" is a short film created as a final project for TC 442, Audio & Video projects. Two paintings that come to life at night see each other for the first time when a young woman hangs them on opposite walls. Longing to be with each other, they try to escape their frames but with no success. Then one night, the woman's painting is put in danger.

DEER AMERICA
Nicole Lysak, Mark Bearss, Xinjuan Deng, Natalie Kozlowski
Location: Lake Erie Room, 10:30 AM
Category: Digital Media--1, Oral
Mentor(s): Robert Albers (Media Arts and Technology)
Deer America is a documentary that focuses on hunting of the whitetail deer, mainly in Michigan. Deer hunting provides healthy food, environmental preservation, and a spiritual connection to the wild. The positive effects of hunting far outweigh the negative preconceived notions. Themes of the documentary include: psychology, spirituality, sport, food health and diet, ethics, economy, and environmental preservation.

MSU LISZTOMANIA BRAT PACK MASHUP
Nina Elias, Bethany Tomaszewski
Location: Lake Erie Room, 1:00 PM
Category: Digital Media--2, Oral
Mentor(s): Bump Halbritter (WRAC)
"Lisztomania" is not only a popular song by the band Phoenix, but also a well-known cultural mashup. The original YouTube video, which garnered hundreds of thousands of hits and has been re-posted numerous times, features footage from iconic 1980s movies like Breakfast Club and Sixteen Candles with the upbeat soundtrack from Phoenix. The video spoke to so many viewers because it captures the carefree attitude and freedom of adolescence, and the joy of letting go to simply dance and enjoy the moment. A troupe of thinkers and shakers in Brooklyn, New York created their own version of the Lisztomania video, which incorporated some elements of the original Brat Pack mashup, but more importantly, contextualized the video to more directly speak to its modern audience. Universities and other large cities began to catch on, adding their own culture to the essential elements of the original video, and always to the same Lisztomania soundtrack. The MSU Lisztomania mashup was created to convey the culture and atmosphere of Michigan State University, but as a part of this inspiring genre. We researched the essence of the Lisztomania genre and put a Spartan twist on it through painstaking care, enthusiasm, and creativity.

IN THE MOMENT
Audrye Tucker, Sara Molnar
Location: Lake Erie Room, 1:15 PM
Category: Digital Media--2, Oral
Mentor(s): Robert Albers (Media Arts and Technology)
Artists, authors, cops, musicians, sports players, they are able to concentrate on their skill so intensely that they enter into a new space called "the zone". Our documentary will look at the experience these men and women have in the moments that they are able to concentrate on their craft so deeply that the phenomenon cannot be fully described. We will have such well known artists as Joe Lulloff, John Kaplan, Judi Brown Clarke, John Corigliano and many others.

INDIE FILM SHOW
Andrew Zeko, Andrew Kozlowski
Location: Lake Erie Room, 1:30 PM
Category: Digital Media--2, Oral
Mentor(s): Troy Hale (Journalism)
The Indie Film Show is 30 minutes of the best Independent Films from around the area. Michigan is growing rapidly with state ties to the Film Industry. This show reveals the talent of our state's filmmakers. The Indie Film Show currently airs on WKAR-TV.

HOW-TO: THE EFFECTIVENESS OF VIDEO TUTORIALS IN COSTUMING
Sarah DeBoer
Location: Lake Erie Room, 1:45 PM
Category: Digital Media--2, Oral
Mentor(s): Karen Kangas-Preston (Theater)
The internet is quickly becoming integrated into every aspect of the learning process, replacing books and other teaching materials with video, games, and texts available online. Despite the nature of some of hands-on teaching practices, in-class lectures, and handouts, many students are also turning to the internet to watch and learn the materials they learn in class. For costume design, in-class demonstrations and exercises are crucial to learning each stitch and technique. However, without constant access to a teacher, students will turn to internet step-by-step demonstration videos to walk them through a technique. We utilized the internet to host our own set of video tutorials for a variety of costuming techniques, and took a series of polls with the students to test the effectiveness of the videos. This research will determine whether or not these video tutorials will be integrated into other costuming classes, as well as any other hands-on theater class within the department.

MEDIA SYSTEMS DESIGN AND IMPLEMENTATION FOR LIVE THEATRE: USING WHAT IS AVAILABLE TO CREATE ART
Paul Veltri
Location: Lake Erie Room, 2:00 PM
Category: Digital Media--2, Oral
Mentor(s): Alison Dobbins (Theatre)
Projected media is a relatively new addition to theatrical performances. As such, there are not methods which guarantee a working system even with the most extravagant budgets. However, when working on much tighter budgets the problems become even more numerous. My research looks at how to create complex working systems on a budget using commodity grade projectors and the processing that is standard on Apple computers so that university and local community and regional theatres may incorporate high quality media elements into their productions without paying the exuberant price to rent a similar professional grade system. For the past few months I have been conducting

field research and testing sample systems in real-world situations. The results of which were used as a basis for the system designed and implemented for the MSU Department of Theatre's production of The Wizard of Oz. In my presentation I intend to present the process of constructing a sample system and speak to the reasons it is built that way as well as its strengths and weaknesses, including presenting options and possible solutions for its shortcomings. This research will serve as a guide for local theatres, including the MSU Department of Theatre, to help them in creating mediated performances.

DETROIT: A CITY RISING
Sara Molnar, Cara Ball, Tiffany Williams
Location: Lake Erie Room, 2:15 PM
Category: Digital Media--2, Oral
Mentor(s): Robert Albers (Telecommunication, Information Studies, and Media), Swarnavel Pillai (English)
Detroit, declared dead by some, has had trouble reclaiming its position atop the list of thriving American cities. But a number of renovation projects are becoming the new pulse of Detroit - attempting to restore the essence that once made this city great. The film, Detroit: A City Rising, intends to highlight a few of these efforts in order to challenge some of the negative views. The film will document the passionate people behind the renovations that are slowly moving the city's veins, in light of what some may regard as impossible. In a format unique to the city in which it documents, the film will provide viewers with the many steps needed to start and endure the renovation process. Featured businesses include the Green Garage - a developing business that helps other environmentally focused businesses grow in Detroit and the Spaulding Court, which consists of a community that has dedicated itself to reclaiming a historic apartment complex in order to change the face of its neighborhood. Detroit's mayor, Dave Bing, recently initiated the Detroit Works Project -- making the city's revitalization a priority and echoing the film in both relevance and time. With an historical perspective at its heart, Detroit: A City Rising will tell the story of a broken city that, through its dedicated residents, businesses and initiatives, is slowly coming to life once again.

ME, MYSELF AND MY FACEBOOK
Audrye Tucker
Location: Lake Erie Room, 2:30 PM
Category: Digital Media--2, Oral
Mentor(s): Robert Albers (Telecommunication, Information Studies, and Media)
This documentary will motivate people to consider where the divide is between digital identity and reality, or to consider if they are one and the same.

LAST CALL @ NICKY O'TOOLE'S
Andrew Kozlowski
Location: Lake Erie Room, 2:45 PM
Category: Digital Media--2, Oral
Mentor(s): Troy Hale (Telecommunication, Information Studies, and Media)
"Last Call @ Nicky O'Tooles" televises the comedic stylings of up-and-coming young comedians from across the state as they premiere their jokes in front of a live studio audience! "Last Call" is a multi-camera, live-to-tape HD television production completely created and produced by MSU students.

Education

Oral Presentations

EXAMINATION OF PEDAGOGICAL CONTENT KNOWLEDGE FOR A NEWTON'S THIRD LAW DEMONSTRATION
Sarah Guile
Location: Tower Room, 9:00 AM
Category: Education, Oral
Mentor(s): Alicia Alonzo (Teacher Education)
Research has shown that in order to teach effectively, a thorough knowledge of subject matter is not all that is required. Pedagogical content knowledge (PCK) is concerned with communicating subject matter to students (Shulman, 1986) and is what distinguishes effective teachers from subject matter experts. PCK includes awareness of the affordances and constraints of classroom demonstrations to support student learning. The purpose of this study is to explore a demonstration typically used to illustrate Newton's Third Law and the different ways it is enacted in the classrooms of three high school physics/physical science teachers. Video-taped classroom observations, student and teacher interviews, and student work were used to explore teachers' purposes for using the demonstration, how it was enacted in the classroom, and how students made sense of the targeted content. The three teachers used the example to serve different content goals, enacting it with varying levels of complexity and at various times within the unit. In the classroom in which the content goals were broadest and least clearly specified, the demonstration reinforced common misconceptions. This study points to the importance of a key, but under-acknowledged, aspect of PCK: teachers need to know which content goals are most effectively supported by their repertoire of classroom demonstrations.

TEACHING ENGLISH TO SPEAKERS OF OTHER LANGUAGES WORKING WITH SPECIAL POPULATIONS
Ashley Maloff, Sarrah Gani
Location: Tower Room, 9:15 AM
Category: Education, Oral
Mentor(s): Margo Glew (Teacher Education)
This project seeks to investigate teachers' experiences with students dually classified as special needs and as English Language Learners. The goal of this study is to learn more about the challenges and strategies that teachers' face in working with this population of learners and, based on the research, gain insight into best teaching practices and support structures for dually classified students. As classrooms are becoming more culturally and linguistically diverse, it is likely that a certain portion of the non-English speaking student population will be classified as special needs. Research indicates that English language learners (ELLs) are placed in special education classrooms at a significantly higher rate than native English speaking populations. The research project will investigate types of special supports and teaching practices that students need who are special needs and also face the challenge of acquiring English for academic purposes.

EFFECTS OF TEACHER BOOK CLUBS ON SELF-EFFICACY AND PRACTICE
Terri Pozehl
Location: Tower Room, 9:30 AM
Category: Education, Oral
Mentor(s): Samantha Caughlan (Teacher Education)
Teacher book clubs have recently gained considerable attention as a form of professional development for in-service teachers. This study looks at the effects of teacher book clubs on feelings of self-efficacy and on teaching practice for pre-service teachers. It studies a book club created by a set of students in the secondary education program at Michigan State, along with other current research on teacher book clubs. The goal of this study is to identify useful designs for teacher book clubs and the possible benefits they hold for developing teachers.

ARE WE EXCLUDING INCLUSION?
Andrea Petitta
Location: Tower Room, 9:45 AM
Category: Education, Oral
Mentor(s): Julia Grant (James Madison College)
In education, there are debates about the place of special education within the school system. On one side of the debate is the idea that students with learning disabilities, emotional impairments, or other special needs require individualized attention and should be placed in pull-out programs or other special education programs away from the rest of the school community. However, others believe that special-needs students are capable of learning in a regular classroom with their peers when teachers are able to carefully plan the lessons so that every student can benefit. Inclusion has shown to have its benefits, but a significant amount of evidence also shows that many schools are moving away from inclusion. Specifically, the Lansing School District has moved away from inclusion over the past year, by reassigning special-needs students to different classrooms at C.W. Otto Middle School. In my research, I will look at Lansing Public Schools as a whole to determine the direction toward which their inclusion programs are moving, as well as looking at previous literature on the topic to determine if this is consistent with the national trend. I will also be looking at the factors possibly contributing to this movement, using interviews and surveys, as well as examining documents from Lansing schools, the State of Michigan and the nation's educational policies. I expect to find that Lansing's schools are in fact moving away from inclusion, due to factors such as finances and teachers' and administrators' changing attitudes.

STEM-PHOBIA: GENDER DIFFERENCES IN STEM INTEREST AND CAREER GOALS OF STUDENTS ACROSS HIGH SCHOOL SETTINGS
Kayla Kremer
Location: Tower Room, 10:00 AM
Category: Education, Oral
Mentor(s): Barbara Schneider (Education Dean)
Although research shows that there are differences between gender when it comes to achievement and eventually seeking careers in science, technology, engineering, and math (STEM) fields1, there is little research that shows the differences among gender between urban and rural school locations. This study seeks to understand the relationship between school locations and gender differences, and how these are related to student achievement and ambitions toward STEM courses and careers. Four schools were surveyed: two urban schools (one control, one treatment) and two rural schools (one control, one treatment). This survey was part of a larger project funded by the National Science Foundation, called the College Ambition Program. This program seeks to increase awareness and provide information for students to pursue college majors and careers in STEM fields. The web-based survey asked students about many aspects of their education and future goals, focusing specifically on students' interests, efforts, and possible career goals associated with STEM fields. After running initial analyses on the data, significant differences existed not only between males and females, but between females in the rural districts compared to females in the urban districts. Research focused on gender differences between schools can help to shed light on some of the inequalities across school settings. By understanding relationships among gender differences and school location, educators may work towards decreasing gender stereotypes and promote equal opportunities for students to succeed in STEM courses and in future careers.

THE INTERSECTION OF MUSIC AND LANGUAGE IN FL CLASSROOMS
Rebecca Sawyer
Location: Tower Room, 10:15 AM
Category: Education, Oral
Mentor(s): Jeff Bale (Teacher Education)
Popular teaching wisdom suggests that music has a definitive place in the language classroom. This is evidenced by the sheer number of people that remember music in their classrooms, and the amount of teachers who self report and are observed using music in their classroom. It is often the most natural parts of the classroom that go unnoticed and unobserved in educational research. This study looks at the current research on music in the language classroom, and seeks to amplify knowledge about how music and memory are related. Additionally, this study seeks to understand what is best practice for using music in the language classroom. Included are possible ways to include music, and what is the most pedagogically sound way to view this type of input.

ASPERGERS: THE BARRIERS OF HIGHER EDUCATION AND THE RESOURCES THAT CREATE ACADEMIC SUCCESS
Evan Goldfarb
Location: Tower Room, 10:30 AM
Category: Education, Oral
Mentor(s): Julia Grant (Social Relations and Policy)
With the passing of the Individuals with Disabilities Education Act, children with autism were granted the educational tools necessary to succeed in the classroom. However, for students with Asperger's Syndrome the problem is social interaction not cognitive development. The focus of this study will be students with asperger's and the barriers to higher education. I seek to show the exponential introduction of programs catered to students with asperger's and their effectiveness. This is important because the challenges these students face are often not academic, but do impact their ability to be successful and the methods of treatment for academic success are different than other disorders on the autism spectrum. Therefore, having substantial resources to enhance social abilities will lead to a heightened college experience. I will seek to show the effectiveness of university programs by looking at specific case studies and articles that examine innovative opportunities for students with asperger's and the lack of resources available at some major institutions. Colorado State is one of the more modern universities with asperger's assistance because of their recent peer mentor program to provide one-on-one guidance. After much investigation of programs and resources offered to students with asperger's I will interview faculty responsible for these resources to judge the efficiency of the programs. I will then discuss leniency by the admissions department in regards to grade point average, extra curricular activities, or alternative options for the essay portion of the application.

DOES MAJOR INFLUENCE STRUCTURAL COMPLEXITY IN STUDENTS' CONCEPTUAL MODELS?
Sasha Makohon-Moore
Location: Tower Room, 10:45 AM
Category: Education, Oral
Mentor(s): Tammy Long (Plant Biology)
Introductory biology students enter with diverse skills, yet all seek not only to gain a broader understanding of natural phenomena, but to communicate their understanding of science within and across disciplines. Scientific models represent a fundamental method for communication among scientists. My research will focus on students' ability to construct models that represent their understanding of biological mechanisms. Specifically, I am interested in testing the hypothesis that certain variables, such as major and sex affect students' model building abilities. We are developing two separate metrics to evaluate the structural complexity of students' conceptual models constructed in various introductory biology assessments. The first determines the ratio of relationships to concepts, and the second is a web-complexity index (WCI) that takes into account the amount of branching within a model. My work contributes to the development of a novel method for analyzing structural complexity of student models and will provide insight into whether other variables correlate with variation in model complexity.

Poster Presentations

EXPLORING BEHAVIORAL RISK AND PROTECTIVE FACTORS IN AT-RISK PRESCHOOLERS
Erika Vivyan
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1312
Mentor(s): John Carlson (Counseling, Educational Psychology, and Special Education)
This study assessed the prevalence of protective factors and behavioral concerns among children in a Midwestern Head Start population. Results from 1,410 adult ratings of their child's behavior indicate that the prevalence of protective factors is within the average range (mean score=49.0, standard deviation=10.7) and prevalence of behavioral concerns within the high average range or almost one standard deviation above the mean (mean score=58.2, standard deviation=10.3) in this low-income, at-risk population. Gender differences in protective factors and behavioral concerns are also reported. For boys, protective factors are relatively lower (mean score=47.8, mean difference=-2.4, 95% confidence interval=-3.5 - -1.3) while behavioral concerns are relatively higher (mean score=59.4, mean difference=2.3, 95% confidence interval=1.2-3.4) compared to girls. These results may help to identify a particularly difficult problem in low-income boys, whose protective factors seem to be lower and behavioral concerns higher than their female classmates. Elevated levels of parent-rated behavioral concerns within this preschool population, puts low income boys and girls at risk for later social-emotional problems and in need of early intervention mental health services.

INVESTIGATING THE CANR UNDERGRADUATE RESEARCH PROGRAM: A STUDY OF STUDENT PARTICIPATION IN HIGH IMPACT AND EXTRA-CURRICULAR PRACTICES
Michelle Leppek
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1322
Mentor(s): Pat Crawford (Bailey Scholars Program)
Undergraduate research is a high-impact practice that is becoming more popular among university students. High-impact practices, in theory, help students learn better faster. Swaner and Brownell (2008) suggest that greater advances will be made as these practices are combined intentionally and with purpose. My study seeks to investigate whether students who are involved in one high-impact practice participate in other high-impact practices or extra-curricular activities. High impact practices include activities such as undergraduate research, capstone courses, study abroad, and freshman seminars. Extra-curricular activities include intramural sports, career-related clubs, Greek life, and student government. The importance of addressing this question is whether these forms of involvement are positively or negatively related to learning. This study will examine if levels of involvement are correlated with learning as measured in GPA. A qualitative survey will produce data that shows the relationship between high-impact practices, extracurricular activities and learning. The objective of my poster is to emphasize the findings of the survey. I anticipate that the results will show a correlation between high-impact practices, specifically undergraduate research, and collegiate extra-curricular activities. This analysis will help us better understand how student involvement can increase and improve learning.

DEVELOPMENT OF THE INVENTORY OF PHONOLOGICAL AWARENESS USING ALTERNATIVE RESPONSES
Chelsea Marks
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1380
Mentor(s): Ryan Bowles (Psychology), Lori Skibbe (Human Development & Family Studies), Gary Troia (Counseling, Educational Psychology and Special Education)
Phonological awareness is an important predictor of later literacy achievement, but assessments of this skill are not available for children with speech production difficulties. Recently developed, the Inventory of Phonological Awareness using Alternative Responses (IPAAR) is the first computerized adaptive test used to assess phonological awareness using nonverbal responses so that it is appropriate for a range of children, including those with speech production difficulties. The current study will discuss how this test was developed including the ways in which it was created to be suitable for children with specialized needs (e.g. response format, vocabulary, item presentation). Research assistants observed three aspects of usability on a 5-point scale during test administration: engagement, understanding of the directions, and maintenance of focus. Our final sample will include fifty children exhibiting typically developing ages 3 to 6 years, with English as a primary language. Preliminary results (n= 24) indicate that children displayed good understanding of the testing procedure (Mean= 4.28; SD= 1.12), were engaged in the measure (Mean= 4.02; SD= .96), but showed some difficulty maintaining focus throughout the assessment (Mean= 3.32; SD= 1.33). No items demonstrated ceiling or floor effects. Next, we will compare responses on the IPAAR to the Test of Preschool Early Literacy (TOPEL), which requires verbal responses, to see whether performance differs by response format. Results from this study could potentially promote the development of nonverbal assessments, readily accessible for typical developing children and those with speech production difficulties.

A BROADENED HORIZON FOR FOSTER YOUTH
Jasmine Jones
Location: Gold Room, 1:30 PM – 3:30 PM
Category: Education, Poster, 1409
Mentor(s): Angelique Day (Research Specialist)
Acknowledging the disadvantages of foster youth transitioning into adulthood from aging out of care is the core of the program. Making educational opportunities known and readily available for these youths is the goal that was set for the program, in the midst of building of relationships that will guide these youths in the correct direction. The program attempts to apply the informational curriculum constructed for the program so that it actively peaks the youths' attention. To assure that the program is a success, or not, data has been recorded through

surveys, questionnaires, and recorded follow-up sessions. The testimonies of the youths serve as the results for these methods. Conclusively, the program tends to serve its purpose.

DEVELOPMENT AND IMPLEMENTATION OF SOYBEAN AGROECOLOGY INSTRUCTIONAL MATERIALS FOR GRADES 3-6 IN MICHIGAN
Makena Schultz
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1420
Mentor(s): Jennifer Rivera-Caudill (CARRS)
The Michigan Soybean Promotion Committee sponsored the development of "Soybeans Go To School" in 1999. The project is a packet of instructional teaching material/curriculum targeted toward 4th grade science and social studies. Having only been updated once and with a resurgence in Michiganders' interest in where their food comes from as well as the environmental implications of producing, updating the curriculum to be current with today's technologies and educational standards while being user friendly is vital. The curriculum will also be expanded to be applicable for grades 3-6 benchmark standards. The soybean curriculum will be evaluated using both pre and post research design methods. The pre-assessment methods include data gathering and analysis to determine the needs of the curriculum and ways that the materials can be implemented that are user friendly and current in relevance through surveys and focus groups. These surveys are currently being conducted with focus group participants being contacted and organized. After collecting the voluntary responses, revisions will be made to the curriculum content. The post-assessment will be based on data gathered through the piloting the program with public Michigan school teacher to determine effectiveness, appropriateness, user friendliness of the program.

MATH MANIPULATIVES: A COMPARISON OF DIFFERENT UNDERLYING METAPHORS USED TO TEACH PLACE VALUE TO SECOND GRADE STUDENTS
Andrew League
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1458
Mentor(s): Kelly Mix (Counseling, Educational Psychology, and Special Education), Julie Nurnberger-Haag (Counseling, Educational Psychology, and Special Education)
Math manipulatives (i.e., physical objects meant to assist in the learning of mathematical concepts) appear as images in assessments (NAEP, 2003) and are very popular among elementary teachers. Yet there is not a clear consensus regarding which types of manipulatives are most effective, in what manner they should be used, or even whether manipulatives are effective at all (Fuson & Briars, 1990; Resnick & Omanson, 1987; Uttal, Scudder, DeLoache, 1997). This study used a pretest-intervention-posttest design to compare the effectiveness of two manipulatives based on different underlying metaphors (trading or packing) for moving between place values. We hypothesized that the packing metaphor would be particularly potent because it taps into a psychological primitive. That is, even infants appear sensitive to packing and containment (Casasola & Cohen, 2002; Casasola, Cohen, Chiarello, 2003; Hespos & Baillargeon, 2001), and the concept of containment is thought to underlie more complex reasoning later in development, including advanced mathematics (Lakoff & NuÃ±ez, 2000). We will compare student gains in place value concepts, multi-digit addition, and addition word problems between the two experimental groups, as well as versus a no-manipulative control group, using an analysis of variance. These data will contribute to the debate regarding manipulative use by testing whether effectiveness depends on the underlying metaphors elicited by different materials.

THE CORRELATION BETWEEN EDUCATION FUNDING AND EDUCATION OUTCOMES
Andrew Revard
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1506
Mentor(s): Matt Grossmann (Political Science)
From presidential through local school board campaigns, the issue of education funding is accorded much attention in the United States. The attention accorded this issue seemingly assumes a causal relationship between education funding and education outcomes. Given the importance accorded this issue, this study examines the relationship between education funding and education outcomes. A correlational study examining the relationship between education funding and education outcomes was utilized for the 2006-2007 and 2007-2008 school years on the fifty states and Washington D.C. For 2006-2007 the relationship between the proportion of income spent on education (measured as per pupil funding as a percentage of median household income) and the average proficiency level on the 8th grade reading and mathematics tests for the National Assessment of Educational Progress was examined. For 2007-2008 the relationship between the proportion of income spent on education (measured as per pupil funding as a percentage of median household income) and the average freshman graduation rate was examined. Subsequently, a linear regression model was applied to both sets of data. The data for 2006-2007 indicated insignificant correlation ($r = .05$) between the amount of wealth spent on education and a state's proficiency level. Similarly, the data for 2007-2008 indicated insignificant correlation ($r = .07$) between the amount of wealth spend on education and a state's graduation rate. The results challenge the assumed causal relationship between education funding and outcomes. The insignificant correlation between funding and outcomes suggests other variables exert a stronger influence on education outcomes.

TEACHER INTERVENTION AND PRESCHOOLERS' CONFLICT RESOLUTION
Kevin Guenther, Allison McCarthy
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1516
Mentor(s): Cary Roseth (Counseling, Educational Psychology, and Special Education)
The role of teacher intervention in preschoolers' peer conflicts is controversial, with one view suggesting that children should resolve conflicts on their own, and another that socialization accounts for conflict resolution's development. This study strives to clarify this issue by using an observational design to examine the effects of two teachers' intervention strategies on preschoolers' conflicts. Specifically, this study examines whether the form of conflict resolution (e.g., stay together or separate) varies as a function of teacher identity and intervention behaviors, and

whether teacher intervention varies as a function of preschoolers' conflict behavior (e.g., physical aggression, verbal aggression, verbal influence). Results have both theoretical and practical implications, highlighting the role of peer conflict and teacher intervention in preschoolers' social development.

WHATS REALLY IMPORTANT? IDENTIFICATION OF IMPORTANT CONCEPTS BY MAJOR AND NON-MAJOR LIFE SCIENCE STUDENTS
Andrew George
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1541
Mentor(s): Tammy Long (Plant Biology)
The ability to extract key concepts from complex, multi-dimensional problems is a valuable skill in any profession, particularly science. Supporting information and minor details often serve as distracters from key concepts. My project compares differences between science majors and non-majors in terms of what they regard as relevant conceptual information when asked a complex question. A subset of student responses was collected from two introductory biology courses, one for non-majors and one for life science majors (n=100/each). On a midterm exam, students were given a summary of a scientific article that examined the effects of Bisphenol-A (BPA) on synapse formation in primate brain tissue. Relevant figures from the paper were included with the summary. Students were then asked several questions to probe their understanding of the information provided, and to test their ability to interpret graphical data. From this, students were asked to develop a conceptual model that accurately depicted the effects of BPA on the brain. More than 90% of students from both courses correctly identified BPA and estrogen as relevant concepts, but majors were more likely to include synapse (99%) and cognition (89%) in their models compared to non-majors (74% and 19%, respectively). Further, the population of non-majors identified a broader range of concepts they regarded as relevant (n=34, overall) compared to majors (n=20). These and other insights into how different student populations process complex information will prove valuable for instructors concerned with facilitating students' development of critical thinking skills.

MAKING CONNECTIONS: DO STUDENTS' CONNECTIONS BETWEEN KEY GENETICS CONCEPTS ELUCIDATE STUDENT UNDERSTANDING?
Shauna Jones
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1614
Mentor(s): Tammy Long (Plant Biology), Mark Urban-Lurain (Division of Science and Mathematics Education)
There are fundamental concepts in every field of study that must be grasped in order to move toward deeper understanding. For biology, understanding of the concept of allele is paramount to grasping basic genetics. Here, I evaluated student understanding of alleles by examining student created genetic models. Specifically, I quantified the connections of various terms (e.g., gene, protein) to allele in order to describe student representations about the relationship of allele to other concepts. The data came from an introductory biology course (N=504) where the same conceptual model was given on the midterm and final exams. The connections from allele to the other terms, and vice versa, were examined using a text analysis software program (SPSS Text Analytics for Surveys), which categorized the student responses. After categorization, I analyzed the frequency of student responses placed in each category to see if students made more or less connections to and from allele on the final. Preliminary analysis shows similar numbers of responses (e.g., midterm=140, final=159) on each exam for the same categories. Additionally, concept webs which illustrate interconnections between the various categories show that the number of connections between categories was also very similar when comparing data from the midterm and final. Future work will examine correlations between correctness and placement of answer in a particular category. My results imply that examining the connections made from allele to other terms, without also examining correctness, may not be sufficient to evaluate student understanding of the concept of allele.

CONTEXT-BASED RESPONSES REGARDING ORIGIN OF VARIATION
Megan Gustafson
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1615
Mentor(s): Tammy Long (ISB)
Natural selection and evolution are fundamental concepts in the understanding of biology and students must learn to apply this knowledge in diverse contexts. My study explores how introductory biology students' responses vary when asked to describe the origin of variation for a plant (wild tobacco) and a digital microorganism (Avidian). Responses were placed into of three categories based on the mechanism students cited as the cause of new variation: natural selection, genetics or environment. Student responses could be placed into more than one category if the response described more than one mechanism for origin of variation. Preliminary data show that students were equally likely to attribute the origin of variation to genetic variation when describing the digital microorganism (78%) or the plant (84%). Conversely, students were statistically more likely to use environmental or natural selection terms when describing the origin of variation for the plant (20% and 10%, $p<0.01$) than the microorganism (2% and 1%, $p<0.01$). My findings indicate that using macro-scale model organisms versus micro-scale model organisms could have an impact on student response, even when asked to describe the same phenomenon. This implies that when teaching introductory biology, instructors should explain evolution in multiple contexts.

HOW DO MICHIGAN STUDENTS FARE: COMPARISON BETWEEN MEAP AND STATE NAEP
Andy Chou
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Education, Poster, 1620
Mentor(s): Matt Grossmann (Political Science)
Researchers have shown that states lowered the standards of state assessment in order to meet with the demands of No Child Left Behind Act. Michigan is among the states that implemented these measures. While these measures boosted the proficiency rate on the surface, columnist and scholars have warned the potential adverse effect. In my paper, I will look at MEAP scores across time and compare the scores between states.

Engineering, Computer Science, and Math

Oral Presentations

VALUE MATRIX THEOREM AND ITS APPLICATIONS TO TWO PLAYER MATRIX GAMES
Mitchell Wood
Location: Lake Huron Room, 1:00 PM
Category: Engineering, Computer Science, and Math, Oral
Mentor(s): Aklilu Zeleke (Statistics)
In Game Theory, the dimension of the matrix game often limits the ability to solve the game exactly. By separating out a large game into solvable 2x2 matrices an analogous value matrix can be formed. The new matrix preserves the qualities of the original game, but now has the advantage of dominating strategy reduction. As an added restriction to solve the value matrix, a player should play the strategy that contains their best payoff while avoiding the opponents' best outcome. The solution to the original matrix comes as a mixed solution to an otherwise unsolvable game. Furthermore a computer program has been generated to solve these games exactly in a minimal amount of time.

DETECTION OF E COLI THROUGH REDUCTION OF GOLD NANOPARTICLES
Patrick Fewins
Location: Lake Huron Room, 1:15 PM
Category: Engineering, Computer Science, and Math, Oral
Mentor(s): Evangelyn Alocilja (Biosystems & Agricultural Engineering)
In this study, we developed a biosensor which enabled sensitive and rapid determination of presence of E. coli O157:H7. Conventional culture plating method requires days to perform, and polymerase chain reaction (PCR) method requires techniques and time to amplify the sample's gene pool. Compared to those methods, our biosensor will cut the detection time down to less than one hour, and it also can be compact and field viable. The detection started by first attaching non-electrically active magnetic nanobeads to the E. coli cells as mechanical tags for separation of the targets from a given sample. These magnetically active E. coli cells were then attached to gold nanoparticles which served as quantitative indicators. By magnetic separation, we obtained the bacteria with a certain amount of gold nanoparticles attached to them. By measuring the amount of the gold nanoparticles by electrochemical method, the presence and the amount of the target bacteria were determined. The results showed that we detected E. coli in the range of cell dilutions of 10-2 (around 106 cfu/ml) to 10-6 (around 102 cfu/ml). To make this method field viable, equipment needed could be stripped down to a galvanometer, sterile pipettes with tips, and a magnet. This method will make a conventional test obsolete by improving efficiency. It will also allow for a harmful pathogen to be detected and dealt with in a consistent and timely manner.

MUTANT AVIDIANS: EXPLORING MUTATIONAL BIAS
Tasneem Pierce, Mairin Chesney
Location: Lake Huron Room, 1:30 PM
Category: Engineering, Computer Science, and Math, Oral
Mentor(s): Charles Ofria (Computer Science)
Avida is an artificial life program that allows for the study of evolutionary biology via self-replicating and evolving computer organisms. Avida allows us to study a variety of evolutionary theories in silico as compared to longer experiments in vivo. We used Avida to model the evolution of codon redundancy via observing the effects of mutational bias. Avidians were placed in a pathfinding module, and the composition of the population that did well in the module was then used proportionally to create a mutational bias for later populations. Mutational bias can increase an organism's fitness. We also used Avida to identify the conditions under which a population will fix a higher mutation rate if it is easy to knock out a mutation-repair mechanism, but difficult to re-evolve one. A high mutation rate alone will typically be maladaptive (many more mutations are detrimental than beneficial), but if a mutator causes a rare beneficial mutation, that mutator may hitchhike on that beneficial mutation. This type of experiment models the evolution of mutator phenotypes in long-term Escherichia coli experiments. The two simulations of evolutionary theory regarding mutations elucidate biological mechanisms for adaptation.

EFFECTS OF MICROCRACKS ON HYDROXYAPATITE SURFACE COMPOSITION AND OSTEOBLAST CELL RESPONSE
Craig Pearson
Location: Lake Huron Room, 1:45 PM
Category: Engineering, Computer Science, and Math, Oral
Mentor(s): Melissa Baumann (Chemical Engineering and Materials Science)
Bone fracture and microcracks generated from daily activities have been found to trigger an enhanced bone remodeling process, which involves bone resorption by osteoclasts and bone formation by osteoblasts. This cellular response is part of a complex mechanism, one important aspect of which is how the local chemical environment changes in the vicinity of microcracked regions. Hydroxyapatite (HA or $Ca_{10}(PO_4)_6(OH)_2$) is the main inorganic component of physiological bone, and thus was chosen as the substrate material for investigating the crack effect on the local environment and osteoblast response. In the present study, microcracks are introduced in the HA by using Vickers indentation. Osteoblasts are brought into contact with the HA surface, and their position and orientation are measured at designated time intervals. The aligning tendency of these bone cells relative to the cracking site gives insight into how they would respond *in vivo* when confronted with a broken bone. Thus, conclusions can be drawn about how the local crack environment affects cell orientation and stimulates the healing process.

INTERIOR BASEMENT INSULATION PANEL
Courtney MacDonald, Darren Fung, Dan Tepe, Sara Wiederoder
Location: Lake Huron Room, 2:00 PM
Category: Engineering, Computer Science, and Math, Oral
Mentor(s): Alfred Loos (Mechanical Engineering)
Dow Chemical has been a household name for home insulation since it first debuted Styrofoam in 1942. Since then, Dow has expanded its product line to include spray foams and polystyrene batting for use as interior insulation within stud walls. Changing energy codes and increased consumer demand for energy efficiency has inspired the push for better insulation products that reduce the energy costs for the homeowner while maintaining an aesthetically pleasing living space. Beginning in 2011, new homes must insulate the interior of a basement if external insulation is not used, as heat loss from uninsulated basements can account for up to a third of a home's energy losses. Basements pose a challenge to existing insulation paradigms-unlike attics and interior walls, basement insulation strategies must account for moisture from the foundation as well as being functional, safe and fire-resistant while maintaining a traditional appearance. The design team researched current strategies for insulating basements, attics, crawlspaces and interior walls in order to understand the available materials and installation methods. The goal was to create an easy-to-install solution that requires no maintenance over its lifespan, is cost-competitive with existing insulation strategies, is simple to manufacture with Dow's existing facilities, and meets the new insulation requirements.

CHARACTERIZATION OF A FAMILY OF CUBIC DYNAMICAL SYSTEMS
Shan Kothari
Location: Lake Huron Room, 2:15 PM
Category: Engineering, Computer Science, and Math, Oral
Mentor(s): Aklilu Zeleke (Lyman Briggs, Statistics)
Motivated by the fact that cubic maps have found potential applications to modeling of biological and physical processes, we examine a family of discrete, non-linear dynamical systems comprising one-parameter cubic polynomials of certain form. We examine and classify their fixed points and two-cycles over various parametric domains. We also study their bifurcation diagrams and use a variety of techniques to analyze their chaotic behavior.

THE CANTOR SET
Matt Wein, Nicole Kiriazis
Location: Lake Huron Room, 2:30 PM
Category: Engineering, Computer Science, and Math, Oral
Mentor(s): Aklilu Zeleke (Statistics and Probability)
The Cantor set is one of the simplest examples of a fractal. It can be depicted graphically by removing the middle third of a line segment and then repeating this to each resulting line segment. The points that remain after this process is repeated infinitely are known as the Cantor set. This set is known to have a number of interesting properties. It can be produced by setting all of the parameters of the Cantor set function equal to 3. This is considered to be a special case of the Tent Map function. Our main goal was to find out more about the Tent Map function by altering its parameters in order to achieve a better understanding of the Cantor set. This leaves several cases to be examined. All three parameters can be equal, as in the case of the Cantor set. One parameter might be different from the other two, which are equal. There are three such cases to examine. Finally, all three variables might be unequal, giving us six cases to examine. Therefore, ten possible variations of the Cantor set could possibly exist.

Poster Presentations

RED CEDAR WATER TABLE COOLING
Kayla Hunt
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Engineering, Computer Science, and Math--1, Poster, 1331
Mentor(s): Dirk Colbry (Institute For Cyber-Enabled Research)
Red Cedar water table cooling involves using water from the Red Cedar water table in the form of geothermal cooling for a more productive way to cool the HPCC in the server room. That was my goal this semester, to research if using a geothermal cooling system is more energy and cost efficient that the current computer room air conditioning (CRAC) system. I estimated the current cost per year of the air conditioning in the server room. Then through researching and calling different companies, I was able to estimate the initial price and the cost per year of a geothermal cooling system. This geothermal cooling system is supposedly, according to Econar, FHP Manufacturing, Water Furnace, and other web sources, much more energy efficient than a regular CRAC so I also researched the energy efficiency between the two different systems. The conclusion I came up with after putting all the information together was that it is more cost efficient to get the new geothermal cooling system and also more energy efficient to have this geothermal system. My suggestion for a more efficient and sustainable server room is to purchase the geothermal cooling system.

RAPID DETECTION OF SALMONELLA ENTERICA SEROVAR ENTERITIDIS GENOMIC DNA USING A NANOPARTICLE-BASED DNA SENSOR
Michael Huarng
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Engineering, Computer Science, and Math--1, Poster, 1365
Mentor(s): Evangelyn Alocilja (Biosystems Engineering)
Salmonella enteric serovar Enteritidis is one of the most frequently reported causes of foodborne illnesses that serves as a major threat in food safety. Although there are many methods commercially available to detect S. enteritidis, none adequately meet the need of the food safety standards. Long detection times, expensive reagents and equipment are among some of the shortcomings of such commercial options. For

these reasons, much research has turned to the utilization of sensitive, inexpensive nanotechnology and biosensors to address these inadequacies. In this study, gold nanoparticle-based biosensors were used to detect the DNA insertion element (Iel) of S. enteritidis from both pure bacterial culture and bacterial-spiked food matrix without polymerase chain reaction (PCR) amplification. In particular, S. enteritidis genomic DNA was directly extracted from pure culture and food matrix, isolated, and hybridized into a sandwich-like structure consisting of magnetic nanoparticles (MNPs)/S. enteritidis DNA/gold nanoparticles (AuNPs) without undergoing any PCR process. Sandwich structures were then analyzed for the presence of target DNA through the direct detection of gold voltammetric peaks using differential pulse voltammetry (DPV) technique. Our preliminary findings demonstrate that the concentration of bacterial DNA could be detected as low as 0.1 ng/mL from pure culture and 1 ng/mL from food matrices using AuNPs as reporter by DPV. These findings suggest that the DNA-based biosensor can serve as a viable tool for a field-based detection of pathogenic contaminants. The biosensor is simple to operate, requires no fancy equipment, can be handheld and battery-operated, and very inexpensive.

THERMAL RECYCLING: USING THERMO-ELECTRICS TO CONVERT HEAT INTO ELECTRICITY
Bobby Valentic
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Engineering, Computer Science, and Math--1, Poster, 1415
Mentor(s): Dirk Colbry (Institute for Cyber-Enabled Research)
This project attempts to find a practical use for excess heat produced in the HPCC server room; namely, converting it into electricity for later use. By using the laws of thermoelectrics, specifically the Seebeck and Peltier effects, it is possible to convert heat into electricity and vice versa. With the use of thermal exchangers, also called thermoelectric generators, the hot air exhausted from the servers can be converted into electricity. This technology is currently in use and available for purchase. For research, two thermoelectric generators were purchased and experiments were performed on them. It was later concluded that while the thermoelectric generators are able to produce electrical power, the amount is nominal and of little practical use. Attempts to find alternate uses for this power are ongoing.

MEASUREMENT OF REACTIVITY OF PD, PT, AND RU NANOCATALYSTS IN HYDROGENATION REACTIONS
Thomas Fielitz
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Engineering, Computer Science, and Math--1, Poster, 1507
Mentor(s): Robert Ofoli (Chemical Engineering and Materials Science)
Because of their small size, nanoparticles (NPs) offer a distinctly large surface area-to-volume ratio that makes them very attractive as catalysts. NPs made of palladium (Pd), platinum (Pt), and ruthenium (Ru) 2-5 nm in diameter were synthesized with n-dodecyl sulfide (NDS) as the stabilizing ligand. Their catalytic activity was investigated in alkene and carbonyl three-phase hydrogenation reactions. The experiments were performed in poly(dimethylsiloxane) (PDMS)-glass microfluidic reactors using either 1-bromohexene or pyruvic acid as the substrate in methanol. To enable catalyst reuse and recycling, the NPs were immobilized in situ in two steps: a) a solution of 3-aminopropyltrimethoxysilane (APTMS, a connecting molecule) was infused into the microfluidic reactors and bonded to the PDMS and glass reactor walls; b) a solution of NPs was infused into the microfluidic reactors, and adhered to substrate-bound APTMS, thus resulting in effective particle immobilization through chemical bonding. Reactions were then conducted using the immobilized NPs, operating with an annular flow of hydrogen gas surrounded by substrate solution along the reactor walls. The product was collected and analyzed via gas chromatography (GC) or GC-mass spectrometry (GC-MS). The reactions achieved 30-100% conversion for the Pd, Pt, and Ru nanoparticles, confirming successful catalyst immobilization and demonstrating their catalytic viability.

OPTIMIZATION OF AN AGENT-BASED TRAFFIC EVACUATION MODEL USING EVOLUTIONARY COMPUTATION
Matthew Durak
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Engineering, Computer Science, and Math--1, Poster, 1508
Mentor(s): Erik Goodman (Electrical and Computer Engineering)
Officials must respond quickly and efficiently in emergencies in order to save lives. They typically plan using a top-down, conceptual model to describe behavior in such a situation. Such a model tends to generalize human behavior and masks individual differences. Agent-Based Models (ABM), in contrast, take a bottom-up approach and represent many "agents" interacting with each other and their environments, each according to some set of rules. ABMs produce the emergent properties of a system under stress. They allow responders to test and compare different strategies. This study uses an ABM of a portion of a city with an irregular grid of roads. Cars drive to locations determined at random to model normal traffic conditions. An emergency is modeled in which a chemical spill occurs south of the area with wind blowing north. Drivers are instructed to evacuate via radio and digital signs. Some drivers hear the instructions and obey, while others remain unaware or stop at intermediate locations. The task of the emergency planners is to control the traffic light signal timings. Evolutionary computation is used to seek optimal timing strategies which minimize the number of casualties and evacuate the area fastest. This method takes initial population of random strategies and evolves them--using mutation or recombination--favoring strategies that minimize casualties. The optimized strategy may be compared against a typical evacuation strategy in order to demonstrate the effectiveness of optimizing an ABM using evolutionary computation.

THERMOELECTRICS
Albert Edwards Jr
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Engineering, Computer Science, and Math--1, Poster, 1521
Mentor(s): Tim Hogan (Electrical Engineering)
Thermoelectric materials can be used for the fabrication of power generation devices which convert waste heat into electricity. These thermoelectric generators have no moving parts; have conversion efficiencies which are independent of the size of the generators; have low maintenance; and can be used with a variety of heat sources. The nation’s largest thermoelectric research group exists at Michigan State

University where new materials are being investigated for higher conversion efficiencies. Traditional thermoelectric materials have thermal to electric conversion efficiencies of less than 10%. This efficiency is based on the temperature dependent material properties of electrical resistivity (in units of Ω·cm), thermopower (in units of μV/K), and thermal conductivity (in units of W/m·K). The challenge associated with identifying new materials necessitates the characterization of many samples. To that end, a four sample measurement system has been designed and constructed as presented in this poster. This is a tube furnace based system for characterization from 300K to 800K using PID temperature control. The system is controlled using the LabView® programming environment for temperature control and data acquisition. Details of construction and calibration steps are presented in this poster.

DETERMINING OPTIMAL PARAMETERS FOR AN ELECTROCHEMICAL CELL TO BE USED WITH BIOSENSORS
Krista Lueck
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Engineering, Computer Science, and Math--1, Poster, 1657
Mentor(s): Evangelyn Alocilja (Biosystems Engineering)
The development of proficient and accurate bacterial biosensors is crucial to preventing foodborne illness outbreaks. Electrochemical cells can be employed within a biosensor for pathogen detection. If the components of this electrochemical cell are optimized, biosensors can function with increased accuracy. The variables evaluated in this study are the size of electrodes used in the cell, the electrolyte solution in which the electrodes are tested, and the distance between electrodes during testing. Electrotextiles were constructed to function as electrodes for testing by coating polypropylene microfibers in conductive polypyrrole. Multiple electrolyte solutions were prepared and diluted to varying molarities. The electrotextile material was cut into pairs of varying measurements, and a glass box was filled with an electrolyte solution at room temperature. The electrodes were attached to a multimeter and inserted into the solution; output current was measured using an unchanging voltage. The resistivity of the solution was calculated and analyzed for the varying solutions, electrode sizes, and distances. The optimal parameters can now be applied for engineering an effective biosensor.

CONDOR SYSTEM
Katrina Suchoski
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Engineering, Computer Science, and Math--2, Poster, 1335
Mentor(s): Dirk Colbry (Institute For Cyber-Enabled Research)
Often times at research universities, the issues of the quantity of compute intensive jobs, and the cost to the run these jobs on a high performance computing center (HPCC) arise. Much money is invested into buying dev-nodes, or computers to run the jobs on, but the lifespan of the nodes, on average, lasts about four years. One possible solution to the overspending occurring is the Condor system. Condor is a specialized workload management system used for compute intensive jobs. The objective of Condor is to disperse the single CPU jobs that are in the queue of the HPCC and dispatch them to computer labs that have computers sitting idle on campus. The overlying question that needs to be answered is how much, if any, money could the system save the university. After doing much research, I have concluded that the Condor system will save the university money.

WINDOW COOLING
Michael Mock
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Engineering, Computer Science, and Math--2, Poster, 1480
Mentor(s): Dirk Colbry (Institute for Cyber-Enabled Research)
The goal of my research is to determine if opening a window in the High Performance Computing Center is a viable and effective alternative to cooling the room. Doing so would alternatively save money and be more sustainable by using less fossil fuels to power the current cooling system. I have done research as to what a server room's atmosphere must be at to function at its optimum and safest level. I have also researched data from outdoor temperature and humidity levels in East Lansing to see what days of the year would be worthwhile to use the outdoor temperature for a cooling system. Using cost comparisons, weather comparisons, and analysis of the two, the HPCC can take my research results and either change the current cooling system, or leave it as is.

USING 3D SCANNING TECHNOLOGY TO EVALUATE ANCHOR POINT DETECTION ALGORITHMS
Joshua Fenton
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Engineering, Computer Science, and Math--2, Poster, 1497
Mentor(s): Dirk Colbry (Institute for Cyber-Enabled Research)
The goal of this research is to develop a new computational method to test the accuracy and precision of anchor point detection algorithms in image processing. The Traditional method for evaluating the error of anchor points is to use manually selected ground truth points. However, ground truth is prone to its own errors (human error) and can show unpredictable bias in the results. We propose using 3D information provided by 3D scanning technologies to independently evaluate the quality of anchor points. As a first step in this research we are using this new evaluation approach to determine the accuracy of a well know dataset. The Facial Recognition Grand Challenge (FRGC) dataset is a collection of three-dimensional facial scans that include manually selected anchor points. Given the FRGC dataset, we used the manual 2D anchor point coordinates to look-up the three dimensional coordinates of each anchor point in any two given scans. After running the scans through a surface alignment program, the coordinates from one scan are projected into the coordinate system of the other scan. This process is repeated over every possible relevant two-scan combination and the results are recorded to yield information about the accuracy and precision of the original manually selected anchor points. Although the current approach is limited to human faces, it provides a methodology for evaluating error that should work well in other domains. The approach will provide a way for researchers developing anchor point detection algorithms to independently measure error.

A FLEXIBLE RESEARCH INTERFACE TO STREAMLINE MANUAL IMAGE ANALYSIS

Timothy Door

Location: Gold Room, 1:30 PM - 3:30 PM

Category: Engineering, Computer Science, and Math--2, Poster, 1522

Mentor(s): Dirk Colbry (Institute for Cyber-Enabled Research)

Chamview is a Python application written to ease image analysis as performed by researchers. The goal is to create an easy to use interface that takes video from an observational experiment and facilitates the gathering of research metrics such as length and anchor point positions. As a first step, the application has been designed while working with behavioral video taken from chameleons to record eye points and step length. A major design goal is to make the program general enough to be useful in many domains while at the same time being configurable to easily adapt to new domain specific research requirements. Presently, the program does the following; 1) Convert a given video to a series of frames as separate images, 2) Allow users to input a text file with a list of labels they would like to use, 3) Allows users to cycle through the frames of the video, clicking to designate specific points with their chosen labels, 4) Save these points and redraw them on the frames with every subsequent view of the frame in question, 5) Keep track of every point's coordinates in a text file, allowing for easy calculations (ex. distance between points). Heading forward, we are investigating computerized prediction of point locations (such as predicting the future position of a point based upon its past velocity) with computer vision to accurately automate the process of analyzing the frames, minimizing the required human interaction as much as possible.

DETECTION OF E COLI 0157:H7 SAKAI THROUGH DEACTIVATED WHOLE CELL FLOURESCENT SURROGATES

Brian Castro

Location: Gold Room, 1:30 PM - 3:30 PM

Category: Engineering, Computer Science, and Math--2, Poster, 1598

Mentor(s): Evangelyn Alocilja (Biosystems and Agricultural Engineering), Mike Anderson (Biosystems and Agricultural Engineering)

Escherichia coli 0157:H7 is a pathogenic strain of bacteria that causes foodborne illness, often leading to hemorrhagic diarrhea and in some cases kidney failure. A variant of this strain infected thousands when it broke out in Sakai City, Osaka, Japan in 1996, and similar outbreaks have occurred all over the world. In order to prevent another catastrophic breakout in the future, rapid and efficient methods for the detection of E. coli 0157:H7 Sakai must be developed. This study focused on creating a fluorescent surrogate antigen target for bacterial antibodies. The methodology involves fixing cells so that they react similarly to live cells for antibody capture. These fixed cells lack the ability to replicate and the pathogenicity of living cells, but retain antigen-binding ability. Fixing cells ensures the safety of the diagnostic procedure, while still allowing for a decisive test. By determining a DNA-intercalating stain compatible with the fixation process, these fixed and stained cells become a visually traceable target.

USING COMPUTER SIMULATION TO IMPROVE ICT GOVERNANCE

Grayson Wright

Location: Gold Room, 1:30 PM - 3:30 PM

Category: Engineering, Computer Science, and Math--2, Poster, 1647

Mentor(s): Erik Goodman (Electrical and Computer Engineering)

In the modern world, Information and Communication Technologies (ICT) networks have become a vital element in any country's economic health. Recently, the US has fallen behind many European countries in the speed and infrastructure of their networks. Many proposed governmental regulations have aimed to solve this shortcoming, but few have been successful. Some of these misguided remedies were implemented because standard economic models fall short when predicting the behavior of complex network systems. Our project, funded by the National Science Foundation, creates a new tool for predicting network responses to newly imposed regulations. We are developing a computer simulation of an ICT network using agent-based modeling and evolutionary techniques. In this simulation, hundreds or thousands of agents, representing consumers, network providers (such as Verizon or Comcast), and application providers (such as Google, Netflix, or Facebook) interact with each other to form a balanced system such as our internet. Evolutionary techniques are applied to produce realistic behavior from the agents. Once an equilibrium is established, regulators will be introduced to change the dynamics of the system. The resulting behavior will be observed, and the effectiveness of the regulation will be judged. This new simulation technique will allow more accurate assessment of the effectiveness of regulations, and will permit more informed and effective governance of our ICT networks.

Environmental Sciences and Natural Resources

Oral Presentations

HYPOXIA IN THE NORTHERN GULF OF MEXICO IN 2010: WAS THE DEEPWATER HORIZON OIL SPILL INVOLVED?
Benjamin Kamphuis, Sam Decamp
Location: Parlor C, 9:00 AM
Category: Environmental and Natural Resources, Oral
Mentor(s): Nathaniel Ostrom (Zoology)
The disastrous events of the BP oil spill in the Gulf of Mexico have left a long term impact which will be dealt with for years to come. The 4.93 million barrels of oil released into the Gulf of Mexico has led to an increased metabolism of O2 by the microbial population of the water column and sediments. Through analyzing water samples collected in the Gulf of Mexico in May and August of 2010, we found evidence of hypoxia (2 mg O2 L-1) near the bottom at several stations (< 60 m). The ratios of primary production to respiration (P:R) were determined at each station based on the isotopic composition of O2 and varied between 0.88 and 1.10. A ratio below 1 indicates net autotrophy whereas a ratio above 1 indicates net heterotrophy. In August, P:R ratios above 1 indicated net heterotrophy and are consistent with respiration of Deepwater Horizon oil. To determine the metabolism of the O2 below the pycnocline, a Rayleigh isotope fractionation model was used. The model's data showed the net heterotrophy was due to the microbial respiration in the sediments rather than in the water column. The future impacts of oil mixed into the sediments are unknown, but will cause hypoxic levels to increase in frequency and possibly strengthen in the years to come. The next goal will be to know how the increased sediment demand of O2 will control development of the hypoxia in the future.

LARGEMOUTH BASS EGG ABUNDANCE: EFFICIENT, RELIABLE ESTIMATES FROM NEST PHOTOGRAPHS
Jason Smith
Location: Parlor C, 9:15 AM
Category: Environmental and Natural Resources, Oral
Mentor(s): Mary Bremigan (Fisheries and Wildlife)
In late spring, female largemouth bass lay eggs in shallow littoral nests, which a male guards. Numerous environmental and anthropocentric factors, plus characteristics of the nesting male affect the reproductive success of individual bass nests. It is unknown if the number of eggs in a nest affects its ultimate contribution to bass population abundance. I sought to develop an efficient method for estimating the abundance of eggs in a nest using analysis of underwater photographs. I divided photographs from eighteen nests into six categories based on substrate (weedy, clean) and egg density (high, average, low). Overlaying a grid onto each image, I counted and recorded the number of eggs in each grid cell, also recording cell type (interior, perimeter). Total egg number per nest ranged from 882 in a weedy low-density nest to 5474 in a weedy high-density one. Mean egg density per grid cell varied significantly among nest egg densities and cell types but not between substrates. Using mean grid cell densities for each nest density and cell type category, I will estimate the egg totals per nest by assigning mean egg density values to each cell, based on its category. I will quantify the correlation between the estimated total egg number and my absolute counts. If the correlation is strong, then the more time-efficient estimation method will be applied to all nests in Dr. Bremigan's bass study, including this important variable in the broader analysis of bass populations.

ANALYSIS OF ARSENIC MOBILITY WITHIN THOMPSON LAKE SEDIMENTS
Elizabeth Karinen
Location: Parlor C, 9:30 AM
Category: Environmental and Natural Resources, Oral
Mentor(s): David Long (Geological Sciences)
Lake sediment cores can interpret the historical loadings of contaminates to the environment. This assumes that once deposited, the chemical record remains. One critical contaminant (arsenic) has been difficult to assess because of its tendency to exhibit post depositional mobility because of changes in the oxidation reduction state to the system. The question that needs to be answered in interpreting the As record is what is due to inputs from human activities or from post-depositional migration. To help address these questions, the As record in Thompson Lake, Howell Michigan was studied. The watershed has been by logging, agriculture, and rapid urbanization and thus affords an interesting study of As loadings that could be due to various processes such as increased erosion, pesticide, industry leakage and changes in the productivity of the lake. The first hypothesis is that the As chemical profile in the sediment is the result of anthropogenic loading and the second is that the profiles are the result of post depositional mobility. If the first is true then profiles should match production/consumption records for As and if the second is true, the profiles should correspond to a redox gradient as defined by the profiles of Mn and Fe. Results show that the As profile matches more of the production/consumption record than the predicted redox sequence. This implies that the As profiles in Thompson Lake may indicate anthropogenic additions and help to provide metrics for interpreting chemical profiles of redox sensitive metals.

GENETIC INVESTIGATION OF MULTIPLE PATERNITY AND ITS IMPLICATIONS IN SNAPPING TURTLES (CHELYDRA SERPENTINA)
Stacey Piotrowski
Location: Parlor C, 9:45 AM
Category: Environmental and Natural Resources, Oral
Mentor(s): Kim Scribner (Fisheries and Wildlife)
Conservation efforts rely on the best available information. However, for many poikilothermic vertebrates, such as turtles, information on the mating system is limited to females. Male reproductive success is more difficult to quantify, because paternity cannot be determined from direct observation alone. The Snapping turtle (Chelydra serpentina) is characterized by extreme longevity and larger clutch sizes than other freshwater turtles. Previous work has demonstrated that females can have multiple males sire offspring within a single clutch (multiple paternity), however the factors influencing multiple paternity have not yet been explored. The 34-year (1972-2006) study of turtles on the Edwin S. George Reserve near Hell, Michigan provides a wealth of information on life history, demographics, and females of known age and

reproductive history. Larger females typically have more eggs per clutch than smaller females, and older females typically have larger eggs than smaller females. Thus, older and larger females are thought to be of higher reproductive quality. Because all males would benefit from mating with older and larger females, we predicted that multiple paternity would be higher within these subsets of females. Using highly-polymorphic microsatellites, we quantified occurrence of multiple paternity in clutches over five years (2002-2006). The frequency of multiple paternity was highly variable among years (20-60%). Correlations between clutch size, female body size, and female age will be explored, and implications to male reproductive success resulting from paternity analysis will be discussed.

GENETIC ANALYSES PROVIDE COMPOSITIONAL ESTIMATES OF LAKE STURGEON POPULATION COMPOSITION TO MIXTURES DURING NON-SPAWNING PERIODS IN LAKE MICHIGAN

Christopher Radek

Location: Parlor C, 10:00 AM

Category: Environmental and Natural Resources, Oral

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

Lake sturgeon, Acipenser fulvescens, are a member of an ancient family of long-lived fish. Indigenous to the Great Lakes region, lake sturgeon have been severely impacted by anthropogenic influences and are a conservation priority. A lack of information regarding recruitment patterns and habitat use during non-spawning periods impedes current restoration efforts. Using microsatellite loci and likelihood-based statistical methods, we estimated population-specific occupancy of open-water habitats during non-spawning periods. Breeding populations included from Michigan (N=3) and Wisconsin (N=4) analyses were conducted by age group and season when possible. We found genetic evidence for heterogeneity in population composition of groups of individuals occupying different habitats throughout Green Bay. Population composition of mixtures varied significantly across Lake Michigan. Compositional estimates varied by season (spring vs. fall) and between adults and sub-adults. This study provides insight regarding the habitat occupancy of non-spawning individuals in open-water habitats. Such information is crucial to conservation efforts for this high conservation priority species.

THE RELATIONSHIP BETWEEN HARVEST CANOPY GAP SIZE AND SOIL NITROGEN TRANSFORMATION DYNAMICS IN NORTHERN HARDWOOD FORESTS

Nicholas Brown

Location: Parlor C, 10:15 AM

Category: Environmental and Natural Resources, Oral

Mentor(s): David Rothstein (Forestry), Michael Walters (Forestry)

Forest management strategies aim to mimic natural forest disturbance dynamics. One approach is the creation of small harvest canopy gaps (0.05-0.25ha) in forests where single tree mortality dominates disturbance regimes. Gaps increase light for regenerating seedlings, but little is known about effects on soil resources. Increased soil moisture and temperature in gaps may increase microbial activity and subsequent rates of nutrient transformation, but how this varies with gap size and how it impacts rates of nitrogen (N) mineralization is unknown. The goal of this study was to determine the relationship between forest harvest canopy gap size and net vs. gross N mineralization rates. At a northern hardwood forest site in Emmet County, MI, gross mineralization rates were measured in situ using the 15N stable isotope dilution model developed by Kirkham and Bartholomew (1954). This method was applied to intact soil cores from the upper mineral layer (0-15cm) in 15 canopy gaps (64-2400m2) and two understory forest plots. Net mineralization rates were measured in concert with gross rates using colorimetric analysis of KCl soil extracts from paired-core incubations. We expect gross mineralization rates to increase linearly as canopy gap size increases. We expect net mineralization rates to parallel immobilization rates and increase with gap size, but only until a certain gap size threshold. Microbial activity increases as gap size increases because of favorable environmental conditions and subsequent N availability, but after this threshold microbes are potentially C limited.

EFFECT OF TEMPERATURE ON OXYTETRACYCLINE MARKS WITHIN CHINOOK SALMON (ONCORHYNCHUS TSHAWYTSCHA) VERTEBRAE

Kelley Smith

Location: Parlor C, 10:30 AM

Category: Environmental and Natural Resources, Oral

Mentor(s): Mike Jones (Fisheries and Wildlife)

All Chinook salmon (Oncorhynchus tshawytscha) stocked into Lake Michigan from 2006-2010 were mass-marked with oxytetracycline (OTC), an antibiotic that is retained in bony structures. Vertebrae from harvested fish are then used to determine stocked and wild origin contributions. Past studies indicate temperature and long-term freezer storage might negatively affect OTC mark readability and detection. My objective was to determine the amount of OTC mark degradation in Chinook salmon vertebrae caused by temperature and long-term freezer storage. I hypothesize that high ambient temperatures and long-term freezer storage adversely affects OTC marks in salmon vertebrae, potentially rendering the mark undetectable. This would ultimately increase the amount of salmon classified as unmarked or wild, leading to overestimates of natural reproduction. Over the summer 48 dissected vertebrae that tested positive for OTC were kept in coolers in the sun under various conditions and treatments reflecting situations that occur when collecting samples. Changes in the mark quality of these samples were observed periodically over a 10 hour period. Another 40 samples of dissected vertebrae that tested positive for OTC had been sitting in freezer bags in freezers for varying amounts of time, a common storage practice by several agencies. These samples were re-evaluated to see if the mark had degraded from its previous reading. The results and conclusions of this study are necessary to establish a standardized sampling, storage, and processing protocol, which would provide better management and understanding of Chinook salmon population dynamics in the future for Lake Michigan's multi-billion dollar salmon industry.

USING PATERNITY ANALYSIS TO INFER CONNECTIVITY OF BLACK BEARS (URSUS AMERICANUS) IN THE NORTHERN LOWER PENINSULA OF MICHIGAN

Rebecca Lust

Location: Parlor C, 10:45 AM

Category: Environmental and Natural Resources, Oral

Mentor(s): Hope Draheim (Zoology), Jennifer Moore (Fisheries and Wildlife), Kim Scribner (Fisheries and Wildlife)

Dispersal affects population connectivity by increasing gene flow among populations, resulting in increased genetic variation and evolutionary adaptive potential which affects overall population persistence. Measuring dispersal through traditional ecological methods such as radio telemetry or capture-mark-recapture (CMR) can be difficult or misleading. Genetic techniques provide a useful alternative approach to measuring connectivity, as gene flow can be used as a surrogate measure of functional connectivity. The goal of this research was to quantify rates and directions of dispersal in American black bears (Ursus americanus). We used genetic paternity analysis to identify mother-offspring pairs of black bears in Northern Lower Peninsula of Michigan and trace movements which are indicative of dispersal events. We genotyped 759 individuals using 13 polymorphic microsatellite loci in order to infer mother-offspring relationships among individuals. The geographic locations of mother-offspring pairs were input into a Geographic Information System (GIS) to determine direction and distance of movements. The mother's geographic location was used as a proxy for natal area in order to track offspring movements away from the natal area to a final dispersal destination. Results will provide critical information on black bear dispersal and its relationship to conspecific density and habitat quality, to enable managers to better prioritize areas for conservation and better regulate harvest.

BENTHIC ALGAL BLOOMS CAUSING LARGE WASH-UPS OF ALGAL DETRITUS ALONG SAGINAW BAY SHORES

Rachel Teets

Location: Parlor C, 11:00 AM

Category: Environmental and Natural Resources, Oral

Mentor(s): Scott Peacor (Fisheries and Wildlife)

The Saginaw Bay and surrounding shores have been heavily degraded due to invasive species, excessive nutrient inputs, and human modification of the ecosystem. Our research focused on one aspect of this degradation: shoreline fouling. Benthic (or bottom-dwelling) algal blooms occurring along the shore of the bay appear to be correlated with wash-ups of algal detritus as deep as 50cm and extending more than 35m from shore. This algal detritus has the smell of decay and is aesthetically unappealing, which has led to decreased tourism in the area; the beaches of this once beautiful area are widely avoided unless cleaned with expensive combing techniques. The worst shoreline fouling events occur along the beaches of the Bay City Recreational Area and extend approximately 2 miles north. By monitoring weather patterns, amount and composition of algal detritus, we found that sloughed algae is moving north to south along the shore, that the amount of detritus collecting on shore is directly correlated to high winds and wave action in the bay, and that much of the detritus washes up at the beginning of the season and simply cycles through the water column. We hope that this monitoring work will allow for solutions and management options to restore the shores. However, continued research is necessary to locate the exact source causing the algal detritus and to identify the sources causes algal blooms.

ANALYSIS OF PEAK DDT CONCENTRATION LEVELS IN THOMPSON LAKE VS PEAK PRODUCTION AND CONSUMPTION LEVELS OF DDT

Paul Grieve

Location: Parlor C, 11:15 AM

Category: Environmental and Natural Resources, Oral

Mentor(s): David Long (Geological Sciences)

DDT and its breakdown products (DDD and DDE) are still found in the environment despite nearly 40 years since its ban. Previous studies of inland lakes sediment cores have found historical peak DDT, and total DDT (DDT, DDD, and DDE) levels coincide with peak production of total DDT in 1962. This observation has allowed us to hypothesize that DDT, and total DDT levels will also peak in lakes correlating to peak consumption of DDT occurring in 1959. If true, observations in Thompson Lake sediment should show peak levels of DDT and its breakdown products to fall between 1959- 1962. To test this hypothesis, core sediment samples were collected from Thompson Lake, sectioned into 0.5 to 1.0 cm increments and submitted for radiometric dating and chemical analyses. Graphing total DDT (ng/g) versus ^{210}Pb dating of the core samples reveals DDT concentrations peaked in 1961. However, DDT concentrations without its breakdown products peaked around 1955. This suggests that total DDT concentrations may be related to the peak consumption and production levels of DDT. Peak DDT levels do not consistently fall within this time range, and may not be as strongly related to peak production and consumption levels. Results from this study shows that peak levels of DDD and DDE will lag that of peak levels of DDT. This study also has implications on the rate of degradation of DDT in a surface water environment, which previous studies have found the half-life to be 2-15 years.

LANDSCAPE RESPONSE TO HUMAN PERTURBATIONS

Derrick Lingle

Location: Parlor C, 11:30 AM

Category: Environmental and Natural Resources, Oral

Mentor(s): David Long (Geological Sciences)

A common assumption is that when landscape systems undergo perturbations, the flows of matter across the landscape will return to prior states of balance. It has been hypothesized that due to the degree of disturbance by human activities, the flow of material will not return to pre-disturbance levels because the system has passed a tipping point and the system will move to a new state of balance. The accumulation of sediments in lakes acts as a chemical recorder of environmental changes in the watershed. Changes in the temporal patterns of chemical concentrations and accumulation rates can be related to changes of mass flows across the landscape and within the lake. To test the hypothesis, a sediment core was taken from Thompson Lake in Howell, Michigan. Two sets of proxies were used, the elements Al, K, Mg to assess changes in flow of material across the landscape and Ca, P, N to assess changes in flow of material within the lake. If the degree of disturbance is dramatic, one would expect to see different steady states prior to and following this disturbance event. Results show a balanced state prior to these major disturbances, significant movement away from balance as a result of logging, beginnings of recovery to prior states of

balance, but then disturbance by urbanization with no indication of recovery but possibly a shift to a new state of balance. These observations are consistent with the hypothesis.

Poster Presentations

DO COLLEGE INTRODUCTORY BIOLOGY COURSES INCREASE STUDENT ECOLOGICAL LITERACY?
Xuemei Ye
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Environmental and Natural Resources--1, Poster, 1372
Mentor(s): Kendra Cheruvelil (Fisheries and Wildlife)
College introductory biology educators have an opportunity to increase ecological literacy. This research used a pre-/post-test design to ask: 1) What level of ecological literacy do underclass science majors have? 2) What demographic factors are related to ecological literacy?, and 3) Does taking introductory organismal biology increase ecological literacy? We found that first-year science majors had relatively high attitudes and perceptions of the environment that were related to motivation, confidence, and future career goals, but lower ecological knowledge that was not related to any demographic factors studied. Students exhibited very little increase in ecological literacy after completing an introductory organismal biology class. We urge introductory biology instructors to assess whether they are increasing student ecological literacy, and provide recommendations for doing so.

WEST CIRCLE DRIVE BIKE LANE INTEGRATION
Ryan Rockwell, Eric Macciomei, Matt Smania
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Environmental and Natural Resources--1, Poster, 1403
Mentor(s): Steven Safferman (Biosystems and Agricultural Engineering)
As an institution that prides itself on being “green,” Michigan State University has taken many steps to decrease its carbon footprint and increase stewardship of the environment. However, anyone who takes a walk though campus will quickly notice the amount of traffic that travels throughout the area and the roads devoted to handling this traffic flow. These paved roads stop rainwater from absorbing into the ground, forcing increased amounts of water into the Red Cedar River, and the volume of traffic releases greenhouse gases into the atmosphere. To address these concerns, our group plans to conduct a traffic study on West Circle Drive to see if it would be feasible to close one lane and convert it into a bicycle-only lane. By creating a bike lane we hope to increase the amount of people that will ride bicycles instead of driving vehicles, decreasing the carbon footprint of the university. To address safety concerns with separating bicycle and vehicle traffic, our group proposes varying degrees of separation based on cost. The higher cost options include rain gardens and porous pavement which will decrease the amount of storm water runoff, which is of great importance to the university due to the proximity of the Red Cedar River. With the proper funding, we hope to alleviate both problems of storm water runoff and greenhouse gas emissions.

ODONATE BIODIVERSITY AND ABUNDANCE IN BIOFUEL PRODUCTION CROPS
Aaron Balogh
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Environmental and Natural Resources--1, Poster, 1424
Mentor(s): Benjamin Werling (Entomology)
Biofuel production has the potential to transform landscapes in ways that promote or reduce biodiversity. Data on the biodiversity-impacts of different crops will allow production systems to be designed based on their ability to support diverse organisms, helping managers to make decisions that promote biodiversity. However, the suitability of different biofuels has not been evaluated for many fauna, including arthropods. Odonates (dragonflies and damselflies) are commonly found in Midwestern landscapes, and are important organisms in natural ecosystems. During late summer 2011, we assessed the abundance and diversity of Odonates in switchgrass and restored prairies in six counties throughout southern Michigan, using an aerial net as a capture method. These two crops have both been proposed as candidates to biofuel production. We hypothesized that Odonate abundance and diversity would be expected to be higher in restored prairies as opposed to the mono-cultured switchgrass fields, because of the greater degree of plant diversity in the prairies. The information obtained from this research can be used to make more informed decisions regarding the relationship between economic biofuel crop productivity, Odonate biodiversity, and environmental sustainability.

THE UNDYING LEGACY OF DDT AND ITS METABOLITES ON MSUS CAMPUS
Craig Bateman
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Environmental and Natural Resources--1, Poster, 1523
Mentor(s): Christina DiFonzo (Entomology)
Dichlorodiphenyltrichloroethane, or DDT, is pesticide that was heavily used in the United States, and on Michigan State University’s campus, beginning after World War II. DDT was cancelled for use in the United States in 1973 due to negative environmental impacts. Its persistence as a chemical has continued its existence in the environment to this day. It was thought that the compound may still exist at MSU, where DDT was sprayed heavily for insect vectors of Dutch elm disease and malaria. In order to determine exactly how much DDT remains, samples were taken from five locations on MSU’s campus to examine current concentrations of DDT and its breakdown products DDD and DDE. Soil samples were taken from two locations on north campus with a history DDT use and a third location in a south campus woodlot. In addition, two indoor samples were collected from the original DDT storage and loading area in the Natural Science Building. Extraction techniques were then used on samples prior to testing in a mass spectroscopy machine. DDT was found in all samples except from Baker Woodlot; DDD and DDE were found in all samples. The highest concentrations were found along Grand River Avenue and in the Natural Science Building. MSU’s Office of Radiation, Chemical & Biological Safety considered these indoor concentrations safe for human exposure, although there is still much to be

known about health impacts caused from low exposure to DDT over time. Nonetheless, this study effectively displays the incredible persistence of this compound.

SPARTY'S SUSTAINABILITY
Amy Jacobs, David Baum, Susan Marvin, Emily Smith, Meagan Zabetian
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Environmental and Natural Resources--1, Poster, 1565
Mentor(s): Steven Safferman (Biosystems and Agricultural Engineering)
Michigan State University prides itself in being "Spartan Green," but is the campus truly "green"? The increasing consumption of Sparty's products, especially following the introduction of the Combo Exchange program, has lead to an explosive amount of waste, contributing greatly to campus un-sustainability. The objective of our project is to reduce this waste by cooperating with Residential and Hospitality Services and the Sustainability Office on campus. The widespread use of water bottles and plastic receptacles for food and drink consumption will be the target of our studies. By using data collected from consumer surveys, on-site observations, Sparty's purchase records, precedents set by other Big Ten schools, and the "Be Spartan Green" campaign, we hope to increase Sparty's consumers' education, reduce excess packaging, and decrease the amount of food waste produced. In order to accomplish this, we will provide the Residential and Hospitality Services and Sustainability Office with a comprehensive list of changes that can be made to alleviate the problems our university is currently creating. It is our hope that students on campus will follow the Sparty's recycling initiative and foster a community concerned about, and aware of, their impact on the environment.

INHALATION OF AIRBORNE PARTICULATE MATTER IN URBAN INDUSTRIAL DEARBORN, MI CAUSES DECREASED HEART RATE VARIABILITY IN SPONTANEOUSLY HYPERTENSIVE RATS
Jessica Konal
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Environmental and Natural Resources--1, Poster, 1605
Mentor(s): James Wagner (Pathobiology & Diagnostic Investigation)
An increase in airborne particulate matter less than 2.5 µm (PM2.5) in ambient air has been linked to acute cardiovascular morbidity and cardiovascular disease complications. In the current study we used changes in heart rate (HR) and its variability (HRV) as endpoints of cardiovascular health. HRV is an indicator of overall autonomic tone, and the elderly and patients with cardiovascular disease (CVD) has significantly lower HRV than younger and healthier people. A four-day study was performed in Dearborn, MI, an environment with high ambient PM2.5 air pollution caused by nearby industrial activity, metal processing, and automotive production. Spontaneously hypertensive (SH) rats were implanted with radiotelemeters to measure ECG, which was converted to HR and HRV. Rats were exposed to filtered air, (AIR) or concentrated air particulates (CAPs). HR and HRV data was analyzed using Statistical Analysis Software (SAS) and outliers were removed and data was sorted based on study date and time by executing codes in the program. SAS values and histograms were used to further determine effects of specific CAP components (i.e., carbons, sulfates). Changes in HR were not statistically significant, but we detected decreased HRV in CAP-exposed rats ($p=0.0364$). These responses were not related to particle mass, but are likely due to specific components in PM2.5. Our results show that inhalation of urban particulate matter in urban industrial areas in Michigan can induce acute cardiovascular changes.

CLASSIFYING AND ENUMERATING ALGAL ABUNDANCE IN THE SAGINAW BAY
Mary Bammer
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Environmental and Natural Resources--1, Poster, 1665
Mentor(s): Scott Peacor (Fisheries and Wildlife)
Nuisance algae blooms have caused widespread build-up of decomposing algae along beaches throughout the state of Michigan. This cause for concern is part of a well-known problem to visitors and residents around Saginaw Bay, Lake Huron. The source of the increased algae levels may be influenced by the invasion of freshwater mussels or the overabundant nutrient supply from agricultural and industrial runoff. All of these factors may be interconnected though a cascade of effects that impact not only the overall ecology of the Great Lakes, but also the local citizenship. In order to more fully understand the causes and effects of the beach-fouling along the bay, we must first expand our knowledge of the algae that causes the problem, which grows on the bottom of the lake. We must determine at what depths the most biomass grows, as well as what species grow and at what times these species are most abundant. To begin tackling these questions, algae samples were taken along specific transects and at varying depths throughout 2009 and 2010 summer field seasons (May-October) from the Saginaw Bay. These samples have been and continue to be analyzed to determine the health and genera of prevailing algae. Analyzing these samples sheds light on the growing conditions in the bay and allow further development of applicable models. This information provides a base with which to connect other research and findings, which can inform management on how to slow or even reverse the increasing ecological problems throughout the Great Lakes.

ALGAL RESPONSE TO ENRICHMENT WITH LIMITING NUTRIENTS: THE CENTRAL IMPORTANCE OF NITROGEN LIMITATION
Alice Hu
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Environmental and Natural Resources--2, Poster, 1401
Mentor(s): Allison Rober (Zoology)
Worldwide nutrient enrichment is heightening due to increased urban and agricultural land-use. Nutrients are among the most important factors regulating algal growth in aquatic ecosystems. The addition of nutrients can result in significant increases in biomass and shifts in species composition, which can alter important ecosystem processes such as nutrient cycling within aquatic ecosystems. We examined the effects of two major nutrients affecting algal growth, nitrogen (N) and phosphorus (P). We manipulated these nutrients to produce treatments consisting of N, P, and N&P, each with low, medium, and high nutrient concentrations; +N (50 μgL^{-1}; 500 μgL^{-1}; 1,000 μgL^{-1}), +P (8 μgL^{-1}; 40 μgL^{-1}; 100 μgL^{-1}), N+P (50 μgL^{-1}-N + 8 μgL^{-1}-P; 500 μgL^{-1}-N + 40 μgL^{-1}-P; 1,000 μgL^{-1}-N + 100 μgL^{-1}-P). We measured algal biomass as chlorophyll-*a* and

compared treatment means using an analysis of variance. Algal biomass increased with increasing nutrient concentration, however differences were not significant between medium and high concentrations. The P treatment did not produce as much biomass as the N and N&P treatments. The N and N&P treatments produced similar amounts of biomass. These results suggest that N is the primary limiting nutrient for algal growth in the Red Cedar River. Furthermore, these results suggest that increases in algal biomass with nutrient enrichment from urban and agricultural runoff can occur even at medium nutrient concentrations, which may provide insight into management of highly populated aquatic ecosystems.

INVESTIGATION OF POSSIBLE LED LIGHTING ON CAMPUS
Nicholas Martin, Nicholas Abdallah, Tyler Beck, Akhilesh Dakwale, John Kriewall
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Environmental and Natural Resources--2, Poster, 1423
Mentor(s): Steven Safferman (Biosystems and Agricultural Engineering)
In this experiment, we will determine if Michigan State University would become more cost efficient by replacing certain light fixture's current bulbs with LED lights. By creating a decision matrix comparing important factors necessary for efficient lighting, we will qualitatively value the effectiveness of current lighting on campus. We will then identify the most ineffective lights and calculate the costs and possible benefits of replacing them with LED lights. Using these cost/benefit calculations and predictions on light bulb prices in the future, we will provide the University with a suggestion of how to illuminate campus at minimal cost with maximum safety.

THE EFFECT OF GRAZER DENSITY ON PRIMARY AND SECONDARY PRODUCTION
Johnathon Constan
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Environmental and Natural Resources--2, Poster, 1452
Mentor(s): Allison Rober (Zoology)
Grazing can have significant negative effects on primary production, however competition for resources can limit the ability for consumers to reduce biomass. We examined how grazer density influences producer and consumer biomass to determine if there is an intermediate grazer density that supports an increase in biomass for both producer and consumer populations. We tested the effect of low, medium, and high densities of snails belonging to the genus Elimia on benthic algal biomass in a laboratory experiment. We expected that algal biomass would increase with decreasing grazer density. We also expected that snail biomass would decrease with increasing snail density as a result of competition for resources. Our data show that algal biomass was greater at medium grazer densities than at low grazer densities suggesting that at intermediate grazer densities algal biomass was able to regenerate biomass due to lower grazing pressure and greater nutrient availability compared to either low or high grazer densities. Snail biomass decreased with increasing grazer density due to competition for resources. These data suggest that there is a trade-off between competition for low levels of limiting resources and an ability to use newly available resources. Our results add insight into the maintenance of both producer and consumer biomass in aquatic ecosystems.

INTERSPECIES TRANSMISSION OF BOVINE TUBERCULOSIS IN MICHIGAN WILDLIFE
Allyson Hughes
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Environmental and Natural Resources--2, Poster, 1455
Mentor(s): Meredith Gore (Fisheries and Wildlife)
Wild white-tailed deer (Odocoileous virginianus) populations in the northeastern Lower Peninsula of Michigan are at risk from the spread of the bacterial disease, bovine tuberculosis (bTB). Although wild deer are the only Michigan species known to be widely infected with bTB, a broad range of mammalian species are susceptible to infection, including humans. Diverse interest groups, including hunters, livestock producers, business owners, and the general public, have expressed concern about the spread of bTB across Michigan and across species. Understanding the transmission risk of bTB to various species is essential to addressing stakeholder concerns and to effective risk management. Through a literature review and analysis, we compiled and organized bTB cases to understand the causes, dynamics of infection, and the risks of inter-species transmission of bTB in Michigan. Results indicate similar infection trends among 19 species. The literature suggests one common cause of infection is due to ingestion of bTB-infected carcasses, with little to no risk of infection beyond that individual. Although there is minimal risk of widespread inter-species bTB transmission, the potential exists. Therefore, at-risk Michigan species should be recognized and monitored for bTB-infection to address stakeholder concerns, while Michigan bTB management continues strict limitations of wild white-tailed deer interactions with livestock.

COMPARISON OF OVERHEAD, DRIP, AND SUB-IRRIGATION FOR AN EXTENSIVE GREEN ROOF SYSTEM
Matthew Kolp
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Environmental and Natural Resources--2, Poster, 1470
Mentor(s): Brad Rowe (Horticulture)
Green roofs provide numerous economic and environmental benefits such as storm-water retention, energy conservation, and mitigation of the urban heat island. A major limiting factor to the success of any green roof, however, is soil moisture and the physical properties associated with the chosen media. Three common irrigation practices (overhead spray, drip and sub-irrigation) will be evaluated to determine the effectiveness of each application method. Modules with and without vegetation will be evaluated based on volumetric moisture content, as well as a comparison of costs among the three irrigation methods. Evapotranspiration will also be recorded and compared against an un-irrigated module. A presentation of results and conclusions may not be available at this time; however, an explicit setup and methodology will have been formulated and available for discussion and assessment. Furthermore, the potential to calculate energy savings based on evapotranspirational cooling compared to air-conditioning may be possible, as well as other insight into irrigation techniques and practices for green roofs.

SERVER COOLING BY SUBMERSION IN MINERAL OIL
Nickolas Salic
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Environmental and Natural Resources--2, Poster, 1515
Mentor(s): Dirk Colbry (Institute for Cyber-Enabled Research)
This project works to lower the cost of MSU's super computers. Each super computer is composed of multiple nodes. Each node or "pizza box" has a CPU that gets very hot. Without something to cool the CPU, it would melt. In order to cool the CPUs, there is a large air conditioning unit on the roof of the engineering building. The problem is that the system used to cool the computers uses a lot of energy. This is very expensive and harmful to the environment, making it relate the sustainability in HPCC. My proposed solution is to dip the computers in non-conducting oil in order to cool them as opposed to using the air conditioning unit on the roof of the engineering building. Benefits would include a lower energy usage to cool the computers. However, it would be hard to do maintenance on the computers when they are covered in oil. I predict that dipping the computer in oil will be an efficient way to cool the computer.

EFFECTS OF GREEN-TREE RETENTION ON RED-BACKED SALAMANDER SURVIVAL IN CLEARCUT FORESTS
Rachael Thames
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Environmental and Natural Resources--2, Poster, 1580
Mentor(s): Gary Roloff (Fisheries and Wildlife)
Alternative silviculture practices such as green-tree retention have been implemented to mitigate some of the negative consequences that timber harvesting has on wildlife populations. However, quantitative evidence of the benefits of green-tree retention to wildlife is lacking. The primary objective of this project was to determine if green-tree retention had an effect on adult red-backed salamander survival. Red-backed salamanders are viewed as an indicator species sensitive to forest management activities. Our results indicate that red-backed salamanders survived in all classes of green-tree retention (ranging from high to low canopy cover). Additionally, to survive site disturbance events like timber harvest, our results indicate that red-backed salamanders use subterranean retreat to help alleviate adverse surface conditions. By determining the value of green-tree retention for minimizing salamander declines resulting from timber harvest practices we can better inform conservation strategies.

DETERMINING PREDICTORS OF ALGAL-BACTERIAL INTERACTIONS IN FRESHWATER STREAMS
Tessa Minicucci, Heidi Jerrils
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Environmental and Natural Resources--2, Poster, 1648
Mentor(s): Robert Stevenson (Zoology)
The relationship between algae and bacteria can be both mutualistic and competitive. Bacteria facilitate algal growth by recycling inorganic nutrients and algae provide a source of organic carbon for bacteria. But bacteria also can outcompete algae for inorganic nutrients when they are limiting. This model has been well-studied in planktonic systems, but is not well understood in biofilms. Our study compared algal biomass on agar substrata in which bacteria were present as well as when they were reduced, via antibiotics, in 10 Michigan streams. Increases in algal biomass in response to bacteria reduction from antibiotic treatments were defined as cases of bacterial competition with algae, which occurred in 39% of samples. Decreases in algal biomass on antibiotic treatments were defined as cases as bacterial facilitation of algae, and occurred in 61% of cases. We compared the magnitude of competition and facilitation effects to streamwater P concentrations and light availability. We observed no effect of P in cases where bacteria had a competitive effect on algae ($p=0.47$). However, P concentrations were inversely correlated with the magnitude of bacterial facilitation in cases where bacteria facilitated algae ($p=0.007$). Furthermore, we found bacteria were better at both facilitating ($p=0.04$) and competing with ($p=0.03$) algae in higher light biofilms. Our data indicate that planktonic models of algal-bacteria interactions may not apply to biofilms and suggest more work is needed to understand drivers of these interactions.

TOWARDS AN UNDERSTANDING OF BIOGEOCHEMICAL PATHWAYS AND PROCESSES ACROSS LOWER MICHIGAN STREAMS: A BASEFLOW BASELINE
Bobby Chrisman
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Environmental and Natural Resources--2, Poster, 1658
Mentor(s): David Hyndman (Geological Sciences), Anthony Kendal (Geological Sciences), Sherry Martin (Geological Sciences)
Surface flow and groundwater flow are the two main flow paths that feed a river system. A stream can be either groundwater dominated, surface runoff dominated, or a combination of the two. Groundwater is the source of the bulk stream flow in Michigan, but the relative contribution of groundwater versus surface runoff is both seasonally and geographically variable. The chemical and biological constituents of the streams vary in correlation to its flow path and therefore processes. To characterize how these processes vary, the biological and chemical constituents along with physical characteristics of the streams were measured. To capture the geographic variability, the sample sites included 34 large watersheds and 33 small watersheds along the coastline of Michigan. The 67 sites describe a range of landscape conditions, landscape uses, watershed size, soils, and geology. To capture the seasonal variability, multiple sampling events are planned during different seasonal periods: baseflow, spring snowmelt, late spring rain, and fall rain after leaf-off. This sampling event is the first of the series. The sites were visited during baseflow conditions in the span of 6 days, providing a snapshot across Lower Michigan. A complete suite of measurements were taken: major ions, stable isotopes of hydrogen and oxygen, alkalinity, temperature, conductivity, pH, nutrients, pathogen indicators, and both benthic and planktonic algae. Broad spatial patterns of these biogeochemical measurements are characterized. These patterns are then related to landscape characteristics including land use, soil texture, and watershed size.

Health, Food, and Wellness

Oral Presentations

ASSOCIATIONS BETWEEN RESISTANCE TRAINING IN FIRST TRIMESTER ON PREGNANCY AND BIRTH OUTCOMES

Allison Pomerantz

Location: Parlor A, 9:00 AM

Category: Health, Food, and Wellness, Oral

Mentor(s): Jim Pivarnik (Kinesiology)

Specific recommendations exist for aerobic exercise during pregnancy but not for resistance training. Purpose: Our purpose was to examine associations between first trimester resistance training and pregnancy complications and outcomes. Methods: Women (n = 154) who had given birth within the last five years completed an online survey regarding participation in resistance training. Women also provided data on weight gain in pregnancy, gestational diabetes, preeclampsia, preterm labor, birth weight, birth length, and gestational age at delivery. Descriptive statistics, t-tests, and chi-square were used. Results: Demographics included (M±SD) age at delivery (29.3 ±4.5 yr) height (165.1±6.2 cm) and weight (83.4±20.8 kg). During the first trimester, 43 women performed resistance training for an average of 2.8±0.8 days/week and 28.1±14.3 min/session. Women who did and did not report resistance training were similar with respect to maternal weight gain (14.4 vs. 15.1kg), gestational age at delivery (38.4 vs. 38.6 weeks), birth length (51.3 vs. 51.3 cm), and birth weight (3.51 vs. 3.746 kg). There was no significant relationship between resistance training during the first trimester and gestational diabetes ($\chi 2 = 0.80$, df = 1), preeclampsia ($\chi 2 = 1.00$, df = 1), preterm labor requiring bed rest ($\chi 2 = 1.46$, df = 1), or medication ($\chi 2 = 2.93$, df = 1), preterm birth ($\chi 2 = 1.07$, df = 2), and miscarriage ($\chi 2 = 0.02$, df = 1). Conclusions: First trimester maternal resistance training was not associated with an increased risk of pregnancy complications or adverse outcomes.

COMPARING ACTUAL TO PREDICTED ENERGY EXPENDITURE DURING PREGNANCY

Alaina Vince

Location: Parlor A, 9:15 AM

Category: Health, Food, and Wellness, Oral

Mentor(s): James Pivarnik (Kinesiology)

Physical activity (PA) participation may assist in reducing adverse outcomes for both mother and child during pregnancy and delivery. However, professionals cannot recommend specific types and amounts with confidence until PA can be accurately measured in the pregnant population. One way to quantify PA intensity is using a metabolic equivalent (MET) value, derived from the Compendium of Physical Activities (Ainsworth et al., 2001), which assigns an energy value to various activities. However, this semi-comprehensive list of MET values was derived from activities performed in males. During pregnancy, a woman's physiology and anatomy change, which may result in altered energy expenditure. As a result, MET values developed using a non-pregnant population may not be valid in pregnancy. The purpose of this study was to measure women's actual energy expenditures (via oxygen consumption) while performing various activities during pregnancy, and to compare these to MET values estimated via the Compendium of Physical Activities. Participants were recruited prior to 20 weeks gestation and considered low-risk by their health care providers. Women visited the lab twice in both second and third trimesters, and performed various locomotor activities and activities of daily living. Energy expenditure for each activity was measured with a portable oxygen analyzer and converted to actual MET values. Although this is an ongoing study, preliminary data suggests that MET values are higher during pregnancy compared to predicted values. These results will assist investigators determining the relationship between activity type and intensity with maternal and child outcomes.

COMPARISON OF VO2 AND ACCELEROMETER COUNTS DURING A PHYSICALLY ACTIVE VIDEO GAME

Margaux Hetzman

Location: Parlor A, 9:30 AM

Category: Health, Food, and Wellness, Oral

Mentor(s): Karin Pfeiffer (Kinesiology)

The transition between high school and young adulthood is important for establishing habits that will affect health in later adulthood. Over half of college students do not meet recommended amounts of moderate or vigorous physical activity whereas 65% play active video games (AVGs). The purposes of this study were to compare accelerometer counts to energy expenditure during an AVG and compare the amount of moderate to vigorous physical activity (MVPA) estimated by each method. Participants were 120 sedentary college students (19.9 ± 1.8 yrs, 69% male) with limited video game experience. Height and weight were assessed, and oxygen consumption (VO_2) was measured using a portable metabolic analyzer. Physical activity was assessed using an accelerometer. Correlations between VO_2 and accelerometer counts were calculated for both vertical axis only and vector magnitude. VO_2 and accelerometer data were converted into METs and classified as MVPA using two equations (Freedson-walking and Hendelman-free living). Paired t-test were used to examine differences in MVPA between VO_2 and accelerometer counts. The average VO_2 was 11.4 ± 4.0 $ml \cdot kg^{-1} \cdot min^{-1}$, which is a moderate level of PA. The average counts for vertical axis was 407 ± 491 counts $\cdot min^{-1}$ compared to 1005 ± 714 counts $\cdot min^{-1}$ for vector magnitude. The correlation coefficient for vertical axis was r=0.36, versus 0.30 for vector magnitude. The Hendelman equation showed a better estimate of MVPA compared to the Freedson equation, most likely due to its application to free living conditions. Results from this investigation will help accurately quantify MVPA during field-based AVG play.

THE RELATIONSHIP BETWEEN AMOUNT AND VARIETY OF FRUITS AND VEGETABLES OFFERED IN LOW-INCOME MICHIGAN SCHOOLS AND STUDENTS CONSUMPTION

Caitlin Fisher, Tiffany Chritz, Hali Sobczak, Elizabeth Weber

Location: Parlor A, 9:45 AM

Category: Health, Food, and Wellness, Oral

Mentor(s): Katherine Alaimo (Food Science and Human Nutrition)

According to the CDC in 2005, only 17% of Michigan students consumed 5 or more servings of fruits and vegetables per day. Schools have the opportunity to affect both a child's current intake as well as future dietary habits by offering a greater amount and variety of fruits and vegetables. The School Nutrition Advances Kids (SNAK) project examined the food and nutrition environment in a sample of 62 low-income Michigan middle schools. For this project, we utilized one week of food service data from each school and food frequency questionnaires from 7th grade students during the fall of 2007and 2008. Fruits and vegetables offered in the SNAK schools will be assigned to the Healthy Eating Index-2005 categories. Fruits will be categorized as whole fruits or juice; vegetables will be categorized as dark green, orange, legumes, starchy, or fried. An analysis of the relationship between amount and variety of fruits and vegetables offered and student intake of fruits and vegetables will be conducted. The variety of fruits and vegetables in schools will be compared to the newly proposed regulations for the National School Lunch Program by USDA. We hypothesize that greater amount and variety of fruits and vegetables will be associated with increased consumption, and that schools are not meeting the new guidelines. This research will be useful for informing policy on fruit and vegetable variety offered by school lunches and the overall impact schools can have on children's diets.

IMPLEMENTATION OF CLASSROOM PHYSICAL ACTIVITY AND NUTRITION EDUCATION LESSONS

Adam Smith

Location: Parlor A, 10:00 AM

Category: Health, Food, and Wellness, Oral

Mentor(s): Heather Hayes (Kinesiology)

The majority of children and adolescents in the United States are not meeting the daily recommended amount of physical activity. Nationwide and in Michigan, the prevalence of cardiovascular disease risk factors has been increasing. School-based interventions, such as Project FIT, have focused on increasing physical activity and nutrition education in the elementary schools as a way to combat this problem. It is vital that interventions be evaluated on their effectiveness in three areas: dose delivered, fidelity, and reach. The purpose of this study was to measure the physical activity and nutrition education dose delivered within the four Project FIT intervention schools. The goal of the intervention was 30 minutes of structured physical activity/day/classroom and 20 hours/year of nutrition education/classroom. Dose delivered was measured by self-reported process evaluations turned in weekly by the teachers. These forms reported both the lesson type (physical activity or nutrition) and the duration of the lesson. Minutes were averaged by school, and then by kindergarten through second grade and third through fifth grade. Differences in minutes reported for nutrition and physical activity were found between the four schools, as well as between grades. On average more minutes of physical activity and nutrition were reported by kindergarten through second grade teachers (314 minutes/week) compared to third through fifth grade (196 minutes/week) teachers. This type of intervention was shown to be feasible with all elementary school grades; however, data are limited by number of forms teachers turned in.

AMERICAS CHANGING PERCEPTION OF CHIROPRACTORS AND THEIR ROLE IN SOCIETY

Anthony Lai

Location: Parlor A, 10:15 AM

Category: Health, Food, and Wellness, Oral

Mentor(s): Mark Largent (James Madison College)

Medicine is one of the most respected professions in the world; yet many professions that are part of the medical workforce are overlooked and underappreciated. Chiropractors are one of these professions. The bias that they are simply for back injuries is prevalent today's society. A study was conducted to better understand the origins, philosophical views, and the effectiveness of their treatments. It also pointed out that chiropractic treatments can positively influence a person's life, and even fix symptoms that were previously incurable with little to no side effects. The research also showed how the American perspective on Chiropractors has slowly changed from one of distrust to admiration. The study was able to effectively show just how important Chiropractors are and how much their treatments can change a person's life.

NEW MARKETING APPROACH FOR MINIMALLY PROCESSED ONIONS

Sara Sobon, Derek Johnson, Aaron Miller, Rita Morse

Location: Parlor A, 10:30 AM

Category: Health, Food, and Wellness, Oral

Mentor(s): Eva Almenar (Packaging)

Traditionally, fresh uncut onions have been sold individually in bins or bundled in mesh bags in the grocery retail environment nationwide. In an effort to distribute onions in a new fashion and to reduce preparation time for the consumer, the new technique would involve peeling and cutting the stems and roots off of the onions. To allow for this change, a new packaging system would need to be implemented; preferably a plastic pouch to ensure product safety and to sustain the longest shelf life possible. As an alternative to commonly used petroleum-based polymers, the bio-based and biodegradable polymer, polylactic acid (PLA), is used to create the pouches. In order to ensure optimal integrity for the product, this study focuses on two different onion preparation processes: sanitation and heat treatment. Upon impurity removal, the onions are either heat or non-heat treated, sanitized in sodium acid sulfate (SAS), conditioned in a 4^{o}C chamber for 1 hour, and packed and sealed in a PLA pouch (3 onions/pouch). A total of 22 pouches are prepared; 11 containing heat treated onions and 11 containing non-heat treated onions. The completed pouches are stored in a 3^{o}C, 55% relative humidity controlled chamber for 25 days. Head space (CO_2 and O_2 levels), weight loss, telescoping, and microbial (bacteria, yeast, and fungi) studies are conducted every fifth day and fully analyzed after storage completion.

Poster Presentations

A STUDY OF GENDER-BASED INFANT FEEDING IN NORTHERN KENYA
Erin DelBene
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Health, Food, and Wellness, Poster, 1321
Mentor(s): Masako Fujita (Anthropology)
Gender-biased infant feeding has many implications on the difference between the growth, health, and wellness of boys vs. girls. This study investigates cross-sectional infant feeding recall data previously collected from a community-based study among agro-pastoralists in Marsabit District, Kenya. Mothers with infants 0-20 mo. old were randomly sampled in stratified infant age groups. Through questionnaires, 241 mothers provided daily frequency of breastfeeding, if they give other foods to the infant, and if so, the types and frequency of food. Using these data, infant feeding and weaning patterns were analyzed based on gender. Preliminary results indicate that there was little gender-based difference in breastfeeding frequency and the cessation of exclusive breastfeeding. Among infants of 0-6 mo., breastfeeding frequency was 9.5 times/day for girls (n=39) and 9.7 times/day for boys (n=53; T-test; p=0.8). At 6 mo., 77% of girls and 75% of boys were exclusively breastfed; at 12 mo., 43% of girls and 47% of boys; and at 20 mo., 35% of girls and 37% of boys. However, gender-based differences existed in the variety of foods given to boys vs. girls. Among infants transitioned toward weaning, on average, girls were fed a wider variety of weaning foods (3 ± 1 items, n=74) than boys (2 ± 0.9 items, n=81; T-test; $p<0.05$). The difference was statistically significant after controlling for infant's age, maternal age and parity in a linear regression model (n=155, $p<0.05$). We will further investigate the feeding frequency of the different weaning foods, and explore possible determinants of gender biased weaning.

PRACTICE AND CHALLENGES OF NUTRITION EDUCATORS AND PARAPROFESSIONALS EDUCATING LOW-INCOME PREGNANT WOMEN ON HEALTHY EATING BEHAVIORS: FOCUS GROUP FINDINGS
Shannon Doud
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Health, Food, and Wellness, Poster, 1324
Mentor(s): Mei-Wei Chang (Nursing)
PROBLEM STATEMENT: Providing nutrition education to low-income pregnant women is critical in helping women eat healthier and prevent excessive pregnancy weight. Little is known about paraprofessional educators' current practices and challenges in providing nutrition education to these women. The purpose of this study was to identify these practice and challenges. DESCRIPTION OF SETTING AND SAMPLE: A total of 26 nutrition educators and paraprofessional educators participated in focus group discussions. They were recruited from six Michigan State University Extension programs in Michigan. DESIGN AND METHODOLOGY: This study applied a qualitative, cross-sectional design. Six focus group discussions were conducted. Focus group questions were developed using the Social Cognitive Theory.DATA ANALYSES: Focus groups were audio taped then transcribed verbatim. The texts were coded to identify common themes. RESULTS: The preliminary results showed educators built positive relationships with their clients, utilized personal experience, and provided concrete examples when providing nutrition education. They emphasized health benefits and hazards and helped clients set small and realistic goals. Challenges that educators faced were the clients' lack of motivation, misconceptions about healthy foods, and lack of grocery shopping skills. Changes that could be made to overcome these challenges include emphasizing being a good role model for children and providing a variety of learning experiences. CONCLUSION: Educators applied many strategies to help low-income pregnant women eat healthier. However, they faced many challenges. IMPLICATIONS FOR NURSING PRACTICE: Nurses can motivate low-income pregnant women to eat healthier by emphasizing good nutrition and being a good role model for their children.

WIC PROVIDERS' PRACTICE AND CHALLENGES OF PHYSICAL ACTIVITY EDUCATION
Kelsey Soronen
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Health, Food, and Wellness, Poster, 1328
Mentor(s): Mei-Wei Chang (Nursing)
Low-income, pregnant women who gain excessive weight are at an increased risk for developing gestational diabetes and preeclampsia. This weight gain and the associated health risks could be prevented by maintaining physical activity. However, the practice and challenges of Supplemental Nutrition Program for Women, Infants, and Children (WIC) dietitians and nutrition educators pertaining to providing physical activity education to pregnant women remain unknown. Therefore, the purpose of this study was to understand the strategies used and challenges faced by WIC providers in educating low-income, pregnant women about physical activity. Participants (N = 25) were recruited from WIC programs in three Michigan counties. Three focus group discussions were held with WIC dietitians and nutrition educators to discuss their practice and challenges relating to educating pregnant women on physical activity. The discussions were audio taped and transcribed verbatim. Common themes were identified for each topic. Preliminary findings showed that WIC providers encouraged moms to be physically active by promoting walking and small bouts of physical activity. They also emphasized lifestyle physical activity (e.g. parking further from a building) and explained the health benefits of physical activity. Challenges that WIC providers faced included clients' lack of motivation to make changes. Other barriers were moms' living in unsafe neighborhoods and lacking access to free community resources. WIC providers practiced several strategies to encourage low-income, pregnant moms to become more physically active. However, they encountered many challenges.

NUTRITION EDUCATORS AND PARAPROFESSIONAL EDUCATORS PRACTICES AND CHALLENGES IN PROVIDING PHYSICAL ACTIVITY EDUCATION TO LOW-INCOME PREGNANT WOMEN

Tara Bradsher

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Health, Food, and Wellness, Poster, 1355

Mentor(s): Mei-Wei Chang (Nursing)

PROBLEM STATEMENT: Excessive weight gain during pregnancy is associated with adverse pregnancy outcomes (e.g. gestational diabetes) and adverse birth outcomes (e.g. macrosomia). These negative consequences can be reduced by preventing excessive weight gain during pregnancy which is facilitated by adequate physical activity. Little is known about nutrition and paraprofessional educators' practice and challenges in providing physical activity education to low-income pregnant women. The purpose of this study was to identify nutrition and paraprofessional educators' practices and challenges in providing physical activity education. DESCRIPTION OF SAMPLE AND SETTING: Twenty six Michigan State University Extension nutrition and paraprofessional educators were recruited from six Michigan counties to participate in focus group discussions. Six focus group discussions were conducted, one in each county. DESIGN AND METHODOLOGY: This study applied a qualitative, cross-sectional design. The Social Cognitive Theory (SCT) was used to guide the development of the semi-structured focus group questions. DATA ANALYSIS: Each focus group discussion was audio-taped and transcribed verbatim. Common themes were identified using the SCT concepts. RESULTS: The preliminary results showed that educators motivated low-income mothers to be more physically active by encouraging short bouts of lifestyle physical activity (e.g., taking a short walk). They emphasized the benefits of physical activity and stressed the importance of the mother's position as a role-model for her children. Finally, they focused on providing concrete examples while helping mothers to set gradual small goals. The challenges that educators faced included the mother's lack of motivation, misconceptions about physical activity, and the mother's personal barriers.

CHILD AND ADOLESCENT DIFFERENCES IN ECONOMY AT VARIOUS SPEEDS ACROSS A TWO-YEAR TIME PERIOD

Thomas Wenzlick

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Health, Food, and Wellness, Poster, 1502

Mentor(s): Karin Pfeiffer (Kinesiology)

The purpose of this study was to determine if economy improved over a two-year period in children and adolescents at two walking speeds and one running speed. Methods: Participants (N=90), 6-16 yrs, visited the laboratory twice (assessment 1). They self-selected a slow walk (SW), brisk walk (BW), and running pace. Trials lasted 5 minutes. VO2 and stride frequency (SF) were assessed. Measurements were repeated two years later (assessment 2). Repeated measures ANOVA was used to compare differences in VO2 between assessments for the entire sample, children (6-10 yrs) and adolescents (11-16 yrs). Post-hoc linear regression examined the following predictors of change in economy: changes in leg length, body mass index, body-surface-area to mass ratio (BSA:M), and SF. Results: VO2 (ml/kg/min) significantly decreased between assessments for SW for total sample (16.3 vs. 15.0; $p<0.001$) and children (18.2 vs. 15.9; $p<0.001$), but not adolescents. BW had a significant difference for total sample (21.5 vs. 19.4; $p<0.001$), children (23.5 vs. 20.7; $p<0.001$), and adolescents (18.8 vs. 17.7; $p<0.003$). Running had no significant differences. BSA:M accounted for 25% of the variance for total sample and 21% for children for SW. For BW, SF and BSA:M accounted for 21% variance for total sample, and SF accounted for 41% in adolescents. Conclusion: Walking economy improved in children for both walking speeds but only BW in adolescents. Economical improvement was likely due to changes induced by growth and maturation of the gait cycle.

GENDER IDENTITY AND MOTIVAITON DURING EXERCISE

Jimmy Ruble, Brandon Decker, Sara Sherman, Nick Thompson

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Health, Food, and Wellness, Poster, 1504

Mentor(s): Brandon Irwin (Kinesiology)

This investigation examined the moderating effect of gender identity on the Köhler motivation gain effect during exercise. The Köhler effect occurs when an inferior team member performs a challenging task better in a group context than one would expect, given knowledge of his/her individual performance. In prior research, the effect has been strongest, especially for females, in conjunctive task conditions where the group's potential productivity is equal to the productivity of its least capable member. No research has examined the relationship between gender identity and motivation gains. We hypothesized that individuals (males and females) who have a high feminine and low masculine identity would experience greater motivation gains than individuals who have a high masculine and low feminine identity under conjunctive conditions. Participants were randomly assigned to one of 2 conditions (individual control, conjunctive) in a 2 (conditions) x 2 (gender) factorial design and performed a series of isometric plank exercises within an exercise game. They performed the first series of 5 exercises alone holding each position for as long as they could, and after a rest period, those in the partner conditions were told they would do remaining trials with a same-sex virtual partner whom they could observe during their performance. The partner's performance was manipulated to be always superior to the participant's. Data will be analyzed using a 2 (High Masculine/Low Feminine, Low Masculine/High Feminine) x 2 (Gender) x 2 (Trial) RM ANOVA with the latter being the within subjects factor and performance as the dependent variable.

CULTURAL INFLUENCES ON INFANT FEEDING PRACTICES IN A SAMPLE OF NATIVE AMERICANS IN MICHIGAN

Theresa Snyder

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Health, Food, and Wellness, Poster, 1664

Mentor(s): Lorraine Weatherspoon (Food Science and Human Nutrition)

Objective-Infant feeding practices such as early introduction of solids and the preference for use of formula instead of breastfeeding is associated with increased risk for obesity, food allergy and other life-long feeding problems. Native Americans are already at increased risk of obesity and type 2 diabetes. The purpose of this qualitative exploratory study was to determine if and how infant feeding practices are influenced in a sample of Native American mothers. Methods: To identify potential culturally-specific influences, six focus groups of six to eight

Native American mothers of infants under the age of one year were conducted at sites throughout Michigan's Lower Peninsula. Focus groups were audio taped and transcribed verbatim. Subsequently, themes were explored using constant comparison analysis of the verbatim focus group transcripts. Results: Based on our initial findings, mothers perceived that feeding recommendations such as those by American Academy of Pediatrics (AAP) cannot be generalized and hence, may or may not apply to them. Family traditions and advice from experienced mothers in the family were more influential than that of health care professionals or the AAP recommendations. Overall, advice offered by lay individuals with relevant experience was highly regarded. Conclusion: Involvement of lay educators, especially experienced mothers, and the inclusion of key support persons, especially the mothers' female relatives, could improve behavioral outcomes in this population, especially relative to encouraging breastfeeding rates and delaying introduction of solid foods.

IMPROVING ACCESS TO CARDIAC CATHETERIZATION IN MICHIGAN: A GIS OPTIMIZATION ANALYSIS

Molly Roseland

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Health, Food, and Wellness, Poster, 1671

Mentor(s): Kirk Goldsberry (Geography)

Despite the various hospitals and clinics scattered throughout Michigan, a surprising number of indispensable health care services remain spatially confined to the middle and southeast corner of the state, leaving many citizens underserved outside these areas. One such service, cardiac catheterization, is especially essential, since it can be used both investigatively (to assess cardiac bloodflow and diagnose heart disease) and interventionally (to emergently restore circulation to blocked coronary arteries, for example, after a heart attack). As understanding the service's current distribution from a geographic perspective is the first step to expanding accessibility to it, I began by mapping all equipped hospitals on the basis of the types of cardiac catheterizations they perform. I then conducted a GIS analysis to generate "drive-sheds" along the road network, which enclosed areas that are within a reasonable (thirty-minute) drive to one or more providing facilities. Alongside census data, this allowed me to determine the population of areas outside the bounds of the drive-sheds, and thus delivered a clear, quantitative report of the percentage of the total Michigan population without decent access to cardiac catheterization. Since this empirically revealed the necessity of an increase in providing hospitals, I finally conducted a number of similar, hypothetical analyses to determine the extent to which access would improve if existing hospitals were to become licensed to perform the procedure. Ideally, these optimized results will encourage a proliferation of the service into areas where it is most needed.

History, Political Science, and Economics

Oral Presentations

RESEARCH ABOUT THE AFFECTION OF CONGRESS SECURITY BILL ON THE STOCKS OF FOOD COMPANY
Can Zhao
Location: Parlor B, 9:00 AM
Category: History, Political Science, and Economics--1, Oral
Mentor(s): Mark Johnson (Finance)
In this research, we tried to find the abnormal returns of food companies during the time when congress discussed and passed security bills. Several statistical models were used.

NUMBERS WITH STORIES: ADOLESCENT BOYS ON THE JANUARY 23, 1945, TRANSPORT FROM AUSCHWITZ TO BUCHENWALD
Justine Brunett
Location: Parlor B, 9:15 AM
Category: History, Political Science, and Economics--1, Oral
Mentor(s): Kenneth Waltzer (Jewish Studies)
On January 23, 1945, a transport of 916 males that had been taken by foot from the Auschwitz complex of concentration camps to Gleiwitz and then sent in open coal cars to Germany arrived at the Buchenwald concentration camp near Weimar. Many among the 916 were young adolescent boys who were eventually sheltered in Buchenwald's Block 66 and saved by an underground rescue effort until liberation. This research attempts to explore the experience of these boys -specifically to determine the number of the 916 who were boys born during or after 1927, the number of those boys who were sheltered in Block 66, and the number who were alive at liberation on April 11, 1945. It also explores the backgrounds of the boys-including where they came from and how long they had been in Auschwitz-in order to see if any social patterns emerge. Using a database and documents compiled by the Nazi perpetrators as well as a day-by-day chronicle of Auschwitz, information will be amassed about the histories of the scores of boys on the transport. This presentation will elaborate on the research methods, comment on any patterns or lack of patterns that were discovered, and explain the significance of the findings. Ultimately, the research will show that while all of the boys were made into faceless numbers and terribly impacted by traumatic experience, they each have a personal story and were participants in a collective story of rescue.

POLITICAL PARTICIPATION OF WOMEN BORROWERS IN MICROFINANCE INSTITUTIONS IN AFRICA: IMPLICATIONS AND NEEDS
Elizabeth Petoskey
Location: Parlor B, 9:30 AM
Category: History, Political Science, and Economics--1, Oral
Mentor(s): Jeffrey Conroy-Krutz (Political Science)
Africa has long had a history of community banking and lending, such as Susu in Ghana and Tontines in Cameroon. Microfinance has been an increasingly popular development policy in recent decades, employed by large international organizations, donors, and microbanks. Political participation is often an assumed outcome of involvement with microfinance. Women are the predominant borrowers within a microfinance institution (MFI). This research explores the levels of political participation of female members based on institution and lending types of a MFI. Literature reviews and case studies of existing microfinance practice allow connections to be made through human, financial, and social capital linkages to women borrowers' political agency. This presentation will demonstrate the proposal for microcredit-plus approach to lending for higher levels of political participation among women borrowers in the African context. By using political participation data to analyze existing MFIs and case studies, I will outline future implications for microfinance and poverty alleviation policies directed at women borrowers in Africa.

THE DETERIORATION OF URBAN COMMUNITIES OF COLOR ASSESSING THE RESPONSE TO THE US CRACK EPIDEMIC
Megan Threats
Location: Parlor B, 9:45 AM
Category: History, Political Science, and Economics--1, Oral
Mentor(s): Curtis Stokes (James Madison College)
The emergence of crack cocaine use in the United States during the mid 1980s was one of the most significant public health and social problems of that era. Crack cocaine use contributed to a series of sexually transmitted disease epidemics, drastic increases in violent injuries and homicides, sky-rocketing unemployment and child welfare rates, and to significant increases in the incidence and prevalence of cocaine addiction. Despite these threats to health and safety, and numerous warnings from other countries, a national public health campaign to counter crack-related morbidity and mortality was never mounted. To the contrary, the strongest response to the crack epidemic came from the police and the courts. As a result, crack-related crimes have accounted for dramatic increases in the numbers of adolescents and adults imprisoned in the United States. Scare attention to the public health dimensions of these policies, let alone the human rights implications, have been catastrophic for affected individuals and communities.

THE EUROPEAN RHYTHM: TWO STEPS FORWARDS ONE STEP BACKWARD
Isabel Laczkovich
Location: Parlor B, 10:00 AM
Category: History, Political Science, and Economics--1, Oral
Mentor(s): Mark Axelrod (James Madison College), Graham Norm (James Madison College)
The common view of the European Union (EU) seems to be rather pessimistic. Media, politicians, and researchers can create with ease endless lists of problems the EU is facing: no direction, financial instability, lack of unity, no cultural presence, and democratic deficit to name a few. Newspaper articles, journals, and magazines, all seem to be painting the demise of the EU. However, in all the anti-EU rhetoric it seems to be

forgotten all that the EU has already established: twenty-seven member states and counting, a common currency, a borderless Europe, executive agencies such as the European Commission and Parliament. The unfortunate thing about the EU is that it is not doing truly well nor is it doing truly poorly; the EU is simply doing "ok". The EU is in need of several minor repairs to improve its operation. Among the most important repairs the EU needs is precisely a stronger European Union. The only way a union can become stronger is through unified citizens that support and connect with the institution. This article discusses under what conditions EU citizens feel connected to their regional governing institutions. Results from 433 questionnaires administered in 9 EU member countries during June and July of 2010 indicate strong visionary leadership, positive media, and building a stronger identity as the answer to citizens feeling more connected to the EU. A strong connection between citizens and the EU will build a stronger Union so they can more easily tackle other problems they are facing.

PROBLEMS, PARADOXES AND POTENTIAL IN THE LOCAL FOOD MOVEMENT
Laura Kovacek
Location: Parlor B, 10:15 AM
Category: History, Political Science, and Economics--1, Oral
Mentor(s): Tobin Craig (James Madison College)
In recent years the rise of the Local Food Movement (LFM) has had a tremendous impact on American culture and politics. From the proliferation of farmers markets to Michelle Obama's fight against childhood obesity, the movement is only gaining momentum. While the media storm surrounding the LFM is largely positive, the movement itself remains nebulous. It is described in vague, glowing terms without any real understanding of its goals and limitations. This presentation will begin with an examination of the LFM's historical and ideological roots. From there, it will look at the movement in its current form. Today the LFM primarily uses a market-as-movement approach to enact change in the global food system. "Locavores" choose to shop at local food and farm direct markets because of a belief in sustainability, community building and supporting the local economy. These tripartite goals are ultimately rooted in a desire for connection -to the land, to ideals and to others. Finally, the consequences of these goals, both pragmatic and philosophical, will be discussed. Particularly, several paradoxes of the LFM will illustrate potential downfalls for the movement's future. How can the movement's current neoliberal approach avoid the pitfalls of similarly free-market industrial agriculture? How can the LFM tout social sustainability while deliberately selecting against a food system that employs millions the world over? The presentation will end with a discussion of what it would take to build a truly sustainable, alternative food system.

2011 STATE BUDGET PROPOSAL
Evan Martinak
Location: Parlor B, 10:30 AM
Category: History, Political Science, and Economics--1, Oral
Mentor(s): Matt Grossman (Political Science)
The state of Michigan faces a $1.4 billion dollar budget deficit in fiscal year 2012-13. Governor Rick Snyder's proposed budget outlines over $1.2 billion dollars in permanent cuts, including cuts to education and state employees. Higher education has been receiving consistent cuts from the government for the past decade, and the budget deficit in Michigan has spiraled out of control. This is a comparative study of Granholm's and Snyder's budget proposals and the effect each had or will have on higher education.

COST DRIVERS OF RAPID DIAGNOSTIC TESTING FOR MALARIA IN MALAWI
Jay Thaker
Location: Parlor B, 11:15 AM
Category: History, Political Science, and Economics--2, Oral
Mentor(s): Jeff Biddle (Economics)
Malawi, land locked in Sub-Saharan Africa, is one of the poorest and most malaria-endemic countries of the world. Every year $16 million USD is used to treat 8 million cases of malaria among a population of 16 million. Rural clinics without water or electricity have followed a "presumptive treatment" protocol under which all suspected malaria cases are treated with antimalarial medications; a new technology called the Rapid Diagnostic Test is cheap, fast, and relatively accurate. This device seemed especially promising, especially since antimalarial prices have been rising. Many scholars believed that the "RDT" would help reduce costs at rural health clinics, in addition to other benefits such as faster treatment and lower risk of antibiotic resistance. Theoretical studies have demonstrated that these devices would decrease costs, but empirical data suggests otherwise. Empirical analysis of data collected at two rural health clinics in Malawi suggests that health officers' prescribing behavior plays a large role in the total cost of these devices; positive test results are given medication, but in most cases patients with negative results are also prescribed medication. Many mechanisms may explain this behavior, including distrust in the new technology, lack of education about the new technology, or an overwhelming fear of malaria. A cost-benefit analysis examined whether, while increasing costs, these devices may still provide a marginal benefit that may justify their use; by most standards these devices would be considered inefficient.

HOUSING & SOCIAL WELFARE: THE STORY OF US PUBLIC POLICY
Elizabeth Petoskey
Location: Parlor B, 11:30 AM
Category: History, Political Science, and Economics--2, Oral
Mentor(s): Matt Grossmann (Political Science)
The policymaking process in the United States is often unclear and complex. This study looks to focus on the variety of factors that have influenced U.S. federal policy since 1945 in the areas of housing and social welfare. The history of housing and social welfare policy in the U.S. set new precedents for health, racial issues, urban planning, and Social Security. Using content analysis of secondary sources that review the recent history of federal policy change, we can be informed on the effect of such influences as Presidential directives, administrative agency actions and court rulings. Cataloging and coding of relevant texts to identify significant policy changes informed the research and author's explanations for legislative change. This presentation explores why the government dramatically expanded housing and social welfare policy

from 1945-1980 and then reversed the trend. This further looks to explain the comparing and differing trends between the housing and social welfare policy areas and the prominent factors among them. Conclusions from the data help provide readers with further understanding of the influences of public policy in the U.S. in different policy areas.

THE ROLE OF SOFT POWER IN CHINESE FOREIGN POLICY TOWARDS AFRICA AND LATIN AMERICA
Marissa Wahl
Location: Parlor B, 11:45 AM
Category: History, Political Science, and Economics--2, Oral
Mentor(s): Simei Qing (James Madison College)
The rise of the People's Republic of China (PRC) as an economic and diplomatic power has been well analyzed over the past decade. However, there is considerable disagreement among scholars and observers as to the PRC's intentions as a world power. Notably, the PRC has sought to engage Africa and Latin America, regions of the developing world that have received minimal attention from the United States and other Western powers in recent years. While many in the United States view with skepticism and concern Chinese engagement of countries in these two regions, this presentation contends that the role of soft power, defined by International Relations scholar Joseph Nye as cultural, institutional and ideological influence, explains both Chinese motivations and why countries in Latin America and Africa have generally been receptive to Chinese engagement. To illustrate this point, this research analyzes Chinese foreign policy towards regional economic leaders, Brazil and South Africa; towards oil producing states, Nigeria, Angola and Venezuela; and towards pariah states, Sudan and Cuba. Ultimately, this presentation argues that the United States should not attempt to compete with the PRC for influence in these regions, but rather should seek to empower these countries to demand equality and fair standards and treatment in their economic and political relationships with the PRC.

AID, GOVERNMENT, AND COMMUNITY ACTION: FACETS OF DEVELOPMENT IN THE PEARL LAGOON BASIN
Claire Glenn
Location: Parlor B, 12:00 PM
Category: History, Political Science, and Economics--2, Oral
Mentor(s): Dan Kramer (James Madison College)
In a shrinking world, global institutions supply Millennium Development Goals and Poverty Reduction Strategy Papers to outline trajectories for development. But how are these competing initiatives experienced on the ground? On the Caribbean Coast of Nicaragua, multiple development strategies have converged to assail local poverty. Since his election in 2006, President Daniel Ortega has promoted policies for social welfare, while navigating the regulations of international lending institutions. He ended school fees, reinstated free health care, and has invested in infrastructure and agriculture. International NGOs, along with the funding of nations like Finland, Denmark, and the United States, have been instrumental in implementing these policies. At the same time, these social programs have been critiqued as cursory and superficial; neoliberal free-trade policies still dominate Nicaraguan governance, courting foreign corporations that exploit labor and resources. This global tension between social and economic improvement has resulted in the patchwork development experienced by the multiethnic inhabitants of the Caribbean Coast. In towns along the Pearl Lagoon Basin, people laud the construction of new health buildings, drainage systems, electrical connections, and plumbing systems. At the same time, they decry the broken promises of politicians, the dilapidated school buildings, the lack of healthcare supplies or transportation. In light of such episodic development efforts, CosteÃ±os have combined their resources, traditional knowledge, and modern ingenuity, finding ways to bridge the development gap.

FROM THE OTTOMAN EMPIRE TO DEMOCRACY: THE CENTRAL ROLE OF ELITES IN TURKISH TRANSITION
Alyssa Meyer
Location: Parlor B, 12:15 PM
Category: History, Political Science, and Economics--2, Oral
Mentor(s): Norman Graham (James Madison College), Folke Lindahl (James Madison College)
In studying the independent Turkish republic, one cannot help to notice the persisting influence of Ottoman political culture upon its politics. As part of a greater study on the role of political culture in democratization, this research serves to illustrate how the defining characteristics of Ottoman political culture have been carried into modern times: the adoration of those in power and a belief that the elite few in power will rule in the interest of the many (even in the presence of vastly different interests). This continuity was first evidenced by the manner in which the republic's founder, Mustafa Kemal Ataturk, imposed modernization reforms upon a deeply religious and illiterate population, believing it justifiable to make reforms in the public's interest. Yet, curiously this political culture has outlived even the founding elites of the republic-manifesting itself today in the practices of the military and Constitutional Court. The military has, in four instances now since the country was opened to competitive elections, imposed itself upon the political system in a similar manner to its founder-dramatically overthrowing and reforming the political system. Furthermore, with each intervention, the Constitutional Court has supported the military by closing the parties in question-allowing for the continuation of the secular, authoritarian policies of the republic's founding. This research, along with similar studies on the post-Soviet republics of Kyrgyzstan and Uzbekistan, has led to the conclusion that regime transitions carried out by elites tend to facilitate the persistence of previous perceptions of authority.

PARTIAL BIRTH ABORTION BAN ACT OF 2003
Ashleigh Costello
Location: Parlor B, 12:30 PM
Category: History, Political Science, and Economics--2, Oral
Mentor(s): David Winder (James Madison College)
In 2003, the 108th Congress passed the Partial Birth Abortion Ban Act under the presidency of George W. Bush. Up until that point, there had been no federal statute restricting abortion procedures since abortion was first legalized in the 1973 Supreme Court case, Roe v. Wade. The ban was passed with a 64-34 Senate vote. Since that time, the Partial Birth Abortion Ban Act has stirred much debate. Supporters of the bill objected to the method used and the partial delivery aspect of this abortion procedure. On the other hand, the opponents of the ban

contended that the ban places undue risk onto the mother's health. Ideologically, in Congress, conservatives were universally for the ban on partial birth abortion, while only twenty-six percent of liberals were in agreement. In the act, the majority of Congress found partial birth abortion to be an unnecessary medical procedure that was inhumane and thus should be banned. However, opponents of the ban feared it was the first step toward restricting abortion altogether. Today, the Partial Birth Abortion Ban Act is still a point of contention between many pro-life and pro-choice advocates.

Poster Presentations

HEALTH CARE REFORM AND MICHIGAN
Leah Brynaert
Location: Ballroom, 1:30 PM - 3:30 PM
Category: History, Political Science, and Economics, Poster, 1347
Mentor(s): Matt Grossman (Politcal Science)
In this project, I will examine President Obama's Health Care Reform Bill and its impact on Michigan. I will look at individual aspects of the bill and interpret ways in which they affect Michigan. Through a timeline, I will outline the individual steps Michigan must take to begin implementing this bill. Not every state is having the same problems with health care as Michigan. I will compare Michigan to other states. These comparisons will focus on the steps Michigan has already taken, citizens who are likely to benefit from the implementation of the bill, and a comparison of the Medicaid standards that must change under the reform. Overall, I will explain what the implementation of health care reform means for Michigan, and other states.

THE RECESSION & SOCIAL PROGRAMS: HOW THE ECONOMIC DOWNFALL CREATES WAVES IN STATE SERVICES
Jocelyn Cutean
Location: Ballroom, 1:30 PM - 3:30 PM
Category: History, Political Science, and Economics, Poster, 1400
Mentor(s): Matt Grossman (Political Science)
The overall effect of recession is widespread. Although much attention is focused on the negative impact of recession on the American everyman, this study explores the overall impact of recession from the other side by asking and answering the question, "How has the recession affected social program based communities?" This study, examining a widely overlooked demographic, delves into the world of state social programs, in particular the Michigan Department of Human Services, and seeks to discover the internal impact of the recession on such programs. This study gains the perspective of those in the field through qualitative interviews, national comparative studies, and in depth research on changes within the social, fiscal, and organizational constructs brought about by the current economic downfall from the inside out. It explores recessional impact on caseloads, program eligibility and enrollment, state finances, worker morale, and the like. In collecting and compiling untapped information through a journalistic approach, The Recession & Social Programs contributes to a growing pool of knowledge based on the negative, consequential effects on social programming which stem in direct relation to recessional periods. The results of this study add perspective in the field of social services. Further research in the area is needed for a more complete understanding of how social programs are internally affected by recessional trends, and may be used to augment overall awareness and motivation toward forward action in coping methodology.

THE SUPREME COURT'S AGENDA-SETTING PROCESS
Sydney Hawthorne
Location: Ballroom, 1:30 PM - 3:30 PM
Category: History, Political Science, and Economics, Poster, 1419
Mentor(s): Ryan Black (Political Science)
In the United States, the Supreme Court is the final arbiter on the most important, controversial, and difficult legal questions that exist. The Supreme Court is unique in that it has almost an unlimited amount of discretion in deciding exactly what types of cases and questions it will review and decide. This flexibility and discretion are very important as in recent years the number of cases asking for review has approached 10,000. Fewer than 100 of these cases (less than one percent) will be granted review. With so many cases before the Supreme Court, how does the Court pick out the needle in the haystack? Most importantly, what factors systematically influence the Supreme Court's decision to grant review in a particular case? Answering this question should be of great interest to academics, legal practitioners, and citizens alike. Previous research and extant theory suggest numerous potential answers to this question. If the Supreme Court is concerned with the consistency of the law, then it will review cases when several lower courts have reached contradictory results. If the justices on the Supreme Court are political and concerned with policy outcomes then they will review cases that are decided in a way that conflicts with their own policy preferences.

THE STRUCTURED COMPLEXITY OF FEDERAL URBAN POLICY
Brittany Albaugh
Location: Ballroom, 1:30 PM - 3:30 PM
Category: History, Political Science, and Economics, Poster, 1448
Mentor(s): Joshua Sapotichne (Political Science)
In this paper, I reconsider the life and alleged death of urban policy on the federal agenda. I propose that scholars and popular commentators who have declared the death of federal urban policy fail to adequately consider the complex nature of urban issue attention. To capture this complexity, I advance a systematic approach for tracing the scope and nature of urban policy on the federal agenda over the period 1946 through 2004. The underpinning of this approach is a distinction between urban "macropolicy" -spatially interconnected conceptions of social and physical conditions -and the narrower, urban-related policy foci of a bevy of policy sectors, such as those focusing on problems of pollution abatement, health, crime detection, and domestic terrorism. I illustrate that urban policy has not simply disappeared, but instead, has been

disaggregated and transformed over the years from the comprehensiveness of the Great Society, to a time-varying mix of initiatives and programs for which city-level policy issues are less central. In all, this contribution offers a re-thinking of federal interest in urban issues and raises important questions about the prospects of presidents, congressional entrepreneurs, and outside interests for shaping urban policy.

PATENTS AND PUBLIC HEALTH: ACCESS TO ANTIRETROVIRAL THERAPY FOR HIVAIDS
Sarah Smaga
Location: Ballroom, 1:30 PM - 3:30 PM
Category: History, Political Science, and Economics, Poster, 1527
Mentor(s): Mark Largent (James Madison College)
Thirty-three million people were living with HIV/AIDS in 2009, nearly twenty-three million of which live in Sub-Saharan Africa. Though antiretroviral drugs have greatly improved the HIV/AIDS prognosis, many patients in developing countries lack access to these treatments, or are developing resistance to existing generic therapies. Patents on antiretroviral medications represent a significant hurdle to the effective distribution of HIV/AIDS treatment on a global scale. The TRIPS Agreement, ratified by the World Trade Organization, seeks to standardize global patent law to increase enforcement of intellectual property rights. Though the Agreement recognizes the importance of generic medications, the allowances it provides are insufficient to remedy existing distribution hurdles. This project explores the evolution of patent policy, specifically in relation to HIV/AIDS and public health, and examines potential solutions that increase availability and distribution of essential medications worldwide.

RICK SNYDERS ECONOMIC DEVELOPMENT CORPORATION
Marina Csomor
Location: Ballroom, 1:30 PM - 3:30 PM
Category: History, Political Science, and Economics, Poster, 1546
Mentor(s): Matt Grossman (Political Science)
Whether for the better or for the worse, Michigan's economy is ever changing. Since the creation of the Michigan Economic Development Corporation, or MEDC, in 1999, Michigan policy makers have been working with local communities to help business in the state to boom. Under the direction of former governor Jennifer Granholm, the MEDC focused on expanding business in certain "growth industries." Governor Rick Snyder, however, intends to place less emphasis on enticing specific industries and will instead look to increase Michigan-based business. This MEDC change in focus will surely have an effect on state industries, including the field of alternative energy, that were once favored by the previous administration. But will these changes be for the better as Snyder hopes?

STEERING "THE SYSTEM": THE ROLE OF ADVERSE SELECTION IN THE MISSISSIPPI BUBBLE
Brad Kells, Jeff Johnson
Location: Ballroom, 1:30 PM - 3:30 PM
Category: History, Political Science, and Economics, Poster, 1612
Mentor(s): Ross Emmett (James Madison College)
One of the problems with the functionality of markets is that of imperfect information. We will show the role of asymmetrical information in the early 18th century economic boom and bust in France by examining two major players in the events: John Law, the head of France's first central bank and owner of the Mississippi Company, and Richard Cantillon, a private banker, speculator, and pioneer of political economy. An over issuance of banknotes combined with considerable speculation by investors about the Mississippi Company led first to a large economic expansion followed shortly by an equally large and destructive contraction. Information disparity between investors and the owners of the Bank and Company was a major reason for (cause of) this bubble, as people who held power, like Law, were able to manipulate the French economy to serve their own ends. Similarly, Richard Cantillon was able to combine "insider information" gleaned from his relationship with Law and his unprecedented understanding of the economics of the system to amass and maintain two large fortunes from his involvement. Law was the least successful of the pair as the unraveling of his control of the fiscal sector dragged him down with the plummeting French economy. The fate of Law's system was the inevitable result of his attempt to manipulate the economy.

COMMERCE AND REGULATION IN MICHIGAN BUSINESS
Marie Hallberg
Location: Ballroom, 1:30 PM - 3:30 PM
Category: History, Political Science, and Economics, Poster, 1633
Mentor(s): Matt Grossmann (Political Science)
Due to the recent recession felt across the whole country and especially in the state of Michigan, business owners today are continually searching for ways to make their business more profitable despite the rising cost of business. The collapse of the auto industry in Michigan led to a host of problems for businesses and an overall feeling of desperation by business owners to get their business back on track. For this reason, commerce and regulation has become a popular issue in the state of Michigan, along with the rest of the U.S. In this project I am interested in finding how easy it is to start a business in Michigan using interstate comparisons. I will be looking at other "Big Ten" states such as Illinois, Indiana, Ohio, Wisconsin, and Iowa and finding how their state governments enable them and grant them resources to improve their business, how business policies are enacted, how commerce is regulated throughout the state, and how these states ultimately compare to one another in different rankings made by business organizations and magazines. Hopefully from these comparisons, it will be discovered if Michigan is using all its possible resources to support and create business opportunities.

THE VOICE OF POLITICAL WEBSITES

Andrew Kuhlman

Location: Ballroom, 1:30 PM - 3:30 PM

Category: History, Political Science, and Economics, Poster, 1641

Mentor(s): Matt Grossman (Political Science)

Citizen participation in government is a vital for the health and well being of a democratic state. It follows that Americans should be involved, or at the very least, literate about public policies and political debates within their government; one of the most democratic states in the world. The involvement of American citizens and their knowledge about government affairs has been of concern, especially in recent years. In an ever-advancing age of technology and information, it seems it should be easier than ever for citizens to be informed and involved. However, are citizens actually using the Internet to do so? In order to make an assessment of this question, several of the most popular political news websites were assessed. These websites were assessed based on their political ideology i.e. conservative, liberal, or moderate, how many views each received, the news each contains, the kind of commentary each allowed, how many comments each received, and the nature of the comments. These websites were also evaluated on the kinds of links each had to other resources and information. It is expected that there will be a low variation of popularity among these websites and that they will have a low general popularity in comparison to mainstream websites. It is also expected that the stories, commentary and linkage will correspond to the political ideology of the website.

Humanities and Performing Arts

Oral Presentations

THE EMERGENCE OF MONOTHEISM
Rebecca Farnum
Location: Green Room, 9:15 AM
Category: Humanities and Performing Arts--1, Oral
Mentor(s): Benjamin Pollock (Religious Studies)
Abraham is known as the "Father of Monotheism," and the three major religious traditions most frequently identified with monotheism are often designated "Abrahamic religions." Yet archaeological evidence has brought to light multiple instances of religious monotheism in different historical periods and in different regions of the world (the most commonly-known perhaps being that of 14th-Century BCE Egypt). This project will seek to answer the question of when and why monotheism emerges in different parts of the world. What cultural conditions seem to be a "breeding ground" for monotheism? What political conditions are necessary in order for monotheism to be maintained in society? As we address these questions, we will also explore the "messiness" of monotheism: e.g., the regular celebration of myriad divinities or forms of divinity within what are identified as monotheistic traditions. We'll question the extent to which "monotheism" as a pure concept might rather be a scholarly construct than an actual, observable phenomenon. Further, we will critique the scholarship around monotheism, looking at the issues that can arise when "Western" monotheism is taken as a standard according to which all other religious traditions are evaluated and ordered.

AUTOBIOGRAPHICAL COMICS AS SOCIAL JUSTICE
Fiona Smith
Location: Green Room, 9:30 AM
Category: Humanities and Performing Arts--1, Oral
Mentor(s): Dylan Miner (RCAH)
As an autobiographical comic artist, activist, and writer, I am researching autobiographical comics and the larger meaning behind them for my senior thesis. Through my research, I explore how autobiographical comics incorporate themes of social justice and direct action, focusing on the comics of Nicole Schulman and the publication World War Three Illustrated. My thesis will be a 20-25 page illustrated comic, which will discuss how autobiographical comics are tools for social justice. In my presentation, I will discuss the objectives, purpose, and importance of Schulman's work as a literary genre and artistic medium. My research is based off of my conversations with Schulman, analysis of Schulman's work, and research from academic readings on comics theory and criticism.

MEDIA AS AN ACTOR
Dennis Corsi
Location: Green Room, 9:45 AM
Category: Humanities and Performing Arts--1, Oral
Mentor(s): Alison Dobbins (Theatre)
For years, theatrical productions have included actors, sets, and lights. The new frontier in theatre is adding media to this list. Designers have struggled with tackling this new beast and figuring out where to position it in terms of what already exists in their craft. Is it a set piece? Is it lighting? I have explored the less thought of possibility: that media is actually another actor on the stage. Inherently, media has a narrative timeline, similar to that of an actor. While a set piece may have a history to it, it is still a passive object. The process involved in dealing with an active element, such as media or an actor, is much different than the process of dealing with something passive, like a set piece. When using media, things must be considered such as power dynamics, focus, and motivation -all which are things a director considers when working with an actor. In my research, I have experimented with the use of live and prerecorded media as another actor in several different scenes. I have tested different system designs to determine how each method affects the audience's interpretation of the media as an actor. Through these experiments, I have discovered that treating media as an actor as opposed to a set piece is a successful way of integrating media into theatre.

REGISTER CHOICE IN DEAF SIGNERS: A COMPARATIVE STUDY OF ASL AND GENDER REGISTER USE
Abaries Farhad, Juliane Brinkman, Jameyla Troy
Location: Green Room, 10:00 AM
Category: Humanities and Performing Arts--1, Oral
Mentor(s): Steve L Johnson III (Linguistics and Languages)
Limited research exists regarding the registers (styles of language use) of American Sign Language (ASL). We are interested in hearing register, the style of ASL used by native Deaf signers in discourse with non-native hearing signers. Markers of hearing register include fingerspelling, mouthing, and contact signing. It is generally accepted that the presence of just one hearing signer prompts the use of hearing register. Thus, our study examines: 1) the features of hearing register and the effect of a hearing signer's presence upon Deaf register choice, and 2) how hearing register compares to the masculine and feminine registers of Standard American English (SAE). Participants were recruited through social networking and given question prompts to facilitate conversation. Three separate sessions were video-recorded, consisting of (1) a hearing signer among five Deaf signers, (2) a female among five males, and (3) a male among five females. The first session began with a Deaf-hearing dyad, and the latter sessions began with a male-female dyad. Subsequent participants for each session were introduced one-at-a-time at five minute intervals. Results show that the presence of a hearing signer prompted the first Deaf signer to use hearing register. However, as more Deaf participants entered the linguistic environment, tokens of hearing register decreased. Results suggest that contrary to the accepted notion, the presence of one hearing signer among a group of Deaf signers is not a strong motivator for hearing register. Overall, hearing register use follows a pattern similar to masculine and feminine register use in SAE.

QUILTS AND JAZZ
Emily Decker
Location: Green Room, 10:15 AM
Category: Humanities and Performing Arts--1, Oral
Mentor(s): Phylis Floyd (Art History)
Quilts of Jazz musicians and songs have been created throughout the years. With their beautiful portraits they tell the story of this intricate music and the people that shaped it. Jazz is a stand-alone genre of music that has more than just a good beat to follow it. Besides quilts about jazz, what do these two art forms have in common? Can the threads of a quilt and the keys of a piano have similar meanings? According to Maude Southwell Wahlam, jazz and quilts do go together. Wahlam states. "African principles of multiple patterns, asymmetry and other unpredictable rhythms and tension [are] similar to those...in jazz." Both of these artistic endeavors compliment each other. The quilts and jazz have African American ties, story telling embedded in them, and deal with improvisation.

SHIVA ON GREEN REVOLUTION AND GENETIC ENGINEERING
Hilda Bouri
Location: Green Room, 10:30 AM
Category: Humanities and Performing Arts--1, Oral
Mentor(s): Kyle Whyte (Philosophy)
In Stolen Harvest, Vandana Shiva makes numerous claims in opposition to genetically engineered (GE) crops. Recently, Paul B. Thompson, consistent with Normal Borlaug, have challenged Shiva's use of facts in support of her views. He focuses especially on her claims regarding GE crop failures, intentional dismissal of counterfeit seeds as a likely explanation of crop failures, and the GE terminator gene. In this paper, I frame this debate in order to assess the importance of Thompson's criticisms to Shiva's overall ethics of agricultural development. For example, it might be argued that Thompson's focus on facts obscures other social and political issues faced by Indian farmers in light of the Green Revolution that are hard to detect in Shiva's text themselves. I argue that Shiva's biased reporting is noticeable and has given rise to doubts as to whether her position will be given serious consideration with development of future agricultural projects. However, Bina Agrawal may provide an alternative to Shiva. Notably Shiva often locates the "crisis" almost entirely in the Third World's experience of the West, while Agrawal recognizes that there are very real local forces of power, privilege and property relations that predate colonialism. This viewpoint allows for a sensible treatment of the debate and provides us with a tool to examine all the players in controversy regarding uses of biotechnology in large-scale agriculture.

NAVIGATING IDENTITY IN SOUTHERN FRANCE
Jonathan Beagley
Location: Green Room, 10:45 AM
Category: Humanities and Performing Arts--1, Oral
Mentor(s): Deidre Dawson (RCAH)
Although the interest in identity as a sociological and cultural concept is recent, much debate has centered on the meaning of identity and also on its sociocultural implications. In particular, the ideology of identity, as is often the case with ideologies, is closely related to social power, and ideologies of identity are heavily implicated in modern political discourse, either explicitly or under the guise of concepts such as ethnicity, race, nationality and even language. The South of France represents an area that is presented as linguistically and culturally homogenous. In reality, this is a highly simplified view of the linguistic and cultural diversity present within this region. The goals of this project include determining the particular ways in which French linguistic identities are articulated, the way these articulations represent and reinforce ideology, how this ideology of linguistic identity interacts with the dominant linguistic ideology and also the political and policy implications of these competing ideologies. This research is based upon a critical, multidisciplinary approach and thus will rely on analysis of personal interviews, political discourse, historical texts and popular music. Furthermore, the project is informed by qualitative, ethnographic research conducted in Montpellier, France.

TOWARDS A THEORETICAL TOOL AGAINST ANTHROPOGENIC ENVIRONMENTAL HARM: BRINGING THE WESTERN "BIO-LOGIC" INTO VIEW
Adam Liter
Location: Green Room, 1:00 PM
Category: Humanities and Performing Arts--2, Oral
Mentor(s): Kristie Dotson (Philosophy)
I will look at the ways in which the two books, Ishmael by Daniel Quinn and The Invention of Women: Making an African Sense of Western Gender Discourses by Oyèrónkẹ́ Oyěwumí, intersect. More specifically, this essay seeks to deal with the ways in which the concepts of "Taker culture" and "Leaver culture" outlined by Quinn, in conjunction with the analytical and scholarly methodologies as well as the explication of certain Western cultural assumptions offered by Oyěwumí, can serve to proliferate a sustainable lifestyle, or culture, in the hopes of mitigating the overly negative anthropogenic impact on the environment. I will argue that recognizing and understanding the "bio-logic" of Western culture as described by Oyěwumí leads to a (better) understanding of the underpinnings of Quinn's "Taker culture," thereby exposing the basic assumption of "Taker culture" with the hopes of challenging the Taker paradigm. What I aim to establish is thus threefold. First, just as Quinn argued, I will argue that "Taker culture" underwrites much of the anthropogenic environmental destruction and degradation. Second, I will argue that the cultural logic underwriting "Taker culture" is the selfsame "bio-logic" described by Oyěwumí. Third, by exposing these basic assumptions, a challenge can begin to be formulated, hopefully leading to an eventual reversal of the destructive underpinnings. The overall aim of this work is therefore to provide a theoretical tool for combating anthropogenic environmental harm.

"THE CULTIVATION OF GENIUS AND THE GROWTH OF UNIVERSAL VIRTUE": AMERICA'S FIRST GRAPHIC HISTORIANS AND THE FOUNDATION OF AMERICAN ART

Janine Yorimoto

Location: Green Room, 1:15 PM

Category: Humanities and Performing Arts--2, Oral

Mentor(s): Peter Knupfer (History)

For my senior thesis, I have researched early American history paintings and their special role in American society. Benjamin West, John Trumbull, and Charles Willson Peale began their careers on the eve of the American Revolution and were instrumental in creating a forum for art in America. Products of the Enlightenment and Romantic period, their artwork documenting the American Revolution reflects the values of nationalism, strong moral character, and education. In America, where art was considered extravagant and vain, they gained acceptance because of their history paintings' utilitarian value. Their understanding of "history" reflected their generation's belief in the heroic and exemplary didacticism of the craft, rather than the scientific, objective, and disciplined profession it became later in the century. The success of West, Trumbull, and Peale in America encouraged other artists to continue their tradition of painting. The promotion of art was furthered by American academies of art and public exhibitions, in the founding of which these men were also essential. The American tradition of documentation through painting continued through the nineteenth century. In researching for my thesis I have looked not only at various secondary sources, but also the autobiographies, diaries, and letters of these three influential men, who were not only artists, but educators, politicians, and philosophers.

TRUTH IN COMICS: AN ACCURACY ANALYSIS OF JAPANESE CULTURE IN MANGA

Sasha Masters Jones

Location: Green Room, 1:30 PM

Category: Humanities and Performing Arts--2, Oral

Mentor(s): Danielle DeVoss (Writing, Rhetoric & American Culture)

My research addresses the accuracy in representation of Japanese culture in Japanese comics, manga. Manga has grown in popularity throughout the U.S. and the world, making it a key source of information the public receives about Japanese culture. To ensure learning about Japanese culture through manga is viable, I have taken my knowledge from Japanese classes and my study abroad in Japan and compared it to the vast amount of manga I have read, focusing on: food, school, etiquette, emotions, dating, and fashion. I have conducted interview-based research and read a variety of articles and books to answer my questions about representations of these aspects of Japanese culture. In my presentation, I will present my findings on the accuracy of representation through food and emotions. My research has demonstrated that cultural knowledge gained through manga is mostly accurate; you just need to discern what is being exaggerated, as is needed in any form of media. This accuracy analysis shows that cultural knowledge gained from manga is reliable if analyzed correctly, thus manga is a viable tool for learning about Japanese culture.

DEVELOPING FEMINIST PHILOSOPHIES AS COALITIONS: INCREASING INCLUSION BY BRIDGING DIFFERENCES BETWEEN FEMINISMS

Ryan Cantrell

Location: Green Room, 1:45 PM

Category: Humanities and Performing Arts--2, Oral

Mentor(s): Kristie Dotson (Philosophy)

The objective of my research is to explore the diversity of feminist philosophy and understand effective means of participation for any would-be feminist. Because of the vast diversity within the field, understanding and effective cooperation amongst feminist philosophers is often hindered, leaving some feminist engagement excluded and/or ignored. Lack of awareness and understanding of the different needs and problems that each kind of feminist addresses, can lead to the production of ignorance. The existence of such ignorance was apparent throughout my research in mainstream and minority feminisms. Under the mentorship of Kristie Dotson, I was able to compare and contrast the experiences in feminist philosophy from the standpoint of different minority positions, specifically those of male feminisms (white men and men of color) and women of color feminisms. Resulting from this research, two profound observations were made. The first major observation is the significance of the specificity of experience involved with one's epistemic standpoint; the second observation is that through micro-ideological crossings a coalitional feminist philosophy/activism can be formed to allow different feminists to work together.

THE IMPORTANCE OF RECOVERING THE AFRICAN AMERICAN PHILOSOPHER

Kimberly Harris

Location: Green Room, 2:00 PM

Category: Humanities and Performing Arts--2, Oral

Mentor(s): John McClendon III (Philosophy)

For this project, I have been recovering primarily documents from African American philosophers writing during what W.E.B Dubois referred to as the "Color-mind Era." Due to Jim Crow laws and segregation, African American philosophers were restricted to publishing in journals that were "for negroes," church reviews or self-publishing was common. In fact, the Journal of Religious Thought and the A.M.E Church Review were places African American philosophers such as Forrest O. Wiggins, Cornelius Golightly, and William R. Banner published their contributions to philosophy. I have had the difficult task of locating their works because of limited resources, which have gone ignored in philosophy due to the legitimacy of places they published and the questioned legitimacy of their work as Black scholars. The second component of my research allows me to engage with the pieces I have found in the course Philosophy and the Black Experience. I am interested in highlighting the works of Wiggins, Golightly and Banner, while showing why philosophy courses and textbooks (anthologies) are missing a central component of American philosophy when African American philosophers such as these are excluded and ignored. I am interested in showing the direct utility in the works of the mentioned philosophers. These philosophical pieces are diverse; however my research will ultimately result in an introductory philosophy anthology that includes African American philosophers and others because they did indeed contribute to philosophy in profound ways.

PRISON THEATRE: A COMPARISON OF TWO ARTS OUTREACH STYLES ON AN UNLIKELY STAGE
Beth Kolongowski
Location: Green Room, 2:15 PM
Category: Humanities and Performing Arts--2, Oral
Mentor(s): Joan Starr (Theatre)
Within the confines of a prison's walls, the MSU Creative Outreach Team counters the cycle of negativity by cultivating creativity and self-expression through artistic practice. This research seeks to understand the results of this intense work so further efforts can be molded to suit participant needs and the goals for the outreach. Little is known publicly about the complexity and value of operating such arts programs with inmates, and it was clear that to make the experience meaningful, we needed to be aware of the effects of different techniques. We examined two methods of arts outreach implemented over two semesters and their resulting outcomes in this unique setting. Based on the principles of instructor versus student-directed teaching, two styles of creative dramatics were utilized: one that emphasized leader control and one that emphasized collaboration and self-direction in the creation of a final performance. A comparison was drawn between each method using our observation of the results in: prisoner participation and feedback, final products, encountered difficulties and collaborative effort. We will address each method, what our observations of the outcomes of each showed and how this information may be utilized by MSU and other arts outreach programs to design effective sessions. The implication for this research may be awareness of some of the possible outcomes of each type of instruction, which can be instrumental in construction and growth of future outreach programs in diverse settings based on the needs and desired results of the work.

THEODICY AND AN ONLINE UNDERGRAD RESEARCH MODEL
Laura Evangelista
Location: Green Room, 2:30 PM
Category: Humanities and Performing Arts--2, Oral
Mentor(s): Chris Frilingos (Religious Studies)
By producing an online website model as a way to present undergraduate research, students at MSU can contribute knowledge to a larger society and provide their peers with an example for future studies. Typically, undergraduate research projects are presented in a paper, maybe a poster, and then never revisited. Using the question of theodicy (why bad things happen to good people if God exists) as a focus for the research topic, I have compiled an annotated bibliography exploring the scope of scholarly analysis of answers that biblical literature presents to solve this problem. Wordpress has been installed as a content management system on website exhibiting the findings, msurelundergradresearch.org. I have edited code on the site to reflect the complexity of online resource expectations, from searchability of the bibliography by category to creating an opportunity for readers to submit questions about the findings. I propose that the university creates a similar site that all undergraduate research projects can be displayed on. Not only will it show the research capabilities of our undergrads, it will also exemplify MSU's commitment to taking advantage of technological advances that can benefit its students.

Poster Presentations

LOST AND FOUND: THE CLOTHING OF FLORENCE LOW, 1865 TO 1980
Kaitlyn Osborn, Hannah Stoppel
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Humanities and Performing Arts--1, Poster, 1472
Mentor(s): Karen Kangas-Preston (Theatre)
In spring of 2010, the MSU Department of Theatre Costume Shop received a donation of clothing that belonged to Florence Low. Her collection spans over a century; from the 1860s to the 1980s, and is a rare find. Florence's collection shows a record of one of the biggest, most abrupt, and most important changes in female fashion in history. As we explore Florence's collection we strive to understand where the pieces came from, how old each one is, and how to preserve them. Our research has also included finding as much as possible on the fascinating woman who made the collection. From interviews with a relation, we are working to discover a connection to Hollywood, ladies' society groups, and how Florence collected the pieces through forgotten luggage. We have made it our mission this year to catalog and preserve this invaluable resource and to research the fascinating woman who compiled it.

AFRICAN AMERICAN VERNACULAR DANCE: IDENTITY, COMMUNITY, & INTERVENTION
Clara Balliet
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Humanities and Performing Arts--1, Poster, 1505
Mentor(s): Austin Jackson (RCAH)
In Critical Ethnography: Method, Ethics, and Performance (2005), D. Soyini Madison observes that "when we perform and witness cultural performances, we realize truths about ourselves and our world that we cannot realize in our day-to-day existence." This has certainly been the case with African American vernacular dance, largely seen as a form of entertainment within popular culture. Current academic work reinforces this view, highlighting the technical and aesthetic value of breaking, crunking, and other dance forms associated with Black performance. Yet African American vernacular dance speaks back to largely invisible, unjust power structures that give rise to the Black performative moment in the first place. The current study seeks to situate analysis of African American vernacular dance within existing socio-cultural, political, and economic contexts that generate it. The research is guided by two guiding questions: What is the social-political meaning of African American vernacular dance? How does breaking "speak" to critical issues of race, class, and power relations in society? Using performance theory as my theoretical framework, I analyze breakdancing as a mimesis (reflection), poiesis (meaning), and kinesis (intervention). By exposing African American vernacular dance as capable of expressing identity and building community, the performance can reach its fullest potential in realizing these capabilities, giving to marginalized youth both art and a community.

SHIFTING ARTISTIC EXPRESSIONS: HOW AFRICAN ARTISTS HAVE RESPONDED TO FOREIGN CONSUMER DEMAND
Carlee Forbes
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Humanities and Performing Arts--1, Poster, 1510
Mentor(s): Stephen Esquith (RCAH), Laura Fair (History)
Art has enormous potential for culture to expression; however, studying art in the African context reveals changes that are occurring to many artistic traditions, in part due to demands from foreign parties from traders to tourists. The main idea behind this work is to examine how African artists, through a sampling of different time periods and cultures, have responded to these outsiders' demands. Using examples of ivories brought back to Europe from the coast of Western Africa in the 14th -16th centuries, wood carvings produced for the tourist art market in Kenya in the late 20th century, and works by 5 modern-day textile artists in Mali, it is possible to see the different reactions that artists have in dealing with consumer demands. In terms of the art itself: What stays the same? What changes have the artists made to satisfy the demand? However, there are also larger questions that simply the art style: How did the artist make the piece the way that he/she did? Finally, what do these changes mean for the culture in which the art was produced?

VARIABILITY IN THE INPUT AND ACQUISITION OF SECOND-PERSON MORPHOLOGY IN TWO DIALECTS OF SPANISH
Carol Ross, Anaite Castaneda, Daniel Chabala, Laura Portko
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Humanities and Performing Arts--1, Poster, 1533
Mentor(s): Cristina Schmitt (Linguistics and Languages)
Chilean Spanish differs from Mexico City Spanish in that syllable-final /s/ undergoes a weakening process (lenition) and can be reduced to aspiration [h] or be omitted altogether. In some cases the omission of /s/ causes an ambiguity. When lenition causes omission a form with and a form without [s] are basically impossible to distinguish. For example, the distinction between second and third person singular verb forms (hablas/you speak vs. habla/she speaks) amounts to the presence vs absence of /s/. Previous work has shown that lenition has an impact on the acquisition of plural morphology (la niña/the girl vs. las niñas/the girls) but no impact on the acquisition of second and third person singular. In this paper we investigate the amount of lenition in second person singular verbal forms present in Child Directed Speech (CDS) in comparison with Adult Directed Speech (ADS). The goal is to determine whether the input the child is receiving for verb agreement is more reliable than the input the child is receiving for number morphology. Using the Miller-Schmitt Corpus we analyze the rate of lenition in verb forms in different contexts (null vs. overt subjects, sentence final vs. medial, etc) and the impact on children's ability to comprehend second vs. third person morphology in comparison to plural morphology.

INPUT EFFECTS ON CHILD PRODUCTION OF SER AND ESTAR IN OVERLAPPING CONTEXTS
Daniel Chabala, Anaite Castaneda
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Humanities and Performing Arts--1, Poster, 1549
Mentor(s): Cristina Schmitt (Linguistics and Languages)
Unlike English, Spanish has two copula verbs, 'ser' and 'estar'. Although second language learners take a long time acquiring the distinction between the two copulas, children learning Spanish as a first language seem to begin to produce 'ser' and 'estar' correctly at a very early age. In this paper we examine the distribution of 'ser' and 'estar' in the input to children in order to compare with their production of the two copulas. The goal is to examine how informative is the input to children acquiring 'ser' and 'estar', particularly in contexts where 'ser' and 'estar' are grammatically possible and only the discourse distinguishes them. Specifically we examine adjectival and prepositional phrases in two dialects of Spanish (Mexico City Spanish and Chilean Spanish). Arguably these dialects differ in the use of the two copulas, with Mexican dialects overusing 'estar'. Using the Miller-Schmitt corpus we focused on properties of adjectives (gradability, morphology and adverbial modification) and on the semantics of prepositional phrases (locative, possessive, constitutive etc). Furthermore we examine properties of the subjects in order to determine trends in the input to children and whether this is reflected in their production.

RESOURCESPACE: BRINGING ARCHAEOLOGICAL DATA INTO THE 21ST CENTURY
Stephanie Senneker
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Humanities and Performing Arts--1, Poster, 1559
Mentor(s): Jon Frey (Art and Art History)
For years, notebooks have been the main method for documenting archaeological excavations. Until recently, the only way to access this information was to find the physical notebook itself at the dig site. With access to better technology, archaeological notebooks can now be digitized and published online, making them accessible anywhere. However, searching for specific data from these documents is still a tedious process. Our project, using an open source application and notebooks from a site in Greece called Isthmia, is to create a system that integrates data from notebooks and other records and makes it readily accessible for researchers. Our goal is to create an intuitive, consistent method of keywording and linking these resources that accommodates the variability in data types and quality, allowing researchers to access and analyze archaeological data much more efficiently.

A COMMUNITY INITIATIVE TO SUPPORT ARTS AND MEDIA
Paul Deckard
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Humanities and Performing Arts--1, Poster, 1577
Mentor(s): Alison Dobbins (Theatre)
This research initiative is a branch of the recent development of the Lansing Media/Theatre Project, which seeks to educate, develop, and produce a program that effectively integrates video media with live theatre in the Lansing Area. The local community at large includes a vibrant cross section of diversity in theatre background, experience, and interests. It is this diversity that will allow us a more accurate evaluation of the

practical real-world integration of theatre and media. The research presented here will focus primarily on community involvement and support for this project and its aims in the performing arts realm. It will also focus on analyzing community evaluations and future developments with the Lansing Media/Theatre Project in hopes to create a structured educational component that is reputable, self-sustaining, and on the technological forefront of theatrical evolution.

WHEN MICE ARE BIGGER THAN ELEPHANTS: CHILDREN'S UNDERSTANDING OF GRADABLE ADJECTIVES IN COMPARISONS
Sarah Conroy, Ellen Hess, Emily Robinson, Ashley Somers
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Humanities and Performing Arts--1, Poster, 1635
Mentor(s): Alan Munn (Linguistics and Languages), Christina Schmitt (Linguistics and Languages)
Gradable adjectives like “big” and “small” are interpreted relative to a contextual standard. When we say, “The elephant is small”, we think the elephant is small compared to other elephants. Comparatively, when we say, “The mouse is big”, we think the mouse is big compared to other mice. Yet, we can compare two huge elephants and it is still possible to say, “This elephant is smaller than the other elephant.” This shows that the relative standard disappears when we use a comparative structure. We tested whether or not children understand that these standards relative to the objects disappear during comparisons. We compared “canonical” and “non-canonical” comparisons (The elephant is bigger than the mouse. vs. The mouse is bigger than the elephant.) through “-er” and “as” constructions (“bigger than” vs. “as big as”). Our hypothesis is that children will have difficulty with the non-canonical comparison because their knowledge of the world overrides their linguistic knowledge. We present results from two experiments with both children and adults that test this hypothesis. One experiment involved using actual figurines and the other used pictures.

TESTING LOCAL CALCULATION OF SCALAR IMPLICATURES
Karl DeVries
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Humanities and Performing Arts--1, Poster, 1636
Mentor(s): Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)
Scalar implicatures (SIs) are traditionally taken to be the result of reasoning about speakers' intentions uttering a given sentence. An alternative view holds that SIs are generated along with the semantic interpretation of a sentence. On this hypothesis it is possible for SIs to be embedded under the scope of other quantifiers. So, "each student read some of the papers" should have a global SI meaning each student read some of the papers and not all the students read all the papers and a local SI meaning each student read some but not all of the papers. A recent study by Chemla and Spector (2009) using a modified truth-value judgment task seemed to detect local SIs. In the study subjects were presented with sentences like "each letter is connected to some of its circles" paired with a picture of six boxes each with a letter surrounded by and possibly connected to circles. Both the linguistic and visual stimuli encourage subjects to regiment the circles into sub-domains. We believe this leads subjects to verify the sentence by first considering the truth of a series of sentences of the form in "X is connected to some of its circles". If the SIs on these sentences were calculated the sum result would be logically equivalent to a local SI. We aim to improve on these results by testing stimuli that make regimentation of the of the visual stimuli into sub-domains harder testing the detection of local SIs under better conditions.

DUTCH COSTUMES AS A MEANS TO PRESERVE CULTURAL HERITAGE
Carolyne Rex, Erika Clauson
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Humanities and Performing Arts--2, Poster, 1402
Mentor(s): Jodi Ozimek (Theatre)
The traditional costumes of Holland are intricate, breathtaking, and iconic. Since 1927, Tulip Time, a Dutch heritage festival in the city of Holland, Michigan, has used costume, dance, and millions of tulips as a means to rejoice in and preserve an immigrant culture. Our research explores ways in which Tulip Time and its Dutch Dance program re-invents, re-energizes and possibly saves from extinction such an important part of this culture’s tradition. Our research techniques include firsthand interviews with members of the Dutch Dance program, field research, and analysis and construction of a regional Dutch costume. We examine the difference between the adaptation of a costume as opposed to a direct replication, the history of these costumes and their authentic links with the folk dress of the Netherlands, and the evolution and growth of culture in immigrant communities. Furthermore, we hope to bring attention to costume as a legitimate means of cultural celebration and preservation.

USING PROSODY TO DISAMBIGUATE INSTRUCTIONS
Thao Dinh, Braden Leinbach
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Humanities and Performing Arts--2, Poster, 1432
Mentor(s): Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)
It is well known that children use prosodic information (boundaries, stress, final lengthening) to extract information from a sentence. Adults sometimes use prosodic information, while at other times this is overridden by lexical and syntactic information. Definite noun phrases presuppose a unique set they refer to in the discourse. Various factors contribute to define what counts as the set in the discourse. In this paper using a forced-choice task we examine adults’ ability to use prosodic information to construct the set that the definite determiner picks out in the discourse. We hypothesize that focus alone is a strong enough prosodic marker to drive an interpretation. Subjects are given sentences such as the ones below in a context in which there are four penguins and four dogs. Prosody A: Draw a circle around two of the penguins and a line under the dogs. Now draw a LINE under the penguins. Prosody B: Draw a circle around two of the penguins and a line under the dogs. Now draw a line under the PENGUINS. Depending on what is prosodically focused, one can refer to the large set (all the penguins) or concentrate on a smaller set (the two circled penguins). Subjects are shown a picture with a line under the large or the small set of penguins, and they have to choose which of the two prosodies better matches the picture. We predict that subjects will consistently match prosody A with the small set and prosody B with the large set.

TOO MUCH IS NOT ENOUGH: EXPLORING HARRIET LAKE'S CLOSET
Kaitlyn Osborn
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Humanities and Performing Arts--2, Poster, 1440
Mentor(s): Jodi Ozimek (Theatre)
In theatre, a costume designer relies on the playwright to determine what a character wears. Research on history, fabric, colors, patterns, and images, all help the designer make their choices. Rarely do we figure out why a character wears what they wear;was it for a specific event? Was it their favorite color? Did they always want to have one? In the case of Harriet Lake we have asked the source, and received answers of when, where, and why she bought a garment, as well as memories that go along with it. Harriet Lake is an extraordinary collector of clothing, shoes, hats, purses, and jewelry. Her closet contains the labels of Chanel, Adrienne Landau, Escada, Rudi Gernreich, and Louis Vuitton, just to name a few. Through their friendships with Harriet, supervisors Jodi Ozimek (MSU) and Kristina Tollefson (UCF) were able to explore Harriet's closet, photograph and document articles of clothing, and perform multiple interviews with Harriet, listening to stories, learning her history, and noting her opinions on fashion. A showcase of Harriet's closet opened at the University of Florida as a museum exhibit. The exhibit included an area replica of her closet, mannequins displaying garments, and cases filled with priceless jewelry, purses, and scarves. From our exploration of Harriet's closet, costume designers are reminded that there are reasons behind our choices and memories behind our clothing. Discovering these reasons and memories help to make the designer's vision stronger.

DOGS NOT PUT IN BOXES BY BOYS: LEARNING A NOVEL NUMBER SYSTEM
Christopher Heffner, Adam Liter
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Humanities and Performing Arts--2, Poster, 1481
Mentor(s): Cristina Schmitt (Linguistics & Languages)
While English has an obligatory singular/plural distinction, in Japanese, bare nouns allow both plural and singular interpretations. To disambiguate between a singular and a plural reading, optional markers ("one" or a special pluralizer) can be added. We report two experiments testing English-speaking participants' ability to learn an artificial language based on Japanese number system. We investigate adults' ability to produce and interpret bare nouns and the optional number markings in affirmative and negative contexts. We ask whether (i) adults can learn that bare nominals can have singular and plural interpretations and, if so, whether they will treat bare nouns as English plurals and (ii) whether they will treat the pluralizer as an English-like plural or not. We hypothesize that participants acquire an understanding of bare nouns but that participants do not learn the more refined inferences attached to bare nouns and pluralizers in negative contexts. In English, "the boy doesn't put dogs in the box" implies that no dogs are put in the box. In other words, negation cannot target the plural. The sentence would be false if he put one dog in the box. In other languages, however, where the plural marker is optional, negation can target the plural. That sentence could be true if one dog is put in the box (unlike in English). Our results will shed light on the process of regularization, generalization beyond the input given to build a grammar in a novel language.

DESIGNERS' PERSPECTIVES ON STORYBOARDS & REUSE
Nina Elias
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Humanities and Performing Arts--2, Poster, 1509
Mentor(s): Scott McCrickard (Computer Science)
Designers naturally have a tendency to reuse previous designs in new creations. Often new concepts are represented in the form of a storyboard. Thus, a tool that can facilitate reuse during storyboarding would be beneficial to designers. PIC-UP is a digital storyboarding tool that contains reusable features in the form of cards featuring a description, image, and tradeoffs. The goals of this research were to identify when designers would utilize the tool in their design processes, what they would use it for precisely, and how they would utilize the completed storyboards. Interviews were conducted with six designers with significance industry experience and researchers--all with exposure to Human Computer Interaction. Participants answered questions about their typical design processes, reuse practices, and thoughts on storyboarding. They also provided feedback on PIC-UP after a brief introduction to the tool and followed a sample scenario guiding them through the design of a museum notification system. Using the Grounded Theory method to analyze the interview results, we found that PIC-UP is useful in initial stages of design work and could be useful for designers with various levels of expertise. In unfamiliar domains, the tool can inspire and encourage discovery; but in general, the likelihood of tool adoption might depend on having a set of artifacts tailored to the designer's specific domain. We also found that PIC-UP might allow designers to more effectively communicate and capture design ideas, but that specific features and methods of output would have to be added.

YOU MUST BE AS TALL AS THIS LINE TO RIDE THE ROLLER COASTER
Kait Ayres, Kara Brewer, Katrina Torgerson
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Humanities and Performing Arts--2, Poster, 1529
Mentor(s): Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)
Language acquisition in children may seem simple and understood but there is still much to discover about what kids know. The knowledge children must acquire about language extends much further than simple vocabulary and includes complicated uses of syntax and pragmatics that we, as seasoned speakers, don't think twice. In this poster we investigate children's understanding of "as" comparisons. When we say, "John is as tall as Bill" we generally interpret this to mean that John is exactly the same height as Bill. However, at an amusement park, when we see a sign that says, "You must be as tall as this line to ride the roller coaster" we interpret this to mean you must be as tall or taller than the specified height. The fact that "as" can mean "greater than or equal to" implies that we use context to narrow the interpretation down to the "exactly" meaning. Previous research has shown that children learn such narrowing late in other linguistic constructions. We designed an experiment first to see if children have the precise "equal to" meaning in examples such as "The blue boy is as tall as the red boy", when the

blue boy is actually taller. We then tested particular contexts such as “You must be as tall as this line to ride the rollercoaster”. We hypothesize that amongst children the “greater than or equal to” meaning will be generally accepted while the strictly “equal to” will be less accessible.

CHILDREN'S KNOWLEDGE OF POSITIVE AND NEGATIVE COMPARATIVES
Emily Smith, Brad Mandeville, Ben Rathbun
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Humanities and Performing Arts--2, Poster, 1581
Mentor(s): Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)
Many facets of first language acquisition are unknown. In this study we examine children's knowledge of gradable adjectives in comparative contexts. When we say that John is tall, we judge John to be tall relative to some contextual standard of height. But when we say that John is as tall as Bill we are not forced to assume that either John or Bill are actually tall by any given standard. However, when we say that John is as short as Bill, we are led to assume that John and Bill are in fact short. Importantly when we use the comparative form with -er ("shorter than" or "taller than") we are not forced to infer any particular height standard, so "as" comparatives are different in this respect. In this poster we examine children’s knowledge of these patterns in both the "as" comparative and the -er comparatives, to find out at what age children began to understand the acceptable contextual use. We present results from an experiment designed to test both the proper and improper use of positive adjectives (like "tall") and negative adjectives (like "short") in both -er and "as" comparative contexts.

THE INTERPRETATION OF PLURALS
Karl DeVries
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Humanities and Performing Arts--2, Poster, 1638
Mentor(s): Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)
Generally singular determiner phrases (DPs), e.g. "a dog", are taken to mean "one" and plural DPs, e.g. "dogs", to mean "more than one". This claim has recently been challenged, and it is claimed that the "more than one" interpretation that plural DPs receive is not part of the meaning of the expressions but rather the result of a scalar implicature (SI). This project is comprised of three experiments designed to further test this claim. Experiment 1 is a truth value judgment task with adult subjects, and experiment 2 is a truth value judgment task with children. Because children are thought to be worse at generating implicatures, we expect to find that children and adults regard plural DPs differently in truth value judgment tasks. Experiment 3 uses a reaction time study with adult subjects to further test this hypothesis.

A THEATRICAL METHOD OF EXPERIMENTATION
Gina Benninger
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Humanities and Performing Arts--2, Poster, 1656
Mentor(s): Alison Dobbins (Theatre)
Most small local theaters do not tend to incorporate media into their productions. Through an initial survey, we discovered that this was due to lack of knowledge about the field. The goal of the Lansing Media Theater Project (LMTP) is to help educate the local artists about integrating video media by using a hands-on approach. The specific goal in this research for me is to look at the different aspects of communication within the theatre community. I think that offering more forms of communication in conjunction with the workshops will increase the likelihood of participants feeling comfortable to bring in media to their community theaters. Throughout the year, we planned a series of workshops held at Riverwalk Theatre that allow people to get a firsthand look at what the technology is that is available to them. We want the participants to be able to respond and ask questions. To help with this, there is a website set up with general information about the program, an e-mail system for initial questions, and forums where anyone can post in depth questions they might have for the workshop leaders. Although this project will not yet be completed by the time of the presentation, I intend to present the impact LMTP has had so far on the surrounding community. The results should show that by using all these different forms of communication and allowing the people to ask questions, there will be a more successful integration of media into local live theater.

Microbiology, Immunology, and Infectious Disease

Oral Presentations

LIFE STYLE SWITCH AND PERSISTENCE OF PHOTORHABDUS LUMINESCENS
Alexander Martin
Location: Tower Room, 1:00 PM
Category: Microbiology, Immunology, and Infectious Disease, Oral
Mentor(s): Todd Ciche (Microbiology and Molecular Genetics)
The bacterium *Photorhabdus luminescens* is an obligate symbiont of the nematode *Heterorhabditis bacteriophora*. Nematode and bacteria work together in a sophisticated symbiosis to infect and kill insects. Our lab observed that *Photorhabdus* is capable of switching phenotype, from a wild type (primary) to a Small Colony phenotype (SC). The SC is required for symbiosis with the nematode, while the primary form is pathogenic to insects. We have made many exciting discoveries investigating the differences between the two phenotypes such as color and size, growth rate, secondary metabolite production, even bioluminescence. The SC has even been mistaken for another bacterial species. This research is possible because we have genetically engineered strains that are locked as either primary or SC, meaning the bacterium cannot switch between the two phenotypes. I determined that primary cells took 2.45 hours/division compared to 4.3 hours/division for SC cells. The competition index assays showed that primary cells are at least 100 times more competitive than SC. We hypothesize that SC could be persister cells. Persister cells are described as the dormant cells that survive stress such as antibiotic, and/or heavy metal challenge, and constitute a small percentage of the total population. These cells are important in recurrent clinical infections. We will determine if the SC cells are composed of more persister cells than the primary form through several experiments such as Minimum Inhibitory Concentration (MIC) and antibiotic tolerance testing. I have preliminary data that suggests a higher incidence of persister cell formation in the SC population.

ADAPTIVE RADIATION OF BACTERIOPHAGE LAMBDA TO SPECIALIZE ON MULTIPLE HOST RECEPTORS
Devin Dobias
Location: Tower Room, 1:15 PM
Category: Microbiology, Immunology, and Infectious Disease, Oral
Mentor(s): Richard Lenski (Microbiology and Molecular Genetics)
Bacteriophage are the most abundant organisms in the Earth's biosphere. Within this large group of viruses there is an enormous amount of diversity. One process through which diversity is generated is through adaptive radiation, or the rapid diversification of an ancestor lineage to specialize on multiple ecological niches. Specialization occurs through resource competition and is reinforced by trade-offs that exist between traits that allow genotypes to exploit different resources. In recent years, model microbial systems have been used to study the components, aspects, and mechanisms underlying adaptive radiations. However, only a small number have seen diversification and specialization in complex environments, and none have involved viruses. Using a model system of E. coli and one of its viruses, bacteriophage lambda, I observed the sympatric diversification of a generalist ancestral lineage to specialize on two different host receptors. Bacteriophage are sexual organisms in the sense that when two genotypes co-infect the same cell recombination occurs. Diversification is opposed by recombination because two genotypes are unable to remain distinct. My study is unique because it not only provides a model adaptive radiation of a virus, but it is an example diversification of a lineage in the face of recombination.

CONTINUING ON THE TRAIL OF REGULATORY T CELLS IN BLOOD AND TISSUES OF MYCOBACTERIUM PARATUBERCULOSIS INFECTED CATTLE
Brooke Murphy
Location: Tower Room, 1:30 PM
Category: Microbiology, Immunology, and Infectious Disease, Oral
Mentor(s): Paul Coussens (Animal Science)
Regulatory T cells (Tregs) are an important control against autoimmune diseases in humans and most mammals. Tregs dampen inflammatory immune responses to many pathogens, limiting damage to the host and aiding development of immunological memory. Johne's disease is a fatal gastrointestinal infection in ruminants, such as cattle, caused by persistent infection with Mycobacterium avium subspecies paratuberculosis (MAP). MAP is a close relative of M. tuberculosis and has been implicated in some human Crohn's disease cases. We recently proposed that Tregs form an important aspect of immune responses to MAP in cattle. Tregs are typically positive for CD4 and CD25 cell surface markers and express the FoxP3 transcription factor. To identify antigen-specific Tregs in MAP test-positive cattle, we developed methods to analyze immune cell populations from cattle using multi-color flow cytometry and intracellular staining. Tregs in tissues have been visualized using multi-color confocal microscopy and immunohistochemical staining. As expected, stimulation of immune cells with MAP enhances the percent CD4+ cells that are also CD25+ relative to nil stimulated cells. This expansion of CD25+ cell populations is not observed in cells from test negative animals. FoxP3 transcription factor expression is variable between animals with some showing up-regulation following MAP stimulation (~20% of CD25+) relative to nil stimulation (~6%). Our data suggest that in some cattle CD4+/CD25+/FoxP3+ cells form a significant proportion of cells responding to MAP antigen stimulation. We are now concentrating on demonstrating a functional role for MAP antigen-responsive FoxP3+ T cells.

VERTICAL DISTRIBUTION OF NITROGEN CYCLING FUNCTIONAL GENES IN HAWAIIAN TARO SEDIMENTS
Andrew Worden
Location: Tower Room, 1:45 PM
Category: Microbiology, Immunology, and Infectious Disease, Oral
Mentor(s): Ryan Penton (Crop and Soil Sciences)
Taro (*Colocasia esculenta)* has been a food staple in Hawaii for centuries and continues to play an important role in Hawaiian economy and culture. It is farmed in flooded freshwater wetlands called loi's, and fertilizer nitrogen is typically added as surface applied urea. A previous experiment in Hawaiian taro fields found >80% of added fertilizer nitrogen in taro fields could not be accounted for using classic nitrogen

balance calculations. A second study suggested that fertilizer runoff is a contributing source of nitrogen entering streams and coastal waters, harming nearby coral reef. In this study, a taro whole core growth method was used to investigate coupled nitrification/denitrification in Hawaiian taro field soils. Genomic DNA was extracted, purified, and quantitatively prepared for q-PCR, which was utilized to study relative abundances of six target nitrification/denitrification genes (*Nir*S, *Nir*K, *nosZ*, *amo*A, Arch-*amo*A, 16S rRNA gene) throughout a soil profile using the 16S rRNA bacterial gene as a total bacterial population estimate. Initial results show gene relative abundance levels were consistent throughout the soil depth profile. Two reductase genes, NosZ and NirS, were the most prevalent, averaging 10^7-10^8 gene copies g^{-1} soil. Archaeal oxidation did not appear to dominate nitrification/denitrification in the taro fields, averaging 10^2-10^3 gene copies per gram soil. This data along with other nitrogen isotope labeling and soil profile data collected by Dr. Ryan Penton has been used to account for ~90% of the nitrogen added via fertilizer, potentially refuting the claim that added taro fertilizer is harming surrounding ecosystems.

MITOMYCIN C AS AN ASSAY FOR LYSOGENIC SOIL BACTERIA
Malorie Machart, Meghan Hodges, Ashley Konal, Ashley Matusz
Location: Tower Room, 2:00 PM
Category: Microbiology, Immunology, and Infectious Disease, Oral
Mentor(s): Thomas Schmidt (Microbiology and Molecular Genetics), Clive Waldron (Microbiology and Molecular Genetics)
When soil bacteria are plated on minimal MBL medium, a large percent of the cells on high-density plates do not form colonies. Instead of colony counts decreasing in direct proportion to the dilution factor, the number of colonies from soil extracts plated on this medium decreased only half as much as expected. Consequently there was a significant lack of colonies at high cell densities. It is hypothesized that the bacteria cells disappearing at high cell density have latent bacteriophage that are activated by signals of high cell density. Here we show that the antibiotic mitomycin C can work towards restoring the missing proportionality on the low-density plates by inhibiting colony formation of 60-70% of the density sensitive strains. Optical density readings of liquid cultures with mitomycin C performed on soil isolates confirmed cell lysis. Sending lysed liquid cultures to the transmission electron microscope facility for a photograph is required for verification of phage. Our results with soil isolates growing on solid or liquid media are consistent with the hypothesis that phage induction of soil bacteria cells at high cell density is a significant factor in the plating anomaly. Once lysis by phage induction is confirmed, mitomycin C in low concentrations can be used to identify and study density-sensitive lysogenic soil bacteria.

IDENTIFICATION OF A CRITICAL AMINO ACID THAT REGULATES HUMAN APOBEC3 ANTI-HIV-1 ACTIVITY
SungMo Son
Location: Tower Room, 2:15 PM
Category: Microbiology, Immunology, and Infectious Disease, Oral
Mentor(s): Ying Dang (Microbiology and Molecular Genetics), Yong-Hui Zheng (Microbiology and Molecular Genetics)
33 million people live with HIV (Human Immunodeficiency Virus)/AIDS (Acquired Immune Deficiency Syndrome) worldwide- 2.1 million die each year and 2.7 million more are infected. Under investigation of HIV/AIDS field, the enzyme called APOBEC-3, Apolipoprotein B mRNA editing enzyme-catalytic polypeptide-like, is one of the major targets of clinical/scientific research at the present time. The APOBEC-3 family of cytidine deaminases has important functional roles within innate immune system. The APOBEC-3 enzymes are able to inhibit the mobility of retro-elements and the replication of retroviruses and DNA viruses that have a reverse transcriptase step in the life cycle, such as the HIV-1 and Hepatitis B virus respectively. And based on different structures, there are many critical APOBEC-3 enzymes such as APOBEC-3A, 3B, 3C, 3DE, 3F, 3G, and 3H. It was shown that APOBEC-3B, 3F, 3G, 3DE, and 3H are all able to encapsulate and deaminate cytosines to uracils on viral minus- strand DNA, resulting in disruption of the viral life cycle. However, our previous studies indicate that despite its high conservation with these active APOBEC-3 family members, APOBEC-3DE has only weak antiviral activity, although broadly expressed in human tissues. In this study, we provide evidence to understand which APOBEC-3DE specific motif site could impact HIV infectivity by comparing it with other APOBEC-3 enzymes. Our study focused on the C320 amino acid site and chimeric proteins of A3B, DE, and F.

AVIAN FILARIOID NEMATODE BARCODING FROM A FOCUS OF WEST NILE VIRUS TRANSMISSION
Garrett Berry
Location: Tower Room, 2:30 PM
Category: Microbiology, Immunology, and Infectious Disease, Oral
Mentor(s): Edward Walker (Microbiology and Molecular Genetics)
West Nile virus (WNV) is a mosquito-borne disease that has been established in the United States for a decade and continues to impact human, wildlife, and domestic animal health. Much is known about the ecological factors that drive the transmission of WNV, but many questions have yet to be answered. It has been hypothesized that the co-infection of a bird with both microfilarial (immature) nematodes and WNV enhances the transmission of WNV. The proposed mechanism involves the microfilarial nematode penetrating the mosquito mid-gut allowing faster spread of the virus into the rest of the mosquito. Although this mechanism has been evaluated in a laboratory environment, very little is known about the species of filarioid nematodes and prevalence rates in avian hosts where WNV is endemic. This project combines morphological and molecular-based techniques to barcode filarioid nematodes from a focus of intense WNV transmission in suburban Chicago, Illinois. Blood samples from American Robins (Turdus migratorius) that have been screened for the presence of microfilariae in the field using microscopy will be screened in the lab using PCR. Prevalence rates identified through microscopy were 46% and we predict that the PCR-based diagnostics will result in higher microfilariae prevalence rates due to increased sensitivity of the assay. We constructed a phylogenic tree of nematode sequences based on 16S DNA and show variation in nematode lineages. This research project will contribute to understanding the potential for microfilarial nematodes to enhance WNV transmission.

IDENTIFICATION OF INFLAMMATORY MONONUCLEAR CELLS IN NERVOUS TISSUE OF MICE EXHIBITING GUILLAIN BARRE SYNDROME
Hahyung Kim
Location: Tower Room, 2:45 PM
Category: Microbiology, Immunology, and Infectious Disease, Oral
Mentor(s): Linda Mansfield (Large Animal Clinical Sciences)
Campylobacter jejuni is the world's leading cause of bacterial enteritis. Campylobacteriosis frequently precedes Guillain Barré Syndrome, an acute autoimmune neuropathy which leads to paralysis. In order to investigate the role of molecular mimicry between *C. jejuni* surface molecules and gangliosides found on peripheral nerves as a trigger for the onset of autoimmune response which lead to Guillain Barré Syndrome and/or Miller Fisher Syndrome,our aim was to determine whether T cells are stimulated after *C. jejuni* infection and whether T cells are required to assist B cells in the production of cross-reactive anti-ganglioside antibodies. Our hypothesis is that mononuclear cells found within and around the peripheral nerve tissue are T cells involved in autoimmune attack. Through CD3 antigen specific immunohistochemical staining, T cells were identified in and around the nervous tissue of both *C. jejuni* 260.94 infected and uninfected NOD WT mice. More T cells were found in and around the peripheral nervous tissue of infected mice than uninfected mice; this results indicates that T cells may be participating in this autoimmune attack. In future work, we hope to improve the immunohistochemical staining protocol, test additional samples, and determine why T cells are present in these nerves and what activities they are engaged in to gain further gain information about the pathogenesis of Guillain Barré Syndrome. This work was funded in whole by funds from NIAID, NIH, Department of Health and Human Services, under Contract No. NO1-AI-30058.

Poster Presentations

PTPN22 1858T IS NOT A RISK FACTOR FOR NORTH AMERICAN PEMPHIGUS VULGARIS
Apram Ghuman
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Microbiology, Immunology, Infectious Disease--1, Poster, 1376
Mentor(s): Animesh Sinha (Dermatology)
Alterations in the protein tyrosine phosphatase N22 (PTPN22) gene affect the threshold for lymphocyte activation. The PTPN22 1858T polymorphism leads to uninhibited T cell receptor cascade propagation. An elevated PTPN22 1858C/T genotype frequency has been correlated with several autoimmune disorders which have T-cell and humoral components. However, a recent Tunisian report demonstrated no association between PTPN22 1858T and patients with Pemphigus vulgaris (PV), an autoantibody associated blistering disorder. Because PTPN22 1858T allele frequency is known to vary across ethnic populations, we conducted a case-control study investigating the relationship between PTPN22 1858T and PV in North American patients of either Ashkenazi Jewish or Caucasian (non-Ashkenazi) decent. Participant genotype was determined in 102 PV patients and 102 healthy controls by restriction fragment length polymorphism-polymerase chain reaction genotyping. Relationships were calculated using Fisher's exact tests and chi-squares. We report that the PTPN22 1858C/T genotype is not significantly associated with PV in either Caucasians (p=0.83) or Ashkenazi Jews (p=0.60). Further stratification of the patient population by gender, age of disease onset, HLA-type, family history of autoimmune disease, history of anti-desmoglein (anti-Dsg) 3 or anti-Dsg1 antibody response, history of lesion morphology, and disease duration did not uncover significant associations between the PTPN221858T allele and PV subgroups. Our data indicate that the PTPN22 1858T mutation is not associated with PV in the North American population. We do observe an elevation of PTPN22 1858C/T genotype frequency in male Pemphigus vulgaris patients. Further investigation will be required to determine if this trend reaches significance in larger studies.

CONTRIBUTION OF ATTACHMENT STRUCTURES TO BIOFILM FORMATION AND XYLEM COLONIZATION IN ERWINIA AMYLOVORA
Bryan Lenneman
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Microbiology, Immunology, Infectious Disease--1, Poster, 1417
Mentor(s): George Sundin (Plant Pathology)
The first critical step in the formation of biofilms, which have been shown to increase survival in host tissue, is the attachment of planktonic cells to a surface. This process is an important factor in the pathogenicity of Erwinia amylovora, the causative agent of fire blight in rosaceous species. Bioinformatic analysis was performed in order to identify putative attachment structures. Single gene and gene cluster deletion mutants ΔhofC, Δhof, ΔfimD, Δfim, Δflg3, Δflg4, Δcrl, and Δeae were generated. Various in vitro and in planta assays were used to determine the function of putative structures in both biofilm formation and pathogenicity. Mutants showed a significant decrease in in vitro biofilm formation as well as reduced virulence in immature pear fruit assays and tree shoot inoculation assays. Tissue collected from in planta assays was observed through scanning electron microscopy to visualize the colonization of the pathogen within shoot leaf tissue. The resulting images show that mutants were either unable to correctly localize in the xylem tissue, which is the preferred location seen in wild type E. amylovora, or were unable to form a mature biofilm in the vascular tissue of the trees. Additional functions of individual putative attachments structures were elucidated through a time course biofilm assay. The results suggest new roles for structures during biofilm formation and highlight the importance of colonization and biofilm formation in host xylem tissue for pathogenesis in E. amylovora.

PHENOTYPIC ASSAY RELATING COMPETITION BETWEEN DOMINANT NEGATIVE MUTANTS OF PSEUDOMONAS SYRINGAE HRPA TO ELIMINATION OF HYPERSENSITIVITY RESPONSE IN TOBACCO PLANTS
Anthony Rademacher
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Microbiology, Immunology, Infectious Disease--1, Poster, 1430
Mentor(s): Dennis Arvidson (Microbiology and Molecular Genetics)
A Pseudomonas syringae pv. tomato strain has been classified as a pathogen known to cause damage to the fruits and leaves of tomato and Arabidopsis plants. This strain is also responsible for the initiation of a hypersensitive response (HR), a defense mechanism in plants that are

generally less susceptible to damage, such as tobacco. The mechanism involves a type III secretion system (TTSS) responsible for injecting virulence factors into plant cells. The structural unit of the Hrp pilus, HrpA, has been studied via insertion mutants to verify functionality. Importance was found in two classes of dominant negative HrpA mutants, showing differences in regards to Hrp pilus formation and effector protein secretion; testing varying ratios of mutant to wildtype may interrupt normal pilus assembly. Future structural studies of the HrpA pentapeptide and related structures have potential for use in agriculture.

INVESTIGATION OF ELECTRON TRANSFER ALONG PILUS NANOWIRES

Carlos Salgado

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Microbiology, Immunology, Infectious Disease--1, Poster, 1453

Mentor(s): Gemma Reguera (Microbiology & Molecular Genetics)

Geobacter sulfurreducens is a bacterium capable of producing current in microbial fuel cells and reducing insoluble Fe(III) oxides in the environment. It has been proven that the expression of pili is essential for carrying out the mentioned processes. These outer membrane protein structures are believed to act as microbial "nanowires" enabling the transfer of electrons over extremely long distances. Well characterized electron transfer pathways have shown that tyrosine residues are involved in long range electron movement, leading to the belief that this same electron hopping mechanism takes place in G. sulfurreducens pili. In order to better understand this pathway, single amino acid substitution mutations were generated in tyrosine residues along the pilus. For growth on soluble electron acceptors, conditions for which pili are not required, no growth defect has been observed. To investigate the role of the mutated residues in electron transfer along the pilus nanowires, the ability of each strain to reduce insoluble electron acceptors such as Fe(III) oxides and the anode of a microbial fuel cell was investigated. We also determined the involvement of pili in long range electron transfer by testing the reduction of insoluble Fe(III) across a semi permeable membrane using both a wild type G. sulfurreducens strain and a pili deficient strain. A deeper understanding of the mechanism of electron transfer along pilus nanowires expressed by G. sulfurreducens will help in the engineering of bacterial strains with higher electricity producing capabilities with a possible later application in the generation of alternative fuel sources.

IDENTIFICATION OF A TRUCHURIS MURIS ENDOSYMBIONT

Allison Nipper

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Microbiology, Immunology, Infectious Disease--1, Poster, 1462

Mentor(s): Linda Mansfield (Microbiology and Molecular Genetics)

Trichuris, a genus of roundworm, often inhabits the gastrointestinal tracts of vertebrates such as dogs, pigs, mice, and humans. Trichuris muris, the species of Trichuris naturally occurring in mice, is studied due to its similarity to the human parasite Trichuris trichiura. Interestingly, previous work in our lab suggests the possibility of a Trichuris endosymbiont, or an organism living within T.muris. During previous work in our lab, 16S rDNA, a section of DNA universal to all bacteria with unique regions which vary by species, was collected from T. muris eggs. The extracted region of DNA was then sequenced and compared to a database of 16S variable regions allowing for possible identification of the bacteria. Three potential matches suggest the T. muris eggs contained Streptococcus, Bacillus, or Burkholderia. In order to test the hypothesis that Trichuris has an endosymbiont, I am currently attempting to PCR DNA collected from the T. muris eggs using PCR protocols relating to the bacterial matches found previously from the egg DNA. If the DNA extracted from Trichuris eggs results in a positive PCR product, a fluorescent in situ hybridization (FISH) probe will be used to identify where the bacteria may live within the worm. The FISH probe will attach to only the DNA of bacteria similar to itself. By examining where the fluorescence appears, we can ensure that the bacteria are in fact endosymbionts and not contaminants.

THE EFFECT OF DELETING THE VIRAL CATHEPSIN AND CHITINASE GENES ON THE BACULOVIRUS EXPRESSION OF TWO INTEGRAL MEMBRANE PROTEINS

Michelle Rae

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Microbiology, Immunology, Infectious Disease--1, Poster, 1473

Mentor(s): Suzanne Thiem (Microbiology & Molecular Genetics, Entomology)

It has been proposed that the deletion of the viral cathepsin and chitinase genes improve secretory and integral membrane protein expression from the baculovirus expression vector system. To test this hypothesis, baculovirus expression vectors with chitnase and cathepsin genes knocked out were compared with baculovirus vectors where they were present. The expression of two model integral membrane proteins, transient receptor potential cation channel subfamily V member 4 and human cannabinoid receptor 2B, were expressed from the baculovirus polyhedrin promoter as enhanced green fluorescence protein (eGFP) fusion proteins. The relative levels of GFP expression from the virus vectors with and without the cathepsin and chitinase genes were compared. The results showed that there was no significant improvement in the expression of the two integral membrane proteins examined when the chitnase and cathepsin genes were deleted.

COMPARISON OF EFFECTOR MOLECULE LEVELS AND FUNCTIONAL ACTIVITY IN MOUSE AND HUMAN NATURAL KILLER CELLS

Tina Ortiz

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Microbiology, Immunology, Infectious Disease--1, Poster, 1544

Mentor(s): Sungjin Kim (Microbiology and Molecular Genetics), Jeannine Scott (Microbiology and Molecular Genetics)

Natural killer (NK) cells are an essential component of the innate immune system and serve two primary roles. They are cytotoxic, with the ability to destroy both virus-infected cells and tumor cells. They also influence other immune cells through the production of immunomodulatory cytokines, such as interferon (IFN) gamma. Former NK cell research has employed the use of mouse NK cells for experimentation in order to potentially gain a better understanding of the human immune system. In this study, we sought to identify deviations from the murine model by comparing the reactions of murine lymphocytes to those of human peripheral blood mononuclear cells (PBMCs) in response to cytokine stimulation. Mouse and human NK cells were incubated with the cytokines IFN alpha and interleukin (IL)-2, IL-

12, and IL-18, then analyzed using flow cytometry. Stimulation with IFN alpha caused mouse NK cells to produce granzyme B, a protein required for cytotoxicity, while this protein was found to be in low abundance in unstimulated cells. In contrast, human PBMCs had a significant amount of granzyme B available with or without stimulation. These results suggest that mouse and human NK cells may be inherently different. In addition, mouse NK cells stimulated with IL-2 plus IL-12 or IL-2 plus IL-18 resulted in increased production of both granzyme B and IFN gamma while significant production of these proteins was not observed in human NK cells under these conditions. This suggests differences in functional activity as well as steady state levels between mouse and human NK cells.

MEASURING MICRO CALCIUM CONCENTRATIONS
John Kuloszewski
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Microbiology, Immunology, Infectious Disease--1, Poster, 1576
Mentor(s): Laura McCabe (Physiology)
The inorganic component of bone contains predominantly calcium and phosphate. These minerals are incorporated into crystals within the extracellular space but also dissolve into the extracellular fluid. Various factors can influence the rate of mineral dissociation. To understand and identify regulatory factors and kinetics of this process, we want to accurately measure the concentration of calcium in solutions that have been incubating with artificially prepared, as well as real bone, pieces. Two sensors are needed: the DJM-146 reference electrode in conjunction with the LIS-146CACM micro calcium electrode (Lazar Research Labs). The probes are plugged into a handheld pH/mV monitor and calibrated a standard dilution curve made with known amounts of calcium, for instance, 0.001M, then 0.01M and 0.1M of CaCl2. The two different probes serve different functions. The LIS-146CACM measures the concentration of the calcium in the solution while the DJM-146 stabilizes the reading. If the LIS-146CACM probe is used without the DJM-146, the readings will drift and be inconsistent. Software provided by the company, (ArrowIon) is used to accurately convert the mV readings to calcium concentrations. The readings from know concentrations of calcium solutions will be used to generate a standard curve for these probes. Using these probes, we will be able to determine the concentration of the calcium from the artificially prepared and real bone pieces.

RECOMBINEERING OF THE PREDICTED SECRETOME OF LACTOBACILLUS REUTERI PTA ATCC 6475
Kar Mun Neoh
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Microbiology, Immunology, Infectious Disease--2, Poster, 1474
Mentor(s): Robert Britton (Microbiology and Molecular Genetics)
Lactobacillus is the largest genus within the group of Lactic Acid Bacteria. Several lactobacilli, such as Lactobacillus reuteri, have probiotic properties. Such properties can be derived from beneficial interactions between secreted proteins or compounds of L. reuteri with its environment (i.e. the human digestive tract). The secretome represents all of the proteins in the L. reuteri genome that are predicted to be secreted from the cell or anchored on the cell wall. Therefore, the objective of this work is to generate a mutant library of the predicted secretome of L. reuteri PTA ATCC 6475 using recombineering. Single-stranded DNA recombineering generates point mutations on the chromosome of L. reuteri by transformation of two oligonucleotides: one targeting the predicted gene of interest and another targeting rpoB. If a recombineering event has occurred, the incorporation of the oligonucleotide targeting rpoB will yield create a mutation that will result in a rifampicin-resistant phenotype. In this pool of rifampicin resistant cells we screen for the incorporation of oligonucleotide targeting the gene of interest, which will generate an in-frame stop codon and a novel restriction endonuclease recognition site. The colonies that have undergone recombineering event (i.e. are rifampicin resistant) are screened with PCR and restriction digest analysis to confirm mutations in the target gene. With mutations in the predicted secretome, we hope to elucidate the functions of these proteins in L. reuteri PTA ATCC 6475 and to understand how this probiotic bacterium interacts with the environment.

THE EFFECT OF ANTIBIOTICS ON TRANSFORMATION IN NEISSERIA GONORRHOEAE
Kathryn Nawrocki
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Microbiology, Immunology, Infectious Disease--2, Poster, 1487
Mentor(s): Cindy Arvidson (Microbiology and Molecular Genetics)
Neisseria gonorrhoeae (GC) is a gram negative bacterium which is the cause of the sexually transmitted infection (STI) gonorrhea. It is estimated that more than 700,000 people are infected with gonorrhea each year in the US, and this number is on the rise (Centers for Disease Control and Prevention). Gonococcal infections have been treated with a wide variety of antibiotics over time; however, the organism has developed resistance to virtually every antibiotic it has been treated with. One mechanism by which GC develops resistance to antibiotics is due to the fact that it is naturally competent, taking up free DNA from the surrounding environment. Since most people are exposed to antibiotics at some point in their lives by either treatment of infection, consumption of food products from treated animals or plants, we suspect that an incoming pathogen has a great likelihood of being exposed to low concentrations of antibiotics. Our hypothesis is that exposure to sub lethal concentrations of antibiotics increases the rate of transformation in N. gonorrhoeae. My project has been to test the effects of sub lethal concentrations of penicillin (a cell wall synthesis inhibitor) and ciprofloxacin (a DNA gyrase inhibitor) on transformation. Results thus far suggest that ciprofloxacin has no effect on transformation efficiency. However, preliminary results suggest that penicillin, at levels that do not affect bacterial survival, may reduce transformation efficiency. Antibiotics to be tested next include erythromycin and tetracycline, both of which are translation inhibitors.

OPTIMIZATION OF CMEIAS SIZE ANALYSIS TO DISCRIMINATE NATURAL MICROBIAL BIOFILM ARCHITECTURE
Kevin Klemmer
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Microbiology, Immunology, Infectious Disease--2, Poster, 1595
Mentor(s): Frank Dazzo (Microbiology and Molecular Genetics)
Microorganisms impact natural systems by surface attachment and growth into biofilms. The spatial study of biofilms can predict microbial colonization behavior, but most studies do not measure size distribution of biofilms at scales that are directly relevant to the microbes themselves. Computer-assisted microscopy and digital image analysis can help to fill that gap. This study was designed to optimize the protocol to discriminate the size distributions of different biofilm architectures using CMEIAS image analysis software. Natural microbial biofilms were colonized on glass slides coated with five treatments of different surface polymer chemistries. Digital micrographs were acquired at 1 um resolution and analyzed by several size measurement attributes featured in CMEIAS. Frequency distribution analysis indicated that the object sizes were positively skewed with abundant noise from small microcolony biofilms that obscured the potential discriminating power of data signals associated with larger microbiofilms. Several data trimming methods were used to delete small sized outliers, including removal of the 0-10th percentile range, the lag in size distribution without discrimination between treatments in an ascending ranked plot, and the size distribution curve that surrounds the mode of small microbiofilms in the frequency data. Evaluation of the resultant output by various distance metrics indicated that the first two trimming methods significantly improved the discriminating power of size distribution analysis, whereas the third method excessively removed signal. Remaining work is to test the performance after combining the two best methods, and compare upper bin limits of constant width vs. bins optimized by cluster analysis.

ENVIRONMENTAL INDUCTION OF C-DI-GMP SYNTHESIS IN VIBRIO CHOLERAE
Jessica Hunter
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Microbiology, Immunology, Infectious Disease--2, Poster, 1621
Mentor(s): Benjamin Koestler (Microbiology and Molecular Genetics), Christopher Waters (Microbiology and Molecular Genetics)
Vibrio cholerae is an aquatic bacterium that causes the diarrheal disease Cholera in humans. V. cholerae exhibits two distinct lifestyles: a sessile lifestyle characterized by low virulence and high biofilm formation and a motile lifestyle with high virulence and low biofilm formation. GGDEF enzymes synthesize the signal bis-(3'-5')-cyclic diguanylic acid (c-di-GMP), a second messenger shown to regulate biofilm formation and virulence in V. cholerae. V. cholerae contains 40 GGDEFs, each containing a conserved GGDEF domain and a variable N-terminus domain. Due to the large number of GGDEFs predicted to control the lifestyle transition of V. cholerae, it is proposed that environmental signals control production of c-di-GMP through interaction with the N-terminus of specific GGDEFs. This study's purpose is to identify environmental signals which induce c-di-GMP production in V. cholerae. C-di-GMP is known to be toxic to Escherichia coli BL21. Therefore, synthesis of c-di-GMP by GGDEFs in E. coli can be measured by optical density. The GGDEFs encoded by the genes VC1367, VCA0165, and VCA0697 are not toxic in E. coli when overexpressed, suggesting they are normally inactive. To identify environmental signals that activate them, these GGDEFs were inserted into E. coli BL21 and over expressed in Biolog phenotype EcoPlates. Growth curves were generated and doubling time calculated. No environmental signals present in the EcoPlates caused a significant decrease in growth rate, suggesting they did not induce c-di-GMP production. Currently, we are examining other Biolog phenotypic microarrays and additional carbon sources for the ability to activate these GGDEF enzymes.

ISOLATION AND CHARACTERIZATION OF A HYPERTHERMOPHILIC SULFATE- AND IRON-REDUCING ARCHAEON FROM CRUDE OIL
Caitlin Miller
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Microbiology, Immunology, Infectious Disease--2, Poster, 1622
Mentor(s): Kazem Kashefi (Microbiology and Molecular Genetics)
Production of H_2S due to the growth of sulfate reducing microorganisms plays an important role in contaminating oil and natural gas reservoirs underground. Although dissimilatory sulfate-reducers have been reported to be native inhabitants of hot oil reservoirs, few have been isolated in pure culture. As a part of a study of the microbial diversity of extreme environments, primary oil recovery samples were collected from an oil reservoir in Long Beach, California. These samples were used to inoculate enrichment culture media containing a variety of electron acceptors paired with organic or inorganic electron donors. A pure culture was recovered on solidified medium under sulfate-reducing conditions and was designated strain Δ due to its triangular shape. The new isolate was a motile, hyperthermophilic chemoorganotroph. Strain Δ grew by coupling the reduction of sulfate to the oxidation of sodium lactate as well as a variety of other electron donors. $S_2O_3^{2-}$, SO_3^{2-}, selenite and poorly crystalline Fe(III) oxide were used as alternative electron acceptors in addition to SO_4^{2-}. Growth was observed at temperatures between 55-95°C with optimal growth occurring at 85-90°C. The optimum pH for growth was pH 6.0 (range of 2.5 to 8.0) and the optimum NaCl concentration was of 2% (range of 0-5.0%). Certain antibiotics inhibited growth, but strain Δ was resistant to trimethoprim, cycloheximide and kanamycin. Analysis of 16S rDNA sequence, cell morphology, and physiology suggests that strain Δ belongs to the *Archaeoglobales* family with *Archaeoglobus fulgidus* as its closest known relative.

ANALYSIS OF EXPRESSION OF AFLATOXIN GENES IN NON-PRODUCING MUTANT STRAINS OF ASPERGILLUS PARASITICUS
Sarah Myer
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Microbiology, Immunology, Infectious Disease--2, Poster, 1655
Mentor(s): John Linz (Food Science and Human Nutrition)
Aspergillus parasiticus, a common fungal contaminant of corn and peanut crops, produces a secondary metabolite called aflatoxin, which is a potent carcinogen and hepatotoxin. This fungus is most frequently found in nature as aflatoxin-producing strains, but five naturally occurring non-aflatoxin-producing strains have been discovered in Australia by Dr. John Pitt. The purpose of this research is to investigate the genetic differences between the standard producing strain, A. parasiticus Su-1, and the five non-secreting strains, A. parasiticus 4467-4471, by using Reverse Transcription Polymerase Chain Reaction (RT PCR) to compare known genes that are key to the aflatoxin production and secretion

pathways. It is expected that RT PCR will show defects in critical transcription factors, such as VeA and AflR, which would cause decreased expression of aflatoxin genes. The lack of aflatoxin production in A. parasiticus strains 4467-4471 was verified by thin layer chromatography, using three toxin extraction solutions (chloroform, isopropanol, ethyl acetate) and three solvent systems (chloroform: acetone: isopropanol, chloroform: acetone, toluene: ethyl acetate: formic acid). To examine and compare the proteins present in the Australian A. parasiticus strains with the proteins from the standard strain, SDS-PAGE protein gels were run, and western blot and coomasie blue stains were performed.

CAMPYLOBACTER JEJUNI COLONIZATION OF C57BL6 IL-10 DEFICIENT MICE ENHANCED BY PASSAGE THROUGH CHICKEN GASTROINTESTINAL TRACT

David Hall

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Microbiology, Immunology, Infectious Disease--2, Poster, 1680

Mentor(s): John Linz (Food Science and Human Nutrition)

Causing 3 million cases of gastroenteritis and 100 deaths per year, *Campylobacter jejuni* is the most common foodborne bacterial pathogen in the United States, with chicken and other undercooked poultry products being the most common source of human infection. Our lab has previously demonstrated that passage of *C. jejuni* through Ross 308 broiler chickens increases the prevalence of populations containing a -1 frameshift mutation in the *wlaN* gene's 8G homopolymeric tract. We hypothesized that *C. jejuni* passage through chickens is an important factor in enabling its subsequent colonization of the human gastrointestinal tract, modeled by C57BL6 IL-10 deficient mice. Suspecting that increased colonization correlated with shifts in allele frequency caused by frameshift mutations at these homopolymeric sequences, we inoculated several *C. jejuni* strains into chickens and then mice and observed the comparative colonization of chicken passed and non-chicken passed strains. By analyzing the homopolymeric tracts through fragment analysis, it was seen that chicken passage does promotes allele shifts at these sites, and also is associated with a strain's ability to colonize mice.

BIOSYNTHESIS OF POLY-HYDROXY-VALERATE (PHV) BY PSEUDOMONAS PUTIDA VIA LEVULINIC ACID UTILIZATION

Stephanie Zaas

Location: Ballroom, 9:30 AM - 11:30 AM

Category: Microbiology, Immunology, Infectious Disease--2, Poster, 1682

Mentor(s): Michael Bagdasarian (Microbiology and Molecular Genetics)

Poly-hydroxy-valerate (PHV) can be used as a biodegradable and biocompatible plastic in medical equipment, such as implants, as well as acting as a "biomass transducer" to produce chiral compounds. Pseudomonas putida strain KT2440 has the unique ability to synthesize PHV from levulinic acid as the sole carbon source. The aim of this project is to understand the metabolic pathways involved in this ability and to use genetic manipulation to increase the production of PHV. Using transposon mutagenesis, we generated 21 mutants that are able to utilize glucose, but not levulinic acid. The genes in which the transposon had inserted were determined by sequencing of the flanking DNA regions. Sequences of one of the mutants revealed that the insertion is in gene PP_2793 encoding Acyl-CoA-Dehydrogenase. Other genes essential for growth on levulinic acid were identified as encoding malate-quinon-oxidoreductase (mqo-1) and succinate dehydrogenase. The gene for Acyl-CoA-Dehydrogenase is located close to the genes encoding Acyl-CoA-Oxidoreductase (PP_2794), and Acyl-CoA-Synthetase (PP_2795). The close proximity of these genes to one another suggests that they may be part of an operon. To confirm that the identified mutations are responsible for inactivation of levulinic acid utilization, a mutant PP_2793 clone was attempted to be complemented with the WT-PP_2793 gene, but this did not restore the wild type phenotype. This may be due to the inactivation of PP_2793 having a polar effect on downstream genes. We attempted to complement PP_2793 mutants with vectors containing the PP_2793+PP_2794 genes; this also did not complement. Further complementation tests will be implemented.

THE INTERACTION BETWEEN LACTOBACILLUS JENSENII AND STREPTOCOCCUS AGALACTIAE

Emily Rustad

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Microbiology, Immunology, Infectious Disease--3, Poster, 1337

Mentor(s): Cindy Arvidson (Microbiology and Molecular Genetics)

Streptococcus agalactiae (Group B strep, GBS) commonly colonize the human vaginal tract. While they do not usually cause disease in women that are colonized, GBS is often transmitted to newborns during childbirth and can cause serious disease including meningitis, pneumonia and septicemia. The present study sought to determine if the bacterium Lactobacillus jensenii (LJ25258), a Gram-positive rod endogenous to the human vaginal tract, has the capacity to affect the growth of GBS in culture. The strain of GBS used in this study (GB112) was a vaginal isolate from a colonized mother. Bacterial strains were grown separately and together in DMEM and growth rates determined. The two bacteria were initially grown together at a 1:1 ratio of LJ25258 to GB112 (10^6 cfu/ml of each). At this concentration, the growth of the GB112 was not significantly affected by the presence of lactobacilli. Since L. jensenii is found in much higher numbers in the vaginal tract than GBS, I next co-cultured the two strains at a 10:1 ratio (10^7 cfu/ml LJ25258:10^6 cfu/ml GB112).

PLATING ANOMALY

Kelli Iceman, Ben MacNeille

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Microbiology, Immunology, Infectious Disease--3, Poster, 1407

Mentor(s): Clive Waldron (Microbiology)

When plating a pure culture, such as Escherichia coli, the amount of colonies that appear are proportional to their dilution factor. When diluting the culture, there is an expectation of a high cell count on a high density (low dilution) plate. The further the culture is diluted, the fewer colonies are predicated to form on a low density (high dilution) plate. Thus, a proportional curve between the dilution factor and colonies is established. However, the plating of soil bacteria does not exhibit this trend. When plating soil bacteria on a high concentration plate, some CFUs appear to be "missing". Therefore, the proportionality of the soil bacteria curve isn't consistent with that of the pure culture. One hypothesis for this plating anomaly is high bacterial density on a plate signals lysogenic phage to enter the lytic cycle. This would cause cell

membrane dissolution and therefore the disappearance of colonies. Mitomycin C, a known inducer of phage, was added in the media to test this hypothesis. The effect of Mitomycin C partially restored proportionality to the dilution series of the soil samples, suggesting an abundance of lysogeny among soil bacteria communities.

SIGNALING SPECIFICITY MODELS OF THE SECOND MESSENGER CYCLIC-DI-GMP IN THE HUMAN PATHOGEN VIBRIO CHOLERAE
Jonathan Massie
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--3, Poster, 1451
Mentor(s): Chris Waters (Microbiology and Molecular Genetics)
In the human pathogen Vibrio cholerae, cyclic-di-GMP (c-di-GMP) is a second messenger molecule that regulates biofilm formation, a sessile state categorized by cellular aggregation and extracellular polysaccharide (EPS) secretion. Interestingly, V. cholerae contains over forty individual diguanylate cyclase (DGC) and phosphodiesterase enzymes (PDE) that produce and degrade c-di-GMP, respectively. We constructed plasmid vectors to heterologously induce expression of each DGC and PDE, and twelve DGC strains showed increased biofilm formation when overexpressed. Because of the multiple inputs into c-di-GMP signaling, it is unclear whether this system functions via high or low specificity. In the "high specificity model" individual proteins are specifically linked to downstream phenotypic responses. In contrast, in the "low specificity model" individual proteins contribute to a general "signaling pool" which in turn potentiates a phenotypic response. To test these two models, we are determining the in vivo c-di-GMP concentration at which each of the twelve active DGCs regulates biofilm formation, called the EC50. Relatively uniform EC50 values across DGCs will suggest c-di-GMP functions via a common signaling pool, indicating a low specificity model. However, divergence in EC50 values between DGCs will indicate a high specificity model. Thus far, of the seven individual DGC strains tested, five show significant difference in EC50 values, whereas two show similar EC50 values, leading to a preliminary conclusion of high signaling specificity. We are continuing to examine the remaining five active DGCs.

OPTIMAL FORAGING THEORY IN ESCHERICHIA COLI
Ryan Quick
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--3, Poster, 1457
Mentor(s): Richard Lenski (Microbiology and Molecular Genetics)
Escherichia coli has evolved complex networks to regulate its metabolic genes. Such complexity most likely arose through the action of natural selection however the system seems maladaptive. For instance, in some environments E. coli will down regulate metabolic genes required to grow on some available resources, limiting E. coli's potential yield. We hypothesize that this paradox can be explained by an ecological theory, Optimal Foraging Theory (OFT), which makes unintuitive predictions for how organisms will select prey items, or for the case of bacteria, sugars. Predictions for this theory are based on how organisms will maximize their instantaneous growth rate rather than long-term reproduction. I will present results testing whether OFT makes accurate predictions for E. coli's gene regulation, behavioral ecology, and evolution. I have found strong support for this theory; when E. coli is given a choice, it consumes the resource that maximizes its growth rather than the most abundant resource. Additionally, once the most profitable resource is consumed E. coli switches faster to better resources. Lastly I found that when E. coli is evolved under laboratory conditions where they do not behave optimally, they acquire mutations in their regulatory genes to improve their foraging decisions. Altogether this project is vital for testing the role resource competition plays in shaping metabolic gene regulatory systems.

OPV VS IPV: CONCEPTS, CONTROVERSIES, AND COSTS
Andrew Johnson
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--3, Poster, 1465
Mentor(s): Mark Largent (James Madison College)
The concept of my project is based on the controversies that surround OPV(Oral Polio Vaccine) and IPV(Inactivated Polio Vaccine). Currently both are still in circulation but OPV is used in areas where cost is an issue, but has been known to, in rare cases, give the user Polio. This has caused a dramatic decrease in its usage in more populous areas of the world, and been replaced with IPV which is far more expensive but does not give the Polio virus. My poster will be set up to clearly identify the concepts of this debate, as well as the many controversies other than costs and effectiveness that go into making a decision between the two vaccines, and lastly the cost that each of them carry and how it also affects the widespread usage of each.

DETERMINING IF THE SYMBIOTIC SMALL COLONY FORM OF PHOTORHABDUS LUMINESCENS DEVELOPS A HIGHER INCIDENCE OF ANTIBIOTIC TOLERANCE
Sarah Kuenzel, Shelby Hemker, Alexander Martin
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--3, Poster, 1483
Mentor(s): Todd Ciche (Microbiology and Molecular Genetics)
The bacterium Photorhabdus luminescens is both an essential symbiont for the nematode Heterorhabditis bacteriophora and a voracious insect pathogen. The bacterium changes to a small colony (SC) variant form when it transitions from pathogenesis to symbiosis. SC are the result of a slower growth rate, which may allow increased tolerance to antibiotics and are common in recurrent infections. Persistent bacteria are the slow-growing variants of the wild type that randomly form and are tolerant to antibiotics. We hypothesize that the SC-form develops a higher incidence of persister cells than the parent form. Before we tested this hypothesis, we determined the formation of persister cells using Escherichia coli K12, a model organism, with the antibiotic ampicillin where persister formation has been previously characterized. Following antibiotic exposure, K12 cells died at a rapid rate where only 0.8% of cells survived after 1 hour. After 1 hour, K12 cells died at a much slower rate, indicating that these cells are persister cells and tolerant to antibiotic exposure. We are performing experiments to determine the incidence of persister formation in locked parent and SC-forms of P. luminescens. Each will be treated using the antibiotics ciprofloxacin and

carbenicillin and it is hypothesized that the SC variant will show more persister cells than the wild-type counterpart. These studies will reveal if there is a link between SC formation, persistence and antibiotic tolerance. In addition, these studies should provide insights into the formation and function of SC variant forms and their function during chronic infection.

EVOLUTION OF BURKHOLDERIA CENOCEPACIA WITHIN HUMAN HOSTS
Andrea Hoffman
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--3, Poster, 1486
Mentor(s): Martha Mulks (Microbiology and Molecular Genetics)
Burkholderia cenocepacia is a ubiquitous Gram-negative bacterium that can cause disease in multiple hosts, including cystic fibrosis patients, nematodes, and onions. In previous studies designed to identify genes required for virulence in different hosts, we found that the Type 2 secretion system (T2SS) and genes involved in biosynthesis of certain amino acids and purines were critical for virulence in nematode and onion models. Most environmental isolates of B. cenocepacia are prototrophs with a functional T2SS. However, several human epidemic strains of B. cenocepacia have apparently lost T2SS functionality. Many clinical isolates of another pathogen in cystic fibrosis, Pseudomonas aeruginosa, are auxotrophs. To ask whether B. cenocepacia from CF patients loses T2SS and/or develops auxotrophy, we examined 64 sequential isolates from 20 patients infected with the Midwest clone epidemic strain. T2SS mutants were detected on nematode growth medium containing 1% skim milk. We found that 35/64 isolates showed reduced secretion of protease on skim milk, while 14/64 showed no detectable secreted protease. These included at least one isolate from all 20 patients. Auxotrophy was tested using minimal M9 medium agar plates and broth. We identified 26 auxotrophic isolates, from 8/20 patients. Additional studies to identify specific nutritional requirement in each auxotroph, genetic studies to identify genetic mutations in the T2SS, and/or the secreted protease are planned. Our results to date support the hypothesis that B. cenocepacia strains mutate during infection of human hosts.

EXPRESSION OF NPR3 A MODEL GLYCOSYLATED MEMBRANE PROTEIN IN ACMNPV INFECTED INSECT CELLS
Jan Galle
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--3, Poster, 1490
Mentor(s): Suzanne Thiem (Microbiology and Molecular Genetics)
Expression of highly glycosylated proteins is known to be fraught with problems. The greater number of membrane spanning domains a protein has, the more difficult it is to express it properly. It has been shown that the Baculovirus expression vector system (BEVS) process protein modification properly and is therefor widely used to express eukaryotic genes. The BEVS was used in order to find a particular host cell, which fits perfect in the needs of viral expression of highly glycosylated proteins. Autographa californica multiple NPV (AcMNPV) one group of the baculovirus family with a double-stranded DNA genome undergo cycles of occluded and budded forms. The budded virus is highly infectious after released as free. There are evidences that mammalian processing events occur in insect host cells as well
Baculovirus assisted insect cell expression has been shown adventurous for glycosylated protein expression. A rapid method to analyze the level of expression is provided by using GFP fused to the membrane protein of interest.

CMEIAS SPATIAL ECOLOGY AT 1X
Kylie Farrell
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--4, Poster, 1491
Mentor(s): Frank Dazzo (Microbiology and Molecular Genetics)
Many medical, industrial and environmental systems are impacted by microorganisms attached to surfaces. This assemblage of adherent microorganisms is called a biofilm. Many studies have examined biofilm development, but most address their structure at spatial scales that far exceed the dimensions relevant to the microbes themselves. The primary objective of this study is to determine which spatial distribution features available in CMEIAS image analysis software can discriminate biofilm architecture at spatial scales relevant to microbes. Micrographs of natural microbial biofilms colonized on glass slides coated with 5 different surface polymer chemistries were obtained at 10 um resolution (acquired using a 1X objective lens) and analyzed for spatial pattern distribution using CMEIAS image analysis. Point pattern and dissimilarity distance analyses indicated that the metrics for nearest neighbor distances could discriminate the various biofilm architectures, and that their patterns of distribution were clustered, indicating that the colonization behavior of microbiofilm colonies had positive cooperativity. Geostatistical analysis of the microbiofilm colonies indicated that their clustering behavior autocorrelated with their location within the spatial domain, and their ability to promote their neighbor's growth occurs over an effective separation distance depending on the substratum chemistry to which they have colonized. Data acquired in this and other similar studies in the Dazzo lab will allow us to rank the discriminating power of CMEIAS measurement features in biofilm architecture analysis and define the real-world spatial scales at which ecological variables relevant to microbes colonizing surfaces actually occur.

ISOLATION OF MUTANT VIBRIO CHOLERAE RESISTANT TO THE ANTI-BIOFILM COMPOUND ABC-1
Lauren Priniski
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--4, Poster, 1492
Mentor(s): Chris Waters (Microbiology and Molecular Genetics)
Biofilms are a community of bacterial cells residing within polysaccharides. Biofilms have many negative impacts such as degrading industrial machinery, increasing risk of infection after surgeries, and increasing the tolerance of bacteria to antibiotic treatments. Our laboratory discovered a novel small molecule, named anti-biofilm compound 1(ABC-1) that inhibits biofilm formation in a broad spectrum of bacterial pathogens. The mechanism through which this compound inhibits biofilm formation is unknown. To determine this mechanism, I initiated experiments to isolate mutant Vibrio cholerae bacteria resistant to effects of ABC-1. This was completed by growing sequential cultures of V. cholerae with ABC-1. Any cells that could form biofilms in the presence of ABC-1 were then collected, and the process was repeated until a

statistically significant difference was demonstrated between the original wild-type strain and the resistant population. The culture was propagated multiple times, and with each propagation the population increased biofilm formation in the presence on ABC-1. A student's t-test was used to find if the difference is statistically significant. However, upon analysis of isolated cells from the resistant population, it was found that individual cells were not significantly resistant to ABC-1. This may be due to the fact that non-resistant bacteria can survive in the biofilm of other resistant bacteria. In the future, other enrichment processes will be developed and further screening of isolated cells will be completed.

ISOLATION AND CHARACTERIZATION OF FERROGLOBUS INDICUS SP NOV A NOVEL HYPERTHERMOPHILIC FE(III)-REDUCING ARCHAEON FROM A HYDROTHERMAL VENT LOCATED ALONG THE CENTRAL INDIAN RIDGE

Lauryn Przeslawski

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Microbiology, Immunology, Infectious Disease--4, Poster, 1501

Mentor(s): Kazem Kashefi (Microbiology and Molecular Genetics)

A novel hyperthermophilic archaeon was enriched and isolated from sulfide rock samples taken from a hydrothermal vent in the Kairei hydrothermal vent field. Kairei is located along the Central Indian Ridge, at a depth of 2,500 m, with recorded temperatures reaching as high as 355 °C. Cells of the new isolate were regular to slightly irregular cocci, about 0.7-1.0 µm in diameter and motile by means of lophotrichous flagellation. Growth occurred under strict anaerobic conditions, within the temperature range of 85-110 °C (optimum at 100 °C), with pH ranging from 5.67 - 9.5 (optimum around pH 7), and the NaCl concentration ranging from 10 - 45 gl-1 (optimum around 20 gl-1). Generation time under optimal conditions was around 4 hr. Molecular hydrogen and CO2 were the electron donor and carbon source under chemolithoautotrophic conditions with poorly crystalline Fe(III) oxide as the electron acceptor. Magnetite was the end product of Fe(III) oxide reduction under the culture conditions evaluated. The structural Fe(III) in smectite and AQDS (anthraquinone-2,6,disulfonate) were also utilized as electron acceptors. Analysis of the 16S rDNA sequences of the new isolate placed it within the Archaeoglobales family, with Ferroglobus placidus as the closest known relative (with 97% similarity). Based on 16S rDNA sequence analysis, distinguishing physiological characteristics and morphology, the new isolate was considered to be a novel member of the genus Ferroglobus within the Archaea. The name Ferroglobus indicus sp. nov. is proposed.

THE SEARCH FOR NOVEL PROTEINS IN THE C-DI-GMP SIGNALING TRANSDUCTION PATHWAY IN VIBRIO CHLOERAE

Carolyn Chan

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Microbiology, Immunology, Infectious Disease--4, Poster, 1519

Mentor(s): Chris Waters (Microbiology and Molecular Genetics)

Cyclic diguanylate (c-di-GMP) is a second messenger that regulates biofilms and motility in Vibrio cholerae and the majority of bacteria, yet much remains to be learned about the signaling pathway that connects c-di-GMP to the regulation of downstream phenotypes. Here, a study to identify proteins that play a role in this pathway using a genotype-phenotype analysis was undertaken. This analysis compares genome sequences with and without a selected phenotype to identify proteins that are associated with the phenotype of interest. Conserved proteins were identified within genomes containing c-di-GMP synthesis enzymes. These proteins were simultaneously absent in genomes lacking c-di-GMP signaling systems. Thus this set of proteins may play a role in the signaling pathway. To determine if these genes are involved in c-di-GMP signal transduction, these genes will be deleted from wild type V. cholerae using natural competence and homologous recombination. Motility and biofilm assays will be performed on the mutants to determine if the deletion has any effect on the c-di-GMP regulation of these behaviors. Currently a mutant of VC1831, a gene encoding a sensor histidine kinase, has been created and phenotypically tested. It showed no significant phenotypical change from wild type V. cholerae in both motility and biofilm assays. I am in the process of deleting three more additional genes identified by the genotype-phenotype analysis.

EXPRESSION OF NG1684 IN NEISSERIA GONORRHEA

Dayna Benoit

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Microbiology, Immunology, Infectious Disease--4, Poster, 1537

Mentor(s): Cindy Arvidson (Microbiology and Molecular Genetics)

Neisseria Gonorrhea is the bacterial pathogen that causes gonorrhea, a sexually transmitted infection that affects millions of people worldwide. A gene suspected to be involved in virulence expression is the NG1684 gene. I studied what factors indicate a change in expression in NG1684 and what factors could be regulatory or signal factors for this gene. Five different N. Gonorrhea mutants were created through transformations. All strains used contained a lacZ fusion, allowing levels of expression to be tested through beta galactosidase assays, as well as plated dilutions of cultures of each mutant strain and the MS11 NG1684:lacZ strain that was used as the control. The mutants that showed a change in expression were the PilT- and PilF- mutants. Both mutations were in the type IV pili found in N. Gonorrhea. PilT- mutants were unable to retract pili back into the cell and consistently showed higher levels of expression, usually double that of the wild type. PilF- mutants were unable to assemble pili and consistently showed lower levels of expression, usually half that of the wild type. PilE- mutants, containing no pilin at all, were assayed and showed no change in expression from the wild type. This suggests it is not the presence or absence of pilin that has an effect on gene expression, but the form that the pilin is in does have an effect. Pilin assembly could be linked to the expression of the NG1684 gene.

QUANTIFYING INHERENT ERROR IN MODELING MICROBIAL RESPONSES IN FOOD MATRICES

Ian Hildebrandt

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Microbiology, Immunology, Infectious Disease--4, Poster, 1540

Mentor(s): Bradley Marks (Biosystems and Agricultural Engineering)

The use of microbial models for validation food safety processes (e.g., pasteurization or sterilization) often neglects the underlying error inherent in any model developed using experimental data. However, it is critical to quantify this error when applying predictive microbial

models to real-world processes, in order to reliably estimate the uncertainty in process validation. The objective of this project is to quantify the inherent level of error associated with different methods, processes, and materials when determining growth and/or inactivation kinetics for bacteria in foods. The approach is to analyze a substantial collection of data produced by research teams studying microbial responses in food environments in order to isolate error and correspond it with different factors affecting the research. Microsoft Excel is used as the primary tool to mine data from an international database (ComBase, Combined Database for Predictive Microbiology, containing over 40,000 food microbiology data sets) and analyze the collection of data for relationships with error. The program developed was designed to organize and sort the collection of data. By employing keyword identification processes, the data will filter into separate categories for analysis. The internal replication error is correlated with different methods, processes, and substrates (e.g., broth vs. solid food materials) to quantify the inherent error associated with each. The analysis of the data provides a statistical meta-analysis of how different factors affect error in predictive microbiology.

QUANTITATIVE DISCRIMINATION OF NATURAL BIOFILM ARCHITECTURES USING CMEIAS CUMULATIVE OBJECT ANALYSIS
Paul Smith
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--4, Poster, 1554
Mentor(s): Frank Dazzo (Microbiology and Molecular Genetics)
Within CMEIAS, a software program using computer assisted microscopy, is a unique analytical module known as cumulative object analysis that features many measurement attributes designed to extract information from microbes in image samples. The purpose of this study was to determine whether selected measurement features in this module are suitable for analyzing biofilm communities, and if so, then rank their ability to discriminate between biofilm architectures. Micrographs of natural microbial biofilms colonized on glass slides coated with 5 different surface polymer chemistries were obtained at 1 um resolution (acquired with a 10x objective lens) and analyzed using Cumulative Object Analysis. The extracted data were analyzed statistically using five dissimilarity distance metrics (% Proportional Dissimilarity, Canberra Dissimilarity Metric, Bray-Curtis Distance, Average Euclidean Distance and Chord distance). These statistical analyses showed a trend indicating that all measurement features tested can discriminate biofilm architecture, and that certain features are more effective than others. All five distance metrics identified % Substratum Coverage as the measurement feature with the strongest discriminating power. In addition, multivariate and univariate ANOVA and the Tukey Post Hoc test confirmed that the biofilm architectures of each substrata were significantly different, and the differences between means of several pairs of substratum treatments were highly significant for each measurement attribute tested. The main conclusion drawn from this study is that several measurement attributes featured in CMEIAS Cumulative Object Analysis are suited to analyze natural microbial biofilms, and some measurement attributes in this module rank very high in ability to discriminate biofilm architecture.

THE ROLE OF CHIS IN VIBRIO CHOLERAE MOTILITY AND BIOFILM FORMATION
Amanda Ngouajio
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--4, Poster, 1582
Mentor(s): Chris Waters (Microbiology and Molecular Genetics)
3',5'-Cyclic diguanylic acid (c-di-GMP) is a ubiquitous bacterial second messenger. In *Vibrio cholerae,* c-di-GMP functions to positively regulate biofilm formation via promotion of *vpsT* transcription, and to negatively regulate motility. A genotype-phenotype analytical study was conducted to identify proteins that may be involved in the c-di-GMP signaling pathway. Genomes with and without selected phenotypes were used to identify proteins that are coupled with the specific phenotypes. Proteins encoded in genomes containing c-di-GMP synthesis enzymes, but absent in genomes that do not have c-di-GMP signaling mechanisms, were identified. ChiS, a sensory box histidine kinase/response regulator, is a chitin sensing gene encoded by VC0622 in *V. cholerae* that was identified in the genome analysis. We hypothesized that ChiS might mediate changes in the levels of c-di-GMP to the control of biofilm formation and motility in *V. cholerae.* Deletion of *chiS* decreased *vpsT* promoter activity, leading to a decrease in biofilm formation. Transcription of the *vpsT* promoter was still induced by c-di-GMP, but at lower levels. Motility, which was expected to be increased in the *chiS* mutant, demonstrated the opposite, suggesting that there exists a missing link(s) from c-di-GMP to the transduction pathway that acts to elicit intracellular responses. It can also be suggested that ChiS contributes to biofilm formation and motility, but is not required for c-di-GMP mediated regulation of these behaviors.

CHARACTERIZATION OF DIGUANYLATE CYCLASE INHIBITORS AS ANTI-BIOFILIM AGENTS
Josh Smith
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Microbiology, Immunology, Infectious Disease--4, Poster, 1610
Mentor(s): Christopher Waters (Microbiology and Molecular Genetics)
Cyclic-di-GMP (or c-di-GMP) is a second messenger molecule utilized exclusively by bacteria. The molecule is synthesized from two guanosine-5'-triphosphates (GTP) by diguanylate cyclase enzymes (DGC). Cyclic-di-GMP is critical for biofilm formation, which accounts for many problems in medicine and industry. Therein, there is a vast need for the development of novel anti-biofilm strategies to combat these problems. Recently, we have identified 13 small molecules in a high-throughput screen of 66,000 compounds that inhibit a *V. cholerae* DGC enzyme and biofilm formation. Because bacteria encode multiple DGC enzymes, the ability of these molecules to inhibit the DGC WspR from *P. aeruginosa* was further examined. The concentration at 50% inhibition, termed IC_{50}, of these compounds was determined for WspR. Eight of the compounds significantly inhibited WspR indicating they are general inhibitors of DGC enzymes. Furthermore, increasing levels of substrate correlated with decreasing inhibition, suggesting these inhibitors might function via a competitive mechanism. Future work will increase the affinity of the compounds that were general DGC inhibitors for their target enzymes, and thus increase their candidacy as useful anti-biofilm agents.

Physical Sciences

Poster Presentations

CHARACTERIZING THE MILKY WAY STELLAR HALO
Monica Derris
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Physical Sciences--1, Poster, 1319
Mentor(s): Brian O'Shea (Physics and Astronomy)
We examine properties of metal poor stars in the Galactic halo to gain insight on galaxy formation and evolution. The observational data used consists of subset of local and uniform Sloan Digital Sky Survey (SDSS) stars whose three dimensional velocities are well quantified. We examine the chemical and orbital properties of the stars by evolving their orbits in two different Galactic gravitational potential models. We demonstrate that the major stellar components of the Milky Way (thin and thick disk, as well as a Galactic halo) can be reproduced by a set of purely local stars. These stars also show phase-space segregation corresponding to orbital resonances in the Milky Way potential. No significant relationship between orbital parameters and [α/Fe] is observed, though we reproduce the stellar distributions seen in [Fe/H].

OPTIMIZATION OF THE EXTRACTION OF DIESEL FUEL FROM WATER FOR FUEL SPILL CLEAN-UP APPLICATIONS
Johanna Smeekens
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Physical Sciences--1, Poster, 1342
Mentor(s): Ruth Smith (Criminal Justice)
The recent oil spill in the Gulf of Mexico has renewed the critical importance of having an efficient clean-up plan when a fuel spill occurs. This research project focuses on determining the most efficient method of extracting a fuel sample from water, using organic solvents. Diesel fuel will serve as the model fuel, since it is a complex sample containing both alkane and aromatic compounds. Samples of diesel were extracted using two organic solvents: pentane, which is a non-polar solvent, and dichloromethane, which is a polar solvent. After demonstrating the purity of each solvent, the extraction procedure was validated by assessing the percent recovery of diesel fuel, based on mass recovered by each solvent. Then, each solvent was added to a mixture of diesel fuel and water to determine the efficiency of the solvent in extracting the fuel from the water. The efficiency was assessed in two ways: by determining the percent recovery of diesel fuel by mass and by analyzing the solvent extract by gas chromatography-mass spectrometry (GC-MS). This technique was used to determine the chemical composition of the extract and, through comparison to neat diesel, compounds that were preferentially extracted by each solvent were determined. These results can be used to determine an appropriate solvent to extract and remove petroleum products from water, which is essential to ensure all compounds in the fuel are extracted for subsequent analysis and monitoring.

DYNAMICAL EVOLUTION AND METAL MIXING IN SUPERNOVA REMNANT SHOCKS
Nicholas Earl
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Physical Sciences--1, Poster, 1530
Mentor(s): Brian O'Shea (Physics and Astronomy)
Using ENZO, a cosmological adaptive mesh refinement (AMR) code, and YT, a python package used to analyze AMR data, we run simulations of metal-enriched shockwave propagation through a variously characterized primordial medium at high-resolutions. The characteristics of the shock itself are similarly varied. We then analyze the dependence of microstructure formation and material distribution in the propagating shock on conditions of velocity, density, temperature, and metallicity of both the shock and medium. Advancing the simulation, we allow the instabilities to develop to some derived time based on initial conditions. We find strong correlations between particle density, temperature, and metallicity in determining the features of the shock column, the development of thick or thin 'fingers', and the distribution of energy, metals, and propagated material. We found the most interesting results when using temperatures in the range of 1,000K to 10,000K, shock velocities of 2 to 8 times the sound speed, densities of 10 to 100 particles per cubic centimeter, and metallicities of 0 to 2.2e-4, with analytic comparisons of parameter sets with and without a metal cooling mechanism, however we do maintain radiative cooling. We examine the significance of these results and what they may suggest in discussions of material propagation between generations of stars.

BIOGEOGRAPHIC ASSOCIATIONS OF DEVONIAN BRYOZOAN GENERA IN LAURUSSIA, SIBERIA, CHINA, AND GONDWANA
Anna Werner
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Physical Sciences--1, Poster, 1600
Mentor(s): Robert Anstey (Geological Sciences)
Two distinct paleobiogeographical provinces have previously been distinguished for the Devonian period, each being divided into five respective biomes. The provinces and biomes were based upon bryozoan generic presence/absence data collected from the literature primarily on North America and Europe, comprising the Devonian landmass of Laurussia. The current author attemps to extend the biogeographical knowledge of the Devonian Bryozoa to the Devonian landmasses of Gondwana (Africa, Australia, Antarctica, and South America), China, and Siberia/Kazakhstania. Biogeographic associations are identified and analyzed using parsimony analysis of endemicity (PAE) and Simpson's index of overall faunal similarity. Assemblages of bryozoan genera are clustered into larger units, the similarities between assemblages within these units being indicative of shared geographic origins. Through analysis of presence/absence data, the effects of a late middle Devonian mass extinction event upon the Bryozoa is also assessed. Through the merging of the data collected from the literature by the current author with that previously amassed from Laurussia, the author attempts to develop a greater understanding of global biogeographic associations and faunal mass extinction events as expressed in the fossil record of the Devonian period.

EXAMINING HEAVY METAL LOADING IN THE SEDIMENT RECORD OF THOMPSON LAKE NEAR HOWELL, MI
Paul Glasser
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Physical Sciences--1, Poster, 1608
Mentor(s): Dave Long (Geology)
Various metals in the geochemical profile of sediment cores taken from Thompson Lake near Howell, Michigan were examined in order to determine the relationship between natural metal loading due to erosion and increased loading due to anthropogenic activities such as logging, smelting, and urbanization. The elements studied consist of Cu, Zn, Ni, Cd, Pb, and Hg, all of which are considered toxic pollutants to both humans and wildlife. It is hypothesized that initial increases in metal loadings in the sediment record is due to increased runoff from deforestation and not from sources outside the watershed. In order to help answer these questions, observed concentrations were compared to expected concentrations if only erosion-controlled loading had occurred. Initial results support the hypothesis and indicate system stability prior to approximately 1850, and since then trends in changing concentration appeared to reflect historical human activities such as logging, burning of fossil fuels, and the adoption and subsequent banning of lead additives to gasoline. The results suggest that some previous interpretations of chemical trends need to be revised and that the effects of human activities may be such that systems cannot return to previous stable states.

ANOMALOUS VOLCANISM ASSOCIATED WITH LATE-STAGE CONTINENTAL RIFTING ON NORTH AMERICA
Justin Segal
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Physical Sciences--1, Poster, 1611
Mentor(s): Tyrone Rooney (Geology)
The Porcupine Mountains of the Upper Peninsula of Michigan are a result of basaltic magmatism associated with the 1.1 Ga Mid-Continent Rift (MCR) system of North America. These rock sequences record the extension of continental crust associated with the opening of an ocean basin during this time period. The basaltic eruptive phases responsible for the formation of the Porcupine Mountains are the latest known eruptive episodes associated with the MCR, and are stratigraphically correlated to Michipicoten Island of Northeastern Lake Superior. Modern models that detail processes active in magma-assisted rifting generally place late-stage basaltic volcanism along the central rift axis. Rift- marginal volcanism is considered the product of earlier rifting stages. The Porcupine Mountains volcanic series, located along a rift margin, is incompatible with this hypothesis. Twenty-three samples were collected from basaltic flows exposed in outcrops within the Porcupine Mountains State Park. Layers of basalt where the temporal relationship was apparent were collected wherever possible. Samples will be analyzed using both X-ray fluorescence and laser ablation inductively coupled plasma mass spectrometry to determine geochemical characteristics. We will develop a geochemical model that details the contribution of differing geochemical reservoirs to magamatism in the MCR. We will furthermore use these data to compare mantle and lithospheric processes previously active in the MCR with those currently active in the East African Rift system. Our work will provide new data for dynamic models that describe the processes active at magma-rich continental margins.

PINETUM DUNE ORIGINATION PROCESSES
Brian Glover
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Physical Sciences--1, Poster, 1629
Mentor(s): Michael Velbel (Geological Sciences)
Most Michigan sand dunes originated with off-shore winds transporting sand grains inland until trapped by vegetation. A recently recognized dune in mid-Michigan, the Pinetum dune on the campus of MSU, appears to have formed under different influences than most of Michigan's dunes. This study uses grain-size analysis to infer the processes involved in the transport of the grains that make up the Pinetum dune. The distribution of grain sizes will be cross-referenced with dunes that have already been analyzed to establish similarities and differences between the Pinetum dune and previously studied and better understood dunes. These comparisons will help identify common source, transport, and depositional attributes the Pinetum dune shares with other dunes, and unique attributes that might help explain the Pinetum dune's unique geography.

ELECTRICAL RESISTIVITY ANALYSIS TO DETERMINE FOUNDATION GEOMETRY OF AN ESKER: MASON, MICHIGAN
Amanda Robinson, Anna Nowicki
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Physical Sciences--1, Poster, 1662
Mentor(s): Remke Van Dam (Geological Sciences)
Eskers are positive-relief glacial landforms characterized as long, narrow deposits of stratified sand and gravel. These landforms have been used for interpretation of local glacial history, and are important for their economic value (construction material) and as potential conduits for contaminant transport. In Michigan, eskers were a product of channelized water flow below and within the Laurentide ice sheet, during the Wisconsinan glaciation. The objective of this study was to assess whether electrical resistivity (ER) geophysical techniques are an effective tool to estimate the esker foundation geometry, that is to determine if scouring is present at the base of the esker. To this end, synthetic forward modeling experiments were performed for several possible foundation geometries and field measurements were conducted at a typical esker site in Mason, Michigan. At this site, apparent resistivity was measured in Wenner mode for a 112-m transect perpendicular to the esker's long axis, using a 56-electrode roll-along method with two meter a-spacing. Using EarthImager2D, the apparent resistivity pseudosection was inverted to obtain a best-fit model of the electrical resistivity. The forward modeling results indicate that ER can be effectively used to determine whether scouring is present; accordingly, collected data show that scouring is present beneath the studied esker. This study may have implications for future research concerning esker formations and their potential as contaminant pathways.

COPPER 5-SULFOISOPHTHALATE COORDINATION POLYMERS

Chaun Gandolfo

Location: Gold Room, 1:30 PM - 3:30 PM

Category: Physical Sciences--2, Poster, 1306

Mentor(s): Robert LaDuca (Chemistry)

Several divalent copper coordination polymers containing both 5-sulfoisophthalate (sip) and bis(pyridyl)piperazine type co-ligands have been hydrothermally synthesized and structurally characterized by single-crystal X-ray diffraction. Across this series, the nature of the neutral co-ligands plays a crucial structure-directing role. Bis(3-pyridylmethyl)piperazine (3-bpmp) and its isomer bis(4-pyridylmethyl)piperazine (4-bpmp) afforded layered phases with different topologies. {[Cu(sip)(H3-bpmp)(H2O)]•3H2O}n (1) and {[Cu(sip)(H4-bpmp)(H2O)]•4H2O}n (2) both possess (4,4) grid topologies, although the latter exhibits mutually inclined 2D + 2D -> 3D interpenetration. {[Cu(sip)(H4-bpmp)]•7.5H2O}n (3), which forms concomitantly with 2, has an uncommon (3,6) triangular grid layer based on {Cu2(OCO)2} dimers. A lower temperature pseudopolymorph, {[Cu6(sip)6(H24-bpmp)3(H2O)20]•4H2O}n (4), is an oligomeric molecular species. Employing bis(4-pyridylformyl)piperazine (4-bpfp) generated{[Cu4(sip)2(OH)2(H2O)3(4-bpfp)]•H2O}n (5), which manifests {Cu4(OH)2} "butterfly" clusters linked into a unique three-dimensional (3-D) 3,3,8-connected trinodal lattice with (3.42)(426)(3244536977829) topology. The copper clusters in 3 and 5 exhibit antiferromagnetic coupling.

GRAIN SHAPE ANALYSIS OF SAND- AND SILT-SIZE SEDIMENT AT THE PHOENIX MARS LANDER LANDING SITE FROM IMAGES ACQUIRED BY THE PHOENIX OPTICAL MICROSCOPE

Anthony Pecchia, Kelsey Foote, Eva Graham, Jeremy Letchford, James Smith, Hiu See Tang

Location: Gold Room, 1:30 PM - 3:30 PM

Category: Physical Sciences--2, Poster, 1309

Mentor(s): Brian Hampton (Geological Sciences), Michael Velbel (Geological Sciences)

The Phoenix Mars Lander landed in Vastitas Borealis, near Mars' northern polar cap, May 25, 2008, and operated until November 2, 2008. The landing site is a valley dominated by periglacial polygonal patterned ground with 3 to 6 meter polygons, which could signify cryogenic water ice processes. A Robotic Arm dug trenches and acquired samples of dry soil and sublimation residues from water ice. It delivered samples to several instrument packages including the Microscopy, Electrochemistry, and Conductivity Analyzer (MECA), which included an Optical Microscope (OM). This presentation describes the results of the investigation to use the shapes of the coarsest grains imaged by the Phoenix OM to establish whether grain shapes (form and especially roundness) vary between different periglacial landforms, types of surface and near-surface materials, and proximity to ice. Determination of grain roundness has been accomplished by assigning each grain a roundness value using the Krumbein scale. These samples were extracted from dry frozen surface, ice sublimation, ice bearing materials, and the tops and sides of polygons. The results showed that ranges of Krumbein roundness are broadly similar for sand and coarse silt-size grains in almost all samples examined. The one exception was found in the trough of the Golden Goose trench, which yielded somewhat lower roundnesses. Similarity of roundness is consistent with similarity of grain sources, abrasion, transport histories, and depositional processes and environments. Differences in grain roundness in the Golden Goose sample suggest some difference in grain accumulation, abrasion, fracturing, or aggregation compared to the other samples.

APPLICATION OF MORPHOMETRIC TECHNIQUES TO ICHNOFOSSILS: A CASE STUDY OF RUSOPHYCUS FROM THE MIDDLE CAMBRIAN GROS VENTRE FORMATION, WYOMING, USA

Emily Cannell, Tara Cooper, Sarah Davis, Lauren Henderson, Alice Hoffman, Andrea Lazzari, Kristen Saunders, Kristen Suing, Victoria Zielinski

Location: Gold Room, 1:30 PM - 3:30 PM

Category: Physical Sciences--2, Poster, 1315

Mentor(s): Robert Anstey (Geological Sciences), Danita Brandt (Geological Sciences)

Attempts to apply morphometric techniques to trace fossils, and thereby create reproducible and objective ichnotaxabases, are usually thwarted by small sample sizes of the ichnotaxon under study. An ichnological lagerstätte of Rusophycus (trilobite trace fossil) from the Middle Cambrian Gros Ventre Formation of Wyoming, USA, provided a large enough sample size to attempt biometric analysis of this ichnofauna. We initially defined and measured 12 distances between landmarks, 3 angles, and 4 counts of morphologic characters from 117 specimens of Rusophycus from the Gros Ventre. Distance metrics were transformed to reflect shape rather than size. Two meristic characters were retained, and the resulting 14 characters were standardized to give all values a range between 0 and 1. Multivariate analyses were performed using PAST (PAleontological STatistics). Results of an initial analysis using Ward Euclidean clustering were reconciled with qualitative examination of the specimens, which indicated that numerous incomplete or poorly preserved traces were inconsistently classified. As a result, the specimen base was culled and the number of specimens judged useful for morphometric analysis was reduced from 117 to 50. Poor or variable preservation remains an intractable problem in attempting to apply quantitative measures in the definition of ichnotaxa (many which are based on a single specimen). The most useful diagnostic criteria for distinguishing Rusophycus ichnogenera are overall shape, and the presence of unique morphologic features.

SYNTHESIS OF PROPARGYL GLYCOLIC ACID

Kayla Felger

Location: Gold Room, 1:30 PM - 3:30 PM

Category: Physical Sciences--2, Poster, 1344

Mentor(s): Greg Baker (Chemistry)

Propargyl glycolic acid has to the potential to be used to transfer necessary cations directly to injured areas due to its highly electronegative region around the hydroxide groups. For example, this substance could be used to deliver calcium to a shattered bone. Because the substance contains ester bonds, it would be easily broken down by the body and the ions would be released. The problem with this is that propargyl glycolic acid is expensive to synthesize in terms of both finances and excessive materials needed. In this presentation, cheaper and large scale methods are explored for creating the molecule.

DEVELOPMENT OF AN ACTIVE TARGET TIME PROJECTION CHAMBER FOR NUCLEAR REACTION STUDIES WITH RADIOACTIVE ISOTOPE BEAMS
Michael Ford
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Physical Sciences--2, Poster, 1374
Mentor(s): William Lynch (Physics), Wolfgang Mittig (Hannah/Physics)
Development of an Active Target Time Projection Chamber for Nuclear Reaction Studies with Radioactive Isotope Beams MICHAEL FORD, National Superconducting Cyclotron Laboratory (NSCL) and Michigan State University (MSU), DANIEL BAZIN, WILLIAM LYNCH, WOLFGANG MITTIG, DAISUKE SUZUKI, NSCL/MSU with AT-TPC COLLABORATION □ An Active Target Time Projection Chamber (AT-TPC) is being developed at the NSCL. This new detector incorporates the gas of a time projection chamber as an active target, providing powerful new capabilities for studying reactions induced by radioactive rare isotope beams. The detector design encompasses a dual gas system, providing one gas optimized for electrical isolation of the field cage and another that serves as the target. For versatile use of the targets, the detector should operate with a wide range of target gasses including H2, D2, 3,4He and Ne at pressures ranging from .2 to 1.0 atm and electric fields up to 1kV/cm. Gas amplification and signal detection will be achieved with planar Micromegas structures mounted at the end of the gas detector volume. The Micromegas anode plane will be segmented into approximately 10,000 pads and read out by the GET advanced active target electronics that are being developed in collaboration with French and Japanese institutes. I will be presenting the current status of the research and development of the AT-TPC and its prototype.

CRITICAL TEMPERATURE SCALING OF THE ANISOTROPIC ISING MODEL
Mitchell Wood
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Physical Sciences--2, Poster, 1444
Mentor(s): Bhanu Mahanti (Physics and Astronomy)
The anisotropy of the triangular Ising Model has two distinct regions where the ratio of J1 to J2 (J1/J2=G) is less than or greater than one. When the values of the interaction strength (or equivocally the spacing between the lattice sites) are equal we return to the typical fully frustrated triangular anti-ferromagnet. In the extreme limit where G goes to zero (J1 goes to 0) the lattice is essentially a NN AFM chain with no phase transition. None the less there is a peak value in the magnetic susceptibility, this leads the researcher to believe there is some sort of critical temperature T* in the G<1 regime. For the other extreme limit of G=inf (J1=inf or J2 going to 0) we return to the square anti-ferromagnet where there is a phase transition at 2.3 KbT/J. Also, at G=1.414 this same Square AFM phase transition is reproduced but at a lower temperature of 1.6 KbT/J. At values of G less than 1.414 this observable phase transition isn't seen, but a similar T* can be seen for a maximum in the magnetic susceptibility.

SOURCE OF LITHIC BLOCKS WITHIN A LARGE, NON-HISTORIC ASH FLOW DEPOSIT, BARU VOLCANO, PANAMA
Danielle Westphall
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Physical Sciences--2, Poster, 1528
Mentor(s): Tyrone Rooney (Geological Sciences)
In western Panama, large non-historic rock avalanche and ash flows deposits blanket the valleys surrounding the easternmost section of the Talamanca Cordillera. The source of both of these deposits is presumed to be Baru volcano, which is characterized by a large sector collapse extending from the summit to the base of the volcanic edifice. This sector collapse presents a unique opportunity to study Baru volcano's complete stratigraphic sequence from the Miocene to the present. Furthermore, this exposure allows for the chemical and petrographic correlation of lithic blocks collected from ash flow deposits with Baru volcano's stratigraphy. In this study we present a procedure to identify the source of such deposits using Baru volcano as a natural laboratory. Our results show four distinct groups of clasts that can be distinguished based upon their phase assemblage and geochemistry. These groups found in ash flow deposits correlate both petrographically and geochemically to the stratigraphic units recognized at Baru volcano. Our results are therefore consistent with the hypothesis that the blocks have their source within the sequence of Baru volcano's edifice. Correlating the geochemistry and mineralogy of blocks found within ash flows to the stratigraphic sequence of surrounding volcanic edifices provides an effective method to identify the sources of non-historic volcanic ash flow events. Ash flow events are common in volcanic environments and are a primary geohazard recognized in such regions. Determining the magnitude and source of ash flow deposits is extremely important for risk assessment in volcanic provinces.

PHYLOGENY OF EUGLENOID AND GREEN ALGAL CHLOROPLAST SSU RDNA AND TRNA'S
Lauren Padgett
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Physical Sciences--2, Poster, 1681
Mentor(s): Richard Triemer (Plant Biology)
The SSU rDNA and trna genes from euglenoid and green algal chloroplasts were used to create a phylogeny which was used to infer the endosymbiotic origin of the euglenoid chloroplast. A 12 gene dataset was aligned and a phylogeny was inferred using Bayesian methods. . The resulting tree placed the unicellular flagellated green alga, Pyramimonas parkeae, at the base of the euglenoid lineage suggesting that Pyramimonas was most closely related to ancestral chloroplast donor. While the basal position of Pyramimonas was well supported in the tree, the relationships among several euglenoid species were not resolved. Euglena viridis was not included in the same clade as the other two Euglena species, causing the genus to be polyphyletic. The position of Strombomonas acuminata, Euglenaria anabaena, and Euglena viridis differs from that shown on previous trees based on nuclear encoded genes. These results may suggest that there was insufficient phylogenetic signal in the dataset and more taxa and or genes may be needed to resolve the relationships among these taxa. Alternatively, the results may indicate that the genes selected may not be under strong selection and may be evolving at differing rates in the various lineages of euglenoids.

Psychology

Oral Presentations

AUTISM: ADULT SOCIAL INTERACTION AND THE WORKPLACE
Andrew Miller
Location: Lake Huron Room, 10:30 AM
Category: Psychology, Oral
Mentor(s): Sigrid Dixon (Counseling Center)
Autism is a disorder of neutral development characterized by impaired social interaction and communication, and by restricted and repetitive behavior. Autism affects information processing in the brain by altering how nerve cells and their synapses connect and organize; how this occurs is not well understood. Although early behavioral or cognitive intervention can help autistic children gain self-care, social, and communication skills, there is no known cure. No one knows exactly what causes Asberger's Syndrome Disorder (ASD). It is clearly rooted in something that affects the development of the brain in early development. Researchers can identify inheritance as the single most important factor, but there appear to be more genes involved. Other factors would include environmental factors or infections. As autistic adolescents grow older, they are faced with more responsibility and decision-making becomes more apparent. Adults with autism encounter many different hardships and modifications in their ability to be employed or coexist successfully with others socially. This particular research will convey great detail in expressing a potential link between adult autism and how it would relate to social interaction and employment.

UNLIKELY ALLIES: ACOUSTIC AND SYNTACTIC CUES IN WORD SEGMENTATION
Christopher Heffner
Location: Lake Huron Room, 10:45 AM
Category: Psychology, Oral
Mentor(s): Laura Dilley (Communicative Sciences & Disorders)
Though perception of discrete words is almost effortless, there are few acoustic cues which consistently signal a word boundary. Recent research has shown that slowing down the speech rate around a region of speech for which acoustic cues to a word boundary were ambiguous made a critical word within the acoustically ambiguous region disappear perceptually. In a series of experiments, we examined whether the perception of a critical word would be affected by its grammatical status in context and/or its context speech rate. Two types of context were contrasted: one where the grammar of the sentence made the critical word optional (an “optional context”) and another which made it obligatory (an “obligatory context”). For each experiment, a slower context speech rate implied a lower rate of critical word reports, and obligatory contexts were more likely to evoke perception of the critical word than optional contexts. These grammatical context effects were largely independent of the manipulation used to produce the different types of context. The two cues sometimes interacted, such that optional contexts were more sensitive to the context speech rate effect than obligatory contexts. These findings shed light on how listeners communicate via spoken language and suggest that listeners appear to use all the cues at their disposal when placing word boundaries, an insight which allows for an enhanced appreciation of how the mind deciphers spoken language.

REDOUBLING OR REMOVING EFFORT
Simon Golden
Location: Lake Huron Room, 11:00 AM
Category: Psychology, Oral
Mentor(s): Kevin Ford (Psychology), Steve Kozlowski (Psychology)
The three-dimensional goal orientation framework informs our understanding of individual responses to negative feedback. After facing negative feedback, learning goal oriented individuals display increased effort and performance, whereas performance-avoid goal oriented individuals show decreased effort and performance. In contrast, performance approach goal oriented individuals show inconsistent effects, as a performance-approach goal orientation has been positively related to effort (Elliot, McGregor, & Gable, 1999) and performance (Senko & Harackiewicz, 2005), similar to a learning goal orientation, but also unrelated to effort (Vandewalle, Cron, & Slocum, 2001), and negatively related to performance (Cianci, Klein, & Seijts, 2010; Cianci, Schaubroeck, & McGill, 2010), similar to the performance-avoid goal orientation. This inconsistency obscures our understanding of reactions to negative feedback, and in turn our ability to influence performance outcomes. Considering the powerful impact of the level of negative feedback on effort and performance (Kluger & Denisi, 1996), the level of negative feedback could help address this inconsistency (Koestner & Zuckerman, 1994). Specifically, we examine the unexplored possibility that the level of negative feedback could interact with goal orientation to affect self-efficacy, goal acceptance, perceived discrepancy, effort, and performance over time using a 3 (learning, performance-prove, and performance-avoid goal orientation) X 2 (high level negative feedback vs. low level negative feedback) between subjects design with repeated measures. Despite the finding that the effects of goal orientation change over time (Senko & Harackiewicz, 2001; Elliot & McGregor, 1999), few researchers have examined this. Thus, we will examine effects over three iterations.

NARRATIVE COMPREHENSION USING RICH AND SPARSE MANIPULATIVES IN SECOND GRADERS
Elizabeth Cook
Location: Lake Huron Room, 11:15 AM
Category: Psychology, Oral
Mentor(s): Kevin Ford (Psychology), Kelly Mix (Educational Psychology)
Manipulatives are commonly used in the classroom to aid in the learning process. This study examines the difference between using manipulatives that are rich in detail (rich manipulatives) and using manipulatives that lack detail (sparse manipulatives). Specifically, the authors look at how rich and sparse manipulatives increase narrative comprehension in second graders. An anticipated 72 students will read a total of four short stories and answer twenty comprehension questions during two sessions. Three conditions will be used: a rich condition that

moves detailed manipulatives in accordance with the action sentences in the stories, a sparse condition that moves abstract manipulatives, and a reread condition that will only view the detailed manipulatives and reread the action sentences. An independent samples T-test will be used to analyze the data.

Poster Presentations

A STICKY SITUATION: THE EFFECT OF EMPATHY ON GENEROSITY IN YOUNG CHILDREN
Alyssa Segal
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Psychology--1, Poster, 1370
Mentor(s): Judith Danovitch (Psychology)
Prosocial behaviors, including sharing, comforting, helping and giving, are present early in development (Han & Shi, 2009). Research suggests, however, that sharing and giving is unlikely to occur between children unless directed by an adult (Hay et al., 1999). Research also indicates that when adults experience empathy their prosocial behaviors are likely to increase(Baumeister et al., 2007). It is unclear if the same is true for children. The current study investigates whether children who hear a sad story will subsequently be more generous than children who hear a neutral story. Children ages four and five are first given ten stickers. Next, they report their emotion using a self report feeling scale. Then, each child hears a sad or neutral emotion story. Afterwards, they report the character's and their own emotion. The experimenter then "realizes" that there are not enough stickers for a child who will be seen later and gives the participant an opportunity to give some of their stickers to this anonymous child. Upon completion of the giving task, the children report their emotion one last time. An independent t-test is used to measure whether there is a significant difference in the number of stickers given by children in the sad versus the neutral condition and a simple regression analysis is used to determine if individual differences in empathy predict the number of stickers given. The results may have implications for understanding and increasing generosity in children.

WOMEN PLAY FOOTBALL!? PRESCHOOLERS ATTRIBUTION OF EXPERTISE ABOUT OCCUPATIONAL AND DOMESTIC ACTIVITIES
Elizabeth Boudiab
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Psychology--1, Poster, 1371
Mentor(s): Judith Danovitch (Psychology)
Research has shown that children are good at attributing knowledge to appropriate experts (Lutz & Keil, 2002), but there have been no studies on how knowledge attribution is affected by gender stereotypes. Research conducted in our lab shows that when children (ages 3-5) are faced with a gender stereotyped occupational condition (male mechanic & female nurse), they attribute knowledge of occupational skills to the appropriate character. The current study uses puppets to see if children are influenced by a character's gender when attributing knowledge of occupational skills and stereotypical activities. Experiment 1 (n=28) creates a gender counter-stereotyped occupational condition (male nurse & female mechanic). Children are asked who would know more about gender-typed activities and occupational skills. Results indicate that children attribute expert knowledge to the appropriate expert, regardless of gender. In addition, children believe a woman in a male-dominant profession knows more about male-dominant activities (i.e. football), but there is no similar stereotype held for female activities. We were further interested in whether children hold stereotypes for these activities regardless of a person's profession. Experiment 2 (n=21) eliminates information about the puppets' occupations and emphasizes only gender. The results show that boys hold male stereotypes, but not female stereotypes, while girls hold no gender stereotypes at all. These findings are surprising and provide the opportunity for further research to broaden our understanding of how children develop these stereotypes.

THE EFFECT OF SLEEP DEPRIVATION ON MEMORY SUSCEPTIBILITY TO MISLEADING INFORMATION
Holly Lewis, Gaebrial Ferguson
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Psychology--1, Poster, 1414
Mentor(s): Kimberly Fenn (Psychology)
After a memory is encoded, misleading information may severely alter it, creating a false memory. Several studies have explored factors that affect susceptibility to misleading information, but the role of sleep and sleep deprivation in this process have yet to be investigated. It is, however, well-established that sleep deprivation has severe consequences to cognitive function including reduced working memory capacity, reduced ability to acquire information, and increased false recall in the DRM paradigm (Diekelmann et al., 2008) likely due to a reduction in frontal lobe function. In the present study, the effect of sleep deprivation on memory malleability and reconstruction was investigated using the misinformation paradigm. Participants arrived in the laboratory at 22:30; half were permitted to sleep for 8 hours and the other half remained awake all night. At 9:00am, participants completed all three experimental phases: encoding, misinformation and test. During encoding, participants were shown a series of pictures that depicted a story. Next, they completed an unrelated math learning task and then proceeded to the misinformation phase, where they read sentences describing the story shown in the pictures. However, misleading information concerning the pictures had been subtly added to the sentences. Finally, participants were given a multiple choice test regarding the story. Results suggest that sleep-deprived participants showed lower rates of correct memory and higher rates of false memory for suggested information than participants who had slept. This suggests that sleep deprivation can increase susceptibility to false memory, which has implications for eyewitness testimony and classroom performance.

DISTAL EFFECTS OF PITCH AND TIMING OF SYLLABLES ON WORD SEGMENTATION
Prashanth Rajarajan, Krista Bur
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Psychology--1, Poster, 1416
Mentor(s): Laura Dilley (Communicative Sciences and Disorders), Devin McAuley (Psychology)
Recent research has suggested that pitch and timing cues initial (i.e., distal) in an utterance play a role in the perceived grouping and subsequent segmentation of syllables later on. However, the extent to which these effects apply under other kinds of acoustic variation remains to be investigated. In this experiment, participants heard eight-syllable sequences with lexically ambiguous endings (e.g., timer derby vs. tie murder bee) in which the acoustic qualities of the last three syllables were held constant while the pitch and/or timing of the initial five syllables were modified. The duration and/or pitch characteristics of the initial five syllables were altered via computer speech editing in a manner predicted to favor parsing of the final syllables as either a monosyllabic or a disyllabic word. Critically, a novel acoustic pattern was used which involved pairing relative frequencies (as high or low) with syllables in a manner that was opposite to the pairing used in previous work. Participants listened to each sequence and reported the final word. The results showed distal prosody influenced the rate of responding with a disyllabic word, indicating that the effects of distal prosody on word segmentation reported previously generalized to a novel acoustic pattern. Overall, these studies reveal insight into how listeners segment and perceive words as separated in fluent speech in spite of the lack of reliable acoustic cues signaling word boundaries.

MASKING AND ITS UNDERLYING NEURAL MECHANISMS IN NOCTURNAL AND DIURNAL RODENTS
Shannon Cramm
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Psychology--1, Poster, 1431
Mentor(s): Laura Smale (Psychology)
Light affects the daily patterning of behavior through entrainment of endogenous circadian rhythms and direct, immediate effects known as "masking." There has been a lot of work done on the former, while the latter -- masking -- has received very little attention. The effects of masking operate very differently in nocturnal and diurnal species: Light induces positive masking (increased activity) in diurnal species and negative (decreased activity) in nocturnal, while darkness does the reverse. This indicates that there must be an underlying neural difference mediating the different masking effects. That difference was the focus of this study. We compared the behavioral and neural differences of masking in response to systematic changes in the photic environment of a diurnal species, Arvicanthis niloticus, and a nocturnal species, Mus musculus. The animals were exposed to systematic, one hour light and dark pulses across the circadian cycle, in both standard 12:12 light:dark conditions as well as constant light/dark conditions. The general activity was measured using motion sensors attached to the cages. Light pulses at one time point in particular, ZT14, seemed to be especially effective in both species: Arvianthis niloticus showed a significant increase in activity, while Mus musculus had a significant decrease. We then looked at the neural mechanisms by comparing the brain activity, using Fos immunohistochemical staining, of animals sacrificed at ZT 15 during a normal light/dark cycle and animals sacrificed at ZT 15 after a light pulse at ZT 14. The results of this study are still being analyzed.

WHY DID HE DO THAT?: CHILDRENS UNDERSTANDING OF HOW EMOTIONS AFFECT COGNITION
Meghan Kanya
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Psychology--1, Poster, 1446
Mentor(s): Judith Danovitch (Psychology)
Studies have shown that different emotional states affect cognitive abilities (e.g. anger influencing a person to become more impulsive and irrational) and that adults are aware of this influence (Pham, 2007). However, thus far no study has examined children's understanding of this phenomenon. This study examined whether children (ages 5-10) understand that emotional states influence cognitive processes. In the first task, children were asked to actively think about each of the four basic emotions (happy, sad, angry, afraid) as they apply to themselves. The next three tasks involved stories about characters experiencing different emotional states who make various decisions. In two tasks, children were asked to predict a character's decision based on the emotions the character is feeling. In a third task, children were asked to explain why a character makes an irrational decision. The results suggest that younger children refer to specific emotions less often when explaining a character's irrational behavior. The data also shows that older children are more likely to pair the experience of anger and fear with impulsive acts and the experience of sadness with reflective acts than younger children. This study will help researchers and practitioners understand at what age children develop emotional knowledge for events occurring around them and others' behavior.

THE EFFECTS OF AGE OF ENTRY INTO EARLY HEAD START ON EARLY VOCABULARY DEVELOPMENT
Kristyn Johnson
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Psychology--1, Poster, 1467
Mentor(s): Hope Gerde (Human Development & Family Studies)
Children raised in impoverished families have significantly smaller vocabularies than children raised in higher income families due to the low quality of the oral language environments at home (Hart & Risley, 1995). One program that has been created to help promote language outcomes in these children is the Early Head Start program (Head Start Program, 2007). My research investigates the effectiveness of Early Head Start on children's vocabulary at 3 years of age. The national Early Head Start Research and Evaluation (EHSRE) study recruited a group of 3,001 families with pregnant women or children below 12 months of age who qualified for Early Head Start. These families were randomly assigned to either an Early Head Start group (1,513) or a control group (1,488). The present study will only look at the data from the Early Head Start group. The children were tested on a variety of cognitive and socioemotional variables at 14, 24, and 36 months. The present study utilizes this archival data to test whether children's receptive vocabulary (Peabody Picture Vocabulary Test; Dunn & Dunn, 1997) at 36 months differs based on the age of children when recruited into the study. Results indicated that children who began Early Head Start earlier have larger vocabularies at 36 months than children in the control group. A possible mediator in this relationship is whether parents read to their children

daily. Thus, Early Head Start does promote vocabulary growth in low-income children, although it is important to start children as early as possible.

CRACKING THE CODE: HOW LINGUISTIC MEASURES CAN AID IN THE UNDERSTANDING OF ATYPICAL PROSODY IN HIGH FUNCTIONING AUTISTIC CHILDREN

Whitney Graham

Location: Gold Room, 9:30 AM - 11:30 AM

Category: Psychology--1, Poster, 1531

Mentor(s): Cristina Schmitt (Linguistics, Germanic, Slavic, Asian, and African Languages)

Autistic children are sometimes described as having atypical prosody. Current research, however, has not led to much progress and has not aided in language therapy for this population because results tends not to be linguistically based and the results from previous studies are inconclusive and contradict one another. Having a clear definition of prosody as well as a standard for measuring it are problems that previous studies have faced and linguistics is a field that can aid in the process of alleviating the ambiguities in research by using what is already known about typical language development and the principles of prosody to identify the atypicalities of prosody in high functioning autistic individuals in order to design and implement more successful treatment programs for this population. I plan to design a research model that will incorporate what is known linguistically about prosody with what has been studied previously in order to address problems with previous studies while also improving the overall understanding of prosody in autism.

INDIVIDUAL DIFFERENCES IN COGNITIVE ABILITY PREDICT SLEEP-DEPENDENT CONSOLIDATION OF DECLARATIVE MEMORY

David Fried, Hannah Borland, Omid Nejad, Kimberly Tweedale

Location: Gold Room, 9:30 AM - 11:30 AM

Category: Psychology--1, Poster, 1532

Mentor(s): Kimberly Fenn (Psychology), Zach Hambrick (Psychology)

While many functions of sleep remain largely unknown, there is evidence for a beneficial role of sleep in consolidation of declarative memories. In particular, several studies have shown that recall of paired associates is higher after sleep than before sleep. Nevertheless, few studies have investigated individual differences in sleep-dependent consolidation. The goal of the present study was to test for correlations between individual differences in cognitive ability and declarative memory consolidation during sleep. Across two experiments, participants learned word pairs and returned for a cued-recall test after a 12-hour retention interval that either spanned a period of wakefulness or sleep. Participants also completed tests of cognitive abilities, including working memory capacity (WMC) in Experiment 1, and WMC, fluid intelligence (Gf), crystallized intelligence (Gc), and verbal fluency in Experiment 2. In both experiments, there was evidence for memory consolidation during sleep; recall performance improved significantly more after sleep than after a waking retention interval. Furthermore, memory improvement after sleep was positively predicted by WMC (Experiment 1) and by a general cognitive ability factor, defined by WMC and reasoning, and by verbal fluency (Experiment 2). None of these individual difference measures were related to baseline recall performance in Session 1, suggesting that the correlations were specific to change in performance after sleep. Finally, no significant correlations were found between these factors and changes in recall performance in the Wake condition. These findings suggest that variance in cognitive abilities may in part reflect differences in storage and consolidation of new memories during sleep.

HOW DO CHILDREN THINK ABOUT REFLECTION AND IMPULSIVITY IN OTHERS?

Courtney Sharp, Amanda Hardwick

Location: Gold Room, 9:30 AM - 11:30 AM

Category: Psychology--1, Poster, 1539

Mentor(s): Judith Danovitch (Psychology)

Adults understand that the amount of time a person spends thinking about a problem determines the quality of their decision. Our study investigates whether children understand this relationship as well. We are also interested in how this understanding emerges, and how it relates to children's own levels of impulsivity. We anticipate that older children will have a better understanding of the relationship between thinking and action. In our experiment, children (ages 6-12) are presented with 16 scenarios about different people in different situations. In each scenario, one person acts impulsively and another acts reflectively (e.g. one person colored their picture really fast and one person took their time). The children are presented with an outcome regarding each scenario and asked to predict which person experienced the given outcome (e.g. which person's picture was colored all inside the lines?). Participants also complete the Matching Familiar Figures Test (MFFT-20), a measure of children's impulsivity. On a computer, children are given an original picture at the top of the screen and a set of six pictures at the bottom of the screen and they must choose which picture looks exactly like the one at the top. Data analysis will examine age differences in understanding other people's behavior and how this relates to the child's own level of impulsivity. The results have implications for improving children's performance in school by enabling them to make more reflective decisions.

THE DEVELOPMENT OF CRITICAL CONSCIOUSNESS

Jessica Wright

Location: Gold Room, 9:30 AM - 11:30 AM

Category: Psychology--1, Poster, 1547

Mentor(s): Matthew Diemer (Counseling, Educational Psychology & Special Education)

Within our culture, the development of critical consciousness is fostered through many different avenues. This research will measure how young people develop the ways that they think about the social and political issues that surround them. The data will be collected through the voluntary participation of members of a local African American after school organization. Participants will be surveyed about how interactions with their parents and peers affect their critical consciousness, how the students believe critical consciousness can be measured, and the effects of critical consciousness on personal and political social action. This presentation will discuss the survey formation process, the data collection process, initial findings, as well as what I've learned via my participation.

LOOKING ON THE BRIGHT SIDE: THE RELATIONSHIP BETWEEN OPTIMISM AND NEURAL CORRELATES OF EMOTION REGULATION THROUGH REAPPRAISAL

Rachel Hartwig

Location: Gold Room, 9:30 AM - 11:30 AM

Category: Psychology--1, Poster, 1604

Mentor(s): Chris Hopwood (Psychology), Jason Moser (Psychology)

Optimistic individuals experience greater overall well-being, both psychologically and physiologically. Evidence has suggested that this relationship is mediated by coping strategies, of which optimists are known for and tend to use positive reinterpretation. This cognitive control mechanism is similar to reappraisal in emotion regulation tasks, in which negative emotions are down-regulated by altering thought patterns. In this study, participants viewed and reappraised neutral and negatively-valenced IAPS images while electroencephalogram (EEG) data was collected. The late positive potential (LPP), an event-related potential (ERP) component that indexes emotional intensity to visual stimuli, was analyzed, as well as midline sites from Fz to Oz. While individual differences in optimism level and use of reappraisal in every day life were marginally significant, main emotion regulation effects were found. The results of this study make an important distinction between two previously interchangeable reappraisal methods, as well as elucidating the time course and scalp topography of the reappraisal method.

DIAGNOSTIC OVERLAP OF PASSIVE-AGGRESSIVE AND NEGATIVISTIC PERSONALITY DISORDERS

Jessica Sims

Location: Gold Room, 1:30 PM - 3:30 PM

Category: Psychology--2, Poster, 1305

Mentor(s): Christopher Hopwood (Psychology)

Passive Aggressive Personality Disorder (PAPD) was both appendicized and transformed into the broader Negativistic Personality Disorder (NEG) in the transition between DSM-III-R and DSM-IV. However, previous research on PAPD has indicated that it is a reliable and reasonably valid construct (Hopwood et. al, 2009; Wetzler & Morey, 1999), even if the validity of NEG is more questionable. Indeed, the broadening of PAPD to NEG may have compromised some aspects of its validity, such as its overlap with other PDs. In this study, the discriminant validity of DSM-III-R PAPD and DSM-IV NEG relative to other DSM-IV PDs was evaluated in a large student sample. Consistent with our hypotheses, the overlap between NEG and several other personality disorders was more problematic for NEG than PAPD. These findings suggest that transforming PAPD to NEG may have contributed to the (perhaps temporary) exclusion of the construct from regular diagnostic practice.

IMPLICIT SUBADDITIVITY IN PROBABILITY JUDGMENTS AND THE ROLE OF WORKING MEMORY

Torrin Liddell

Location: Gold Room, 1:30 PM - 3:30 PM

Category: Psychology--2, Poster, 1336

Mentor(s): Tim Pleskac (Psychology)

Subjective probability judgments often violate what is known as the normative principle of description invariance. This principle requires that different descriptions of the same event be assigned identical probabilities. The present study investigates one violation of description invariance known as subadditivity. Subadditivity occurs when the subjective probability assigned to constituent members of a hypothesis are assigned a higher total probability than the probability assigned to the hypothesis of which they are constituents. For example, a “packed” hypothesis such as “dies of natural causes” could be “unpacked” into “dies of cancer,” “dies of heart disease,” and other such natural causes. Subadditivity has occurred when the sum of the probability assigned to these individual causes is greater than the probability assigned to the packed hypothesis. Recent research has suggested that under some circumstances, the occurrence of this phenomenon is dependent on the typicality of the unpacked constituents, such that if the constituents are typical members additivity occurs and if the constituents are atypical members the pattern opposite subadditivity, superadditivity, occurs. The present study directly tests this prediction. To do so, participants were taught the frequencies of colored shapes in a distribution. They were then asked to assign probabilities of occurrence to various descriptions of these colored shapes. A second goal of the study was to determine if working memory capacity affects the amount of component hypotheses that are self generated, and if so in what circumstances.

EFFECTS OF COMMUNAL VERSUS AGENTIC TRAINING STYLES ON LEARNING OUTCOMES

Shannon Lukey

Location: Gold Room, 1:30 PM - 3:30 PM

Category: Psychology--2, Poster, 1357

Mentor(s): Kevin Ford (Psychology)

With more women entering the workforce, the differences between masculine and feminine leadership styles have been a key topic of research. Much of the research in this area has concerned subordinates’ perceptions of these differences, not whether these styles have a direct affect on particular workplace outcomes. The intent of this study is to go further and observe the relationship between the feminine-typed communal style of leadership and the masculine-typed agentic style of leadership to a concrete aspect of the workplace: training. Thus, in this study, either a male or female trainer will teach a gender-mixed group of participants the basics of chess, altering training style to be either agentic or communal. Furthermore, I will assess the perceptions the group has on the trainer’s abilities, gender, and the overall effectiveness of the training. Through this study, I hope to add to the debate about the leadership styles of male and female leaders in the workplace and offer a more concrete outcome to relate the effectiveness of these styles to. This study can help show whether either training style is more effective to the learning of individuals and assess whether either style has an advantage over the other.

THE DEVELOPMENT OF CHILDREN'S ABILITY TO SHARE APPROPRIATE KNOWLEDGE WITH OTHERS
Kaitlin Reilly
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Psychology--2, Poster, 1358
Mentor(s): Judith Danovitch (Psychology)
When asking a child a question, the child's answer could range from a concise and accurate reply to a lengthy monologue that has almost nothing to do with what was asked. This prompts the question of how children choose what knowledge to share with whom. Previous experiments have shown that as children age, they are better able to choose what pieces of information experts would want to know. The current study builds upon this by investigating how what children (grades K, 2, and 4) would want to know compares to what they think others would want to know. There are two parts to this experiment. In the first part, the child is given two facts about an obscure animal and they have to decide which fact they think is most important for themselves to remember. In the second part, the child is given a fact and has to decide which of two characters would need to know that fact based on their occupation. Data analysis will concentrate on the differences among age groups and also compare how accurately the child chooses to share appropriate knowledge. The expected results will show that as children age, they are better able to share appropriate knowledge. The results of this experiment will provide further insight into whether children can appropriately share knowledge that is most important for another person to know, rather than what they think is most important for themselves.

FINDING NEMO ON A BROKEN BUCKET: CHILDRENS PREFERENCE FOR OBJECTS WITH FAMILIAR CHARACTERS
Alyssa Segal
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Psychology--2, Poster, 1359
Mentor(s): Judith Danovitch (Psychology)
Advertising is a massive industry that can have an enormous impact on children's decision making. Advertisers have developed ways to capture the minds of young children, persuading them to want a particular item. Often this is done by using familiar characters to endorse products in commercials or by placing an image directly on the item. Research indicates that this is effective because children are able to easily recall familiar characters (Batada & Borzekowski, 2008) and that children trust a familiar source of information over an unfamiliar source (Corriveau & Harris, 2009). The current study addresses the extent to which images of familiar characters influence children's decision making in choosing products. In the study, participants (age 3) choose their favorite cartoon character. Next, they are shown a set of 10 paired identical objects: one of the objects is new and the other is broken and dirty. However, the damaged and dirty object has an image of the child's favorite character on it. The participant is asked which one of the objects they would rather have. Although pretesting shows that children prefer new objects over damaged objects, we hypothesize that some participants will choose the broken object if their favorite character is displayed on it. The results of this study display the extent to which a familiar character plays a role in a child's decision making. These results may have implications for policy makers, advertisers, and parents.

MIND YOUR ERRORS: NEURAL EVIDENCE LINKING GROWTH MINDSET TO REMEDIAL ACTION
Hans Schroder
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Psychology--2, Poster, 1363
Mentor(s): Jason Moser (Psychology)
Individuals endorsing a growth mindset believe intelligence can be developed through effortful learning. Conversely, those with fixed mindsets believe intelligence is a stable characteristic that cannot be changed. These two mindsets are associated with markedly different reactions to failure. Whereas growth mindsets view failure as instructive feedback and focus on learning from mistakes, fixed mindsets view failure as evidence for their immutable lack of ability, and don't consider learning from mistakes. The current study examined response-locked event-related brain potential (ERP) indices of error monitoring and post-error behavioral adjustment. Specifically, we examined the error-related negativity (ERN) and error positivity (Pe), two ERPs that are observed after errors in reaction-time tasks. While the ERN signals initial error detection 50-150ms following an error, the Pe reflects the level of attention to errors and subsequent behavioral adjustment after this initial detection. Based on previous research indicating mindset is related to later error processing and ensuing correction, we hypothesized that growth mindset be associated with enhanced Pe amplitude and superior post-error behavioral adjustment compared to a fixed mindset, and that ERN would not differ between the two mindsets. Twenty-five undergraduates performed a flanker task while electroencephalogram (EEG) was recorded and then completed a scale measuring their mindset endorsement. Consistent with our hypotheses, ERN was not related to mindset. Moreover, a growth mindset was associated with enhanced Pe amplitude and increased post-error accuracy compared to a fixed mindset. These results provide neural evidence for enhanced error processing in individuals with a growth mindset.

SEEING HAND GESTURES IN THE MATH CLASSROOM HELPS STUDENTS LEARN
Ryan Duffy, Matthew Lewandowski
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Psychology--2, Poster, 1441
Mentor(s): Kimberly Fenn (Psychology)
Recent research has found that children who produce hand gestures while learning math are more likely to score higher on tests given both immediately after training (Cook & Goldin-Meadow, 2006) and several weeks later (Cook, et al., 2007). However, this work has not determined whether similar benefits can be obtained when children simply observe their instructor gesture and do not produce gestures themselves. Furthermore, prior studies have all used individualized instruction; thus the benefit of gesture on a classroom-wide level remains unresolved. To address these questions, we trained third graders in their natural classroom setting on mathematical equivalence problems with addition (i.e. 4+6+7 = 4+__). Six short instructional videos were presented. For half the classrooms, the instructor in the videos gestured while she explained the problems, and for the other half, she did not. Students were tested on novel equivalence problems immediately after training and after a 24-hour retention interval. We found that gesture significantly improved equivalence learning. Students who saw gesture during

instruction performed better on the immediate and 24-hour tests than students who did not. Furthermore, students who saw gesture were also better able to transfer their knowledge to equivalence problems in multiplication at the delayed test. These findings have strong implications for math education. Gestures that are produced at the front of the classroom may facilitate mathematical learning and create a more lasting memory representation that persists long after the lesson has ended.

SPLASHES OF COLOR: A COMPARISON OF TWO CASE STUDIES OF GRAPHEME-COLOR SYNESTHESIA
Krista Bur
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Psychology--2, Poster, 1443
Mentor(s): Devin McAuley (Psychology)
Synesthesia is a rare perceptual phenomenon in which stimulation in one sensory modality elicits a sensory experience in another modality. In previously presented study, we examined the reliability and automaticity of the synesthetic experience of KB, a female with letter-color and number-color synesthesia. The current study compares KB to another female letter- and number-color synesthete MA using the same tests of reliability and automaticity. To assess reliability, KB and MA rated their strength of color experience in response to each letter and number and completed a letter-color matching task in two separate sessions. Both KB and MA showed consistent strengths of letter-color experience, $r = 0.94$ and $r = 0.98$ respectively, and reliable letter-color/number-color matching, $r > 0.94$ for all RGB correlations. The automaticity and perceptual nature of KB and MA's synesthesia were examined using a modified Letter Stroop task in which letters were presented in either congruent or incongruent colors, a Math Stroop task assessing potential number-color interference, and an Embedded Figures task where specific letter-color associations defined a hidden figure that we predicted would be easier for KB and MA to detect compared with controls. When compared to non-synesthete control participants in these tasks, both KB and MA showed incongruency effects not present in the control sample. Individual differences between KB and MA in specific letter-color pairings, letter-specific strength experiences, and the pattern of performance will be discussed.

ATTENTION, EXPECTATION, AND THE PERCEIVED DURATION OF AN AUDITORY EVENT
Neelima Wagley, Benjamin Mastay
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Psychology--2, Poster, 1445
Mentor(s): Devin McAuley (Psychology)
How much attention we pay to an event has been shown to influence the perceived duration of that event (e.g., 'a watched pot never boils'). Previous studies have shown that when an unexpected (oddball) stimulus is presented within a series of otherwise identical (standard) stimuli, the duration of the oddball tends to be overestimated. Explanations of the oddball effect have proposed that distortions in perceived duration of oddball stimuli are due to unexpected oddball stimuli capturing attention. Critically, this explanation always predicts overestimation of the duration of an oddball stimulus. The present study investigated whether the perceived duration of an event depends on whether the temporal occurrence of the event is expected or unexpected. Listeners judged the duration of an oddball tone embedded in a nine-tone series, where the oddball was defined by a difference in the pitch of one tone. The timing of the onset of the oddball was also varied so that it was either 'early', 'on-time' or 'late' relative to the sequence rhythm. The serial position of the oddball varied randomly from trial to trial across positions 5, 6, 7, or 8 and listeners judged whether the duration of the oddball stimulus was 'shorter' or 'longer' than the standard. Pitch oddballs that were 'early' were underestimated relative to pitch oddballs that were 'on-time' or 'late'. Results are inconsistent with both the enhanced attention and repetition suppression hypotheses, but rather support a role for temporal (rhythmic) expectations in the perception of event duration.

DISCRIMINATION OF SLOW RHYTHMS MIMICS BEAT PERCEPTION IMPAIRMENTS IN PARKINSON DISEASE
Jonathon Walters, Karli Nave, Amelia Wiggins
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Psychology--2, Poster, 1594
Mentor(s): Devin McAuley (Psychology)
Synchronizing movements to a beat is a common behavior in all musical cultures. Some individuals have more difficulty perceiving a beat than others, however. In a recent study, Grahn and Brett (2009) found that basal ganglia dysfunction impairs beat perception. Individuals with Parkinson Disease (PD) and age-matched controls listened to three rhythms and judged whether the third rhythm in the series was the same or different than the preceding two. Simple rhythms had a clear beat, whereas complex rhythms did not. Control subjects showed a beat-based advantage whereby simple rhythms were better discriminated than complex ones. However, PD patients did not show a similar beat-based advantage, suggesting that neural circuits involving the basal ganglia play a role in beat perception. In the present study, we first replicated the beat-based advantage with control subjects and then investigated whether the performance of control subjects can be made to resemble that of PD patients by simply slowing down the rhythms. Consistent with this hypothesis, control subjects showed a beat-based advantage when presented at the tempo used in the Grahn & Brett (2009) study, but did not show a reliable beat-based advantage when the rhythms were slowed down. These results support a distinction in the timing literature between beat-based and interval based timing and suggest that the neural systems involved in beat-based timing are less activated when rhythms are sufficiently slowed.

LATERALIZED DISTRACTOR EFFECTS ON CONTINGENT ATTENTIONAL CAPTURE
Kirk Harrison
Location: Gold Room, 1:30 PM - 3:30 PM
Category: Psychology--2, Poster, 1601
Mentor(s): Mark Becker (Psychology), Susan Ravizza (Psychology)
The dorsal frontoparietal network (DFN) is thought to set and maintain attention based on goals and expectations, whereas the ventral frontoparietal network (VFN) reorients attention to unexpected items, especially when they are task relevant. This study assessed how task relevance is set in the VFN. The DFN may set task relevance in a top-down fashion by directly communicating this information to the VFN.

Alternatively, the VFN may be biased toward task relevant stimuli because the bottom-up sensory inputs to the system may respond more vigorously to task-relevant stimuli. Using an attentional blink paradigm, we observed the effect of distractor items presented in either the same or the opposite hemifield as the target. Support for the idea that task relevance is set indirectly through the modulation of sensory areas would be found if the attentional blink was larger for distractors in the same hemifield versus the opposite hemifield. In this experiment, participants monitored a visual stream for letters of a pre-specified target color. Concurrently, singleton distractors could appear in the same hemifield, or the opposite hemifield (corresponding or diagonal location) as the target. Distractor color was either task-relevant (same color as target), irrelevant (different color), or neutral (not a singleton color). Attentional blink did not differ by hemifield at corresponding locations, but was smaller for relevant distractors presented diagonally in the opposite hemifield. Thus, we have some evidence that sensory areas may signal task relevance to the VFN.

Social Science: General

Oral Presentations

HENRI CARTIER-BRESSON AND INDIA: THE QUESTION OF PHOTOGRAPHY'S VALUE IN SOCIAL MOVEMENTS
Rebecca Sobanski
Location: Lake Superior Room, 9:00 AM
Category: Social Science: General--1, Oral
Mentor(s): Elizabeth Drexler (Anthropology)
The images taken by Henri Cartier-Bresson, a world leading photojournalist in India at the time of Mahatma Gandhi's assassination, highlighted the differences of Indian culture as compared to Western culture while simultaneously showing the universality of humanity and the dignity of Indian citizens. Cartier-Bresson's goals and intentions for these pictures were undermined by the text that interpreted the images for the vast majority of U.S. readers of popular magazines such as Time and others. This presentation examines these pictures, taken in a time of prominence for photography and photojournalism, in light of current critiques of photography that seeks to contribute to social change. By looking at the historical context, the political thought of the time, and the social forces at play the text can come into focus. Americans interpreted the images as pure difference and beyond that, a telling deficiency on the part of the Indian citizens pictured instead of a rallying call to lend support. Reflecting on this historical case of photography in action and applying it to current claims that photos harm human rights movements more then help them it can be seen that this claim is untrue.

CONCEPTUALIZING FATNESS: EMERGING DISCOURSES AMONG THE FAT ACCEPTANCE MOVEMENT AND FOOD ADDICTS
Michael Tash
Location: Lake Superior Room, 9:15 AM
Category: Social Science: General--1, Oral
Mentor(s): Julia Grant (James Madison College)
While the dominant discourse towards fatness presumes that overweight and obese individuals are inherently unhealthy and arrive at their current "condition" by choice, the fat acceptance movement as well as individuals who identify as food addicts are trying to redefine these assumptions by different methods. Specifically, by looking at the National Association to Advance Fat Acceptance (NAAFA) and Food Addicts in Recovery Anonymous (FA), I intend to see how these two potentially competing groups seek to advance the quality and protections for fat individuals - something that I feel up to this point has not been looked at comparatively. In order to properly analyze these groups, I intend to gather their rhetoric via mission statements, memoirs and other provided literature by qualitative means. In this, I hope to see how each group views themselves in terms of being identified as "disabled." Further, I will seek to find out how each group is using various medical definitions and models to their advantage in order to reduce stigma and gain legitimization by others. Additionally, I will ask what the consequences are to these approaches? And most importantly, are the two spheres of thought among these two groups distinctively separate whereas they seek separate protections for overweight and obese individuals? In this research, I hope to complicate the presumed definitions of fatness and display the vast array of viewpoints within the fat community.

REDIRECTING JUSTICE: COULD EXPANDING MENTAL HEALTH COURTS SOLVE MICHIGANS CORRECTIONS DILEMMA?
Stephanie Eisenberg
Location: Lake Superior Room, 9:30 AM
Category: Social Science: General--1, Oral
Mentor(s): Julia Grant (James Madison College)
Michigan's Correctional System has had to deal with the looming implications of budget restraints for the last several years. This has lead to the closing of prisons, the early release of offenders, and overcrowding of remaining prisons. Mental health courts are a rather new innovation in the criminal justice system that provides alternative solutions for criminal offenders with mental illnesses instead of prison. This study will examine current mental health courts to determine their effectiveness with regards to cost and reoffending. To examine this, statistics on a national level about the cost of these courts versus the cost of prison will be analyzed. Statistics on the amount of individuals who go through these courts and reoffend or are rehabilitated will also be analyzed. The national findings will then take on a local level, as I will determine if Michigan will benefit from the expansion of these courts in order to save money and positively impact offenders with mental illnesses. The hope of this study is to show that these courts are beneficial to a large number of individuals who would otherwise be sent to prison. Due to their effectiveness, I hope to show that Michigan would highly benefit from the expansion of these courts into more districts across the State. By doing so, Michigan will save money in their correctional facilities, will save the correction facilities from the current overcrowding problem, provide treatment to those offenders with mental illnesses, as well as benefit the overall community.

MEDIA, YOUTH, AND GENDER IN INTERNATIONAL CONTEXTS
Katherine Leong
Location: Lake Superior Room, 9:45 AM
Category: Social Science: General--1, Oral
Mentor(s): Colleen Tremonte (James Madison College)
How does one learn to "be a man" or "be a woman"? In this study I hope to analyze contemporary usages of gender within public communication. I hope to explicate the various means and mediums through which gender is conveyed. In the modern world, "visual literacy" has become a common term for the ability to read and interpret meaning from multiple texts. Using the framework of multi-modality and visual literacy, it is possible to analyze closely the use of gender as an ideology which incorporates fixed boundaries into society. This happens in multiple cultural contexts. To analyze the impact of gender within cultural formation, which trickles down through media, I will examine three nations in their use of popular media to analyze the ways in which gender is defined. First, I will view Germany through this lens and attempt to create a loose definition of the trends in mainstream and popular culture that influence the perception of gender by youth growing up in

Germany today. I will then look to Brazil and the material goods within the popular culture to see how products and marketing appeal aim to define gender and connect gender with the marketplace in a nation that is "rapidly modernizing and developing." Finally, I will examine the United States and the current trends in popular culture here. Research concerning the United States will include qualitative interviews on gender collected from a select group of Michigan State University students.

ONE FAITH, TWO STATES
Donald Matlock
Location: Lake Superior Room, 10:00 AM
Category: Social Science: General--1, Oral
Mentor(s): Mohammed Ayoob (James Madison College)
This essay is animated by a single, seemingly simple, question: "Is Islam compatible with democracy?" The obvious answer is "yes," but to leave the discussion at that would be inadequate. This essay will attempt to answer this question by examining the modern state building process. First, I will discuss the three variables that make up the modern state -- coercive capacity, infrastructural power, and unconditional legitimacy; then, I will assess the role of Islam. In the second part of this essay I will examine the differing state building processes for Saudi Arabia and Iran, their current governing structures, and their movement toward democracy. Islam, in both of these examples, is used as a means to obtain state legitimacy, and it is not in any way an obstacle to that democratization process.

ACCOMMODATIONS FOR THE MOBILITY LIMITED: THE UNIQUENESS OF APPALACHIA
Damian Nelson
Location: Lake Superior Room, 10:15 AM
Category: Social Science: General--1, Oral
Mentor(s): Julia Grant (James Madison College)
Living in Appalachia presents a unique experience for those with limited mobility. Appalachia is a demographically an older and more overweight location, poorer and disproportionately reliant on manufacturing in comparison to the United States as whole. Paradoxically, these characteristics are simultaneously correlated with higher rates of mobility limitations and a lower ability to provide aid for those with such limitations. Therefore, it is important to assess what kind of access to the community a person with mobility limitations has or is lacking. I will assess the limitations on the mobility impaired living in Appalachia by researching three specific criteria. I will examine the access to public or private transportation available in communities throughout the region by researching city and region transportation websites, which will aid in assessing transportation being promoted by local governments and their effectiveness. Secondly, I will examine the accessibility of homes, restaurants, grocery stores, and other locations by evaluating available research conducted by local disability rights organizations. Third, I will examine available government services that are given to those with mobility limitations to determine whether or not adequate funds are being provided to allow for a mobile life. Lastly, I will examine who other than local and state level governments offer aid to those in such. Such organizations I intend to interview include the Michigan State University alternative spring break program and a Lansing based church involved in implementing aid to those in the region.

THE CREATION OF THE AMERICAN MIDDLE CLASS THROUGH HOMEOWNERSHIP: AN ANALYSIS OF MINORITY EXCLUSION AND FORECLOSURE IN DETROIT, MICHIGAN
Joelle Simon
Location: Lake Superior Room, 10:30 AM
Category: Social Science: General--1, Oral
Mentor(s): Louise Jezierski (James Madison College)
Currently African Americans are experiencing higher rates of foreclosure in comparison to whites. Home buying and ownership has always been considered an important element of American society, as it reflects a sense of middle class status and social mobility. American society's acceptance of Capitalism, consumerism, and individual competition generated the creation of various governmental policies. Public policies incentivized and enhanced these ideals through the creation of home ownership credits and tax expenditures; however, the allocation of these policies within a blatantly racist society produced a discriminatory housing market that established racially segregated neighborhoods. I argue that the creation of racially segregated neighborhoods in Detroit, Michigan left minorities, specifically African Americans, more economically and socially vulnerable to subprime lending which increased the risk of foreclosure. I test this argument by studying subprime mortgage lending and foreclosure statistics through the United States, but specifically focus on statistical data related to housing in Michigan. I hope to explore how historic racism has contributed to neighborhood segregation and the current foreclosure disparity among races. I conclude that blatantly racist attitudes within the housing market and the unjust allocation of resources set forth in governmental policy created racially segregated neighborhoods in metropolitan areas throughout the United States leaving African American at a historic disadvantage and more vulnerable to foreclosure in Detroit, Michigan.

FEMINIST APPLICATIONS TO CHICANA LABOR ORGANIZATION IN THE UNITED STATES
Monika Johnson, Gabriela Alcazar, Kellie Clock , Samantha Meyer
Location: Lake Superior Room, 10:45 AM
Category: Social Science: General--1, Oral
Mentor(s): Zahra Jamal (James Madison College)
This paper analyzes Chicanas' participation and roles in labor organizing in the United States. Research demonstrates that in the labor movements Chicanas are involved in, they are oppressed from multiple avenues as leaders, organizers, and activists. As they work toward workplace equity, Chicanas in the United Farm Workers of America, the International Ladies' Garment Workers' Union, and the Garment Worker's Center face subjugation from their employers, organizers, and male superiors. While grappling with the tensions associated with Anglo-feminism and the greater Chicano movement, women in these institutions may, at times, find agency and power through their roles as leaders, while others find themselves subjugated further. Within the UFW and the International, patriarchal leadership disenfranchised women; contrastingly, in the case of the Garment Worker's Center, women found agency by joining together with similarly situated women in order to

boycott the unfair labor policies of the clothing retailer Forever 21. These three labor organizations exemplify the various roles Chicanas have undertaken in grassroots organizing, in addition to, the hardships and successes they have experienced amidst the consequences of the sticky floor (Henderson and Jeydel 2007:238). In order to better understand the Chicana experience and multidimensional social location, we first delve into the theoretical framework of Chicana feminism. We then proceed to analyze the UFW, the International, and the Garment Worker's Center in this context to find specific support for our assertions regarding the means and method by which women hold agency and power, or lack thereof, within grassroots organizations.

REFLECTIONS ON THE VIVISECTED OTHER
Mitch Goldsmith
Location: Lake Superior Room, 1:00 PM
Category: Social Science: General--2, Oral
Mentor(s): Louise Jezierski (James Madison College)
In the United States, millions of nonhuman animals are killed each year in cruel and redundant experiments. The ritualized vivisection of animal persons comprises an integral part of a larger masculinist scientific enterprise rooted in racist European Enlightenment thought. Vivisection serves as a means to recreate the world; harnessed by the patriarch to substantiate as fact preconceived prejudicial and androcentric conceptions of women, animals and nature. The vivisection of nonhuman animals is intricately linked to and provides support for the vivisection of human animals and promotes the white human male as the ideal being; the end result of the evolutionary process. In this way, vivisection is speciesist, sexist and racist in so far as these systems of oppression are interlocking and have all -at one time or another- found scientific support and justification through vivisection and science. From this ideological base we can begin to understand the contemporary vivisectionist superstructure which carries these speciesist, sexist and racist legacies in its current industrialized state. By exposing the trinity of oppression inherent in vivisection (speciesism, sexism and racism) and patriarchal society as the impetus for the vivisection enterprise, we are now armed with the tools necessary to begin dismantling vivisectionist institutions and the masculinist epistemologies which support them; with the goal of ultimately replacing these oppressive structures with life-affirming ones which value compassion and equity over power and privilege.

MICHIGAN POLICY NETWORK: EMPLOYMENT
Alyssa Firth
Location: Lake Superior Room, 1:15 PM
Category: Social Science: General--2, Oral
Mentor(s): Matt Grossmann (Political Science)
Throughout the Spring semester, I will have researched and sought out the reasons why the automotive industry has gone down. Not only will I be looking into the history, but what it does for jobs today and why employees are only being hired at a fraction of what they once were.

HETERONORMATIVITY AND GENDER PERFORMANCE IN WHITE HOUSE POLITICS
Monika Johnson
Location: Lake Superior Room, 1:30 PM
Category: Social Science: General--2, Oral
Mentor(s): Julia Grant (James Madison College)
Race and gender, because they are easily identifiable human separators, are often referenced as points of contention in politics. Whether an established political figure or contesting candidate, subordinated groups face challenges and obstacles to seeking legitimacy. In the 2008 Presidential race, Ariel Sabar writes, "Commentators in the news media dissected everything from Clinton's laugh and clothes to her ankles and cleavage, and hecklers at a New Hampshire campaign stop in January shouted, 'Iron my shirt!'" As an indicator of these prejudices, the role of the first lady can be examined through the lens of gender performance and heteronormativity. The position has been sexualized and stigmatized in American history, creating a cycle of imposed social norms from constituency to public figure. American politics has long influenced the social climate of the nation, drawing upon the ideals of opposing parties and competing for the affection of the electorate. In many ways, politics attempts to portray what is normative; that is, what most people agree is the truth. Today, heterosexual relationships are portrayed and emphasized heavily in politics; in addition, the historical and stereotypical role of women, though not necessarily advocated vocally, is dictated through communicated norms. Theoretically, these issues are addressed through Judith Butler's work on gender performance and the philosophical idea of heteronormativity. This research examines the tenures of several first ladies, having striking contrasts in their role as a socio-political figure.

CREATING A RUBRIC TO ASSESS ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES AT INSTITUTIONS OF HIGHER EDUCATION
Anna Mott, Lauren Grevel, Brad Parker, Torey Stockwell
Location: Lake Superior Room, 1:45 PM
Category: Social Science: General--2, Oral
Mentor(s): Julia Grant (James Madison College)
As more students with disabilities pursue higher education, the lack of a comprehensive assessment of the tools and resources available at various institutions hinder both students' ability to take full advantage of educational opportunities, as well as institutions' ability to provide the best educational experience for these students. While studies have been conducted to review accessibility standards, their scope is limited to specific factors such as, web accessibility or physical accessibility. Our study, however, will consist of a holistic assessment of four Big Ten Universities' efforts in accommodating students with disabilities. This assessment will review the Universities' existing efforts in three broad areas including campus accessibility, services for students with disabilities, and student life. Within the campus accessibility category, we will be examining the physical characteristics of buildings, roads, sidewalks, and public transportation. Services for students with disabilities include resources for both physically and mentally disabled students. Interpreters, personal assistants, and books on tape are a few examples of resources for students with physical disabilities, while counseling and the number of disability-specific specialists are examples of resources for students with mental disabilities. Lastly, student life includes the number of disability friendly student organizations and sports. Through the

evaluation of these areas, we will create a rubric that universities can use to improve their capacity to accommodate students with disabilities, and for these students to use in choosing an institution of higher education.

AMERICA SHOOTING UP: A COUNTERATTACK OF DRUGS ON DRUG TRADE
Stephanie Saloka
Location: Lake Superior Room, 2:00 PM
Category: Social Science: General--2, Oral
Mentor(s): Mark Largent (James Madison College)
Cocaine has infiltrated American society for nearly 150 years, first as a medication and second as an illicit and lucrative drug. The maintained demand for cocaine within the United States has given birth to the most notorious and profitable drug trafficking organizations in the world, with an estimated profit of over twenty billion dollars per year. Since the 1970s, the War on Drugs has spent well over a trillion dollars to thwart the trafficking of cocaine and related violence spilling over onto the American border. The efforts have yet to show a dramatic lasting effect and new methods to counter consumption of cocaine are being developed in the form of an anti-addiction vaccine, TA-CD. Still in its trial phases, TA-CD promises to fully blunt the cravings and effects of cocaine by creating target-specific antibodies to block permeation of cocaine molecules into the brain. Recent studies suggest TA-CD is effective in causing a massive decrease in use and dependence of cocaine, as well as a sharp spike in tolerance. With the new vaccine entering the final trial phase, addition to the list of compulsory vaccine looms and may help eliminate cocaine trafficking. As alluring as this might sound, there are a number of very difficult ethical and political problems such a techno-fix would force us to confront.

REDUCING RECIVIDISM BY REDUCING MENTAL ILLNESS
Matt Mamo
Location: Lake Superior Room, 2:15 PM
Category: Social Science: General--2, Oral
Mentor(s): Julia Grant (James Madison College)
The criminal justice community is well aware that the incarcerated population in the United States has an overrepresented population of persons with a mental illness compared to the overall rate of persons with a mental illness. The causes for the overrepresentation are varied and include but are not limited to homelessness, poverty, the closing of mental health institutions, poor education, isolation, lack of a family or friend support structure, and an increased difficulty finding employment. Major causes of higher incarceration rates exist prior to a person entering the criminal justice system but other environmental factors of prison life may influence a person's mental health after they enter the criminal justice system. The influence of the criminal justice system on a person's mental health is the main concern for this research. Further exploration of this topic may steer research to a key factor or influence such as the different architecture associated with different security level prisons, relationships experienced while incarcerated, location of prison that reinforces isolation from friends or family, or the societal challenges a mentally ill person faces after being associated with crime. Showing how the criminal justice system increases mental illness, PTSD, personality disorders, schizophrenia, bi-polar, and others will help the criminal justice system reduce crime and recidivism rates.

CULTURE OF BELONGING: BUILDING A HOME IN THE MIGRANT STREAM
Ruth Verdin
Location: Lake Superior Room, 2:30 PM
Category: Social Science: General--2, Oral
Mentor(s): Estrella Torrez (RCAH)
The Guatemalan civil war that lasted into 1994 plagued the country with extreme violence and poverty causing a large number of Mayans to flee during the 1980's to ensure survival. Among the people that left are Sebastian and Fina, now married and settled in northern Michigan for over 15 years. Using Critical Race Theory, more specifically differential racialization, this research looks at how Mayan farm workers build community in northern Michigan. The researches engaged on a qualitative study that inquired on the definition of community by Fina and Sebastian and scholars and how the definition of community is implemented to create a living environment. Focusing on the relationship to the land, permanent residents of the area and migrant farm workers and the relationship to el patron the qualitative research highlights the elements that form a community for Mayan farm workers in northern Michigan. The implications of this research are important at a time when immigration discussions and arguments are dehumanizing people who are forced to leaver their home.

IMPROVING THE LIVES OF MICHIGAN DISABLED FARMERS
Kristin Babbie
Location: Lake Superior Room, 2:45 PM
Category: Social Science: General--2, Oral
Mentor(s): Julia Grant (James Madison College)
Agriculture is widely recognized as one of the most dangerous fields for a person to have an occupation. In the United States, about 74,824 adults working on a farm operation suffered from an agricultural injury in 2001. Some of these injuries resulted in permanent disability and threatened the farmer's career. In 1991, the United States Congress began funding The AgrAbility Project in order to provide support to disabled farm workers in their mission to continue working in agriculture. AgrAbility helps farmers by performing an assessment of their farm and then providing suggestions to improve its efficiency through assistive technology. Clients are directed to low-interest loans and sometimes, financial assistance is available. Currently, 22 states have an AgrAbility Project including Michigan who has been active since 2003. For Michigan, the most current single-year data shows that 503 farm workers were hurt at work, however the state's AgrAbility program has served only 180 farmers since its establishment. The Wisconsin AgrAbility program, on the other hand, has served 450 farmers in 2009 alone, more than twice as many people than Michigan AgrAbility has in the past six years and accounts for 37% of AgrAbility clients served nationally. This study seeks to discover first, why Michigan AgrAbility has served such a small number of farmers and second, how Wisconsin AgrAbility's model might offer some replicable ideas to improve Michigan's program. Through analysis of archived newsletters, newspapers, government documents, and personal interviews with AgrAbility associates recommendations for improvement will be offered.

Poster Presentations

BEST PRACTICES IN THE RETENTION OF NATIVE AMERICAN SOCIAL WORK STUDENTS
Lucas Gogliotti
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1310
Mentor(s): Suzanne Cross (Social Work), Angelique Day (Social Work)
This presentation will focus on the low retention rates for Native American students in social work higher education programs in the U.S. Native Americans have the lowest post secondary education retention rates of any racial minority group in the United States. This particular population of students face several barriers on a daily basis that contribute to their lack of success in post-secondary education. Our research team in the study of Native American Social Work Students in Social Work Programs, conducted in 2010-2011, found the major reasons for low retention rate included; poor curriculum, inaccuracies of Native American Content, and the cultural incompetence of students' classmates. A broader review of the literature on the issue indicates additional barriers such as poverty, isolation, difficulty assimilating to mainstream culture, and racism. These barriers represent significant disadvantages for Native American students; however, there are changes that could be established to increase the success of Native Americans students. Examples include modified freshman year programs, increased scholarships, improved curriculum, multicultural support programs, and basic cultural training for professors and instructors.

THE JUXTAPOSITION BETWEEN PARENTING, CULTURE AND KNOWLEDGE: PARENTAL ROLES AND CULTURAL DYNAMICS IN REFUGEE FAMILIES
Valentina Djelaj
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1311
Mentor(s): Debrenna Agbenyiga (Social Work)
Evidence suggests that the resettlement process many refugees encounter is extraordinarily stressful and can have significant implications on their physical and mental health. For families from non westernized countries who resettled in the United States, these stressors include new language acquisition, employment training, medical attention, and access to community resources. However, very little attention has been focused on the parental stressors that refugees encounter while adapting to life in their host nations. The lack of research in this area is of particular importance because the stressors that refugee parents encounter impact how they discipline and interact with their children. This study examines parental stressors of refugee families in relation to childcare, disciplining their children, and the community barriers that parents encounter while they acclimatize to their host countries. Examining the stressors associated with parental actions in these populations could inform service providers of points of intervention in these communities and alleviate some of the mental health issues that refugee families encounter. The results from this study contribute to the field of education by providing new information about refugee families, and this is of particular interest to both the refugee families and our educational system. Perhaps, by understanding the stressors related to this issue, parents and teachers could collaborate and find alternative methods to help these families develop more positive disciplinary methods.

LATINO OLDER ADULTS
Jessica Ceh
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1314
Mentor(s): Daniel Velez-Ortiz (Social Work)
This research looks at how Latino older adults and their attitudes towards such topics as technology and mental health services, including the stigma attached to mental health. It also deals with the topic of community services integration and availability of resources. This has been done by reviewing the literature on the various topics and compiling research.

HEAD START HEALTH OUTCOMES
Siobhan O'Laoire, Crystal Na
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1316
Mentor(s): Kyunghee Lee (Social Work)
The study uses data collected in collaboration with Michigan's Capital Area Community Services Head Start Early Childhood programs (Director, Lucy McClintic [CACS]) across 60 Head Start classrooms (www.cacsheadstart.org). Each year, approximately 1,500 Head Start children enroll in the program. The current study will use data from 4 cohort years, collected from 2006-2010. The proposed study conducts a secondary analysis using data drawn from approximately 4,500 Head Start children in Michigan (the Capital Area Region) to determine which children receive the most benefit from Head Start under which conditions. Specifically, this research will examine effects of the duration of Head Start enrollment on children's academic and health outcomes.

THE MANIPULATION AND CORRUPTION OF THE HEALTH INDUSTRY
Ryan Swaney, Caitlin McCarthy
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1327
Mentor(s): Mark Largent (History of Science and Technology)
For decades the pharmaceutical, health and food industries have been holding information from the public, manipulating and skewing results and even hiring ghost writers to write inconsequential experiments and reports. Big industries have been manipulating science by testing drugs against known "worst drugs", only making certain data available to the public and using flawed experiments in order to come out with flawed data. Capitol Hill has passed laws encouraging, or rather ignoring theses issues. Scientists have willingly altered data changing science from

being objective to subjective. Pharmaceutical companies have turned humans into lab rats. Tobacco companies have known how bad cigarettes are; yet they continue to manufacture tobacco products. Furthermore, workers in big industries have unknowingly been putting their lives at risk each workday because of the unregulated and abused work conditions. Companies have been using incentives and bribery to get their product on the market, including the use of public service announcements to concoct diseases in order to sell certain drugs. It is time all of the secrets are put onto the table and the big industries are called out on their flaws.

BEST PRACTICE FOR RECRUITMENT OF AMERICAN INDIAN SOCIAL WORK STUDENTS
Justin Pung
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1323
Mentor(s): Suzanne Cross (Social Work)
The recruitment of American Indian students into postsecondary education has been sub par for decades. The U.S. Department of Education reported in 2002 that American Indians made up less than one percent of the country's college population, and only earned 0.7 percent of all degrees awarded in that year. Given the profession's core value of diversity, social work practitioners and schools need to be on the front lines of this problem, working to discover why current recruitment efforts are failing and how they can be amended. The objective of this study was to examine recruitment strategies detailed by past research, as well as interview current American Indian students for their insights on the collegiate experience. Review of the literature suggested that American Indian students need more cultural support from preschool onward, and that tribal colleges best exemplify this ideal at the postsecondary level. The study gathered quantitative and qualitative data from current undergraduate and graduate American Indian social work students (n=41). A questionnaire was administered to the subjects via face-to-face interview, phone or email correspondence. Among the issues subjects raised were the importance of American Indian teachers as role models, the institution of culturally competent curriculum, and the presence of many sociological barriers to their academic success. Further research is needed on the recruitment strategies employed by major universities and how they stack up to that of tribal colleges.

JUSTIFICATIONS OF ONLINE PEDOPHILIA
Brittany Harper
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1351
Mentor(s): Thomas Holt (Criminal Justice)
The explosion and expansion of technology in the 1990's, including personal computers and on-line communications via the Internet, has enabled a variety of deviant sexual behaviors and the formation of virtual deviant subcultures. In particular, there is significant societal concern over the behaviors of pedophiles in on-line environments. Previous studies have focused primarily on how child pornography is distributed on-line, while few have considered the ways in which pedophiles may justify their relationships with young children. This study will explore the techniques of neutralization employed by the pedophile community using a qualitative analysis of posts made in multiple web forums run by and for pedophiles, as well as interviews with law enforcements officers who track pedophiles within these forums. Implications for the study of pedophiles including how they characterize themselves will be explored, as well as deviant sexual subcultures in general. The significance of this study for law enforcement is also considered.

BEYOND VIOLENCE
Lindsay Rothwell, Amanda McCormick
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1389
Mentor(s): Sheryl Kubiak (Social Work)
According to Pollock, Mullings, and Crouch (2006), women comprise about 17% of the arrests for violent offenses. The interventions for these women are limited. Beyond Violence (Covington, 2010) is a newly developed intervention currently being tested in Michigan. The goal of the Beyond Violence program is to reduce aggression and recidivism by focusing on the women's prior trauma exposure and drug addiction. To assess the implementation of this new intervention, focus groups were conducted with group participants at Huron Valley Women's Facility at mid way and completion of the 20 week curriculum. Themes for each group emerged through repetitions of topics, and were ranked accordingly. Three separate analyses from three different coders were compared and compiled to create a general overview of how effective the women in the intervention group viewed the program in comparison to a treatment as usual (TAU) group. Preliminary findings indicate women's satisfaction with the new intervention and differences between groups. These findings will be used to improve and refine the intervention. Long term outcomes in relation to recidivism will be tracked and assessed post release These findings are promising and may lead to a wider dissemination of the intervention.

HOW PARENTS LEND A HELPING HAND IN CHILDRENS PUZZLE SOLVING
Elizabeth Gutowski
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1413
Mentor(s): Claire Vallotton (Human Development and Family Studies)
Recently, much research has focused on gesture use in interpersonal interactions. One important implication of this research is the possibility of influences on learning. Gestures may serve to scaffold learning, allowing learners to gain more than what is presented verbally. However, this research has focused on teachers' gestures and their impacts on school-aged children, with little focus on parents' gestures. This study examines the impact of parents' gestures on very young children's learning. We asked: (1) Does parents' use of gestures while helping their children increase children's success in solving a puzzle independently? (2) Is the benefit of parents' gesturing dependent upon child age? Parent-child dyads, which included children between 1.5 and 5.5 years old (M=3.5), completed the same puzzle during three trials: (1) Pre-Help child only, (2) Parental Help, (3) Post-Help child only. For the Parental Help phase, dyads were randomly assigned to one of two conditions: (1) Hands (parent free to use hands) or (2) No Hands (parent sat on hands). We coded children's use of parents' strategy for solving the puzzle, and

scored children's success on the puzzle based on the number of simple and complex pieces lying flat. Results showed that children under 4.5 years old were more likely to use adults' puzzle-solving strategies if adults could use their hands, and these strategies helped them solve the puzzle independently. Thus, younger children are sensitive to parents' use of gestures, and more likely to use parents' strategies when parents have used their hands for demonstration and explanation.

THE LANGUAGE OF SELF-REGULATION IN TODDLERHOOD: CONTENT OF MOTHERS SPEECH AFFECTS CHILDS SELF-REGULATION STRATEGIES
Stephanie Bentley, Elizabeth Gutowski, Michelle Scott
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1434
Mentor(s): Claire Vallotton (Human Development and Family Studies)
The role of language and other higher cognitive skills in the development of self-regulation and self-control has been a focus of research with older children, while the role of the content of mothers' and children's speech in emotional regulation of very young children has been understudied. Children begin to speak around one year of age, and communication and representation skills also begin pre-verbally, thus it is possible that these early language skills might help children self-regulate. This study asks: (1) When mothers reflect children's internal states in their speech, will children regulate themselves in order to compromise and comply more readily, or will children persist in attempting to get what they want? (2) When mothers' use of speech indicates a sense of togetherness in a task, will children regulate in order to compromise or comply more readily? (3) Will there be a stronger correlation between the types of speech used by mothers and children as children get older? Sixty children participated, their ages ranged from 23 to 49 months. Mother-child dyads were videotaped during a situation that elicited child frustration. The coping strategies used by these dyads were coded based on emotion regulation research by Stansbury and Sigman (2000). The dyads' language was transcribed and analyzed using the Child Language Data Exchange System (CHILDES; MacWhinney, 2000). When mothers described children's emotions, children continued attempting to get what they want. However, when mothers used speech that indicated that they were working together on the task, children compromised and complied more often.

EFFECT OF PARENT LANGUAGE ON CHILDREN'S PROBLEM SOLVING ABILITY
Kayla Keane, Elizabeth Gutowski, Michelle Scott
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--1, Poster, 1689
Mentor(s): Claire Vallotton (Human Development and Family Studies)
This study aims to understand the effects of parents' language on their children during problem solving situations. In order to understand the pragmatic purposes of language (e.g., asking a question; directing the child's attention) used by parents and how their children internalize this language, we created a specific scenario in which a child solves a puzzle. This study included children (n=125) between 1.5 and 6 years old, participating in three different puzzle-solving segments. Segments include: (1) The child solves the puzzle independently, (2) The parent helps their child solve the puzzle, and (3) The child, again, solves the puzzle on their own. We ask: (1) How can the pragmatic features of language be captured for parents and their children during a puzzle-solving task? (2) How does parents' language affect children's puzzle-solving skills? We hypothesize that different pragmatic purposes of parental language may affect how a child responds in a problem-solving situation. Understanding these different effects may lead to finding the best way to communicate with a child in learning scenarios. In the process of answering our research questions, we will transcribe all language used throughout each video-recorded session, and will code the language using the Inventory of Communicative Acts-Abridged (INCA-A) system. The INCA-A system was chosen due to its applicability to the pragmatics of language and its ability to look at the specific intent and purpose of communication for both the parents and the children of this study.

PROFESSIONALS RECOMMENDATIONS FOR IMPLEMENTING SERVICES AND POLICIES TO SUPPORT PARENTS WITH A MENTAL ILLNESS AND THEIR CHILDREN (PRISPS-PMIC)
Claire Thams, Jennifer Ogle
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1394
Mentor(s): Joanne Riebschleger (Social Work)
Little is known about how to support the parenting roles and families of adult consumers of public mental health agencies. The research question for this qualitative study asked, "What do health, mental health, and child welfare professionals recommend for services and policy responses to the reported parenting and family needs of mental health consumer parents?" The needs of families of public mental health consumer parents, drawn from a prior study, revealed parent concerns about financial issues, family communication challenges, and a lack of accessible information and resources to strengthen positive family interactions and child development. A snowball sample of 10 to 12 key community professionals from across Michigan, especially the greater Lansing area, participated in telephone interviews conducted by two Michigan State University social work seniors who were supervised by a social work faculty member. Interviewers' notes were typed and analyzed using a text data constant comparison method. Professionals' recommendations were coded by open, axial, and selective qualitative data themes. Main themes of the findings included professionals' specific service suggestions, policy recommendations, as well as identified barriers and facilitators for implementing those recommendations. Professionals offered hope for developing mechanisms to support parenting roles and families of adult mental health consumers.

TECHNOLOGY AND AGING PROJECT (TAP2): TEACHING TECHNOLOGY TO OLDER ADULTS WITH A PEER TUTOR MODEL
Caitlin Tupper
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1449
Mentor(s): Amanda Woodward (Social Work)
The Technology and Aging Project (TAP1) was developed to provide older adults with Information and Communication Technologies (ICT) training and investigate if high ICT efficacy was correlated with other aspects of their lives, such as increased social support. TAP2 builds upon TAP1, utilizing a peer tutor model of computer training and collecting data from the tutors and learners. Members of the TAP1 control group

(n=19) received computer training from TAP1 experimental participants (n=6). Learners were divided into a beginner group and an intermediate group, depending on the participants' computer skills. The groups met weekly for eighteen sessions, with topics ranging from basic computer skills to blogging. Data collection occurred at baseline, 3 months, 6 months, and 9 months (3 month follow up). Data was collected from the tutors and the learners and measured computer self-efficacy, perceived social support, and use of ICTs.

IMPACT: SYSTEM OF CARE
Elizabeth Barnard
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1460
Mentor(s): Marya Sosulski (Social Work)
In the realm of mental health, social support plays a large role in the progress for individual cases. Programs such as systems of care provide "a comprehensive spectrum of mental health and other necessary services which are organized into a coordinated network to meet the multiple and changing needs of severely emotionally disturbed children and adolescents" (Stroul & Friedman, 1986, p. iv). The Ingham County System of Care, known as Impact, was implemented in Michigan in 2005 as a collaboration of services dedicated to assisting the child and the family. The Impact system of care provides a package of services to clients surrounding family guidance and home based programs with a "family driven" slogan. Some of these programs include wraparound, individual therapy, family therapy, school assistance, parenting classes, and a family advocate. Data analysis was recorded based on interviews conducted with workers, directors, and families involved in the program, to gain information on the correlation between the agencies and organizations. The results from the analysis will lead to greater understanding of the relationships within the system in hopes of advancing further progress in the mental health community.

FURTHER CONSIDERATION OF GENDER AND HOUSEHOLD ACTIVITIES AT MORTON
Larissa Stenzel
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1471
Mentor(s): Jodie O'Gorman (Anthropology)
Current research at the Oneota and Mississippian Morton Village archaeological site in Fulton County, Illinois includes analysis of previously unreported households and reanalysis of others in light of new questions and theoretical perspectives. This poster presents a reanalysis of House 7, characterized by Harn and Klobuchar (2000) as "decidedly male-oriented," based on the types of artifacts found on the floor of this household. My research re-examines artifacts from House 7 and compares those artifacts to the artifacts found on the floor of Houses 8 and 9, two Mississippian houses, also from the Morton village site. Working from the recent literature on gender in archaeology and using a comparison of the artifacts in the floor assemblages to grave goods found with sexed skeletal remains at the associated Oneota Norris Farms Cemetery, my findings support a more complicated view of gendered spaces.

SOCIAL ANXIETY: REVEALING DISGUISED SYMPTOMS IN CHILDREN
Ana Garcia
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1513
Mentor(s): Julia Grant (James Madison College)
Social Anxiety Disorder (also known as social phobia) can be extremely debilitating for anyone who has it. While some are merely uncomfortable in situations when under scrutiny from people, others can be completely incapable of leaving their homes for fear of the situations. Oftentimes people with this disorder are too scared to ask questions, carry conversations, make presentations, or do other tasks that normal people can do with little to no stress involved. With such an overwhelming desire to flee situations or avoid them entirely, those who suffer from social anxiety can unintentionally harm their chances of making their life better through experience. One concern is primarily that which lies in the education and performance of children who possess symptoms of social anxiety. Although much research regarding social anxiety has been done for late teens and adults, little has filtered its way to explaining the potential number of children who have the disorder. It is my goal to explain how the diagnosis of social anxiety may be slipping through the cracks when analyzing children. By comparing the symptoms of social anxiety and certain personality traits found in children, I plan to explain how some of these characteristics may in fact be factors displaying or leading to social phobia. Particularly, I wish to critically assess sources regarding perfectionism and shyness in children and apply these traits to what may be a deeper fear of the social scrutiny that accompanies social anxiety.

CLIMATE CHANGE AND THE EXPANSION OF G SWYNNERTONI IN KENYA
Leah Dodge
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1525
Mentor(s): Joseph Messina (Geography)
Animal African trypanosomiases (AAT) is a vector borne parasitic disease, transmitted by the bite of a tsetse fly. The main species of the tsetse fly found in southern Kenya is G. pallidipes, but recently, there has been an influx of the species G. swynnertoni from Tanzania. G. swynnertoni feeds on bovine blood, when available, increasing AAT infection rates in cattle. AAT threatens not only cattle but the economic livelihoods of rural pastoralists. As an emerging new form of the AAT disease threat in Kenya, little research has been published, but it has been mentioned that it is difficult to get an accurate count of G. swynnertoni. With intention of discovering the potential distribution of G. swynnertoni in Kenya, what impacts it might have, and offering control solutions, I will combine a literature review, an assessment of regional climate changes, and evaluation of Tsetse Ecological Distribution modeled results. It is expected that changes in the regional climate have played a role in the spatial expansion of G. swynnertoni. Increased wetness and more moderate temperatures are most likely influencing fly populations movement. However, anecdotally, the tsetse follow the cattle as they are moved from grazing areas in Kenya to Tanazania and back. The changing climate and the movement of cattle appear to interact to facilitate the movement of G. swynnertoni into new areas of Kenya. The G. swynnertoni

expansion is hypothesized to increase disease risk among cattle and also pressure economic livelihoods of the rural poor and most of the Maasai.

IMPACT SYSTEM OF CARE FAMILY ADVOCATE SUPPORT PROGRAM ASSESMENT
Megan Novak
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1637
Mentor(s): Marya Sosulski (Social Work)
Impact, a System of Care (SOC) Initiative in Ingham County, works to provide a coordinated web of services for children with Serious Emotional Disturbances (SED) who are referred by the juvenile court system and/or within the child welfare system, and their families. The Impact Initiative works to create a wraparound team for each child, including family members, school staff, human service professionals, and more. This team works to bring all necessary parts of a previously fragmented process together. In the context of the Impact program: "Family Advocates are parents of children who experience emotional, behavioral, or mental health challenges". (www.impactsystemofcare.org, 2011). These parents have had experience with the same systems Impact SOC families are involved with. Family Advocates support, empower, and educate families, as well as help them develop the skills to navigate these systems themselves and act as a bridge between the families and professional service providers. Families may choose to work with a Family Advocate to benefit from social support, including learning a variety of skills to advocate for their children as they work with the different organizations. This research investigates background narratives of the Family Advocates, drawing data from the "Impact System of Care Family Advocate Support Program Assessment". Using face-to-face interviews, the research aims to uncover connections between what the Family Advocates said they learned from their own experiences as parents advocating for their children with SED and the ways they provide support for the families and children. Common themes will be highlighted.

UNDERSTANDING LIFE, THROUGH TRASH
Lindsay Wancour
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1649
Mentor(s): Lynne Goldstein (Anthropology)
In 2005, the Michigan State University Campus Archaeology Program (CAP) conducted an excavation on campus to celebrate the university's sesquicentennial. The excavation was the first archaeological field school ever held on campus. The area selected for excavation was the site of the campus' first dormitory, Saints' Rest. The dormitory was located north of West Circle Dr. just east of the MSU Museum's current location. Saints' Rest was in use from 1856, one year after the university opened, until 1876 when it burned down during the school's winter break. The field school's focus was on student life when campus was first created. In 2006/7, CAP conducted an excavation in an area just east of Saints' Rest. This work uncovered a trash pit associated with Saints' Rest. Finding a trash pit was extremely important because trash pits provide an unfiltered look into the past. In this presentation I will compare the analyses and artifacts from the original Saints' Rest excavation in 2005 with those uncovered from the Saints' Rest Trash Pit excavation. I hope to display the difference in our understanding of student life due to the additional information from the trash pit. Other sources will include the archives of Michigan State University and Heather L Mustonen's MA thesis. With these resources, I intend to gain the best understanding of what student life was truly like in the late 1800s.

RELATIONS ACROSS GENDER BETWEEN MOTHERS EMOTIONAL EXPRESSIVITY, MARITAL SATISFACTION, AND PRESCHOOLERS PROBLEM BEHAVIORS
Jessica Slone, Antoniu Nedelea
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1659
Mentor(s): Lori Skibbe (Human Development and Family Services)
We examined relations between a mother's emotional expressivity, a mother's marital satisfaction, and children's problem behaviors. We then investigated whether mothers use differing levels of emotional expressivity with boys versus girls in their homes during preschool and whether there are gender differences in the problem behaviors children display. Data consisted of n=51 families with children (31 boys, 20 girls) between three and five years of age (X=48.7 months; SD=7.73). The sample of mothers, all of whom were married, completed a questionnaire at the beginning of the school year asking three questions about marital satisfaction (e.g., How satisfied are you with your marriage?) and reported their positive and negative emotional expressivity using the Family Expressiveness Questionnaire--"Short Form (FEQ; Halberstadt, 1996). Problem behaviors were measured using teachers' responses on the Social Skills Improvement System (SSIS; Gresham & Elliot, 2010) at the beginning of the year, which were found on the teacher forms. Mother negative emotional expressivity was negatively correlated with their report of satisfaction in their marriage (r =-.303) and problem behaviors in their children (r=.337). Thus, high levels of marital satisfaction related to low levels of negative emotional expressivity and low levels of teacher-reported problem behaviors for their children. An independent sample t-test was conducted to see if positive and negative emotional expressivity differed between boys and girls. Results indicated that there was no significant difference in levels of emotional expressivity toward sons (t(49)=.027, p=.978) vs. daughters (t(49)=. 474, p=. 638). The poster will present implications for these findings.

IMPROVING ACCESS TO NEONATAL INTENSIVE CARE UNITS IN MICHIGAN
Kelly Archer
Location: Gold Room, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1663
Mentor(s): Kirk Goldsberry (Geography)
Neonatal intensive care units, which are beds that are crucial to the health of many newborn babies, are relatively sparse in northern Michigan. With the use of geographic information systems I will determine who has immediate access to a bed and who does not. Using U.S. Census data I will also determine the major demographic characteristics of the population without immediate access to a bed. With the analysis tools of the

geographic information system I will then determine where the most at risk areas in Michigan are that are in need of an NICU bed. My poster will present the results of my research and analysis regarding these NICU accessibility issues.

ENVIRONMENTAL POLICY
Megan Shelly
Location: Ballroom, 9:30 AM - 11:30 AM
Category: Social Science: General--2, Poster, 1685
Mentor(s): Richard Hula (Political Science)
As environmental issues become an increasingly more prominent issue in today's society, it is important to look further into the way in which environmental science is translating into social adaptations, and further more, how it translates into policy changes. Deciphering the language barrier between science and policy has long been an issue in political science, and with increasing paradigm shifts regarding our relationship to the environment, major complications may arise when attempting to consider all interest groups as well as hard science in policy making. Our research has focused on a review of the State of the State Surveys administered my Michigan State University, concentrating on questions relating to public concern for environmental issues. In addition to this review, a collection of literature regarding the co-evolution of science and policy is being examined to address the relationship between science and policy making, and what factors facilitate or prevent a socially symbiotic relationship between the two.

WOMEN AS MOTHERS OF CHILDREN IN THE ATTACHMENT RELATIONSHIP
Catherine Donovan, Alyssa Benedict, Molly Blackburn
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1329
Mentor(s): Victoria Fitton (Social Work)
Attachment and attachment relationships that mothers have with their infants and children are examined through semi-structured, in-depth phenomenological interviews. The study method and data analysis were driven by interpretive phenomenological analysis (IPA) and feminist theory and method. Attachment theory and attachment constructs provide a background for the study questions, literature review, and interview instrument development. Mothers were the identified subjects and selection was purposely biased toward playful, interactive, and positively engaged mothers and children. Each case was specifically analyzed for data related to the research questions and the attachment categories delineated in a previous observational study: reciprocity and mutuality, proximity, verbal communication, affect and emotion, physical affection, and play. In addition, themes with rich supportive data across cases were identified as: education; responsibility; childcare; and time management. These mothers spoke lovingly and authentically about the attachment relationship with their children. Every woman addressed the multiple roles that are a reflection of being a mother with a breadth and depth of emotive language that not infrequently brought her to tears. The mothers were articulate and vulnerable, fully engaged in the collaborative process of the interviews with the researcher. The narratives are rich and flow with language of love, tenderness, pleasure, and attachment.

MEASURING PARENT-CHILD COMMUNICATION DURING SEMI-STRUCTURED INTERACTION IN DYADS THAT INCLUDE CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT
Emalee Manns, Kelly Lennon
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1412
Mentor(s): Claire Vallotton (Human Development & Family Studies)
Communication between parents and their children is an important element supporting a child's social, cognitive, and language development. This is especially true for children with specific language impairment (SLI). Previous research related to children with SLI suggests that although book reading is an excellent way to understand language in parent-child dyads, these children may resist book reading (Kaderavek & Sulzby, 1998). Other research identifies differences in language use during book reading and play activities with mothers and typically developing children (Yont, Snow, and Vernon-Feagans, 2002). Therefore, this study focuses on language use between parents and children with SLI during both book reading and play. Research Questions: (1) How can the pragmatic features of language be captured for mothers and their children with SLI? (2) How does parent and child pragmatic language differ across scenarios? Data Collection: Fifty-six children with SLI between 48 and 60 months and their mothers participated in this study. A semi-structured scenario was used where children and parents had 10 minutes to interact with four different sets of items. Research Plan: The Inventory for Communicative Acts Abridged (INCA-A; Ninio, Snow, Pan, and Rollins, 1994) will be used because it is applicable to all types of individuals, regardless of their age or language capabilities. We will use existing transcripts of these semi-structured scenarios by transferring them into the Child Data Language Exchange System (CHILDES) software for language analysis, where INCA-A coding can then be completed in order to analyze and answer the research questions stated above.

INGHAM COUNTY'S SYSTEM OF CARE INITIATIVE -- IMPACT
Elizabeth White
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1438
Mentor(s): Marya Sosulski (Social Work)
Multiple studies have demonstrated that social support plays a significant factor in the reduction of mental health disparities. In "Toward Explaining Mental Health Disparities," Anshensel (2009) established a positive association between declining mental health status and social context especially concerning stress-inducing social situations. The research further supports the development of programs to create social systems of support and resources such as Ingham County's System of Care Initiative, called Impact. Developed in 2005, Impact is a "partnership of child and family-serving agencies working together with youth and families to provide coordinated services for children with serious emotional disturbance" (www.impactsystemofcare.org, 2009). The program was designed to improve community mental health in the greater Lansing area. Our research examines the perceived effectiveness of certain aspects of Impact with a focus on the family advocate role. Data are drawn from "Impact System of Care Family Advocacy Support Program Assessment" study, which uses critical narrative analysis techniques to

analyze face-to-face interviews with families, administrators and other program personnel. The interviews reflect participants' experiences with the Impact program, with special focus on the Family Advocacy Support component. The goal of the analysis is to demonstrate the link between participants' satisfaction with individual aspects of the program and participation, as well as respondents' interpretations of how effective they believe some aspects of Impact to be. The results will contribute to broader knowledge about the effectiveness of this particular program and its overall implications for further development of support services to promote community mental health.

BIKE MSU! THE INTERACTIVE EXPERIENCE: USING INFORMATION VISUALIZATION TO EDUCATE AND ENTERTAIN
Matthew Bambach
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1442
Mentor(s): Kirk Goldsberry (Geography), Rebecca Tegtmeyer (Art & Art History)
Although Michigan State's bicycle infrastructure has come a long way in the past decade, there is still much work that needs to be done to ensure that all commuters on campus are safe. Anyone who has walked, biked, driven or even bussed across MSU's campus knows we have a significant issue with the various forms of transportation coexisting, so something needs to be done about it. The aim of the "Bike MSU!" project is to promote bike culture on MSU's campus through the construction of an interactive and informational Web narrative encouraging students to become educated and use proper safety when it comes to commuter cycling. The end goal of this project is to take the gathered information and organize it in order to make it easier to understand. This will empower students to have a better understanding of the problems with biking on campus, what the university is doing to fix these problems, and how students can become involved. In order to get a sense of community opinion, interviews, surveys, and research methods have all been utilized to analyze the situation and get a feel for social and behavioral trends. By putting this information in an engaging, entertaining and aesthetically pleasing visual form, students are more likely to connect with the message on a personal level and have fun while learning important facts.

EXPLORING THE EVOLUTION OF ENERGY: A HISTORY OF MICHIGAN STATE UNIVERSITY ENERGY USE
Theresa Koenigsknecht
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1459
Mentor(s): Lynne Goldstein (Anthropology)
The high demand for energy and the controversy surrounding power resources is an increasingly significant issue facing our world today. The necessity for huge energy production is often associated with large institutions such as Michigan State University, but the use and demand for energy on campus has undergone several transformations. The MSU Campus Archaeology program (CAP) is dedicated to investigating the evolution of higher education through the study of archaeological and historic evidence, and I am specifically interested in the change in energy use throughout campus history. Employing CAP's four historical time periods I will investigate the changes in the college's use of energy from its earliest days to the present. The four periods include Phase I 1855-1900, Phase II 1900-1925, Phase III 1925-1955, and Phase IV 1955-present. These periods are characterized by shifts in campus landscapes, purpose and population, and should contain specific evidence for various energy resources and uses. The range of methods to be integrated into this project will include the use of wood fuel, the introduction of electricity and centralized steam heat, the use of several coal power plants, and a new push for and discussion of possibilities in green energy. I will investigate if past methods have been sustainable or effective, the impact of campus growth on energy, and the consequences of particular systems. Researching energy methods can provide a greater understanding of the history of MSU as well as valuable information for future energy use on campus.

CHANGES IN SENTENCE GUIDLELINES
Johanna Jelenek
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1478
Mentor(s): Matt Grossman (Political Science)
This project aims to track the progress of efforts by the Michigan Department of Corrections to reduce the lengths of prison sentences to cut costs. Like most states during the recession, funding is tight in Michigan. Authorities in the State Agency have proposed reducing the length of prison sentences to prevent overcrowding of jails, which would ultimately save taxpayers and the state money. This project will track the progress of sentence reduction policies in Michigan over time and will compare Michigan's policies to those of other states. More specifically, this project will focus on sentence lengths for drug related crimes and other misdemeanors. I believe that in focusing on our court and jail systems, there is large amount of money that can be saved to bail out the economy. Reducing jail sentences is the first step, and will hopefully prove to be beneficial.

MAKING ARCHAEOLOGY ACCESSIBLE
Stephanie Cross
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1514
Mentor(s): Lynne Goldstein (Anthropology/Archaeology)
My research focuses on the ways in which the field of Archaeology can be made accessible to people with disabilities. Accessibility is considered here as not only making the field of Archaeology available to people with disabilities but also making it understandable to such people. Availability is important, but the ability to fully understand what is available is quite different. The term disability implies more than the physical ailments that prevent one from partaking in certain events. I want to address the ways in which the field of Archaeology can break down handicaps it creates for people with disabilities. Handicaps include ways in which one's abilities are restricted by the environment, and since Archaeology emphasizes peoples' interactions with the environment, it should not create new handicaps for people with disabilities. By researching new technologies and teaching strategies, I will propose some ways that Archaeology can present itself to people who have one or more of four different categories of disabilities. The internet will be an important part of the strategy outlined for people with mobility

disabilities while specialized maps and unique descriptions can be employed by people with sensory impairments like vision or hearing loss. The hardest categories of disability for archaeologically accessible information are those that alter the brain's ability to process information: cognitive disabilities and specific learning disabilities. Nonetheless, I will try and present some possible solutions. By means of this presentation, I will combine two passions of mine hopefully making a difference in both fields.

MICHIGAN TOURISM POLICY: THEN AND NOW
Lauren Gibbons
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1550
Mentor(s): Matt Grossman (Political Science)
Tourism has been a priority for the Michigan government for a long time, and some policymakers think it's even more important to continue the trend with the current economy. Research covers recent policy decisions on the state's tourism industry and also go back into history of how tourism has been regulated, promoted and acted upon by officials, locals and tourists themselves throughout the years. A look into how the current budget proposal addresses tourism funding will also be discussed.

IMPROVING THE ACCESSIBILITY OF ARCHAEOLOGICAL DATA THROUGH GEOGRAPHIC INFORMATION SYSTEM (GIS)
Alec Wells
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1585
Mentor(s): Lynne Goldstein (Anthropology)
In the field of archaeology, the best analyses and theories are made through examination of all evidence provided by an excavation site. However, looking at field notes and excavation logs can make conceptualizing an archaeological site difficult. A solution to this complication would be to organize all of the data collected from an archaeological excavation and present it in an understandable manner. This research will organize the artifacts excavated from the Campus Archaeological field school in the summer of 2010 and present them spatially as real world locations using GIS software. The GIS software allows a user to search and analyze an entire site for artifact characteristics, such as type, weight, depth, and time period. Visually representing an entire excavation can allow for a more thorough analysis and the ability to make conclusions about early life on MSU's campus.

HOME LITERACY ENVIRONMENT AND CHILDRENS LANGUAGE AND LITERACY SKILLS AT PRESCHOOL ENTRY
Jessica Pirrone, Nancy Roycraft
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1609
Mentor(s): Hope Gerde (Human Development & Family Studies)
Research has shown that children's literacy skills when they enter preschool influence reading skills in later grades (Juel, 1998; National Early Literacy Panel, 2008). Previous work suggests that the home learning environment is important for supporting young children's language and literacy skills (e.g., Hart & Risley, 1995). Our project extends previous work by examining whether parent's engagement in particular language and literacy activities at home supports children's language and literacy skills when they enter preschool. To answer this question we gathered data from 197 preschoolers and their parents who attend an early childhood education center in Michigan. Parents completed a questionnaire of home learning experiences (Cooney & Morrison, 2002) at the beginning of the school year. We will use seven items of this scale which specifically target language and literacy skills (e.g., "How many times in a week do you read to your child"). Trained research assistants tested children individually at school using standardized measures of phonological awareness, letter knowledge and expressive vocabulary. Our hypothesis is that parents who engage their children in specific language and literacy activities at home will have children with higher language and literacy skills. Regression analysis will be used to test our hypothesis.

GIVING YOUTH A VOICE THROUGH ONLINE PHOTOVOICE METHODS
Sara Hockin, Kelly Warsinske
Location: Ballroom, 1:30 PM - 3:30 PM
Category: Social Science: General--3, Poster, 1624
Mentor(s): Pennie Foster-Fishman (Psychology), Lauren Lichty (Psychology)
Michele-Rolph Trouillot (1995) wrote that the voicing of opinions "involves the uneven contribution of competing groups and individuals who have unequal access to the means for such production." In the United States, the unique perspectives youth hold are often underrepresented in public policy discussions. One way to resolve this issue is to directly involve the youth through grassroots social action. As part of the National Youth Leadership Initiative developed by the Community Anti-Drug Coalitions of America, a team of MSU community psychologists used an online Photovoice method to discover the perspectives of approximately 130 youth (adolescents) across West Virginia. Photovoice gives underprivileged populations access to means for change through a process of community examination and dialogue. In traditional Photovoice, participants take photographs and share stories based on framing questions such as "what problems do youth face in your community", have small facilitated group discussions, and display the photographs and narratives in a public exhibit. Community leaders and policy makers are invited to attend the exhibits. These exhibits provide an opportunity to begin discussing community issues from the perspective of those not typically represented in public policy discussions. This poster discusses the traditional Photovoice method and how it was adapted to engage a large group of youth from a distance. It also shows how, in taking photovoice online, we encountered a different set of obstacles not present during traditional photovoice and overcame some constraints of traditional photovoice. Lastly, implications are discussed for use of technology in future photovoice projects.

LIVING MANY LIVES

Bria Berger

Location: Ballroom, 1:30 PM - 3:30 PM

Category: Social Science: General--3, Poster, 1628

Mentor(s): Marya Sosulski (Social Work)

African American women's health needs, especially mental health needs, are unique because of differential treatment based on the intersection of race and gender. Cultural stereotypes and stigmas from the community often prevent them from seeking clinical treatment from service providers. The following research examines details regarding the ways that African American women's experiences of help-seeking behavior are related to their understanding of how mental illness is related to oppression, stereotypes, and cultural stigmas. The methodology includes a qualitative analysis of interviews conducted with eight African American women with Axis I mental illnesses. The interviews detail their history of mental illness, family, life, work, school, and difficulties regarding racial stereotypes and mental health treatment. The data were analyzed for common themes and experiences and interpreted in the context of systematic oppression. Mental health needs for minorities often differ from the needs of people in the dominant culture, and because people in minority groups may be reluctant to seek treatment, the available research on these populations is lacking. Thus, the resulting data will contribute to the literature in several different contexts. The results will detail how intersections of race and gender status confound and influence help-seeking and mental health care. The information from this analysis can also be used for community outreach to dispel myths and stereotypes, as well as providing a framework for future research on mental health care in minority populations.

Performance Demonstrations

INSIDE OUTSIDE: THREE VOICES
Lauren Hall, Laurie Hollinger, Grace Pappalardo
Location: Parlor C, 1:00 PM
Mentor(s): Anita Skeen (RCAH), Ann Folino White (RCAH & Theatre), Donna Keegan (Visiting Playwright)
Western society, in its patriarchal structure, has long been guilty of placing women as 'other,' and as a substandard specimen of men. The impact of this has resulted in countless examples of women's marginalization not only because of their gender, but because of their variations from hegemonic standards of femininity – including strong wills, a need to gain some control in a world that seeks to control them, and minds of their own, that challenge the status quo. These portrayals of three women (Helen, a modern day woman trapped by her OCD, Charlene, a sixties-era teenage mental institution patient, and a seventeenth century widow), explore just a few examples of how women have dealt with their 'place' in culture and society. They touch on stigmas attached to difference, and on issues of assimilation and gentrification, by illustrating just a few methods women have used throughout time to deal with and escape their situations in society, including development of mental disorders, self-mutilation, self-imposed exile and suicide.

DISCOVERING POETRY
Taylor Davis
Location: Parlor C, 1:30 PM
Mentor(s): Mark Sullivan (RCAH)
It is too easy to bury one's self beneath the banalities of everyday language. Academic diction, also, has its place and benefit, but cannot illuminate certain dark corners of existence. We must admit there are aspects of our lives not akin or beholden to scientific explanation, and that the devices we have derived to make our murmurs most clear, our plain communication, often pollutes our true meanings. It remains, frankly, that all else is inept (except for poetry) at describing the landscape of the human heart. Though it creates the wild and fantastic, its purpose is to lend voice to that which we can, but cannot normally, speak. We are creatures, after all, made of fear and lust and smoke. We are alive, and often ashamed, as I have been, and as I have learned to express through my writing. My creative work within the Residential College of the Arts and Humanities has revealed to me the poetic significance of delivery and deliverer. From conception to performance, poetry is the continual threading process of understanding, expression and freedom. It is the new form of unearthing, examination and deduction. It is not limited to talent or subjected to hierarchy. It is the tool of the modern scholar. Here, with it, we stand at the nexus of the inner garden.

Research Mentors

Many thanks to the dedicated faculty mentors who guided and supported the undergraduate research and creative activites presented today.

Debrenna Agbenyiga, *Social Work*
Katherine Alaimo, *Food Science and Human Nutrition*
Robert Albers, *Telecommunication, Information Studies, and Media*
Michael Allen, *Animal Science*
Eva Almenar, *Packaging*
Evangelyn Alocilja, *Biosystems & Agricultural Engineering*
Alicia Alonzo, *Teacher Education*
Jenn Anderson, *Communication*
Mike Anderson, *Biosystems and Agricultural Engineering*
Robert Anstey, *Geological Sciences*
Steven Arnoczky, *The Laboratory for Comparative Orthopaedic Research*
David Arnosti, *Biochemistry*
Cindy Arvidson, *Microbiology and Molecular Genetics*
Dennis Arvidson, *Microbiology and Molecular Genetics*
Mark Aupperlee, *Physiology*
Mark Axelrod, *James Madison College*
Mohammed Ayoob, *James Madison College*
Michael Bagdasarian, *Microbiology and Molecular Genetics*
Greg Baker, *Chemistry*
Jeff Bale, *Teacher Education*
Susan Barman, *Neuroscience, Pharmacology*
Cornelius Barry, *Horticulture*
Melissa Baumann, *Chemical Engineering and Materials Science*
Mark Becker, *Psychology*
Jeff Biddle, *Economics*
Laura Bix, *Packaging*
Ryan Black, *Political Science*
Howard Bossen, *Journalism*
Ryan Bowles, *Psychology*
Danita Brandt, *Geological Sciences*
Mary Bremigan, *Fisheries and Wildlife*
Johan Brink, *Institute of International Agriculture*
Robert Britton, *Microbiology and Molecular Genetics*
Bonnie Bucqueroux, *Journalism*
Julia Busik, *Physiology*
John Carlson, *Counseling, Educational Psychology, and Special Education*
Samantha Caughlan, *Teacher Education*
Mei-Wei Chang, *Nursing*
Kendra Cheruvelil, *Fisheries and Wildlife*
Todd Ciche, *Microbiology and Molecular Genetics*
Hilary Clayton, *Large Animal Clinical Sciences*
Lindsay Coe, *Physiology*
Dirk Colbry, *Institute For Cyber-enabled Research*
Jeffrey Conroy-Krutz, *Political Science*
Vanessa Cook, *Large Animal Clinical Sciences*
Constantinos Coursaris, *Telecommunication, Information Studies, and Media*
Paul Coussens, *Animal Science*
Tobin Craig, *James Madison College*
Pat Crawford, *Bailey Scholars Program*
Suzanne Cross, *Social Work*
Ying Dang, *Microbiology and Molecular Genetics*
Judith Danovitch, *Psychology*
Deidre Dawson, *RCAH*
Angelique Day, *Research Specialist*
Frank Dazzo, *Microbiology and Molecular Genetics*
Danielle DeVoss, *Writing, Rhetoric & American Culture*
Matthew Diemer, *Counseling, Educational Psychology & Special Education*
Christina DiFonzo, *Entomology*
Laura Dilley, *Communicative Sciences and Disorders*
Sigrid Dixon, *Counseling Center*
Alison Dobbins, *Theatre*
Kristie Dotson, *Philosophy*
Hope Draheim, *Zoology*
Elizabeth Drexler, *Anthropology*
Meghan Drummond, *MMG*
Dan Dutkiewicz, *Institute of International Agriculture*
Ross Emmett, *James Madison College*
Stephen Esquith, *RCAH*
Laura Fair, *History*
Eva Farre, *Plant Biology*
Kimberly Fenn, *Psychology*
Jenifer Fenton, *FSHN*
Victoria Fitton, *School of Social Work*
Phylis Floyd, *Art History*
Michele Fluck, *Microbiology*
Kevin Ford, *Psychology*
Pennie Foster-Fishman, *Psychology*
Eric Freedman, *Journalism*
Jon Frey, *Art and Art History*
Karen Friderici, *MMG*
Chris Frilingos, *Religious Studies*
John Froehlich, *MSU-DOE Plant Research Lab*
Masako Fujita, *Anthropology*
Hope Gerde, *Human Development & Family Studies*
Margo Glew, *Teacher Education*
Kirk Goldsberry, *Geography*
Lynne Goldstein, *Anthropology/Archaeology*
Erik Goodman, *Electrical and Computer Engineering*
Meredith Gore, *Fisheries and Wildlife*
Norman Graham, *James Madison College*
Julia Grant, *James Madison College*
Matt Grossman, *Political Science*
Bump Halbritter, *WRAC*
Troy Hale, *Telecom, Information Studies & Media*
Zach Hambrick, *Psychology*
Ray Hammerschmidt, *Plant Pathology*
Brian Hampton, *Geological Sciences*
Sandra Haslam, *Physiology*
Salah Hassan, *English*
Mary Hausbeck, *Plant Pathology*

Heather Hayes, *Kinesiology*
Sheng-Yang He, *Plant Research Laboratory*
Eric Hegg, *Biochemistry and Molecular Biology*
Gretchen Hill, *Animal Science*
Tim Hogan, *Electrical Engineering*
Thomas Holt, *Criminal Justice*
Chris Hopwood, *Psychology*
Patricia Huddleston, *Retailing*
Richard Hula, *Political Science*
David Hyndman, *Geological Sciences*
Brandon Irwin, *Kinesiology*
Austin Jackson, *Residential College in the Arts and Humanities*
Zahra Jamal, *James Madison College*
Louise Jezierski, *James Madison College*
Mark Johnson, *Finance*
Steve L Johnson III, *Linguistics and Languages*
Mike Jones, *Fisheries and Wildlife*
Jin-Ho Kang, *Plant Research Labs*
Karen Kangas-Preston, *Theater*
Elizabeth Karcher, *Animal Science*
Kazem Kashefi, *Microbiology and Molecular Genetics*
Donna Keegan, *Visiting Playwright*
Anthony Kendal, *Geological Sciences*
Sungjin Kim, *Microbiology and Molecular Genetics*
Peter Knupfer, *History*
Benjamin Koestler, *Microbiology and Molecular Genetics*
Donna Koslowsky, *Microbiology and Molecular Genetics*
Steve Kozlowski, *Psychology*
Dan Kramer, *James Madison College*
Lee Kroos, *Biochemistry and Molecular Biology*
Sheryl Kubiak, *School of Social Work*
Min-Hao Kuo, *Biochemistry and Molecular Biology*
Robert LaDuca, *Chemistry*
Maria Lapinski, *Communication*
Mark Largent, *History of Science and Technology*
Robert LaRose, *Telecommunication, Information Studies, and Media*
Michael Lavagnino, *The Laboratory for Comparative Orthopaedic Research*
Kyunghee Lee, *Social Work*
Richard Lenski, *Microbiology and Molecular Genetics*
Xiaobo Li, *Biochemistry and Molecular Biology*
Lauren Lichty, *Psychology*
Folke Lindahl, *James Madison College*
John Linz, *Food Science and Human Nutrition*
David Long, *Geological Sciences*
Tammy Long, *Plant Biology*
Alfred Loos, *Mechanical Engineering*
Doug Luckie, *Biology*
William Lynch, *Physics*
Bhanu Mahanti, *Physics and Astronomy*
Linda Mansfield, *Microbiology and Molecular Genetics*
Bradley Marks, *Biosystems and Agricultural Engineering*
Sherry Martin, *Geological Sciences*
Devin McAuley, *Psychology*
Laura McCabe, *Physiology*
John McClendon III, *Philosophy*
Scott McCrickard, *Computer Science*
Deborah McCullough, *Forestry, Entomology*
Katheryn Meek, *Microbiology and Molecular Genetics*
Joseph Messina, *Geography*
Kyle Miller, *Zoology*
Dylan Miner, *RCAH*
Wolfgang Mittig, *Hannah/Physics*
Kelly Mix, *Educational Psychology*
Susanne Mohr, *Physiology*
Jennifer Moore, *Fisheries and Wildlife*
Kelly Morrison, *Communication*
Jason Moser, *Psychology*
Martha Mulks, *Microbiology and Molecular Genetics*
Alan Munn, *Linguistics and Languages*
Cheryl Murphy, *Fisheries and Wildlife*
Debra Nails, Philosophy
Brian Nielsen, *Animal Science*
Julie Nurnberger-Haag, *Counseling, Educational Psychology, and Special Education*
Robert Ofoli, *Chemical Engineering and Materials Science*
Charles Ofria, *Computer Science*
Jodie O'Gorman, *Anthropology*
Brian O'Shea, *Physics and Astronomy*
Katherine Osteryoung, *Plant Biology*
Nathaniel Ostrom, *Zoology*
Peggy Ostrom, *Zoology*
Jodi Ozimek, *Theatre*
Sunchung Park, *MSU-DOE Plant Research Lab*
Amol Pavangadkar, *Telecommunication, Information Studies, and Media*
Scott Peacor, *Fisheries and Wildlife*
Ryan Penton, *Crop and Soil Sciences*
Karin Pfeiffer, *Kinesiology*
Swarnavel Pillai, *English*
James Pivarnik, *Kinesiology*
Tim Pleskac, *Psychology*
Benjamin Pollock, *Religious Studies*
Wendy Powers, *Animal Science*
Simei Qing, *James Madison College*
Susan Ravizza, *Psychology*
Gemma Reguera, *Microbiology & Molecular Genetics*
Dawn Reinhold, *Biosystems and Agricultural Engineering*
Joanne Riebschleger, *Social Work*
Jennifer Rivera-Caudill, *CARRS*
Allison Rober, *Zoology*
Gary Roloff, *Fisheries and Wildlife*
Tyrone Rooney, *Geological Sciences*
Cary Roseth, *Counseling, Educational Psychology, and Special Education*
David Rothstein, *Forestry*
Brad Rowe, *Horticulture*
Dale Rozeboom, *Animal Science*
Steven Safferman, *Biosystems and Agricultural Engineering*
Joshua Sapotichne, *Political Science*
Thomas Schmidt, *Microbiology and Molecular Genetics*
Christina Schmitt, *Linguistics*
Barbara Schneider, *Education Dean*
Brian Schutte, *Microbiology and Molecular Genetics*

Jeannine Scott, *Microbiology and Molecular Genetics*
Kim Scribner, *Fisheries and Wildlife*
Alexander Shingleton, *Zoology*
Shinhan Shiu, *Plant Biology*
Kami Silk, *Communication*
Animesh Sinha, *Dermatology*
Anita Skeen, *RCAH*
Lori Skibbe, *Human Development and Family Services*
Laura Smale, *Psychology*
Jim Smith, *Biology*
Ruth Smith, *Criminal Justice*
Sandi Smith, *Communicaton*
Marya Sosulski, *Social Work*
Joan Starr, *Theatre*
Juan Steibel, *Animal Science & Fisheries and Wildlife*
Robert Stevenson, *Zoology*
Curtis Stokes, *James Madison College*
Narelle Stubbs, *Large Animal Clinical Sciences*
Mark Sullivan, *RCAH*
George Sundin, *Plant Pathology*
Rebecca Tegtmeyer, *Art & Art History*
Jetze Tepe, *Chemistry*
Suzanne Thiem, *Microbiology and Molecular Genetics*
Michael Thomashow, *MSU-DOE Plant Research Lab*
Laurie Thorp, *RISE*
Estrella Torrez, *RCAH*
Colleen Tremonte, *James Madison College*
Richard Triemer, *Plant Biology*
Gary Troia, *Counseling, Educational Psychology and Special Education*
Nathalie Trottier, *Animal Science*
Brad Upham, *Pediatrics and Human Development*
Mark Urban-Lurain, *Science and Mathematics Education*
Zey Ustunol, *Food Science*
Claire Vallotton, *Human Development and Family Studies*
Remke Van Dam, *Geological Sciences*
Michael Velbel, *Geological Sciences*
Daniel Velez-Ortiz, *School of Social Work*
Patrick Venta, *Microbiology and Molecular Genetics*
James Wagner, *Pathobiology & Diagnostic Investigation*
Clive Waldron, *Microbiology and Molecular Genetics*
Edward Walker, *Microbiology and Molecular Genetics*
Michael Walters, *Forestry*
Kenneth Waltzer, *Jewish Studies*
Chris Waters, *Microbiology and Molecular Genetics*
Lorraine Weatherspoon, *Food Science and Human Nutrition*
Patty Weber, *Veterinary Medicine*
David Weliky, *Chemistry*
Benjamin Werling, *Entomology*
Ann Folino White, *RCAH & Theatre*
Kyle Whyte, *Philosophy*
Ellen Wilch, *Microbiology and Molecular Genetics*
David Winder, *James Madison College*
Robert Wiseman, *Physiology/Radiology*
John Withers, *Plant Research Laboratory*
Amanda Woodward, *Social Work*
Jeff Wray, *English*
Geri Zeldes, *Journalism*
Aklilu Zeleke, *Lyman Briggs/Statistics*
Yong-Hui Zheng, *Microbiology and Molecular Genetics*

Index of Presenters

Student participants are listed alphabetically by last name.

ReCUR

Red Cedar Undergraduate Research

Looking to publish your research?

Submit to ReCUR

ReCUR features students' submissions from all disciplines across campus.

Research findings from all fields are published as:

Research Articles, which describe substantial completed undergraduate research projects

Highlights of Undergraduate Literature, which showcase work published by MSU undergraduates in other scholarly journals

Original creative works are published in the form of:

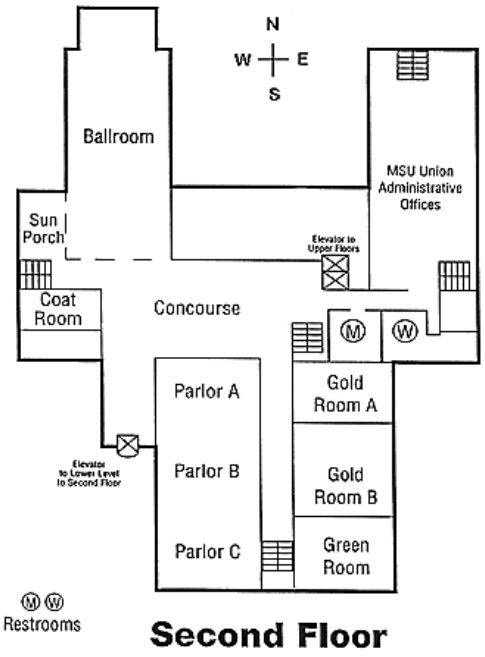
Poetry
Short Creative Prose
Visual Art
Theatre and Film
Musical Compositions

The December 2010 edition featured work from particpants in the 2010 University Undergraduate Reasearch and Arts Forum (UURAF). **All 2011 UURAF participants are eligible to submit work for the December 2011 edition.**

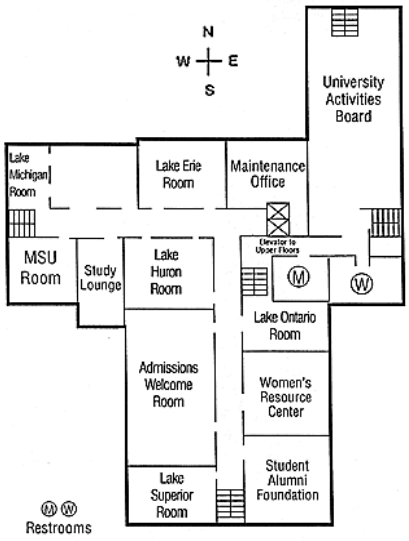
For more information and to read past issues, checkout **www.recur.msu.edu**

Red Cedar Image by J. Auchtung

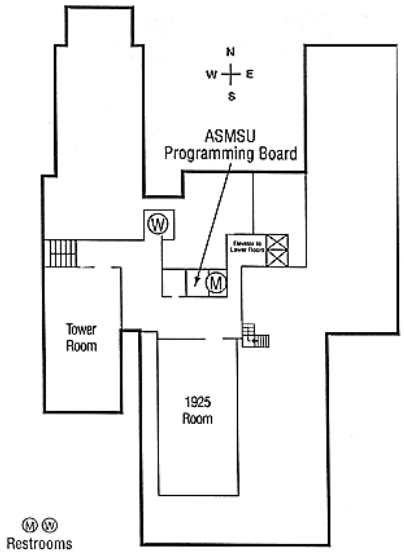
Map of MSU Union



Second Floor



Third Floor



Fourth Floor

Note: The Tower Room, located on the 4th floor, is accessible only by the west staircase on the 3rd floor.