



**UNIVERSITY UNDERGRADUATE
RESEARCH AND ARTS FORUM**

Michigan State University
April 12, 2013



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Welcome to the 15th annual University Undergraduate Research and Arts Forum at Michigan State University. Throughout the day, undergraduate students from diverse academic disciplines will present their outstanding research and creative endeavors. Nearly 560 students from 13 different colleges are participating in today's event. These students were mentored by more than 300 faculty members.

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

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



MICHIGAN STATE
UNIVERSITY



Acknowledgements

We acknowledge President Lou Anna K. Simon and Acting Provost June Pierce Youatt'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; Dr. Korine Wawrzynski, Director of Undergraduate Research; and Megan Shannahan, Assistant 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 and Vaughn Love, 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 Jill Zelenski '13, who is pursuing a Bachelor of Fine Arts in studio art with a specialization in graphic design. Jill is a member of the AIGA Detroit MSU student group.

Being Spartan Green

In an effort to be more environmentally conscious, we have made several changes to this year's program book. We removed all abstracts from the printed version, which significantly decreased the amount of paper used as well as the printing cost. Programs are organized by category and include QR codes that direct you to the abstracts, which are located online for each section. A full, PDF version of the book is posted on our website and is accessible at <http://urca.msu.edu/uuraf/>.

Awards Ceremony

To recognize exemplary scholarly achievements, monetary prizes will be awarded. One first-place award (\$100)* will be given in each section. First-place award recipients will be considered for the grand prize award, which will be announced in early summer. All first-place award recipients will be contacted to submit a brief paper on their UURAF program topic and an electronic version of their poster or oral presentation. The Editorial Board 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 Parlor C 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.

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2013 UURAF Schedule of Events

All events occur in the MSU Union

Event/Time	Location
MORNING REGISTRATION 8:15 AM – 9:00 AM, Registration for morning oral presentations 8:30 AM – 9:15 AM, Registration for morning poster presentations	2 nd Floor Concourse
ORAL PRESENTATIONS, 9:00 AM – 12:15 PM 8:30 AM – 9:00 AM, Download PowerPoint presentations onto room computers 9:00 AM – 12:15 PM, Presentations delivered throughout morning	Parlor C Green Room Lake Erie Room Lake Michigan Room Lake Ontario Room Lake Superior Room MSU Room
POSTER PRESENTATIONS, 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 their posters	Ballroom Gold Rooms A and B Parlor A and B
<i>Morning Snack: 8:30 AM – 11:00 AM in the 2nd Floor Concourse</i>	
Break to Reset Rooms for Afternoon Sessions 11:30 AM – 12:30 PM	
AFTERNOON REGISTRATION 12:15 PM – 1:00 PM, Registration for afternoon oral programs 12:30 PM – 1:15 PM, Registration for afternoon poster programs	2 nd Floor Concourse
ORAL PRESENTATIONS, 1:00 PM – 3:00 PM 12:30 PM – 1:00 PM, Download PowerPoint presentations onto room computers 1:00 PM – 3:00 PM, Presentations delivered throughout afternoon	Parlor C Green Room Lake Erie Room Lake Michigan Room Lake Ontario Room Lake Superior Room MSU Room Tower Room
POSTER PRESENTATIONS, 1:30 PM – 3:30 PM 12:30 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 their posters	Ballroom Gold Rooms A and B Parlor A and B
<i>Afternoon Snack: 1:00 – 4:00 PM in the 2nd Floor Concourse</i>	
AWARD CEREMONY, 4:00 PM All UURAF participants, faculty, and guests are encouraged to return for the awards ceremony.	Parlor C

Poster Presentation Room Assignments

Morning posters will be displayed from 9:30 AM – 11:30 AM

Category	Location
Agriculture & Animal Science, Sections 1 & 2	Ballroom
Biochemistry & Molecular Biology, Section 1	Gold Room
Cell Biology, Genetics & Genomics, Sections 1 & 2	Ballroom
Communication Arts & Sciences, Section 1	Parlor A & B
Engineering, Computer Science, & Mathematics, Section 1	Parlor A & B
Graphic Design, Section 1	Ballroom
Health, Food, & Wellness, Sections 1 & 2	Gold Room
History, Political Science, & Economics, Section 1	Gold Room
Humanities & Performing Arts, Section 1	Parlor A & B
Linguistics, Languages, & Speech, Section 1	Gold Room
Microbiology, Immunology & Infectious Disease, Section 1	Gold Room
Physical Sciences, Section 1	Parlor A & B
Psychology, Sections 1 & 2	Ballroom
Social Science: General, Sections 1 & 2	Gold Room
Social Work, Section 1	Ballroom

Afternoon posters will be displayed from 1:30 PM – 3:30 PM

Category	Location
Agriculture & Animal Science, Sections 3, 4, & 5	Ballroom
Biochemistry & Molecular Biology, Sections 2 & 3	Gold Room
Cell Biology, Genetics & Genomics, Section 3	Parlor A & B
Communication Arts & Sciences, Section 2	Parlor A & B
Education, Section 1	Parlor A & B
Engineering, Computer Science, & Mathematics, Sections 2, 3, & 4	Ballroom
Environmental Sciences & Natural Resources, Sections 1 & 2	Gold Room
Graphic Design, Section 2	Ballroom
Health, Food, & Wellness, Section 3	Gold Room
Humanities & Performing Arts, Section 2	Gold Room
Linguistics, Languages, & Speech, Sections 2 & 3	Ballroom
Microbiology, Immunology & Infectious Disease, Sections 2, 3, & 4	Parlor A & B
Physical Sciences, Section 2	Gold Room
Psychology, Sections 3 & 4	Ballroom
Social Science: General, Section 3	Gold Room

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 located on the inside back cover.

Oral Presentation Room Assignments

Morning oral presentations begin at 9:00 AM and run continuously until 12:15 PM

Category	Location
Agriculture & Animal Science, Section 1	Lake Ontario Room
Biochemistry & Molecular Biology, Section 1 <i>(Note: Session begins at 11:00 AM)</i>	Lake Michigan Room
Digital Media, Section 1	Green Room
Environmental Sciences & Natural Resources, Section 1 <i>(Note: Session begins at 9:30 AM)</i>	MSU Room
Health, Food, & Wellness, Section 1	Lake Michigan Room
History, Political Science, & Economics, Section 1	Lake Erie Room
Humanities & Performing Arts, Section 1	Lake Superior Room
Social Science: General, Section 1	Parlor C
Social Science: General, Section 2 <i>(Note: Session begins at 11:00 AM)</i>	Parlor C

Afternoon oral presentations begin at 1:00 PM and run continuously until 3:00 PM

Category	Location
Agriculture & Animal Science, Section 2	Lake Ontario Room
Cell Biology, Genetics & Genomics, Section 1	Tower Room
Communication Arts & Sciences, Section 1	MSU Room
Digital Media, Section 2	Green Room
Education, Section 1	Lake Erie Room
Engineering, Computer Science, & Mathematics, Section 1	Parlor C
Health, Food, & Wellness, Section 2	Lake Michigan Room
Humanities & Performing Arts, Section 2	Lake Superior Room

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 located 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.

Agriculture and Animal Science

Oral Presentations, Section 1

ANTIBIOTICS: THE CONNECTION BETWEEN POLICY AND FACT

Benjamin Bailey, Ryan Guysky, Chelsey Klein, John Peleman, Paveenuch Sriragu

Category: Agriculture and Animal Science, Section 1

Location: Lake Ontario Room, 9:00 AM

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

In modern day government and politics decisions are constantly being made that will affect the future of the world. These decisions regard complex issues that cannot be solved simply. One cannot solely present facts and data and expect the situation to be solved in the way they want. For example, massive amounts of data regarding the poor use of antibiotics in both the livestock and the healthcare sectors of the United States have been attained through research and experiments. The facts clearly show that this misuse of antibiotics is leading to the rapid increase of antibiotic resistant bacteria. The data even points to a possible connection between antibiotic use in the livestock sector and rising obesity rates in America. Even so, this data cannot be used to change the application of antibiotics in today's society. There are too many issues to address. If the livestock sector was banned from using antibiotics, their profits would drop and their farming techniques would change immensely. Also, if doctors stopped prescribing antibiotics in the way they do, people would certainly be upset. This oral presentation will make connections between hard facts and political problems regarding the misuse of antibiotics and attempt to offer scope on the magnitude of this issue. This problem cannot be solved. It can, however, be addressed, allowing the enlightenment of the American people.

EFFECT OF ORGANIC ZINC SUPPLEMENTATION ON METALLOTHIONEIN AND ZINC TRANSPORTER -1 MRNA EXPRESSION IN DUODENUM OF GROW-FINISH PIGS

Julie Feldpausch

Category: Agriculture and Animal Science, Section 1

Location: Lake Ontario Room, 9:15 AM

Mentor(s): Gretchen Hill (Animal Science), Patty Sue Weber (Large Animal Clinical Sciences)

Metallothionein (MT1A) and Zinc Transporter-1 (ZnT1) play an important role in zinc homeostasis. Currently, the expression and molecular regulation of MT1A and ZnT1 in the duodenum of pigs is unknown. Therefore, the objective of this study was to establish that MT1A and ZnT1 are expressed in the duodenum and to determine the effect of different dietary concentrations of organic zinc on the expression of these genes in duodenal mucosal cells of grow-finish pigs. Treatment groups consisted of 4 corn-soybean meal basal diets with: 1) 0 ppm trace minerals; 2) 25 ppm organic zinc; 3) 50 ppm organic zinc; and 4) 100% NRC trace minerals. When the pigs were slaughtered, duodenum mucosa scrapings were collected and snap-frozen in liquid nitrogen. RNA was extracted from 3 duodenum samples in each of the 4 diet groups. cDNA was synthesized from the RNA isolates (average RIN=7.5) and used to evaluate gene expression of MT1A and ZnT1 by specific Taqman Expression Assays. MT1A and ZnT1 expression was normalized using the geometric mean of GAPDH and SDHA by qbase software. GAPDH and SDHA were identified as the two most stably expressed reference genes from a pool of 9 potential reference genes using gNorm. Both MT1A and ZnT1 were expressed in the mucosal cells, but no significant dietary effect for either MT1A or ZnT1 was observed in this data set ($P = 0.95$). These results indicate that regulation of MT1A and ZnT1 in the duodenum of grow-finish pigs may not be at the pre-translational level.

AGRICULTURAL VISIONS AND FOOD ETHICS: A MUSLIM DIALOGUE

Brady Ryan

Category: Agriculture and Animal Science, Section 1

Location: Lake Ontario Room, 9:30 AM

Mentor(s): Salah Hassan (English)

This paper focuses on the complexities of food ethics, with particular emphasis on how Muslims have defined, and continue to

define, halal, “permitted” food. Muslim communities and individuals differ in their understanding of the nuances of halal because of inconsistencies and ambiguities in the Quran and the Hadith, and because of changes in Muslim communities over time. These inconsistencies and changes have fostered a centuries-old debate over the meaning and ethical significance of halal, which in turn informs modern agricultural and food debates. This paper will examine the discourse of halal and shaping of the Muslim dialogue in modern agricultural debates. In order to understand this dialogue this paper will outline the basics of today’s competing agricultural visions. One, made possible by industrialization, proposes deep manipulation and exploitation of the Earth’s natural resources, plants, and animals for human gain. The other seeks a return to the earth, emphasizes its inherent productive potential, and generally condemns disruption of “natural processes” and what some consider the capitalization and colonization of global agriculture. For centuries Muslims have considered the social, ethical, and religious implications of their food, seeking to understand the proper role of humans in harnessing natural forces, and continually questioning previous assumptions as times and technologies change. Thus, Muslims who wrestle with the complexities of food and agriculture today apply an historic discourse to contemporary issues. This paper will analyze the Muslim dialogue surrounding halal and link it to Muslim voices in contemporary agricultural debates.

OSMOREGULATORY GENES AND THEIR SALINITY-DEPENDENT EXPRESSION IN SEA LAMPREY

Stephanie Saloka

Category: Agriculture and Animal Science, Section 1

Location: Lake Ontario Room, 9:45 AM

Mentor(s): Weiming Li (Fisheries and Wildlife), Shinya Yuge (Fisheries and Wildlife)

Sea lamprey belong to the most primitive vertebrate group alive today, the cyclostome. While many cyclostomes’ body osmolality is determined by the environment, sea lamprey maintain it at 1/3 of seawater (SW) like many vertebrates. We hypothesized sea lamprey possess osmoregulatory genes and exhibit their expression alteration in freshwater (FW) and SW. I contributed to checking plasma Na⁺ concentration by spectrometry, identifying genes from the RNA sequencing profiles previously obtained, confirming their sequences by cDNA cloning, determining their tissue mRNA expression by RT-PCR, and by verifying their levels in FW/SW by quantitative RT-PCR. However, due to missing brain data, we stopped investigating salinity-dependent growth. We demonstrated the FW/SW-adaptability by observing no marked change in Na⁺ levels. We identified and analyzed uroguanylin-like, guanylyl cyclase c like (*gc-c-li*), sodium chloride co-transporter like (*ncc-li*) and anion exchanger like (*ae-li*) genes. All the mRNA expression was found exclusively/abundantly in the gills, intestines, and kidneys. In SW lamprey, mRNA expression was altered as follows: uroguanylin-like and *gc-c-li*, decreased in intestines; *ncc-li*, increased in kidneys; *ae-li*, decreased in gills and increased in kidneys. The results in uroguanylin-like, *gc-c-li*, and *ncc-li* were opposite to those reported in teleost fish. No change was observed in transcripts of a control gene, elongation factor. Overall, genes that are known to have osmoregulatory functions in teleosts were found in sea lamprey, and their different FW/SW-responsive expression may encourage us to re-consider osmoregulatory genes from an evolutionary view.

EFFECTS OF DIETARY STARCH SOURCE ON HEPATIC GENE EXPRESSION OF PERIPARTUM DAIRY COWS

Caroline Ylioja

Category: Agriculture and Animal Science, Section 1

Location: Lake Ontario Room, 10:00 AM

Mentor(s): Mike Allen (Animal Science)

Forty-eight Holstein cows were used in a randomized block design experiment to determine hepatic gene expression responses to dietary starch source in the postpartum (PP) period. Treatments were dry corn (DC) or high moisture corn (HMC) fed from parturition until 28±3 d PP. HMC compared with DC increased milk yield 3.4 kg/d (P = 0.02) and plasma glucagon concentration (P < 0.04) during the treatment period. Sustained effects of treatment were detected when cows were offered a common diet from 29±3 to 84±3 d PP; HMC increased feed intake and fat-corrected milk compared with DC but effects diminished over time (P < 0.03). Liver tissue sampled at 7±3d prepartum and 14±3d PP was analyzed for relative mRNA abundance of genes related to metabolism. HMC allowed increased anapleurosis compared with DC by increasing expression for pyruvate carboxylase (1.44X), propionyl CoA synthetase (1.19X), and propionyl-CoA carboxylase- α (1.16X, all P < 0.05), and increasing expression for methylmalonyl CoA epimerase more over time (pre- vs. postpartum) for HMC than DC (1.30X vs. 1.03X, P = 0.03). Gene expression for carnitine palmitoyl transferase 1 α tended (P = 0.11) to decrease more over time for HMC than DC. HMC also increased expression for citrate synthase compared with DC (1.15X, P = 0.07). HMC increased expression for glyceraldehyde 3-phosphate dehydrogenase (1.13X, P = 0.02), and glucose 6-phosphatase (1.17X, tendency P = 0.10), consistent with increased gluconeogenesis. Treatment effects on plasma glucagon concentration and hepatic gene expression are consistent with increased milk yield for HMC compared with DC.

Oral Presentations, Section 2

DAM STAKEHOLDERS: ASSESSING STAKEHOLDER PARTICIPATION IN MICHIGAN DAM REMOVALS

Elizabeth Brajevich

Category: Agriculture and Animal Science, Section 2

Location: Lake Ontario Room, 1:00 PM

Mentor(s): Mark Axelrod (Fisheries and Wildlife)

There are over 2,500 dams in the state of Michigan, the majority of which are fast approaching or already exceeding their design life. The decision to remove a dam involves many factors and can be extremely divisive in communities, exciting some and infuriating others. This leads to the question: under what conditions are stakeholder values being preserved? This study aims to determine how much influence stakeholders have in different dam removal decisions based on the dam ownership structure (private, local government, state government, and federal government). The communities surrounding Elm Creek Dam, Charlotte City Dam, Shiawassee River Dam and Browns Creek Dam, will be surveyed. By obtaining empirical evidence in the form of interviews and surveys, we will come to understand the public's participation in the decision making process as well as their perception of the results of the removal decision. Analyzing this information will allow us to compare the conditions under which stakeholder opinions are and are not reflected in dam removal decisions. No research prior to this study has examined whether or not stakeholders are appropriately represented in these serious decisions. This study is inspired by a desire to learn from case studies about management-stakeholder relations. It can provide insight into how to engage the public in future dam management decisions across the state.

MEASURING PREDATOR AVOIDANCE BEHAVIOR IN SOYBEAN APHID

Grace Hirzel

Category: Agriculture and Animal Science, Section 2

Location: Lake Ontario Room, 1:15 PM

Mentor(s): Doug Landis (Entomology)

Natural enemies contribute to pest suppression through both direct predation and through non-lethal effects of predator avoidance behaviors. Such behaviors can result in lost feeding time, increased exposure to other enemies and high ground temperatures, and increased stress responses. Soybean aphid, *Aphis glycines*, the most economically damaging pest of soybean in the northern United States, is primarily controlled by coccinellid predators. However, little is known about the relative importance of non-lethal effects for soybean aphid control. To shed light on this, we investigated whether soybean aphids would exhibit predator avoidance behavior in response to the presence of, or predation on con-specifics by, the multicolored Asian lady beetle, *Harmonia axyridis*. We observed soybean aphids feeding on a soybean leaf in a petri dish arena during and after trials in which a *H. axyridis* was placed in the arena, to determine if the aphids would move from their initial location. We compared this to control treatments in which aphids were crushed with forceps or left undisturbed. We found no significant differences in the number of aphids leaving the designated area among the three treatments, suggesting that soybean aphids do not exhibit predator avoidance behaviors under these conditions. Our research indicates that direct population reduction due to predation is likely of primary importance for soybean aphid control. Knowledge of soybean aphid behavior can contribute to the development of efficient biocontrol strategies for this pest.

INCORPORATION OF OMEGA-6 AND OMEGA-3 FATTY ACIDS INTO PLASMA LIPID FRACTIONS OF LACTATING COWS: CHRONIC EFFECT OF ABOMASAL INFUSION OF LINOLEIC AND LINOLENIC ACIDS

Lynn Nagengast

Category: Agriculture and Animal Science, Section 2

Location: Lake Ontario Room, 1:30 PM

Mentor(s): Adam Lock (Animal Science)

Six rumen-fistulated Holstein cows were randomly assigned to one of two treatments to examine the effect of linoleic (18:2) and linolenic (18:3) acids on the incorporation of omega-6 and omega-3 fatty acids (FA) in plasma lipid fractions. Treatments were abomasal infusions of: 1) omega-6 FA blend (N6) or 2) omega-3 FA blend. FA were provided every 6 h for 20 d. Blood was collected d -2, d -1, and 0 h prior to first infusion and on d 2, 4, 8, 12, 16, and 20. N3 increased the concentration of 18:3 and total omega-3 FA in all lipid fractions ($P < 0.002$). By d 20 the concentration of 18:3 was increased 127, 224, 270, and 317% compared with N6 for plasma free fatty acids, triglycerides, cholesterol esters, and phospholipids, respectively ($P < 0.001$). N6 increased the concentration of 18:2 and total omega-6 FA in cholesterol esters and phospholipids ($P < 0.04$). For plasma free fatty acids, N6 increased the concentration of 18:2 ($P < 0.04$) but not total omega-6 FA ($P = 0.11$); 18:2 and total omega-6 FA were not different in triglycerides ($P > 0.78$). Abomasal infusions of 18:2 and 18:3 increased concentrations of omega-6 and omega-3 FA, respectively in plasma lipids, although relative increases in omega-3 FA were greater than that for omega-6 FA.

THE ROLE AND USE OF MODEL SYSTEMS TO STUDY HUMAN PREIMPLANTATION EMBRYOS

Roya Oliai

Category: Agriculture and Animal Science, Section 2

Location: Lake Ontario Room, 1:45 PM

Mentor(s): Jason Knott (Animal Science)

A high percentage of human preimplantation embryos are lost and assisted reproduction technologies (ART) require viable blastocysts to implant. Looking at what causes embryo losses can help make ART better and contribute to scientific knowledge about the preimplantation embryo development. Currently the role of Cdx2 and trophoblast lineage is being researched, as well as tight junction biogenesis in blastocysts. Recently published in Development, Dr. Knott's laboratory showed that transcription factor AP2 γ plays a key role in blastocyst development (Choi et al., 2012). My project transformed into looking at the animal model systems used to understand early embryonic loss in humans. I worked with Inchul Choi, Ph.D. postdoctoral fellow, to collect and culture mouse embryos to then be used in immunostaining techniques and PCR to analyze the differences in controls and experimental embryos. Tim Carey, Ph.D. student, and Catherine Wilson, cell culture researcher, use a stem cell line to investigate the effects and expression of Cdx2, a fusion protein and factor associated with the trophoblast differentiation.

Poster Presentations, Section 1

FLIGHT BEHAVIOR AND SUCCESSFUL LANDINGS OF LAYING HENS HOUSED IN AVIARY SYSTEMS WITH LITTER

Shelby Goodwin

Category: Agriculture and Animal Science, Section 1

Poster: 1

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

Mentor(s): Janice Siegford (Animal Science)

Aviary systems have potential to improve laying hen welfare compared to current conventional systems. With multiple levels, nest boxes, perches and litter in addition to standard feeders and drinkers, these systems provide a variety of enrichments that let hens perform natural behaviors, such as flight. More space helps birds work muscles and bones during flight. However, more flight space may not necessarily be more beneficial for hens, as we have anecdotally observed that many hens do not land on their feet. Using data from a commercial facility, this study focuses on landing success for each flight observed over an entire day (lights on to lights off) in four aviary sections on two separate dates. Flights that began and ended on litter had a success rate of 74.83% during mid-lay and a success rate of 87.3% during late-lay. Flights that originated on perches and ended on litter had a success rate of 83.5% for mid-lay and 86.36% for late-lay. No difference was found in the proportion of failed versus successful landings based on whether hens flew from litter to litter or perch to litter ($\chi^2 = 0.23$; $p = 0.63$). Conversely, the proportion of crashes observed in hens at late lay was significantly higher than observed in hens at mid lay ($\chi^2 = 6.4$; $p = 0.01$). Also, a higher proportion of flights occurring in double aviary sections resulted in crashes compared to flights made in single aviary sections ($\chi^2 = 5.4$; $p = 0.02$). This study is part of the Coalition for a Sustainable Egg Supply (CSES) project.

FROM BASMATI TO JAPONICA: EVERYTHING YOU NEED TO KNOW ABOUT RICE

Ognenka Avramovska

Category: Agriculture and Animal Science, Section 1

Poster: 2

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

Mentor(s): Carl Boehlert (Engineering)

Rice is one of the world's most plentiful crops and is used in cuisine all over the world. The production of rice though, is also very wasteful. Because all rice grains are coated in a thin shell, a lot of rice husks (RHs) result from its production. Interestingly, because of the high-silica content of the RHs, more companies are investigating ways to reduce the amount of waste from rice production by using the husks for raw material for silicon compounds. Rice can also be further processed by par-boiling, which results not in waste, but degradation of the nutrients of rice grain itself in return for a quicker cooking time. This project follows the production processes of rice using microscopy techniques including SEM imaging, as well as Qualitative EDS analysis.

COMPARISON OF TEMPORAL CHANGES IN ANTIMICROBIAL RESISTANCE ACROSS DAIRY CATTLE PRODUCTION PHASES

Stephen Carney

Category: Agriculture and Animal Science, Section 1

Poster: 3

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

Mentor(s): Bo Norby (Comparative Epidemiology)

Bacteria resistant to antibiotics are a concern to animal and human health because of the potential for poor response to antimicrobial therapy when indicated. Resistant bacteria of food animal origin may also be transmitted to humans through the food chain. Most studies of antimicrobial resistance (AR) in food animals have been cross-sectional in nature, and therefore, failed to assess the impact of production changes, physiological status, treatment history, and season on the shedding of fecal coliforms with AR in individual animals over time. In order to evaluate these circumstances, fifty cows on a commercial Michigan farm were randomly enrolled across the following initial lactation stages: recently freshened, mid-lactation, late-lactation, far-off dry, and close-up dry cows. Fecal samples were collected from each cow every other week. Total fecal coliforms were enumerated as colony-forming units per gram feces cultured on MacConkey agar using a spiral plater and automated colony counter. Additionally, fecal coliforms were determined by spiral plating of fecal samples on MacConkey agar with the following drug concentrations: Ceftiofur (8 µg/ml), Ampicillin (32 µg/ml), Tetracycline (16 µg/ml) and Ciprofloxacin (0.5 µg/ml). Reduced susceptibility to ciprofloxacin has not been detected in any of the fecal samples. Fecal coliforms with resistance to ceftiofur were found in 13% of samples and did not differ statistically across cattle production phases. Resistance to both ampicillin and tetracycline was higher overall (20.5 % and 35.1%, respectively) and was significantly reduced when cattle entered the dry period.

EFFECT OF LITTER SUBSTRATE ON LAYING HEN BEHAVIOR IN AN AVIARY SYSTEM

Nicole Martinec

Category: Agriculture and Animal Science, Section 1

Poster: 4

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

Mentor(s): Darrin Karcher (Animal Science), Janice Siegford (Animal Science)

Understanding laying hen welfare is complex, with one approach being the evaluation of laying hen behavior in the housing system. Cage-free aviary systems are one alternative system being used in the U.S. egg industry. An aviary is a multiple tiered system providing perches, nest boxes, and floor space with litter substrate. Several types of litter substrates can be used, but it is unknown which will promote favorable natural behaviors such as dust bathing, scratching, and foraging. The objective of this study is to compare behaviors laying hens display in an aviary housing system using different litter substrates during a production cycle. The study is being conducted at the MSU Poultry Teaching and Research Center. The new laying hen facility has four rooms with aviary systems, each contains four aviary sections with a different litter substrate: wood shavings, straw, AstroTurf or no substrate. Bovans White laying hens are being used, with hens housed at a stocking density of 1 square foot per bird. I hypothesize that laying hens will show more dust bathing behavior on a small particle size litter substrate (i.e., wood shavings) and a higher frequency of aggressive pecking in a litter area with no litter substrate. Video recordings and live observations will be made over a production cycle to observe the frequency of dust bathing and aggressive pecking exhibited in the different litter areas. This study will provide egg producers with information on substrates that promote favorable hen behaviors in the litter area.

EFFECTS OF MIST NETTING ON AVIAN STRESS: ETHICAL IMPLICATIONS OF HANDS-ON FIELD RESEARCH

Emily Cannell, Rae Ballantyne, Brianna Cadigan, Michael Hazelbaker

Category: Agriculture and Animal Science, Section 1

Poster: 5

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

Mentor(s): Jeanette McGuire (Zoology, Fisheries and Wildlife), David Orban (Zoology)

Mist netting is a highly-useful field technique that involves the capturing birds (or other avian creatures) in a fine-mesh net for a wide variety of research purposes. While mist netting may be a simple and effective research method, the process results in birds being handled extensively by humans. Despite the widespread use of mist netting in research, few studies have addressed the effects of mist netting on bird stress levels. This study investigated how multiple aspects of mist-netting (time spent removing the bird, handling time, previous captures, noise levels) affect bird stress levels (indicated by breathing rates). Thirty-six birds were sampled from three national parks in Uganda in summer 2012. Six out of 8 bird species captured had significantly higher breathing rates than what was expected based on Calder's equation for resting avian breathing rates (Calder, 1968). As hypothesized, a significant positive relationship between handling time and breathing rate was observed,

indicating that handling time increased individual stress. Time taken to remove the bird from the mist net and previous mist-net captures did not have an impact on breathing rate. These results indicated that quicker processing time of birds after removal from the nets could reduce bird stress. Further quantification of stress levels, especially through measurement of corticosterone levels after capture, is needed to properly evaluate mist-netting techniques and reduce bird stress levels caused by human handling.

TREATMENT TO IMPROVE LINERBOARD OXYGEN and WATER BARRIER PROPERTIES

Thomas Flack

Category: Agriculture and Animal Science, Section 1

Poster: 6

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

Mentor(s): Donatien-Pascal Kamdem (Packaging)

Problem: Mold and bacteria limit the use of biorenewable and biodegradable packaging materials in wet environments. The objective of this study is to assess, evaluate, and determine the efficacy of using bio based oils on paperboard to repel water and limit the presence of oxygen to control microbial growth. An optimal treatment will make paperboard resilient enough to displace non-composting plastics as a sustainable solution in industrial applications such as food packaging. The laboratory manufactured flexible film specimens will be formulated using chitosan and cedar leaf and/or argan oil (0, 2, 4, and 6% oil). This study will evaluate the tensile strength (TS), water vapor transmission rate (WVTR), and antimicrobial properties of each specimen in adherence with ASTM standards. Preliminary data strongly suggests that bio based oils reduce TS, but improve WVTR.

Poster Presentations, Section 2

QUANTIFYING WATER USE ON DAIRY FARMS IN MICHIGAN

Kyle McLachlan

Category: Agriculture and Animal Science, Section 2

Poster: 7

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

Mentor(s): Faith Cullens (Extension Education), Dana Kirk (Biosystems and Agricultural Engineering), Steve Safferman (Biosystems and Agricultural Engineering)

The economy in Michigan relies heavily on one of its greatest natural resources, water. The tourism, manufacturing, and agricultural industries have all benefited from an abundance of readily available fresh water. Michigan has been able to develop a thriving dairy industry, and fresh water is critical to its continued success. Tracking water usage and eliminating waste on dairy operations is vitally important to Michigan's long term water security. The objective of this paper is to audit and document the water usage on small and large capacity dairy farms throughout Michigan. Several farms will be chosen to maintain a series of data logging flow meters to determine total water usage at each water outlet. Then an assessment of how much water was used for each common farm task such as animal hydration, cooling, cleaning, or milk treatment will be quantified. This information will be compared with data collected from a previous literature review to try and establish benchmark figures that correlate with well managed dairy operations. Currently the data suggests that there is large variance in water usage for dairy operations regardless of productivity. It is expected that there are certain standards and practices for many of the activities that govern dairy farm operation. However, it is also expected that within dairy farms there may be a large amount of water wasted through inefficient operations.

AN ISOTOPE STUDY OF THE HAWAIIAN PETREL MID-NON-BREEDING SEASON FEATHER

Alex Dutcher

Category: Agriculture and Animal Science, Section 2

Poster: 8

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

Mentor(s): Peggy Ostrom (Zoology)

The Hawaiian Dark-Rumped Petrel (HAPE) is an endangered species of seabird native to the Hawaiian Islands. HAPE spends the majority of its time at sea, making its foraging habits and ecology generally unknown. Samples are difficult to obtain from this species; therefore sampling methods developed by Anne Wiley were utilized to minimize damage to the few specimens available. The objective of my research was to analyze the feathers grown in the mid-non-breeding season and compare them to the bases of the other primary feathers previously sampled by Anne Wiley. Ideally, this was to provide a more complete picture of HAPE foraging habits during the non-breeding season. I was able to develop a successful sampling method for

obtaining the stable isotope values both down the length of the feather and as an average. The resulting barb protocol is so minimally invasive that it can be applied to live birds or museum skins without causing harm or visible damage. After analyzing my results from the EA sampling, I have reached multiple conclusions. Based on the results from previously sampled P1 feathers, the beginning of the HAPE non-breeding season showed minimal variability and a general increase in both d13C and d15N values. This is likely a reflection of northern movement. The longitudinal trend in P6 is more variable, reflecting more complex movement in adult HAPE during the middle of the non-breeding season.

ANALYSIS OF THE WORKFLOW IN STUDYING THE BIOMECHANICS OF EQUINE CIRCULAR LOCOMOTION

Rachel Peterson

Category: Agriculture and Animal Science, Section 2

Poster: 9

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

Mentor(s): Hilary Clayton (Large Animal Clinical Sciences), Dirk Colbry (Institute for Cyber-Enabled Research), LeeAnn Kaiser (Large Animal Clinical Sciences)

Michigan State University's McPhail Equine Performance Center, equipped with high-speed infrared cameras and force plates imbedded into the arena floor, is currently unraveling a new realm in the biomechanics of equine locomotion by analyzing circular motion. The aim of their current study is to perform a comprehensive investigation of the mechanisms of circular movement based on both force and movement adaptations in hopes to understand the effect circling has on the equine limbs and movement pattern. In obtaining data for this project ten infrared cameras simultaneously record the horse's movement by targeting 92 reflective markers placed on the horse's body. These images are then merged with the use of a Cortex computer program to create a three-dimensional model that can be used to calculate the motion of each relevant joint. The data gained from the horse traveling over the force plates can also be integrated to be viewed simultaneously in this program. As can be expected, the Cortex program is not able to produce flawless three-dimensional models automatically and thus, extensive review of the tracks must be done manually. This research project surveyed research students and their workflow, working in the Cortex program. This survey has provided a complete breakdown of the various elements that contributed to this type of research, along with possible insights to improve the efficiency of the work done in the lab.

OPTIMIZING BAIT FOR MONITORING THE INVASIVE PEST, SPOTTED WING DROSOPHILA (DROSOPHILA SUZUKII MATSUMURA)

Ashley Leach

Category: Agriculture and Animal Science, Section 2

Poster: 10

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

Mentor(s): Rufus Isaacs (Entomology)

Spotted Wing Drosophila (Diptera: Drosophilidae) is an emerging significant pest of berry crops across the United States. Native to Southeast Asia, this vinegar fly oviposits into ripening fruit thereby contaminating fruit with larvae, introducing harmful pathogens and decreasing internal integrity. A solution of baker's yeast (*Saccharomyces cerevisiae*), sugar, and water is typically used in traps to monitor *D. suzukii* in susceptible crops; however these traps are not very predictive of infestation risk. To determine whether this trap could be improved, the type and species of yeast in addition to sugar type were manipulated. Traps baited with Baker's yeast, ale yeast (*S. cerevisiae*), or wine cuvée yeast (*S. bayanus*) and either sucrose or glucose were placed in raspberry plantings in Southern Michigan. Regardless of sugar substrate, wine yeast attracted the highest number of both male and female *D. suzukii* over the eight week trial. When compared to Ale yeast and Baker's yeast used in Spotted Wing Drosophila traps, the wine yeast captured approximately 15% more flies each week on average. Sugar type had little effect on the response of *D. suzukii*, while yeast type was more accurate in predicting number of flies caught. Further laboratory bioassays with these yeasts will be performed to determine *D. suzukii* bait preference. The implementation of optimized bait solutions in Spotted Wing Drosophila monitoring will likely yield a more accurate measure of the fly's relative population and the risk of crop infestation.

COMPARISON OF OVERHEAD, DRIP, AND SUB-IRRIGATION FOR AN EXTENSIVE GREEN ROOF

Sarah Greer

Category: Agriculture and Animal Science, Section 2

Poster: 11

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

Mentor(s): Brad Rowe (Horticulture)

It was shown in Phase I of this project that green roof substrates subjected to overhead irrigation maintained the highest volumetric moisture content and had the least amount of runoff or wasted water compared to drip and sub-irrigation.

Therefore, the objective of this study was to compare how these irrigation method influenced plant health. The study was conducted atMSU Plant Science Greenhouses in LiveRoof green roof modules where two species, Sedum album and Sedum floriferum were subjected to no supplemental water, overhead, drip, or sub-irrigation treatments. Repeated measurements were recorded for plant survival, growth index $[(L \times W \times W)/3]$, chlorophyll fluorescence, and substrate volumetric moisture content. After 12 weeks plants were harvested, separated into roots and shoots, dried, and weighed to determine biomass, root:shoot ratios, and carbon sequestered. Results show that overhead was the most favorable for plant growth and health. Plant dry weights averaged 1.00 g, 0.78 g, 0.40 g, and 0.09 g for Sedum album subjected to overhead, drip, sub and no irrigation, respectively, when no water retention fabric was used. The inclusion of water retention fabric generally improved results for drip and sub-irrigated plants. Chlorophyll fluorescence values were generally highest for plants subjected to overhead irrigation. Because green roof substrates tend to be coarse to allow adequate drainage, water does not move laterally to a great extent as it would in finer substrates. For this reason, drip and sub-irrigation may not be the most efficient irrigation methods.

ANEROBIC DIGESTION

David Holzwart

Category: Agriculture and Animal Science, Section 2

Poster: 12

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

Mentor(s): Louis Faivor (Biosystems)

A 250,000 gallon plug flow anaerobic digester was installed on campus in the fall of 2011 with no operating procedure. An operation manual is needed so the students can operate the digester while maintaining an environment suitable for anaerobic digestion to occur. This will also aid in the development of a procedure and operations plan that potential farm operations and investors can review and reference when planning, and operating anaerobic digestion systems. The goal of this project was to allow someone with little training or technical background to operate an anaerobic digester in a manner that will allow the system to function effectively, efficiently, and safely. It was concluded that a safety guide, sample collection method, feeding/recirculating methods, temperature regulations, and components breakdown would be a few of the main topics to include in this manual. As with all research projects, the objectives, and operations can change over time. This manual was designed to adapt with those changes. Continued improvements and additional components on this system need to be monitored and integrated into this manual. Future plans for the digester include the addition of a solid liquid separator and it will cause a series of changes to the scheduled tasks of the digester. Algae raceways will also be added to the waste system and will require a method of operations.

Poster Presentations, Section 3

WYOMING AND MICHIGAN COMPARATIVE SOIL ANALYSIS

Jessica Harris

Category: Agriculture and Animal Science, Section 3

Poster: 14

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

Mentor(s): Carl Joseph Boehlert (Chemical Engineering and Materials Science)

Essential for the sustenance of the plant are certain nutrients. These nutrients must be available for consumption in the soil where the plant is located. I have obtained soil samples from both Wyoming and Michigan. I am conducting a comparative soil analysis of these, searching for those nutrients that plants thrive on, nitrogen and phosphorus. I hope that my juxtaposition of the samples will be indicative of the fertility of either state. Wyoming, specifically the Big Horn Basin, is a high desert, contains high amounts of alkali, and is resting upon a shelf of Madison Limestone. The combination of those three factors result in an arid climate. Due to the presence of Lakes Michigan, Heron, Eerie, and Superior, Michigan soil is well hydrated. Using the Scanning Electron Microscope and the Energy Dispersive Spectroscopy, I intend to identify the substances that result in a more fertile Michigan soil.

IRE1 α TRANSMEMBRANE DOMAIN OLIGOMERIZATION AND SECONDARY STRUCTURE

Ryan LaMarca

Category: Agriculture and Animal Science, Section 3

Poster: 15

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

Mentor(s): Christina Chan (Biochemistry and Molecular Biology)

The endoplasmic reticulum (ER) is the organelle responsible for the folding and maturation of transmembrane and secretory proteins. When the ER undergoes "stress," such as an accumulation of too many unfolded proteins, the Unfolded Protein Response (UPR) is activated. The intent of the UPR is to either restore ER homeostasis or cause the cell to die via apoptosis. One signal transduction pathway initiated by UPR activation starts at the type I transmembrane protein Inositol-requiring-enzyme-1- α (IRE1 α). IRE1 α promotes homeostasis restoration by reducing the concentration of unfolded proteins in the ER. Since the UPR is activated in several liver diseases, it is thought that restoring ER homeostasis could be used for possible treatment of those diseases. Hence it is vital to completely understand the mechanism of IRE1 α . While previous research has uncovered much about the luminal and cytosolic domains of IRE1 α , to the best of our knowledge no previous information exists concerning the transmembrane domain. With the use of CD spectroscopy we report that the TM domain of IRE1 α is α -helical when in a membrane-mimic environment. Additionally, our SDS-PAGE and FRET analysis shows that IRE1 α forms oligomers when in SDS micelles.

EFFECTS OF PLATING CONDITIONS ON ZEBRAFISH EMBRYONIC FIBROBLASTS

Stephan Diljak

Category: Agriculture and Animal Science, Section 3

Poster: 16

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

Mentor(s): Jose Cibelli (Animal Science)

Somatic cell nuclear transfer (SCNT) is a promising model for transgenesis in zebrafish that can overcome limitations of other techniques. However, thawing and plating potential fibroblast donor cells yields low rates of cell survival and proliferation. Here, we evaluate the effects of thawing and plating zebrafish embryonic fibroblasts onto gelatin, fibronectin, or a control at different cell densities through analysis of live and dead cell numbers. We show that cells plated at lower densities on fibronectin have a significantly higher live/dead cell ratio than those plated on gelatin. Also, gelatin and fibronectin improve in live/dead cell ratio with an increase in the number of cells plated and to an even greater extent over time. Preliminary observation of cells plated with Rho-associated kinase inhibitor and in 5% oxygen suggested a negative effect on cell viability, and inconclusive evidence, respectively. We conclude that plasma fibronectin consistently promotes the ratio of viable adherent cells to dead cells in comparison to gelatin.

FEEDING THE FUTURE

Madeline Judge, Kevin Adams, Casie Forbush, Jennifer Thach

Category: Agriculture and Animal Science, Section 3

Poster: 17

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

Mentor(s): Matt Raven (Community, Agriculture, Recreation and Resource Studies), Laurie Thorp (Community, Agriculture, Recreation and Resource Studies)

Only about 1% of Americans are involved in production agriculture. Consequently, many people have become detached from the source of their food. In order to evaluate Michigan State University students' understanding of the current food and agricultural systems, a survey was distributed to students living in Bailey Hall and Emmons Hall during the first week of Fall Semester 2012. The survey included demographic information as well as questions about the students' previous experiences with agriculture and their current sense of community at MSU. Students living in Bailey Hall have since been encouraged to get involved with the Bailey GREENhouse, edible landscape and green roof in ways that include planting, caring for, harvesting and cooking with herbs and vegetables. Additional educational activities centered around the GREENhouse and food production will be staged throughout the remainder of Spring Semester 2013. The same survey will be conducted again in April of 2013 to evaluate how the intervention activities impact Bailey Hall residents' understanding of food production. Emmons Hall residents represent the control group. The objectives for this project were: 1. Assess residents' knowledge, attitude, and self-reported behavior toward agriculture and food systems using Fall 2012 survey and Spring 2013 survey data. 2. Develop and conduct educational activities throughout the remainder of Spring Semester. 3. Determine the impact the Bailey GREENhouse, green roof and edible landscape have in educating campus based undergraduates about sustainable food systems and developing a sense of community (analyze data from the pre-test and post-test).

EFFECTS OF NITROGEN FERTILIZATION SOURCE AND PLACEMENT ON WHEAT AND WEED COMPETITION

Devon Rossman

Category: Agriculture and Animal Science, Section 3

Poster: 18

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

Mentor(s): Dan Brainard (Horticulture)

Weed and nutrient management are two of the greatest challenges to wheat-rice rotational systems of India. Ongoing research has suggested that crop-weed competition and nitrogen (N) losses to the environment can be reduced by targeting fertilizer sources and placement to match crop N demands. A preliminary greenhouse study was conducted to evaluate the effects of four N sources and two levels of weed competition on early wheat growth. The N treatments included urea, ESN (a slow-release, polymer coated urea), or chicken manure compost at 77 lbs N/Acre, and an unamended control. Weed competition consisted of either no weeds, or Phalaris minor (littleseed canarygrass) – a major weed of wheat in India – sown at the time of wheat planting. In total, there were 8 treatments with four replicates of each. Unexpectedly, the germination of Phalaris minor was poor compared to the seed germination rates measured in petri dishes, so the effects of weed competition could not be meaningfully measured. However, the rate of release from the varying N sources seemingly impacted the long-term availability of nitrogen and consequent benefit to the crop. The unamended control, chicken manure, and urea plots did not yield statistically different wheat biomasses from one another. However, ESN fertilization resulted in statistically more wheat biomass accumulation than in each of the other treatments. If precision placement of ESN fertilizer can give an advantage to wheat over weeds, it will help to alleviate many of the issues experienced in wheat and other similar cropping systems internationally.

UTILIZING ENVIRONMENTALLY SMART NITROGEN TO IMPROVE THE PRODUCTION EFFICIENCY OF MICHIGAN AGRICULTURE

John Schramski

Category: Agriculture and Animal Science, Section 3

Poster: 19

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

Mentor(s): Kurt Steinke (Crop and Soil Sciences)

With the world's population forecast to reach 9 billion people by the year 2050 there is a great need for more global food production. With this in mind, agricultural producers and scientists are striving for ways in which more food can be produced while protecting and preserving our earth for future generations. Nitrogen has long been recognized as the yield-limiting nutrient in terrestrial ecosystems that produce our world's food staples. Synthetic fertilizers such as granular Urea and liquid UAN 28% have been used in the past, but only offer nitrogen to the plant shortly after applied. Environmentally Smart Nitrogen is a granular nitrogen fertilizer enclosed in a polymer coat, which dissolves overtime and allows plant available nitrogen to be released throughout the growing season. This is vital since crops generally require more nitrogen prior to pollination. However, limited information on ESN has been published, and there are possible unknown problems for farmers. Our research is concentrated on discovering the leaching levels as well as crop uptake of ESN compared to Urea and UAN 28%. We hope to seek any potential threats this revolutionary fertilizer product could create for agricultural producers as well as the sustainability of our earth in the future.

THE MICROSTRUCTURE OF PAPER: ANALYZING HOW THE STRUCTURE OF CERTAIN PAPERS MAKES THEM MORE ABSORBENT THAN OTHERS

Luis Merino

Category: Agriculture and Animal Science, Section 3

Poster: 20

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

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

My research seeks to understand how the microstructure of a material makes it water absorbent. In order to achieve this goal I will use paper as my model material. Using scanning electron microscopy (SEM), I will image different types of papers under both dry and wet conditions, in order to compare the microstructure, of each different type of paper, with its absorbency. In my presentation, I will showcase both my analysis of the microstructural characteristics, found through this comparison, and the SEM images that are representative of my findings. I hope to discover the differences in the basic microstructure of each different type of paper, and the differences in their microstructure when in conjunction with water. I hope those differences will provide insight as to what makes materials water absorbent, and I also hope that insight can be used for materials other than paper, in order to create new super absorbent polymers, with uses that may range from slightly innocuous, such as the

improvement of incontinence garments, to crucial, such as inventions that facilitate clean water distribution to remote villages in third world countries.

Poster Presentations, Section 4

METAGENOMICS ANALYSIS OF A ~3-BILLION-READ TRANSCRIPTIONAL DATA SET FROM A WILD APPLE SPECIES, *M. FUSCA*

Cordarius Rodgers

Category: Agriculture and Animal Science, Section 4

Poster: 21

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

Mentor(s): Steve van Nocker (Horticulture)

Metagenomics is an emerging field of the study of genetic material recovered directly from heterogeneous biological samples. It is most frequently utilized to identify various individual species within mixed microbial communities, through massively parallel sequencing of recovered DNA and comparison of DNA sequence with those of known organisms cataloged in databases. The goal of the study was to develop approaches for high-throughput analysis of species composition from environmental transcriptional (RNA-based) data. We found that a strategy combining sequence homology-search programs BLASTX and BLASTN was most efficient for identifying unknown sequence. We analyzed a collection of transcriptional (RNA-based) sequence datasets containing nearly 3 billion sequence reads and 300 billion nucleotides derived from 72 organs and developmental stages of a wild apple species, *Malus fusca*. Approximately 20% of sequence reads showed high sequence similarity with previously identified genes from *Malus*. Approximately 50% of reads showed homology with genes from other plants and may represent previously undiscovered apple genes. Of the remainder, ~ 1% could be confidently classified as originating from a collection of macro and microorganisms. These results demonstrate the utility of an RNA-based approach for gene discovery and metagenomics.

DO CONSUMERS LIKE DISPLAYS THEY SEE LATER IN THEIR SHOPPING EXPERIENCE? EYE TRACKING ANALYSIS OF GARDEN CENTER DISPLAYS

Meagan Rogowski

Category: Agriculture and Animal Science, Section 4

Poster: 22

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

Mentor(s): Bridget Behe (Horticulture)

Eye-tracking hardware has allowed researchers to analyze how individuals respond to visual stimuli and has been used in multiple areas of study. However, few studies have focused on retail displays in the consumer marketplace. Using quantitative information collected with Tobii X1 Light eye-tracking device to detect eye movements and focal fixations during the viewing time, we investigated whether consumers' eye-movements correlated with the areas of interest (AOI) for ornamental plant displays and analyzed their attention to the AOIs and their likelihood to purchase the product. Data was collected at two retail settings in two countries of similar socioeconomic status, the United States and Australia. Participants were asked to view 32-36 slides of merchandised in-store displays of varying ornamental plants, including: hydrangea, boxwood, cyclamen, flower carpet rose, and an array of flowering annuals. After data collection, we analyzed the relationship between fixation count (the number of times participant views a specific area of the display), total visit duration (amount of time spent viewing a particular area of interest on the display), and their likelihood to purchase the products. Information collected from this experiment shows higher likelihood to buy among the last displays viewed compared to the first displays seen. The question remains if consumer attention duration diminishes in the observation of displays over time. This study sheds new light upon consumers' responses to in-store displays, and helps to determine how retailers can implement this new information into practice to better capture and retain consumer interest of their displays.

BEHAVIOR IN AN AUTOMATIC MILKING SYSTEM

Vania Van Hyfte

Category: Agriculture and Animal Science, Section 4

Poster: 23

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

Mentor(s): Janice Siegford (Animal Science)

The use of an Automatic Milking System (AMS) in the dairy industry is a growing method for large production dairies. This system grants cows considerable control over milking by allowing them to be milked at their leisure. However, blocking events – instances of cows preventing other cows that have just been milked from leaving the exit alley of the milking parlor – have

been recorded in the AMS. Researchers observed that primiparous and lighter weight cows block the most, which is the reverse of the type of cows entering the milking parlor at will. It has been suggested that more dominant cows enter the AMS first, and we will investigate whether blocking is a display of dominance by the smaller cows upon exiting the machine. Blocking hinders the ease and efficiency of the AMS which may result in milking delays, additional stress, and even potential milk yield reductions. We plan to analyze the behavior of dairy cows at the exit alley of two AMS at the Kellogg Biological Station (Hickory Corners, Michigan). At this farm, researchers have observed a number of blocks by different dairy cows. There will be series of video cameras positioned to view both of the exit alleys and waiting pens adjacent to the robotic milkers. The video will be collected for one week to allow for interpretation of whether blocking occurs among the herd and to identify which cows are participating – with data concerning her weight and parity.

COMMUNITY-BASED AFRICAN ANIMAL TRYPANOSOMIASIS CONTROL PROGRAMS: A GENDERED PERSPECTIVE

Leah Dodge

Category: Agriculture and Animal Science, Section 4

Poster: 24

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

Mentor(s): Meredith Gore (Fisheries and Wildlife)

African Animal Trypanosomiasis (or Nagana) is a vector borne disease transmitted by the bite of the tsetse fly that affects both animal and human populations in sub-Saharan Africa. The disease causes significant disability in cattle (i.e. poor appetite, increasing debility, and death), therefore causing significant financial burden in communities that are dependent on cattle for their livelihoods. Taking both direct and indirect production costs into account, it is estimated that \$4.7 billion is lost annually. In controlling the tsetse fly, widely used methods include trapping and targeting. Importantly, community participation has become increasingly popular in ensuring the sustainability of traps as there is not a single organization or political body (e.g. non-governmental organizations or the government) responsible for the continued maintenance of traps. Women have the potential to play a significant role in the assembly and maintenance of tsetse traps and targets that are placed around watering areas as women are traditionally and disproportionately responsible for domestic chores such as fetching water and are, in some pastoralist communities, becoming increasingly involved in cattle rearing. Theoretically, the inclusion of women into such activities can offer both social and economic benefits as well as increased status within their communities; this has the potential to give women a higher degree of agency. Through literature review, this study explores the absence of gendered literature on community participation and tsetse control. In this, the role that women currently (do not) perform and have the potential to undertake in the future is considered.

DEVELOPMENT OF A FARM TO CONSUMER TRACEABILITY MODEL

Shelby Tackett

Category: Agriculture and Animal Science, Section 4

Poster: 25

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

Mentor(s): Daniel Buskirk (Animal Science)

The overall goal of this project is to develop a working model of beef traceability from live animal to package. Two-dimensional barcodes were used to track wholesale cuts from individual animals throughout two different processing methods. Scanning the barcode launches a mobile website that gives farm of origin information and therefore allows consumers to know the source of their selection. Seventy-two Angus and Angus x Simmental crossbred steers were used to examine alternative methods of tracking beef carcasses to wholesale cuts. Carcass quarters were processed at Byron Center Meats, Byron Center, MI. Video of all beef processing was digitally recorded using 2 digital video recorders, each equipped with 2 surveillance cameras for later analysis of exact timing of procedures. Carcasses were processed using a serial method (SERIAL) one day and parallel method (PARALLEL) on the next; 9 carcasses were processed each day. The SERIAL method consisted of fabrication of all cuts of a single carcass before moving on to the next, and PARALLEL consisted of processing of 10 hindquarters followed by, 10 forequarters, 8 hindquarters, and 8 forequarters. The major difference between the processing methods was that beef from only one animal was available at a time on the meat cutters' tables for SERIAL, whereas beef from multiple carcasses were on the meat cutters' tables for PARALLEL. Once processing ended, the video was analyzed to determine the time involved in tracing for each processing method.

EGG LOCATION IN AVIARY SYSTEMS AND CORRELATION TO LITTER SUBSTRATES

Angela Johnson

Category: Agriculture and Animal Science, Section 4

Poster: 26

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

Mentor(s): Darrin Karcher (Animal Science)

In 2009, Michigan passed legislation mandating all laying hens will be given one square foot per bird, while not specifically identifying the type of housing system. More recently, the United Egg Producers and the Humane Society of the United States have started to pursue federal legislation related to laying hen housing. The United States' egg industry will be moving away from conventional cages to alternative housing systems such as the cage-free aviary system. The aviary system provides the hens with nest boxes, perches, and floor access. The floor contains a litter substrate providing hens the option to express natural behaviors. The hens should lay all eggs in the nest box area within the system, but with access to the floor there is a chance of eggs being laid in other areas. Eggs not laid in the nest box have a higher risk of breaking or coming into contact with excreta resulting in bacterial contamination. The purpose of this research is to determine if different litter substrates influence where eggs are laid within the cage-free aviary system specifically between floor and nest box areas. Each system provides an astroturf, wood shaving, straw or concrete floor substrate. Eggs will be collected daily and quantified by their location in the system. The determination of where eggs are laid in the aviary system and correlation to the litter substrates will provide guidance to the commercial industry on type of litter substrates to consider in the cage-free aviary system.

FEED WASTAGE IN ENRICHED COLONY SYSTEMS FOR LAYING HENS

Justin Warchuck

Category: Agriculture and Animal Science, Section 4

Poster: 27

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

Mentor(s): Darrin Karcher (Animal Science)

Feed wastage is a major concern for commercial egg producers since approximately 70% of costs in producing an egg come from feed. Egg laying industry is beginning to transition to new housing systems such as the enriched colony cage which provides perches, scratch pads, and nest boxes for the laying hens. Besides the actual feed trough, an auger that transverses the cage system deposits feed onto the scratch pad, the hens are able to scratch, peck and dust bathe. As a result, the hens do not necessarily consume the feed but remove it from the scratch pad where it falls to the manure belt. The hypothesis is that the shape of the scratch pad will influence the amount of feed lost. To test this hypothesis feed waste will be gathered in a collection box placed under the scratch pad area. Two layers of material will be used to segregate fecal material from the feed to accurately quantify the feed wasted. The collected feed will be extracted and weighed. With research under way, the project suspects a more significant amount of feed will be lost from "I" shaped pads compared to rectangular pads; therefore a greater loss on monetary gains for the producer.

Poster Presentations, Section 5

APPLE FRUIT MOISTURE LOSS IN STORAGE: INFLUENCE OF VARIETY AND CUTICULAR DAMAGE IN A SEASON OF EXTREME WEATHER

Douglas Alt

Category: Agriculture and Animal Science, Section 5

Poster: 28

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

Mentor(s): Randy Beaudry (Horticulture)

Fruit of the apple (*Malus domestica*) cultivars McIntosh, Empire, Jonathon, Jonagold, Gala, Golden Delicious, Honeycrisp, and Minneiska 1914 (Sweet Tango) were each harvested at their commercial harvest maturity and stored in cold storage (5°C) until all varieties had been collected. In the first experiment (Variety Experiment), 20 fruit from each cultivar were randomly selected, weighed for an initial mass, and numbered. The apples were arranged into a tray pack cartons, covered, placed in a cold storage at 5°C and 65% R.H., and fruit determined every 3-7 days for 36 days. In a second experiment (Cuticular Damage Experiment), Honeycrisp was scored for degree of cuticular damage on a scale ranging from 0 for no damage to 3 for severe damage. Seven apples from each degree of damage were randomly selected, weighed for an initial mass, and numbered. They were then placed in tray pack cartons, covered and placed in a cold storage at 5°C and 65% R.H., and fruit weight determined every 3-7 days for 36 days. The moisture loss for Gala and Minneiska 1914 was statistically higher than the other cultivars, but similar to each other. These varieties suffered from enlarged lenticels and numerous, visible cracks in the cuticle. As the degree

of cuticular damage increased in the Cuticular Damage Experiment, moisture loss of the Honeycrisp apples also increased. The data suggests that moisture loss of apples in storage is affected by cultivar and cuticular damage, but the latter factor has a much more significant effect.

IS INCREASED FEAR ASSOCIATED WITH FEATHER PECKING IN COMMERCIAL TURKEYS?

Chelsea Niewiadomski

Category: Agriculture and Animal Science, Section 5

Poster: 29

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

Mentor(s): Marisa Erasmus (Animal Science), Janice Siegford (Animal Science), Janice Swanson (Animal Science)

Feather pecking, a form of injurious pecking, is a problem in commercial turkeys. Previous research has shown different tendencies of chickens to develop feather pecking with some association between this behavior and a hen's fear response. No research to date has examined the individual differences in feather pecking and fear responses among turkeys. This study evaluated whether a relationship exists between feather pecking and fear responses in turkeys. Commercial male turkeys were housed in groups of 5 to 6 in seven pens from day 1 to 14 wk of age. Behavior was video-recorded at 8 wk and instantaneous scan samples of behavior were executed at 5 min intervals, identifying birds that feather pecked (PECK) and birds that did not (NPECK). Turkeys were also classified as targets of feather pecking (TAR) or not (NTAR). Two fear tests, tonic immobility (TI) and open field (OF), were used to assess turkeys' fear responses at 8 wk (n=20). Differences in fear responses of PECK and NPECK and TAR and NTAR were evaluated using Fisher's exact test. Results from OF tests were not significantly different between turkeys of the various classifications. However, there was a trend toward significance between TI fear responses of NTAR and TAR birds (P=0.057). Thus PECK birds were not distinct in their responses to TI and OF tests when compared with NPECK birds, demonstrating that the performance of feather pecking does not appear to be associated with fear responses in turkeys though being a target of feather pecking might be.

MALE STICKLEBACK (GASTEROSTEUS SPP.) COURTSHIP ACTIVITY FLUCTUATES ACROSS THE SEASON

Anna Reh-Gingerich

Category: Agriculture and Animal Science, Section 5

Poster: 30

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

Mentor(s): Janette Boughman (Zoology)

Threespine stickleback, *Gasterosteus aculeatus*, are a freshwater fish species that exhibit both male parental care and female mate choice. Because males raise the offspring, a female's only investment involves carrying eggs. Males invest heavily in building nests, courting females, and caring for young. Recently it has been discovered that female investment is consistent across the season, but females become less choosy as the season progresses. The central question of our study is to ask how males might adjust their investment in courtship across the season. Might lesser-quality males exploit decreased choosiness but consistent female investment, thereby slowing the evolutionary progression of the species? To test this, we enticed males daily to build nests (N=143) from April to August 2012. Males who completed nests (N=34) were placed in a three-day rotation of no choice trials with females that were ready to deposit eggs. We measured nest quality, nuptial coloration intensity, and courtship patterns. Our results strongly indicate that males were more likely to perform nesting behaviors rather than court the female as trial number (not seasonal timing) increased (p<0.001), but females were more likely to respond to courtship behaviors during mid-late season, with increasing importance placed on the quickness of the first courtship behavior (p=0.0430). Thus, practice matters for males, yet timing matters for females, in determining mating success. Future studies will investigate how quality in male appearance and courtship might compare to nest quality and nesting behavior in female choice, and how male investment in each changes over time.

QUANTIFICATION OF ATTACHMENT AND DETACHMENT OF NANOSILVER PARTICLES ON FRESH PRODUCE SURFACES

Alexandra Delannoy

Category: Agriculture and Animal Science, Section 5

Poster: 31

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

Mentor(s): Wei Zhang (Plant and Microbial Sciences)

Nanotechnology is a relatively recent development in science. ENPs (engineered nanoparticles) can be manufactured to a size of less than 100 nm. Some of these ENPs, in particular nanosilver (active ingredient) can be used by agricultural companies to improve sustainability and productivity of production of crops. ENPs are mainly used in pesticides and fertilizers to enhance performance and delivery of agrochemicals to plant. By adding ENPs to these formulas, it could be introduced into the food

chain through attachment to fresh produce surface and uptake from soil. Consumption of fresh produces with these nanoparticles attached to the surface of fruits and vegetables may potentially negatively impact human health in the future. The effects have only been minimally explored, and so the object of this study is to quantify the attachment and detachment of nanosilver on produce surface and to also identify optimal washin procedures to remove nanosilver from the produce surface. The results will inform us the propensity of ENPs to attach on fresh produces and help design better strategies to mitigate contamination risk.

EFFECT OF CHIP SCRAPS ON STARTER PIG GROWTH

Nicole Martinec, Caelah Doerr, Erika First, Ashley Rogers, Krysten Trottier

Category: Agriculture and Animal Science, Section 5

Poster: 32

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

Mentor(s): Nathalie Trottier (Animal Science)

With the rising price of corn, swine producers are faced with increased feed costs due to corn being a large component in swine diets. A possible alternative feed is chips scraps, which are snack chips that are usually discarded for being too oily, too dry, overcooked, etc. To save feed costs and save this food source from being thrown away, chips scraps can be included into a starter pig diet in place of a percentage of corn. A starter pig is a piglet that has been weaned and has started eating a solid diet. Chips scraps and corn have similar amino acid profiles and are both high in energy. This study is critical to assess the utilization of chip scraps at differing rates of dietary inclusion, as well as the practical feasibility for starter pig feed on a commercial basis. Three blocks of twelve pigs are randomly allocated to three diets: 1) 40% chip scrap inclusion rate, 2) 20% chip scrap inclusion rate, and 3) 0% inclusion rate. Feed intake is monitored daily and weights are recorded weekly. Metabolism trials will be conducted with feces collected daily. Fecal samples will be analyzed for nitrogen and energy content. Our poster will show our results thus far, with expected results showing that pigs with chip scraps included in their diet will grow just as well or better than pigs fed the standard corn based diet. This study will provide swine producers with information on a more affordable high energy feed ingredient.

ASSESSMENT OF PLASTIC BIODEGRADABILITY BY MEASUREMENT OF CARBON DIOXIDE EVOLUTION

Matt Weal

Category: Agriculture and Animal Science, Section 5

Poster: 33

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

Mentor(s): Rafael Auras (Packaging)

The accelerating concept of sustainability is causing many evolutions on the fronts of material science to innovate ways to support the environment through altering the life-cycle of man-made waste. In the plastics industry, additives have been designed to enhance the end-life scenario of polymers to quicken their decomposition by means of living organisms. There is a lack scientific evidence to support that such additives are truly performing as claimed. A large-scale direct measurement respirometer (DMR) was constructed within an environmental chamber simulating an aerobic decomposition, or compost scenario (conditions of 58 ± 2 °Celsius and $55 \pm 5\%$ relative humidity with the presence of oxygen as outlined in ASTM D6400 and ISO 14855). Capable of monitoring 96 distinct bioreactors, the DMR is a component of a 3 part (aerobic, anaerobic, and soil burial) investigation and evaluation of the performance of 3 brands of additives to polyethylene (PE) and polyethylene terephthalate (PET). Harnessing a precise flow rate of oxygen-rich air throughout the system permits an infrared gas analyzer to accurately distinguish carbon dioxide evolution of the polymers within each reactor as degradation persists. The system is manipulated by gas flowmeters and electronic manifolds, controlled by a pre-existing, but reengineered, Labview program. Records of carbon dioxide evolution are then compared against data from a known biodegradable polymer, corn starch. It is anticipated that the outcomes of this project will provide definitive results regarding true biodegradability of the additive systems studied.

Biochemistry and Molecular Biology

Oral Presentations, Section 1

C-TERMINAL DOMAIN OF RETINOBLASTOMA PROTEIN GOVERNS PRB STABILITY AND ITS ROLE IN APOPTOSIS

Raj Lingnurkar

Category: Biochemistry and Molecular Biology, Section 1

Location: Lake Michigan Room, 11:00 AM

Mentor(s): R. William Henry (Biochemistry and Molecular Biology), Satyaki Sengupta (Biochemistry and Molecular Biology)

Mutations in the Retinoblastoma gene are present in one third of all human cancers. A noted tumor suppressor, Retinoblastoma protein (pRB) binds transcriptional activator E2F1, repressing transcription of genes critical to cell cycle progression. Consistent with its tumor suppressor activity, pRB also governs apoptosis in proliferating cells in response to DNA damage. Tethering of pRB to pro-apoptotic gene promoters is mediated through its C-terminus region, which contains critical intermolecular contacts with E2F1. Intriguingly, retinoblastoma patients harbor a premature stop codon in the RB gene, resulting in a truncated pRB lacking the entire C-terminus. We hypothesize that these mutants are debilitated for inducing apoptosis in the face of genotoxic stress, and thus offer cancer cells a distinct survival advantage. To test this, mutations were introduced into the RB gene to mimic this clinically observed genotype, and mutant proteins are being assayed for their ability to induce apoptosis in cancer cells. The pRB C-terminus region also shows structural homology to the C-terminal region of other RB family proteins, p107 and p130. Based on our recent work, we hypothesize that this region is also linked to the targeted destruction of pRB, contributing to the etiology of cancer progression. Currently, mutant forms of human pRB bearing defined C-terminal deletions are being tested for stability in cancer cells. Findings from these studies would uncover regulatory pathways impingent on pRB, and provide us insight to therapeutic strategies for cancers involving loss of pRB function.

A GENETIC APPROACH FOR UNDERSTANDING THE ROLE OF THE CONSERVED ELONGATOR PROTEIN COMPLEX IN HUMAN DISEASE

Keshabi Chapagai

Category: Biochemistry and Molecular Biology, Section 1

Location: Lake Michigan Room, 11:15 AM

Mentor(s): Steve Nocker (Horticulture)

Elp3 is the catalytic subunit of the histone acetyltransferase elongator complex that plays an important role in gene regulation. Previous studies have suggested that the function of Elongator is to carry out transcription elongation through chromatin templates. Whereas, recent studies suggest that Elongator is involved in many cellular activities such as protein acetylation, exocytosis, zygotic paternal DNA demethylation and tRNA modification. It also promotes the leaf development in some plants such as Arabidopsis, and causes neurological disease in human beings. However, its mechanism in promoting the human disease is still unclear. In this study we are taking a genetic approach to understand the function of Elongator in Arabidopsis because the genetic analysis using human model is impossible. So, suppressor screen, an experimental process use to identify the individual that exhibit the phenotype of interest is used as a leading pathway for the identification of gene that works with Elongator.

USING FLY EYES TO UNDERSTAND A TUMOR SUPPRESSOR: KEY MUTATIONS IN DROSOPHILA RBF1 REVEAL FUNCTIONAL SIGNIFICANCE IN FLY EYE DEVELOPMENT

Irina Pushel

Category: Biochemistry and Molecular Biology, Section 1

Location: Lake Michigan Room, 11:30 AM

Mentor(s): David Arnosti (Biochemistry and Molecular Biology)

The retinoblastoma protein (Rb) was identified as the first tumor suppressor, and is frequently inactivated in a broad range of human cancers. In healthy cells, Rb is a crucial cell cycle regulator, pausing the G1 to S phase transition. Cancer cells often have mutations in Rb that prevent this pausing and allow the cells to proliferate unchecked. An understanding of the function of this family of proteins will allow for better identification and treatment of diseases caused by such mutations. Using *Drosophila melanogaster* as a model system, we study Rbf1, the *Drosophila* homolog to Rb, to assess how mutations influence protein stability and repression activity. Previous studies have shown that phosphorylation is an important mechanism for controlling Rbf1 repression activity. Our goal is to assess the effects of mutations at several key phosphorylation sites on fly eye development, and use this data to assemble a comprehensive model of how phosphorylation of Rbf1 influences its function in vivo. We overexpressed wild type and mutant Rbf1 specifically in fly eyes and compared the range of phenotypes (from wild

type round eyes to very severe rough eyes) for each mutant, ranking them according to severity. In light of cell culture-based assays about protein stability and repression activity, we propose that Rbf1 function involves two distinct modules under phosphorylation control in development.

DEVELOPMENT OF A FUNCTIONAL GENOMICS PLATFORM FOR EXPLORING TROPANE ALKALOID BIOSYNTHESIS IN ATROPA BELLADONNA

Matthew Bedewitz

Category: Biochemistry and Molecular Biology, Section 1

Location: Lake Michigan Room, 11:45 AM

Mentor(s): Cornelius Barry (Horticulture)

Alkaloids are a group of natural 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 antimalarial 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 these compounds 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. An *A. belladonna* transcriptome was 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 identified candidate genes, co-expressed in *A. belladonna* roots that encode enzymes that may be involved in the missing steps of tropane alkaloid biosynthesis. A virus-induced gene silencing (VIGS) system was developed to test the function of these candidate genes and progress on the biochemical characterization of one of these candidates will be presented.

Investigation of the Production of Hydrogen by Hydrogenase as a Virulence Factor

Eric Young

Category: Biochemistry and Molecular Biology, Section 1

Location: Lake Michigan Room, 12:00 PM

Mentor(s): Eric Hegg (Biochemistry)

The enzyme hydrogenase catalyzes the reversible production of molecular hydrogen from substrate proton and electrons. There exists three main types of hydrogenase, which are classified on their composition of their active site. The focus of this project is on [FeFe]-hydrogenase, as [FeFe]-hydrogenase has been shown to have the highest turnover rate of all the classes of hydrogenase. This is important because studies indicate that the presence of molecular hydrogen plays a role that increase cell viability when under antibiotic stress. Some types of antibiotics have the eventual consequence of the production of dangerous hydroxyl radicals and hydrogen has the ability to help quench these radicals. In this experiment the correlation between hydrogen production and cell survival under antibiotic-induced oxidative stress will be investigated, with the eventual goal of defining hydrogenase as a possible virulence factor for certain pathogens. Cultures will be grown under anaerobic conditions, while manipulating hydrogenase expression level, overall hydrogen headspace concentration, and, antibiotic utilized.

Poster Presentations, Section 1

DETERMINATION OF ARABINOSE FERULATE ACYLTRANSFERASE SUBSTRATES USING FLUORESCENCE POLARIZATION

Nicholas Fernandez

Category: Biochemistry and Molecular Biology, Section 1

Poster: 40

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

Mentor(s): Curtis Wilkerson (Biochemistry and Molecular Biology)

Lignin is a hydrophobic polymer present in plant cell walls conferring critical traits such as vascular tissue rigidity and resistance to enzymatic digestion by pathogens. Synthesis of the polymer is driven by radical coupling of p-coumaryl alcohol(H), coniferyl alcohol (G), and sinapyl alcohol (S) in the presence of peroxidases and laccases. Grasses have a number of novel innovations in lignin synthesis and deposition. Grasses uniquely have ferulate incorporated into hemicellulose, a major component of plant cell walls, and this ferulate is incorporated into lignin during lignin synthesis. This has a profound impact on the effectiveness of cell wall lignification. Using bioinformatic techniques we have identified an enzyme responsible for the addition of ferulate to arabinoxylan in grasses. This enzyme named Arabinose Ferulate Acyltransferase (AraFAT) has not been characterized and

information on its substrates may provide insights into its role in lignin-hemicellulose crosslinking. Currently, we do not know if the substrate is UDP-arabinose or arabinose bound to the mutase that converts arabinose between furanose and pyranose forms. We propose to determine between these two substrates using a biophysical technique, namely Fluorescence Polarization (FP). FP utilizes the rotational frequency difference of a fluorescent or fluorescently tagged molecule and a significantly larger binding partner. This phenomenon is called fluorescence anisotropy, and can measure quantitative binding properties. The nature of the AraFAT substrate binding as well as the possibility of the enzyme complexing with a UDP-arabinose mutase can be determined and we can likely use this technique to determine the kinetic properties AraFAT.

RECEPTOR-DERIVED PEPTIDES THAT MIMIC GLUTATHIONE FUNCTION

Ariana Koch

Category: Biochemistry and Molecular Biology, Section 1

Poster: 41

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

Mentor(s): Robert Root-Bernstein (Physiology)

Cellular antioxidant activity is normally associated with the intracellular peptide glutathione (Gly-Cys-Glu), which catalyzes the removal of oxygen from dehydroascorbate to re-form ascorbate. (Dillon, et al. 2004; 2006; 2010) reports that adrenergic and histaminergic receptors also bind ascorbate at their first and extracellular loops, and that these receptors are able to prevent or reverse the oxidation of ascorbate into dehydroascorbate. Particularly, glutathione shares some sequence similarities with regions of the first and second extracellular loops of these aminergic receptors. Notably, these loops contain a cysteine flanked by one or more hydrophilic amino acids. The purpose of the research is to compare peptides derived from the adrenergic and histaminergic receptors with glutathione in terms of their ability to prevent oxidation of ascorbate to dehydroascorbate. It examines the reactions or lack thereof when ascorbate and various amino acids are combined in a pH 7.4 phosphate buffer solution and exposed to UV rays when run through a SPECTRAMax PLUS Absorbance Spectrometer and the data collected by SOFTmax Pro software. Various amino acids were tested and their data analyzed at 265 nm. Further testing focused on binding between ascorbate and cysteine. The binding prevented rapid oxidation of the ascorbate compound when exposed to UV rays over an extended period of time. Concentrations of ascorbate and cysteine were varied to analyze the effectiveness of the binding between the two. Then other amino acids were tested in varying dilutions to confirm the hypotheses.

HCO₃ TRANSPORT RECOVERY IN COLD CORRECTED CF ΔF508-8 LUNG EPITHELIA CELLS TREATED WITH PDE INHIBITORS AND FSK

Eric Kontowicz, Jacob Aubry

Category: Biochemistry and Molecular Biology, Section 1

Poster: 42

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

Mentor(s): Doug Luckie (Physiology)

The autosomal recessive disorder CF is caused by a mutation in the CFTR gene, with the most common mutation being F508 (Welsh and Smith, 1995). In addition to its role in Cl⁻ transport, there is evidence that HCO₃⁻ transport is equally affected, and possibly plays a more important role in the onset of the disease (Choi et al, 2001). Cold temperature correction at 27°C has been shown to facilitate F508 mutated CFTR proteins to the apical membrane (Valentine et al, 2012). We are exploring whether it is more beneficial to treat cold corrected cells with PDE inhibitors or cAMP stimulators. To evaluate this, we will use ion flux and cytosensor microphysiometer assays. Iodide efflux assay will be used to test the efflux of iodide in F508-8 mutated cells, which correlates to chloride efflux ability. Cytosensor microphysiometer assays will be used to test the extracellular change in pH when F508-8 mutated cells are exposed to drugs. We predict that a cocktail of Forskolin, Sildenafil, and KM11060 used in conjunction with the cold corrected F508-8 cells will produce the greatest increase in Cl⁻ and HCO₃⁻ ion flow because of CFTR's cAMP dependence for channel gating (Lubamba et al, 2011) (Valentine et al, 2012) (Venglarick et al, 1990). From this, we can conclude that a cAMP stimulator and PDE inhibitor used in conjunction with cold corrected cells can drastically improve Cl⁻ and HCO₃⁻ transport in F508-8 CF mutated cells.

AB-INITIO PREDICTION OF MEMBRANE PROTEIN STRUCTURE USING MOLECULAR DYNAMICS SIMULATIONS

Courtney Cox

Category: Biochemistry and Molecular Biology, Section 1

Poster: 43

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

Mentor(s): Micheal Feig (Biochemistry)

G-protein coupled receptors (GPCRs) comprise a large family of integral membrane proteins which mediate sensory processes

(Dong, X. et al, 2001). They are also involved in cell recognition and communication processes and have therefore emerged as a prominent superfamily for drug targets. However, the atomic-level structure is currently available for only one GPCR (bovine rhodopsin), making it difficult to use structure-based methods to design drugs and mutation experiments (Vaidehi, N. et al, 2002). Building reliable structural models of GPCRs is difficult due to the paucity of suitable templates, low sequence identity, and the wide variety of ligand specificities within the superfamily (Michino, M. et al, 2010). However, these models can be produced with the development of protein structure protocols, which predict the 3-dimensional structures of GPCRs from their corresponding amino acid sequences. Our objective is to generate “an iterative protein structure refinement protocol that involves the combination of efficient sampling methods with the application of scoring functions that are able to identify the most native-like conformations from an ensemble of structures” (Feig). The Feig group recently developed a new protocol, which is based on molecular dynamics simulations, but adds a new scoring and averaging protocol (Mirjalili, V. and Feig, M. 2013). In this protocol, the membrane is represented by the heterogeneous dielectric generalized Born model (HDGB), with a continuously varying dielectric constant and surface tension along the membrane normal (Tanizaki, S. and Feig, M. 2005). This study determines the effectiveness of this scoring function in predicting membrane protein structures.

REGION SPECIFIC PROTEIN REFINEMENT USING STEERED MOLECULAR DYNAMICS

Keenan Noyes

Category: Biochemistry and Molecular Biology, Section 1

Poster: 44

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

Mentor(s): Michael Feig (Biochemistry and Molecular Biology)

With applications in fields like drug design and nanotechnology, the need for accurate 3-dimensional protein structures is ever increasing. Despite having knowledge of millions of protein sequences, only a fraction of those sequences have experimentally determined structures. In an effort to develop models of the remaining protein structures, computational methods have been developed. Unfortunately, these computer-based methods often cannot create protein structures close enough to the native state to be useful for many practical applications. In order to get the protein structure to levels of experimental accuracy, protein structure refinement is used. While there have been some documented successes in the field of protein refinement, there remains no consistently successful method. One of the major problems that structure refinement faces is the issue of energy barriers. Often while refining towards the native state, the protein reaches an energy barrier which it cannot overcome, causing the program to sample the same state repeatedly and thus halting refinement. To try and solve this, I'm applying steered molecular dynamics to particular regions of the protein backbone to provide an extra assist to certain areas to help overcome the energy barriers. Hopefully, these directed pulls may allow for the protein to overcome the energy barriers and refine to the native state. If this method of refinement is successful, it would be an important step forward towards creating a consistently successful protein refinement method.

THERMODYNAMIC REGULATION OF NON-PHOTOCHEMICAL QUENCHING IN ARABIDOPSIS

Matthew Smith

Category: Biochemistry and Molecular Biology, Section 1

Poster: 45

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

Mentor(s): David Kramer (Biochemistry and Molecular Biology)

Photosynthesis is a pivotal biological process for all life, and learning how to increase photosynthetic efficiency can benefit society and positively impact all life on Earth. In plants, overexposure to sunlight can reduce photosynthetic efficiency by creating harmful reactive oxygen species, including single oxygen and superoxide. Plants have adapted to protect themselves by dissipating excess excitation energy as heat; this process is known as non-photochemical quenching (NPQ). The mechanism of NPQ is under intense debate. Some models posit that NPQ involves exciton transfer to low-energy carotenoid energy levels, while others propose that de-excitation involves electron transfer. NPQ can be quantified by measuring chlorophyll fluorescence yields after saturating normal photochemical quenching with light. However, these differences in fluorescence seem to disappear at liquid nitrogen temperatures, 77K. Based on this observation, we hypothesized that NPQ involves a thermally activated intermediate. If so, characterizing this intermediate may allow us to identify the mechanism of NPQ. We are testing this hypothesis by measuring the temperature- dependence of chlorophyll fluorescence emission spectra of wild type and mutant plants with altered NPQ responses. Preliminary work was performed in a Dewar flask that was allowed to slowly heat upon depletion of liquid nitrogen. This apparatus was attached to a spectrofluorometer via a fiber optics light guide, with illumination from a filtered light emitting diode. Preliminary results show clear differences in fluorescence temperature- dependence between the light- and dark- adapted wild type and NPQ mutants, consistent with the proposed thermally activate

COMPARISON OF ELECTROLYZED WATER PRODUCTS FOR ANTIMICROBIAL APPLICATIONS: STABILITY AND ACTIVITY

Eric Walton, Stephen McNamara

Category: Biochemistry and Molecular Biology, Section 1

Poster: 46

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

Mentor(s): Jayda Erkal (Chemistry), Dana Spence (Chemistry)

In the last 30 years, electrolyzed oxidizing water (EOW) has gained popularity in the food, agriculture, dental, and medical industries. EOW has demonstrated antimicrobial activity against bacteria such as *Escherichia coli* and *Staphylococcus aureus* and also has displayed antiviral activity against hepatitis B, hepatitis C, and human immunodeficiency virus. The active compound in commercially available EOW products consists of a mixture of hypochlorous acid (HOCl) and its conjugate base hypochlorite (OCl⁻); however, hypochlorous acid and hypochlorite can over time degrade into chloride and chlorates. This degradation is hypothesized to negatively impact the solution's antimicrobial activity as it is directly related to the solution's stability and in effect, its shelf life. In order to observe any change in the ratio of acid to conjugate base (i.e. change in stability of the product), the pH can be monitored over time and can be related to the ratio by the pKa of hypochlorous acid ($pK_{a_{HOCl}} \sim 7.5$). Results indicate that the pH of the solution does change with respect to time when compared to a commercially available product with a known shelf life (5.79 ± 0.03 versus 7.52 ± 0.03 respectively), indicating a change in the solution stability. Additionally, the antimicrobial activity of the EOW product on *E. coli* was observed to depend on the concentration of the active compound, indicating a minimum effective concentration to fully inactivate a suspension of *E. coli* cells.

A BIOCHEMICAL CHARACTERIZATION OF PROTEIN NANOWIRES

John Rotondo

Category: Biochemistry and Molecular Biology, Section 1

Poster: 47

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

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

The metal-reducing bacterium *Geobacter sulfurreducens* has evolved a unique strategy for respiring insoluble minerals using hair-like conductive appendages or pili. The *Geobacter* pili are homopolymers of a single peptide subunit (pilin or PilA) whose assembly promotes the electronic coupling of amino acids and the transfer of electrons through intermolecular and intramolecular pathways. Despite lack of metals or known organic redox cofactors in the pili, they transport electrons along their length at rates greatly exceeding respiratory rates of the cell. The ability of these protein filaments to function as nanowires enables these organisms to produce electricity in microbial fuel cells and reductively precipitate toxic contaminants such as uranium. Furthermore, the possibility of genetically engineering pilins enables the customization of their conductive and binding properties for applications in nanotechnology. These applications require development of protocols that enable their physical and biochemical characterization. When purified, the wires aggregate strongly, preventing their successful deposition on electrodes and their characterization by conductive probe atomic force microscopy. The first goal of my project is to develop protocols for their deaggregation. The aggregation of the wires and the strong hydrophobic interactions between the pilin subunits in the assembly also makes them resistant to denaturation with a range of chemical denaturants such as detergents. For this reason, a second goal of my project is to develop techniques for the depolymerization of the pilins and to characterize them by mass spectrometry. Here we show the efficiency of several methods for the deaggregation of the pili and their depolymerization.

Poster Presentations, Section 2

MICROPHYSIOMETRY AND IODIDE EFFLUX INDICATE DHP 4E IMPROVED I⁻ TRANSPORT AND POTENTIALLY LOWERED ACIDIFICATION RATES IN 508-8 CFTR CELLS

Lauren Lenzion, Hillary Albert, Anthony Dimovski

Category: Biochemistry and Molecular Biology, Section 2

Poster: 48

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

Mentor(s): Douglas Luckie (Physiology)

Mutations in the cystic fibrosis transmembrane conductance regulator results in defective protein maturation leading to premature degradation of the CFTR protein (Class II) and defective gating properties hindering its opening (Class III) (Rowe et al., 2005). The most common CFTR mutation, $\Delta F508$, is a Class II and Class III mutation requiring dual treatment to correct its defects. 508-8 mouse mammary epithelial cells were incubated at 25°C to correct the Class II mutation before treatment with DHP potentiators 4e and LL103 (VX-770 analogs). Iodide efflux and microphysiometer assays were used to study DHP effects on

iodide transport and extracellular acidification rates in Δ F508-8 mutated cells to determine the effectiveness of asymmetric 4e and symmetric LL103 DHP potentiators. Previous research suggests asymmetric DHPs induce greater potentiation of CFTR channels because of varying ester linkage and branched structure. This structural variance is thought to impact interaction with nucleotide binding domains 1 and 2 to promote potentiation (Giampieri et al., 2012). We hypothesized 4e would elicit greater iodide efflux rate constants than LL103 based on this research. Average iodide efflux rate constants of 4e treated cells (0.00105 ± 0.000384) supported our prediction in comparison to LL103 treated cells (0.000166 ± 0.0000908). Low temperature rescue significantly reduced acidification rates ($p = 0.00468$). Further tests are needed to confirm drug influence on acidification rates. Corrected and potentiated Δ F508 CFTR is suggested to increase chloride transport and apical surface fluid in human bronchial epithelial cells thereby reducing CF symptoms (Van Goor et al., 2011).

EVIDENCE FOR VPR-DEPENDENT HIV-1 REPLICATION IN HUMAN CD4 POSITIVE CEM.NKR T-CELLS

Jiajun Zhou

Category: Biochemistry and Molecular Biology, Section 2

Poster: 49

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

Mentor(s): Yong-Hui Zheng (Microbiology and Molecular Genetics)

Vpr protein encoding by Human Immunodeficient virus 1 (HIV-1) can arrest cell cycle in the G2 phase and enhance viral replication in macrophages. Previously, we reported that a potent HIV-1 restriction in the human CD4+ CEM.NKR (NKR) T cells. From the parental NKR cells, we isolated eight clones by limiting dilution. These clones showed three levels of resistance to the wide type (WT) HIV-1 infection: non-permissive (NP), semi-permissive (SP), and permissive (P). We compare the replication of WT and Vpr-defective viruses in these cells. Although WT virus could replicate in the permissive and semi-permissive clones, the replication of Vpr-defective virus was completely restricted. The Vpr-defective virus life cycle was then compared with the WT virus life cycle in the semi-permissive cells, it was found that the Vpr-defective virus could enter the cell and produce virions containing properly processed Gag and Env proteins, but these virions showed much less efficiency for reverse transcription during the next-round of infection. In addition, although viral replication was restricted in the non-permissive cells, treatment with arsenic trioxide (As₂O₃) could completely restore WT, but not Vpr-defective virus replication. These results demonstrate that HIV-1 replication in NKR cells is Vpr-dependent. Vpr promotes HIV-1 replication from the 2nd cycle likely by overcoming a block at early stage of viral replication. Further studies of this mechanism should provide new understanding of Vpr function in the HIV-1 life cycle.

THE EFFECTS OF PU.1 AND CEBP/β ON CHROMATIN ARCHITECTURE AND LINEAGE-DETERMINING CELL DIFFERENTIATION

Brandon Wilkinson

Category: Biochemistry and Molecular Biology, Section 2

Poster: 50

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

Mentor(s): Monique Floer (Biochemistry and Molecular Biology)

PU.1 and CEBP/β are transcription factors that are thought to play a role in chromatin architecture at the nucleosomal level, and contribute to specific gene expression and regulation. In a PU.1^{-/-} cell line, an estrogen receptor domain was added to the PU.1 gene, making it responsive to tamoxifen. I am measuring nucleosome occupancy at 3 pro-inflammatory gene enhancers to determine how chromatin architecture is affected when tamoxifen is added. I am comparing these results to a macrophage-like cell line (CEBP/β present) and a lymphoblast cell line (CEBP/β absent) to determine how chromatin architecture is affected at the 3 pro-inflammatory gene enhancers given these conditions as well.

DISCOVERY OF 3KPZS ANTAGONISTS FOR SEA LAMPREY CONTROL

Santosh Gunturu

Category: Biochemistry and Molecular Biology, Section 2

Poster: 51

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

Mentor(s): Leslie Kuhn (Biochemistry)

Male sea lampreys release a mating pheromone, 7α,12α,24-trihydroxy-3-one-5α-cholan-24-sulfate (also known as 3-ketopetromyzonol sulfate or 3kPZS, Figure 1) which attracts females to spawning grounds. 3kPZS binds to the receptor SLOR1 on the surface of sensory neurons in the olfactory organ, causing a behavioral response, and is detected in femtomolar concentration. SLOR1 was best modeled using human beta1-adrenergic receptor. This structural template allows reliable modeling of the 3D structure of SLOR1. By computational screening of a database of more than 8 million drug-like organic molecules represented by 240 million low-energy conformations, we aim to find a molecule that binds to SLOR1 and blocks its

detection of 3kPZS. We are selecting molecular analogs for electro-olfactogram assays based on having the same steroid ring as 3kPZS and matching its important 3-keto and sulfate oxo groups, while also incorporating different side groups. Molecules with different molecular scaffolds that mimic the shape and electrostatics of 3kPZS are also being selected, as assessed by ROCS software and our own scripts. An additional approach we are using for screening is the SLIDE (Screening for Ligands by Induced-fit Docking, Efficiently) docking software developed by Dr. Kuhn's lab, to assess the quality of interactions for each candidate with SLOR1.

CHARACTERIZATION OF THE RNA-BINDING PROTEIN PPR27 FROM TRYPANOSOMA BRUCEI USING FLUORESCENCE POLARIZATION ANISOTROPY

David Dickson

Category: Biochemistry and Molecular Biology, Section 2

Poster: 52

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

Mentor(s): Charles Hoogstraten (Biochemistry)

Pentatricopeptide repeat protein 27 (PPR 27) is but one of a large family of highly conserved proteins found in *Trypanosoma Brucei*, the parasite responsible for Human African Trypanosomiasis, commonly known as African sleeping sickness. There have only been six of these PPRs found in humans, while over 35 have been discovered in *T. Brucei*. Their nonessential role in our bodies makes them an excellent potential drug target to effectively eliminate the parasite while leaving the human host unharmed. Upon full characterization of the protein and its possible function, efforts can be made to discover how to stop it. Previous data suggested a role for PPR proteins in binding unique single-stranded RNA sequences within trypanosomal mitochondria. Our current focus is using fluorescence polarization anisotropy and extensive user-defined curve fitting and data analysis to investigate the protein-ligand binding interactions for our protein construct. We tested our protein against several homopolymeric fluorescently labeled nucleotide oligomers to obtain the dissociation constant (K_d) for the interaction. Previous work in the Hoogstraten lab has demonstrated preferential binding to G-rich single stranded RNA sequences of approximately 9 bases in length. Current work has focused on elucidating the secondary structure of G-rich RNA sequences using Fluorescence Resonance Energy Transfer (FRET). Future work will entail characterization of two additional members of the PPR family using a similar protocol.

Phosphatidic Acid Binding by TGD2 Is Conserved Throughout Photosynthetic Organisms

Peter Hsueh

Category: Biochemistry and Molecular Biology, Section 2

Poster: 53

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

Mentor(s): Christoph Benning (Biochemistry and Molecular Biology)

The transport of lipid building blocks from the endoplasmic reticulum (ER) into chloroplast envelope membranes is essential for thylakoid membrane biosynthesis. Previous studies in *Arabidopsis* showed that the trigalactosyldiacylglycerol (TGD 1, 2 and 3) are necessary for lipid transport and form a ABC transporter-like complex in the inner envelope membrane of chloroplast. TGD2 is the substrate binding protein; its N-terminus anchors it in the inner envelope with a membrane-spanning domain, while its soluble C-terminus has been shown to bind phosphatidic acid (PtdOH) specifically. Here we take an evolutionary approach by studying TGD2 homologs from green algae, *Chlamydomonas reinhardtii* (Cr), and cyanobacteria, *Synechocystis* sp. 6803 (Sy). TGD2 function is of interest in these organisms because they do not have lipid transport from the ER to the chloroplast. To investigate TGD2 PtdOH binding in detail, the soluble C-terminal regions of each protein were fused with *Discosoma* sp. red fluorescent protein (DsRed). The fusion proteins, DsRed-CrTGD2 and DsRed-SyTGD2, are greatly improved in solubility and easier to detect during protein production in *Escherichia coli*. The lipid binding activities of purified proteins are investigated in vitro using liposome association assays. Results show that both proteins have similar PtdOH binding activity to *Arabidopsis* TGD2. We hypothesize that these similar protein activities imply a conserved TGD2 function, leading us to question the in vivo role of TGD1, 2 and 3 in algae and cyanobacteria.

NOVEL ASSOCIATION OF DNA AND DEXTRIN GOLD NANOPARTICLES

Mark Schonfeld

Category: Biochemistry and Molecular Biology, Section 2

Poster: 54

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

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

My research focuses on how DNA associates with dextrin gold nanoparticles. The research will determine if and how DNA forms into a complex with the nanoparticles. Currently, gold nanoparticles are used for biosensor detection of various food and waterborne contaminants and in bio-defense detection processes. However, depending on the structure of the complex, the particle application can be diversified to include DNA biosensors, DNA sequencing, DNA probe targeting sequences, or DNA nanowires if the DNA stretches out and the gold fits into the major cleft. Novel, nonspecific association was carried out by combining the DNA synthesis into the gold solution. The complex was then observed using TEM microscopy to see how the components associated. The wide possible applications of the association allows for a broad step forward in nanoparticle technology.

TESTING EFFICIENCY OF BACTERIAL CAPTURE USING $Fe_3O_4@Au$ NANOPARTICLES

Jonathan Horton

Category: Biochemistry and Molecular Biology, Section 2

Poster: 55

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

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

At present, testing for bacterial contamination costs the food industry a considerable amount of time and money and it is not completely reliable for detecting pathogenic bacteria as testing is limited. However, by using magnetic nanoparticles attached to an antibody, E. coli O157:H7 can be magnetically separated from food samples in a rapid and relatively inexpensive manner. My research is aimed at examining the efficiency of using $Fe_3O_4@Au$ nanoparticles attached to an anti-E. coli O157:H7 antibody to extract E. coli O157:H7 from a broth culture. If $Fe_3O_4@Au$ nanoparticles are shown to be at least as effective for extracting E. coli as previous capturing materials, they will reduce the cost and amount of time required for testing food for contamination. This, in turn, will help to reduce E. coli O157:H7 outbreaks and save money for the food industry.

Poster Presentations, Section 3

REDUCTION OF INHIBITION BY HYDROXYCINNAMIC ACIDS DERIVED FROM BIOMASS PRETREATMENT USING SIMULTANEOUS LIQUID-LIQUID EXTRACTION AND FERMENTATION

Kyle Tomek

Category: Biochemistry and Molecular Biology, Section 3

Poster: 56

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

Mentor(s): Tim Whitehead (Chemical Engineering and Materials Science)

Production of biofuels involves the formation of bioethanol from lignocellulosic biomass. Three main steps are involved in the transformation of biomass into ethanol: (1) pretreatment, (2) enzymatic hydrolysis and (3) fermentation. Pretreatment is needed to make polysaccharides accessible for enzymatic hydrolysis and subsequent fermentation. A number of pretreatment technologies have been developed using a diverse range of pH, temperatures, oxidants, and solvents. All of these pretreatments have unique positive attributes but have a common problem: the generation of hydroxycinnamic acid inhibitor compounds from lignin degradation. To test the tolerance of E. coli KO11 and S. cerevisiae BY 4710 to these inhibitors, growth experiments using minimal media were prepared using varying concentrations of ferulic acid, p-coumaric acid and their decarboxylase derivatives. Two-phase organic fermentation using alkanes and higher alcohols was conducted to test the removal of these inhibitors. After finding conditions in which the decarboxylase derivatives of these hydroxycinnamic acids are less toxic, enzyme purification and design will be used to improve the catalytic conversion of these acids to their derivatives.

CONSTRUCTION OF A GATEWAY DRIVEN GFP REPORTER FOR USE IN NANNOCHLOROPSIS

Samuel Ballard

Category: Biochemistry and Molecular Biology, Section 3

Poster: 57

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

Mentor(s): Eva Farre (Plant Biology)

Nannochloropsis is a unicellular microalgae under extensive study because of its capability of accumulating oil and unique lipid metabolism. Michigan State University laboratories have collaborated to produce a genome, transcriptome, and nuclear transformation protocol for Nannochloropsis oceanica CCMP 1779. Modified vectors that are composed of a Nannochloropsis resistance driven cassette and a gateway cloning site can be used to switch in endogenous Nannochloropsis promoters by the Gibson Assembly Method. My project consisted of modifying a vector that contains a Nannochloropsis hygromycin resistance driven cassette by insertion of a gateway recombination site that drives GFP (green fluorescent protein) expression for utilization in Nannochloropsis. The vector will be applied in promoter activity and protein level assays, as well as protein localization, with targets indicated to be involved in adapting Nannochloropsis to acclimated day/night cycles and endogenous periodic regulation by a circadian clock.

CYTOCHROME C OXIDASE: METHOD FOR BACKWARDS CATALYSIS

John Salyers

Category: Biochemistry and Molecular Biology, Section 3

Poster: 58

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

Mentor(s): Denis Proshlyakov (Chemistry)

Cytochrome c Oxidase is an integral membrane protein and the terminal member of the electron transport chain. In the mitochondria, four electrons from cytochrome c are used to facilitate the reduction of oxygen to water and the pumping of hydrogen across the inner mitochondrial membrane in order to form an electrochemical gradient. This electrochemical gradient is then used by ATP synthase to form adenosine triphosphate (ATP). The proton pumping mechanism of Cytochromec Oxidase is still under debate and to solve this issue, a new method of studying the protein is in development. Using a method called spectroelectrochemistry we attempt to use electrochemistry to force the enzyme backwards in its catalytic cycle to produce the Feryll (F) and Peroxy (P) states directly from the ground state (O state). Spectrophotometry is used in tandem with this process in order to confirm the appearance and/or disappearance of the individual states. The process will take place on an electrode in a thin layer cell with hexachloroiridate (IV) being used as a mediator to shuttle electrons between the electrode and the protein in solution. The formation of these enzyme states directly from the ground state will allow us to synthetically control when the proton pumping action happens, thus enabling the further analysis of this elusive mechanism.

ANALYSIS OF METAL-BINDING SITES IN UREASE ACCESSORY PROTEIN BY COMBINATION OF METAL-CATALYZED OXIDATION AND MASS SPECTROMETRY

Adib Abdullah

Category: Biochemistry and Molecular Biology, Section 3

Poster: 59

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

Mentor(s): Mark Farrugia (Biochemistry and Molecular Biology), Robert Hausinger (Biochemistry and Molecular Biology and Microbiology and Molecular Genetics)

The metalloenzyme urease catalyzes the hydrolysis of urea into ammonia and carbonic acid, a reaction that provides cells with a useful nitrogen source or used to increase virulence (e.g., in *Helicobacter pylori* colonization of the stomach). The model urease system from *Klebsiella aerogenes* consists of UreA, UreB, and UreC subunits and uses a di-nickel active site for catalysis. The accessory proteins UreD, UreF, UreG, and the nickel metallochaperone UreE are required to sequester and shuttle nickel ions to the active site *in vivo*. Previous *in vitro* studies have shown that all of the accessory proteins except UreF bind nickel ions, but the residues required for nickel binding are only known for UreE. To investigate the metal-binding sites in selected protein species, we performed *in vitro* metal-catalyzed oxidation (MCO). MCO generates short-lived reactive oxygen species (ROS) that can locally react with nearby residues and result in oxidative modification or cleavage at residues close to the metal-binding sites. Samples were subjected to proteolytic digestion and the peptides analyzed by matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF) mass spectrometry (MS) to identify the oxidized regions. Our results show that nickel or iron catalyzed oxidation successfully oxidizes a tryptic peptide fragment on UreE that contains the known metal binding residues. Ongoing studies are using pepsin and chymotrypsin digests or tandem MS approaches to identify the exact oxidized residues in other accessory proteins. Site directed mutagenesis of the suspected metal-binding

residues will be used to validate the assignments by testing for loss of metal binding.

IDENTIFICATION OF CAROTENOID PATHWAY REGULATORS THROUGH QUANTITATIVE TRAIT LOCI AND GENOME WIDE ASSOCIATION STUDIES

Yen-Nhu Nguyen

Category: Biochemistry and Molecular Biology, Section 3

Poster: 60

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

Mentor(s): Dean Della Penna (Biochemistry and Molecular Biology), Sabrina Gonzalez-Jorge (Biochemistry and Molecular Biology)

Carotenoids are plant pigments that function as hormone precursors (abscisic acid, strigolactones), photoprotectants, antioxidants and are also structural components of the photosynthetic apparatus. While the core plant carotenoid biosynthetic pathway has been characterized, the identification of non-pathway genes that regulate carotenoid accumulation is yet to be done. To identify such regulatory genes, the natural variation of *Arabidopsis thaliana* was exploited using quantitative trait loci (QTL) and genome wide association studies (GWAS). Two recombinant inbred line (RILs) populations were scored and several quantitative trait loci (QTL) were identified, many of which did not contain structural genes in their intervals. Three shared, significant QTLs were identified on chromosome 4 for violaxanthin, lutein and total carotenoids (LOD scores >10 and explaining >40% phenotypic variation). QTL mapping and gene expression studies identified one of nine carotenoid cleavage enzymes, 9-cis-epoxycarotenoid dioxygenase 4 (AtCCD4), as the candidate gene underlying these QTLs. Concurrently, using a 360 member association panel, a significant association to AtCCD4 was identified for β -carotene. Functional characterization of AtCCD4 through knock-out analysis showed that mutants exhibit a 3-fold increase in total seed carotenoids and a 8-fold increase in β -carotene compared to wild type. Given its identification in both approaches and its high carotenoid accumulation, AtCCD4 is a candidate regulator of carotenoid homeostasis in *Arabidopsis* seeds.

POTENTIAL PREVENTION OF TYPE II DIABETES IN HIGH-RISK INDIVIDUALS USING A COMBINATION OF PPAR AGONISTS AND DPP4 INHIBITORS

Thomas Turkette

Category: Biochemistry and Molecular Biology, Section 3

Poster: 61

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

Mentor(s): Karl Olson (Physiology)

It is generally accepted that Type II diabetes (T2D) occurs when pancreatic β cells secrete insufficient amounts of insulin to overcome peripheral insulin resistance. Causes of β cell dysfunction remain uncertain, but appear to be linked to ectopic fat deposition in β cells. We hypothesized that improving lipid storage in β cells, while promoting triacylglyceride (TAG) during glucose-stimulated insulin release would prevent the transition of pre-diabetes to T2D, and improve β cell function in T2D. To test this hypothesis, 6 wk-old pre-diabetic ZDF rats were treated for 2 wks or 7 wks with pioglitazone, a peroxisome proliferator-activated receptor gamma (PPAR) agonist that increases lipid storage, or with alogliptin, a dipeptidylpeptidase-4 (DPP4) inhibitor that increases incretin levels and augments lipolysis, or pioglitazone/alogliptin combination. Treatment of ZDF rats with pioglitazone or alogliptin initially improved glucose tolerance, but this effect was diminished by 13 wks of age. The loss of glucose tolerance was associated with a decrease in saturation status of complex lipids, and accumulation of diacylglyceride (DAG) and TAG in pancreatic islets. In contrast, combined treatment with pioglitazone and alogliptin preserved glucose tolerance and was associated with normalization of pancreatic islet DAG and TAG levels. Studies are underway to determine whether the impact of pioglitazone and alogliptin on islet lipid is a direct action of these drugs on β cells or secondary to improved insulin resistance. Overall, these findings support the combined use of PPAR agonists and DPP4 inhibitors for the prevention of T2D in high-risk humans.

EXPRESSION OF A FERULATE MONOLIGNOL TRANSFERASE IN ARABIDOPSIS AND CLONING OF A CINNAMOYLCOENZYME A REDUCTASE RNAI CONSTRUCT

Patrick Ropp

Category: Biochemistry and Molecular Biology, Section 3

Poster: 62

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

Mentor(s): Curtis Wilkerson (Plant Biology)

With world oil production not likely to increase and an increasing demand for energy, the development of biofuels is an important avenue for research and development. One major source of fuel is the conversion of polysaccharides and cellulose

material into ethanol or other compounds. Lignin, a significant constituent of plant biomass, is the major obstacle to enzymatic digestion of biomass to produce biofuels. Removal of lignin requires high temperatures and chemical treatments, which reduces the amount of net energy produced. A possible solution to this problem involves the substitution of normal lignin with an altered lignin whose structure can be more easily broken. One way this can be achieved is by incorporating coniferyl ferulate into the lignin. Ferulate monolignol transferase (FMT) is an enzyme that synthesizes coniferyl ferulate. We have cloned this gene from *Angelica sinensis* and overexpressed it in *Arabidopsis*. Using reverse transcriptase PCR, I have screened *Arabidopsis* plants for high levels of FMT expression. A complication in producing plants with coniferyl ferulate incorporated in lignin is the low levels of feruloyl-CoA, one of the substrates of FMT. In response, we created an RNA interference construct to lower expression levels of another enzyme in the lignin pathway that competes for feruloyl CoA, cinnamoyl-coenzyme A reductase (CCR1). CCR1 expression levels can be reduced by RNAi to reduce consumption of feruloyl-CoA and potentially increase yield of coniferyl ferulate in the plant for integration into the lignin. We are currently screening plants to determine if our strategy has been successful.

PURIFICATION OF METHYLATED HISTONE H3 BY PIMAX SYSTEM

Wei-Yu Liu

Category: Biochemistry and Molecular Biology, Section 3

Poster: 63

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

Mentor(s): Min Hao (Biochemistry and Molecular Biology)

The purification using PIMAX system is efficient and accurate. In our case, we use the cloned plasmid expressing two proteins. One contains 6x-his tag, leucine zipper Fos and SumoN, and enzyme methyl transferase Set7/9 and G9A. The other one includes leucine zipper Jun and SumoC, and the substrate histone H3. We take the advantage of leucine zipper and got the two proteins together to allow enzyme modifying the substrate. The following step is to use Ni-NTA to co-purify the complex of these two proteins and use Sumo Protease which specifically cuts the peptide bond between SumoC to release methylated H3.

Cell Biology, Genetics, and Genomics

Oral Presentations, Section 1

FREE FATTY ACID INDUCED EMT OF HEPG2 CELLS

Jason Portis

Category: Cell Biology, Genetics and Genomics, Section 1

Location: Tower Room, 1:00 PM

Mentor(s): Christina Chan (Chemical Engineering)

The regulation of complex cellular activities in free fatty acid (FFA) treated HepG2 cells involves cooperative interactions between genes. Previous approaches have largely focused on identifying individual target genes, so cooperative functions have remained in the dark. Our approach combined gene expression data with metabolic profiles to select a set of genes for network construction. We determined that palmitate significantly reduces DSP expression, and insulin treatment restores the lost expression of DSP. Insulin resistance is a common pathological feature of fatty liver and related ailments, where the loss of DSP has been documented in liver carcinoma. Reduced DSP expression can lead to the loss cell-to-cell adhesion through desmosomes and disrupt the keratin intermediate filament network. Confocal microscopy analysis of FFA treated HepG2 cells showed reduced levels of keratin expression. Currently we are investigating the effects of palmitate treatment on epithelial-mesenchymal transition (EMT), commonly called metastasis. One technique used to investigate this technique is a scratch migration assay where a wound is induced on a surface of cells and their migration to heal the wound is tracked and measured over time. Western blotting is also used to measure changes in the level of expression, both in keratin and vimentin.

UTILIZATION OF A TARGETED CANDIDATE GENE APPROACH TO IDENTIFY THE GENE RESPONSIBLE FOR LUTESCENT 1 MUTATION OF TOMATO

Julia Miller

Category: Cell Biology, Genetics and Genomics, Section 1

Location: Tower Room, 1:15 PM

Mentor(s): Cornelius Barry (Horticulture)

Chloroplasts serve as sites for photosynthesis and for the synthesis of primary and specialized metabolites. Characterization of chloroplast mutants facilitates understanding of the biochemical processes that occur in chloroplasts and their role in plant growth. The lutescent 1 (l1) and lutescent 2 (l2) mutants of tomato (*Solanum lycopersicum*) have identical phenotypes indicative of chloroplast defects. They display enhanced rates of chlorophyll loss in leaves and fruits as they age and seedlings are slow to de-etiolate. The l2 mutant maps to tomato chromosome 10 and causes a premature stop codon in a chloroplast targeted zinc metalloprotease of the M50 family of unknown function. The l1 mutant maps to the short arm of chromosome 8 but the underlying gene is unknown. Identifying the underlying gene responsible for the l1 phenotype may allow greater understanding of the role of l2. Based on the similarity of mutant phenotypes between l1 and l2, we hypothesized that l1 also encodes a plastid targeted protein. Nine genes from within the l1 mapping interval were found to contain a plastid targeting sequence. Eight l1 mutant alleles are available, included alleles induced by mutagens expected to cause deletions. Utilizing a combination of PCR amplification of candidate genes from cDNA and genomic DNA, coupled with sequence analysis, the candidate gene for the l1 locus was identified. An update of progress, particularly on the characterization of l1x2 double mutants, will be provided.

DIAGNOSING HYPOLACTASIA BY GENOTYPING GENE MCM6 SNP C/T-13910 IN INTESTINAL VILLI CELL LINES VIA ALLELE SPECIFIC PCR

Hassan Fadel

Category: Cell Biology, Genetics and Genomics, Section 1

Location: Tower Room, 1:30 PM

Mentor(s): Douglas Luckie (Biology)

The C/T-13910 mutation on the MCM6 gene is the root cause of the persistence of lactase-phlorizin hydrolase (LCT) gene expression (Bulhões et al, 2007). The C/T-13910 mutation involves a single cytosine to thymine base pair substitution 13,910 base pairs upstream of the LCT initiation codon (Enattah et al, 2002). The presence of the mutation causes lactose persistence in up to 97% of adult cases (Bulhões et al, 2007). The purpose of the research was to successfully develop a method of detecting the C/T-13910 mutation. Allele specific PCR was conducted in order to properly genotype human intestinal villi DNA samples. Two forward primers (FWT and FMT) and one reverse primer (Rprimer) were created to anneal to either mutant or wildtype DNA. The experimental hypothesis was that a single base pair mismatch on the last nucleotide from the 3' side of the

forward primers would allow for detection of the C/T-13910 mutation using allele specific PCR and gel electrophoresis (Bodlaj et al, 2006). A 0.8% agarose gel was used to analyze the amplified DNA by means of electrophoresis in an attempt to identify the presence of C/T-13910. Primers FWT and FMT are predicted to yield bands of length 984 base pairs for homozygous genotypes wildtype and mutant DNA. Heterozygous genotypes are predicted to show a segment of DNA 984 base pairs long, due to the replication of both genotypes (Bulhões et al, 2007).

MLK3 SIGNALING IN GLIOMA INVASION

Sean Misek

Category: Cell Biology, Genetics and Genomics, Section 1

Location: Tower Room, 1:45 PM

Mentor(s): Kathleen Gallo (Physiology)

Each year approximately 13,000 Americans die from brain tumors. Gliomas, brain tumors which arise from glial cells, are highly invasive and often inoperable, leading to survival times of about a year. Elucidating protein kinase signaling pathways that drive invasion is critical for identifying therapeutic targets and developing effective therapies. Mixed Lineage Kinase 3 (MLK3) activates multiple mitogen activated protein kinase (MAPK) pathways and also regulates GTPase activity. Our lab has shown that MLK3 is critical for breast cancer cell migration, invasion, and metastasis. In this study, the role of MLK3 in signaling, migration, cytoskeletal changes, and invasion of human glioma cells was investigated using gene silencing, as well as a small molecule inhibitor. In addition, a model of glioma invasion has been developed in which spheroids of glioma cells are transplanted into a matrix that mimics the human ECM and allowed to disseminate.

IMPLICATIONS OF NOVEL LUNG CANCER ASSOCIATED MUTATIONS IN HUMAN RETINOBLASTOMA FAMILY PROTEIN P130

Monica Pomaville

Category: Cell Biology, Genetics and Genomics, Section 1

Location: Tower Room, 2:00 PM

Mentor(s): R. William Henry (Biochemistry and Molecular Biology), Satyaki Sengupta (Physiology)

Mutations in the Retinoblastoma (RB) tumor suppressor protein family are associated with several forms of human cancer. RB family proteins – consisting of pRB, p107, and p130 – prevent unrestrained cell growth through transcriptional repression of genes that promote cell division. Although the tumor-suppressing function of RB has been studied in great detail, little is known about the contribution of other members. Recent genetic studies have revealed p130 as a major player in the development of lung cancer. Moreover, human cancer genome sequencing has identified a series of mutations in p130 that maps mostly to a region of the protein that our lab has characterized as vital in regulating the stability and activity of p130. We initially hypothesized that these specific cancer associated mutations in p130 compromise its ability to regulate cell cycle progression, contributing to uncontrolled cell proliferation. However, our initial studies suggested that these mutations are not debilitating to the repression of cell cycle genes. This led us to hypothesize that these mutations could offer cancer cells a survival advantage through potent inhibition of proapoptotic genes as compared to the wild type protein. Wild type and mutant forms of p130 harboring human cancer associated mutations are being assayed to determine their effect on the repression of proapoptotic genes and cell death. The findings from these studies will contribute to our understanding of the complexity of the RB tumor suppressor pathway and its contribution to distinct cell fate choices associated with cancer.

Poster Presentations, Section 1

REGAINING KNOCKED OUT GENE FUNCTION

Derek Hibbs

Category: Cell Biology, Genetics and Genomics, Section 1

Poster: 120

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

Mentor(s): Barry Williams (Zoology; Microbiology and Molecular Genetics)

It has been previously shown that some organisms in which a gene has been knocked out can regain the function of that gene, without it reverting back to the wild type, over a period of time. Despite this, uncertainty remains on how quickly this change can occur. The goal of this project was to see if baker's yeast, *Saccharomyces cerevisiae*, could regain function of a knocked out gene within one generation via random mating. I tested this starting with haploid cultures of strains in which the genes to produce lysine and tryptophan were knocked out respectively. First they were mated with wild type yeast strains and sporulated to produce confirmed haploid knockouts of each. The haploid knockouts were crossed in each possible combination with others containing the same knockout genotype. The resulting diploid crosses were plated on $-trp$ and $-lys$ plates respectively to see if any of them had regained the function to produce their respective amino acids which they genotypically

should not be able to produce. For trials of tryptophan and lysine knockouts, both had some offspring regain function within just one generation despite not having the original gene to create the amino acids.

THE ROLES OF ANDROGEN RECEPTORS AND INTERLEUKIN 6 IN THE PATHOGENESIS OF HEPATOCELLULAR CARCINOMA

Leena Babiker

Category: Cell Biology, Genetics and Genomics, Section 1

Poster: 121

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

Mentor(s): Hua Xiao (Physiology)

Hepatocellular carcinoma (HCC) ranks third in annual cancer death and has limited treatment options. Androgen receptors (AR) are highly expressed in human HCC cells; AR is able to promote proliferation of cells and regulate cell apoptosis. HCCs without AR show an increase in cell apoptosis and a decrease in cell proliferation in comparison to HCC cells with AR. Since AR can act as an oncogenic protein, we hypothesize that the level of AR expression in human HCCs correlates with the progression and prognosis of patients with HCC. Interleukin 6 (IL-6) is a multifunctional cytokine that promotes the proliferation of hepatocytes; we also hypothesize that there is a correlation between IL-6 expression and HCC progression and prognosis. To test this hypothesis, existing DNA microarray datasets in Gene Expression Omnibus (GEO) which shows expression levels of thousands of genes including the AR and IL-6 gene in a set of human HCCs from patients is used, and statistical methods such as independent T-Tests and Chi-square will be used to show a significant statistical difference in the expression of AR and IL-6 genes in HCCs and the progression and prognosis of cancer. This study is important because understanding the relationship between gene expression and the HCC progression and prognosis will help us understand more about the mechanism of HCC and provide potential targets for developing therapeutic methods.

POSSIBLE HERITABLE CAUSES OF HOLOPROSENCEPHALY WITH AGNATHIA

Quinn Barrett

Category: Cell Biology, Genetics and Genomics, Section 1

Poster: 122

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

Mentor(s): John Fyfe (Microbiology and Molecular Genetics)

Holoprosencephaly is a birth defect in which the brain is unable to bifurcate into two lobes during development. Extreme cases result in other craniofacial abnormalities including cyclopia. There are both genetic and environmental factors that are known to cause HPE. Mutations in the SHH (Sonic Hedgehog) have been linked to genetic cases. Our study involves a dog born with a variant of holoprosencephaly that affects mandibular formation, resulting in agnathia. Other litters produced by the mother had a high percentage of birth defects and stillborns, leading to our hypothesis that genetic factors are involved in this case. To determine the cause of this defect a list of candidate genes in which a mutation could cause this specific phenotype were compiled by literature search and tested for mutations by analyzing gene sequences of the affected dog and its parents. Initial candidate genes were PRRX1 and TWSG1, selected for their role in embryonic cranial development as growth factors. To identify mutations in these genes, the exons were amplified from genomic DNA by PCR and sequenced. There were no significant differences between the sequences collected from these dogs as compared to dogs of normal phenotype, suggesting that neither of these genes caused holoprosencephaly with agnathia in this case. Other candidate genes that are proposed for study are genes that, when mutated, can inhibit the SHH signaling pathway. These candidates include BMPR-1A, BMP4, and Noggin. Further research will include analysis of one or all of these genes by the previously described methods.

THE IMPACT OF TYPE-1 DIABETES AND GENDER ON MOUSE INTESTINE

Rachel Brock

Category: Cell Biology, Genetics and Genomics, Section 1

Poster: 123

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

Mentor(s): Laura McCabe (Physiology)

Type-1 diabetes is associated with bone loss and the intestine is involved with the regulation of bone density. Therefore, we treated non-diabetic and diabetic mice with factors that can enhance intestinal health and examined the effects on proximal small intestine (jejunum) samples of both males and females. RNA was extracted from 1-cm jejunum pieces and cDNA was prepared by reverse transcription. Polymerase chain reaction (PCR) was first done with an unaffected housekeeping gene, HPRT, to verify equivalency among samples and control for variation in RNA levels and integrity. RNA levels for other genes were expressed relative to HPRT. Gender differences were readily apparent in the results. For example, with calcium-binding protein CalD9k, important for calcium absorption, the RNA levels were significantly increased in female jejunum compared to

male while for IL-6, involved in autoimmune inflammatory responses, levels were significantly decreased in females compared to males. Diabetes increased intestinal epithelial markers of maturation. However, diabetic males displayed increased alkaline phosphatase, or IAP, (which correlated with intestinal vitamin D hydroxylase expression) while females displayed increases in glucose transporters (SGLT-1). The latter would negatively impact glycemic control. We did observe some genes that were affected by T1-diabetes in a gender-independent way. For example, IL-6 was decreased by diabetes in both male and female jejunum. Pearson's correlation indicated that IL-6 was inversely correlated with serum glucose levels. Taken together, male and female intestines are different and respond differently to diseases such as T1-diabetes.

EYA1 SEQUENCING IN A PATIENT WITH SUSPECTED BOR SYNDROME

Shohei Ueno

Category: Cell Biology, Genetics and Genomics, Section 1

Poster: 124

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

Mentor(s): Ellen Wilch (Microbiology and Molecular Genetics)

BOR (branchio-oto-renal) syndrome is an autosomal dominant genetic disorder of development involving ear, neck, and kidney. Mutation in EYA1 is usually the cause of this syndrome. Mutation in EYA1 has been found in 40% of families with BOR syndrome, while SIX1 and SIX5 mutations have been identified in 3 to 4%; however the causes in most cases are still unknown. We collected DNA from a 4 year old boy and his mother. The boy was diagnosed with hearing loss at birth. He also has Mondini malformation of the cochlea, an earpit, and an abnormally-shaped outer ear, all typical features of BOR syndrome. We undertook sequencing of EYA1 in DNA from both the proband and his mother, who may also have a mild case of BOR syndrome. No known or candidate coding region or splice mutation of EYA1 was found after sequencing 11 of the gene's 18 exons. There are several possible explanations for this result: 1)a causative mutation may reside in the promoter, or in the 7 exons that remain to be sequenced; 2)this family may have a mutation in SIX1 or SIX5, or another unknown region that causes BOR syndrome; 3)the causative mutation may be a deletion of one or more exons that cannot be detected by PCR; or 4)undetected regulatory mutations of EYA1 may cause BOR syndrome.

THE ROLE OF AKT1 IN ESTROGEN-STIMULATED CELL MIGRATION IN ESTROGEN RECEPTOR POSITIVE BREAST CANCER CELLS

Edward Walton

Category: Cell Biology, Genetics and Genomics, Section 1

Poster: 125

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

Mentor(s): Susan Conrad (Microbiology)

Akt 1, or Protein Kinase B (PKB), is a serine/threonine kinase that is a well-established pro-survival protein in breast cancer cells. In estrogen receptor (ER)-positive MCF-7 cells, it has been reported that estradiol (E2) treatment leads to increased Akt activity. Additionally, several studies have indicated that the ER may promote breast cancer cell survival via the PI3K/Akt pathway. E2, acting via ER, has also been reported to increase migration of MCF-7 cells. The hypothesis of this project is that the pro-migratory effect of E2 may be mediated via Akt. A previous graduate student in our laboratory constructed a stable derivative of MCF-7 cells that express a constitutively active form of Akt. Consistent with our hypothesis, we have obtained preliminary results demonstrating that this cell line is more migratory than the parental MCF-7 cells. To directly examine the role of Akt in E2-stimulated migration, we are investigating whether E2 treatment increases MCF-7 cell migration in the presence and absence of an Akt inhibitor.

EXAMINATION OF GENES TO VERIFY DOMINANT INHERITANCE AND TO CLASSIFY THEIR MODES OF MOLECULAR ACTION

Jennifer Placek

Category: Cell Biology, Genetics and Genomics, Section 1

Poster: 126

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

Mentor(s): Pat Venta (Microbiology and Molecular Genetics)

This study was undertaken to find out the molecular mode of action of mutant genes that first show the phenotype between 1 year of age and puberty ("age class three") and to see if they were correctly labeled as having a dominant form of inheritance by either Victor McKusick in his publications of Mendelian Inheritance in Man or Gerardo Jimenez-Sanchez, Barton Childs and David Valle in their paper, Human Disease Genes. Once the study was complete the results showed that some genes in age class three were misclassified as having a dominantly inherited phenotype when they really showed no evidence of dominance. Eight genes were excluded from the study because they are cancer causing genes and these genes have too many contributing factors to be called simply dominant. Five of the 46 genes show, as a molecular mode of action, to be toxic proteins and seven

of the 46 were found to be dominant-negative. This shows that toxic proteins are more common than it was previously thought while the number of dominant-negative and haploinsufficient genes found were about what was expected.

Poster Presentations, Section 2

A SIMPLE BIOINFORMATICS APPROACH TO IDENTIFY TETRANUCLEOTIDE MICROSATELLITES WITH PREDICTABLE HETEROZYGOSITY USING A SINGLE REFERENCE GENOME: APPLICATION TO THE HORSE

Jenna Bozek

Category: Cell Biology, Genetics and Genomics, Section 2

Poster: 127

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

Mentor(s): Pat Venta (Microbiology and Molecular Genetics)

Microsatellite (simple tandem repeat; STR) polymorphisms are used for many purposes in genetics and forensics, including paternity testing and DNA identification. Tetranucleotide STRs (tetraSTRs) are more variable and easier to genotype than the more commonly used dinucleotide repeats (diSTRs). However, identifying tetraSTRs has not been easy, particularly for species such as the horse whose genome appears to lack good tetraSTRs. Our lab has developed a bioinformatics approach to find good tetraSTRs. We hypothesized that this method would be useful even in the horse. TetraSTRs were identified by using the Table browser tool and RepeatMasker track available at the UCSC Genome Browser website. Tetranucleotide repeats were chosen that have high SW scores, and other additional criteria. PCR primers were used to genotype several of these microsatellites in 9 horses of different breeds. 300 tetraSTRs with predicted heterozygosities of at least 0.65 were identified in the entire equine genome. Of these, one for each of the autosome was selected for PCR primer design. Five of six tetraSTRs genotyped had heterozygosities above 0.65. The results strongly support our hypothesis. This method was found to be highly effective even in a species thought to lack good tetraSTRs. The complete panel of horse tetraSTRs identified here is a strong alternative to the horse diSTRs currently in use by commercial and academic institutions. Based upon these results, we believe it is very likely that the method will have broad applicability to any mammalian species.

BONE MARROW OSTEOCLASTOGENESIS IN OVARECTOMIZED MICE

Isabel Silverstein

Category: Cell Biology, Genetics and Genomics, Section 2

Poster: 128

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

Mentor(s): Laura McCabe (Physiology)

Post-menopausal women have low estrogen levels, which cause increased osteoclast activity resulting in bone loss. Osteoclasts are bone-resorbing cells that are needed for bone remodeling. Osteoclasts are derived from a special type of blood cell (monocyte/macrophage) located in the blood and bone marrow. In this study, ovaries were removed (OVX) from Balb/c mice to simulate post-menopausal conditions and bone loss (as determined by micro-computed tomography) 4 weeks later. At this time marrow cells were isolated from each mouse (6 per group) and put into culture. Osteoclastogenesis (the formation of osteoclast cells from precursor cells) was induced using macrophage colony-stimulating factor (M-CSF) and receptor activator of nuclear factor kappa-B ligand (RANKL). Five days later cells were stained with tartrate resistant acid phosphatase (TRAP). Cells were counted in categories. I measured the total number of cells containing greater than or equal to three, five or 10 nuclei. More mature osteoclasts, which would likely be more active (resorbing more bone), tend to have more nuclei. My results indicate that the number of cells with greater than 3 nuclei did not differ between control and OVX (38 versus 33). A similar finding was seen when measured the number of cells with >5 nuclei (22 versus 20) or > 10 nuclei (11 versus 9.3). While osteoclast activity is normally increased by OVX, statistical analysis indicated that there were no significant differences between the OVX and control group at this time point. Future studies will include additional time points and optimization of the osteoclastogenesis assay.

IDENTIFICATION AND IMPLICATIONS OF ACTIVE LINE-1 ELEMENTS IN CANINES

Hillary Cullison

Category: Cell Biology, Genetics and Genomics, Section 2

Poster: 129

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

Mentor(s): Patrick Venta (Microbiology and Molecular Genetics)

Long interspersed nuclear elements (LINEs) are non-long terminal repeat retrotransposons that have risen to such a high copy number in mammalian DNA as to be considered ubiquitous. The purpose of this research is to identify those LINEs that are

active in the canine genome. This is of interest for numerous reasons including understanding of cellular response to retrovirus exposure, the role of LINES in various regulatory elements, and their use as a tool to identify evolutionary histories. The most highly studied of these elements is LINE-1 (L1), for which genomic signatures allow the detection of both actively transposing LINES and inactive fixed LINES. In order to identify potentially active LINES, the UCSC Genome Browser was used to search canine chromosomes 1-3 for full length LINES (~6000 bp). These LINES were then translated in silico by use of the Expsy translate tool and examined for complete open reading frames for the two proteins encoded by active LINES. Thirty potentially active LINES were identified. These elements were then compared to a generated consensus sequence to approximate the number of mutations accrued in each element as an indication of relative age. Of the 30 candidates initially identified, the three youngest, and presumably most active, elements are now available to undergo isolation, amplification, and testing in cell culture in order to determine activity.

TRANSCRIPTIONAL INHIBITION OF AP-1 USING TAM-67 IN BREAST CANCER CELL LINES: MDA-MB-231 AND MCF-7

Brooke Pallas

Category: Cell Biology, Genetics and Genomics, Section 2

Poster: 130

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

Mentor(s): Michele Fluck (Microbiology and Molecular Genetics)

Activator protein (AP-1) functions in intra-cellular signal transduction pathways as a primary transcription factor that regulates the initiation of cellular transcription of several downstream genes. A dimeric protein, the AP-1 complex is made of two subunits, c-fos and c-jun. Both proteins possess DNA and protein binding domains, as well as a trans-activation domain (TAD) which works cohesively with other proteins to discharge the DNA and loosen its tight association with the nucleosome in order to allow transcription to initiate. This study focuses on the introduction of the engineered plasmid, Trans-Activation Mutant 67 (TAM 67), which is a dominant-negative mutant of c-jun, in which the activation domain at the N-terminus has been removed. Transfection of this AP-1 specific inhibitor was performed via a retrovirus vector into two separate breast cancer cell lines. The MDA-MB-231 cell line, established from a metastatic breast cancer tumor, and the MCF-7 cell line, originally isolated from a non-metastatic tumor were both exposed to plasmid containing retrovirus and successfully infected cells were then isolated by Puromycin treatment. The research objective is to observe the role that AP-1 plays in the regulation of breast cancer cell growth and evaluate the phenotypic variation of colony development between infected and uninfected communities. The study also examines the mutant cells ability to survive and proliferate while suspended in gelatin agar. The overproduction of the dominant-negative Jun protein should out-compete wild-type Jun, and produce an inability of the cell to retain its cancer qualities.

A POTENTIAL ROLE FOR HORMONE REPLACEMENT THERAPY IN BREAST CANCER DEVELOPMENT

Jaya Gupta

Category: Cell Biology, Genetics and Genomics, Section 2

Poster: 131

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

Mentor(s): Mark Aupperlee (Physiology), Sandra Haslam (Physiology)

During menopause, natural production of estrogen and progesterone declines, causing hot flashes, night sweats, and other symptoms. Hormone replacement therapy (HRT) eases these symptoms and decreases the risk of osteoporosis; however, HRT with estrogen and progestins (P) has been linked to higher breast cancer risk. P may be linked to elevated breast cancer risk through a progestin-induced rise in proliferation. Increased proliferation heightens the likelihood of cancer development. We hypothesized that increased Cyclin E and decreased p27 mediate progestin-induced proliferation. Cyclin E in the nucleus is known to bind to a cyclin-dependent kinase and transition the cell into the DNA replication phase, while p27 inhibits cell cycle progression. Through immunofluorescence analysis with anti-Cyclin E and anti-p27 antibodies, we examined nuclear Cyclin E and p27 levels in archival normal postmenopausal human breast tissues from women receiving either no HRT, estrogen (E) HRT, or estrogen + progestin (E+P) HRT. The percentage of cells expressing nuclear Cyclin E increased with E HRT, and was greatest with E+P HRT. In contrast, the percentage of cells expressing p27 decreased with E HRT, and significantly decreased with E+P HRT. While Cyclin E and p27 have a role in E and E+P-induced proliferation, these results suggest that p27 is an important mediator of progestin-induced proliferation in the human breast and that the progestin-induced decrease in p27 may lead to increased breast cancer risk. Further studies are needed investigating P's regulation of p27, Cyclin E, and other P-effected factors in breast cancer development.

MIXED-LINEAGE KINASES IN GLIOMA VIABILITY

Ashley Sample

Category: Cell Biology, Genetics and Genomics, Section 2

Poster: 132

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

Mentor(s): Kathleen A. Gallo (Physiology)

Glioblastomas are highly malignant and highly lethal cancers of the central nervous system. The mixed lineage kinases are a family of serine/threonine kinases that can activate multiple MAPK pathways, including JNK. Our lab has shown a critical role for mixed lineage kinase 3-JNK signaling pathway in breast cancer migration and invasion. My current studies demonstrate that treatment with an MLK inhibitor markedly decreases viability of multiple human glioma cell lines. The mechanism through which this occurs is currently being examined. Experiments include determining the impact of an MLK inhibitor on cell cycle and MAPK signaling pathways in glioma cell lines. In addition we are testing the utility of combination therapies with an MLK inhibitor and chemotherapeutic drugs commonly used to treat glioma.

VX-809 DEPENDENT DECREASE IN EXTRACELLULAR ACIDIFICATION IN MOUSE Δ F508 EPITHELIAL CELLS

Nicholas Fernandez, Nicole Patel, Paul Singh

Category: Cell Biology, Genetics and Genomics, Section 2

Poster: 133

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

Mentor(s): Doug Luckie (Biology)

Cystic Fibrosis is a debilitating hereditary illness resulting from the dysfunction or absence of the epithelial chloride channel, CFTR. The most prevalent genetic defect responsible for the disease is a deletion of the phenylalanine residue at position 508. CFTR acts a Cl/HCO₃ channel, and decreased functionality of the channel is suspected to lead to extracellular pH imbalance. A decreased extracellular pH is hypothesized to be the root of many CF disease symptoms, opposing established beliefs of improper chloride levels reducing immunological function. VX-809 is a corrector that improves folding and processing of Δ F508 CFTR and restores proper channel function. Drug efficacy at a maximally effective concentration of 3 μ M as well as 1.5 μ M and 6 μ M can be assessed with ion efflux experiments using an Iodide electrode. Increased CFTR maturation will yield a greater efflux of iodide through apical CFTR channels when stimulated with forskolin. The Cytosensor Micropysometer employs silicon technology to measure extracellular acidification rates in cultured cells. When incubated with VX-809 for 24-48 hours, we predict acidification rates to decrease. We hypothesize that incubation of Δ F508 mouse epithelial cells with VX-809 will correct the pH imbalance by re-establishing regular CFTR function.

Poster Presentations, Section 3

QE RESPONSE IN THE IRE1 MUTANT OF ARABIDOPSIS THALIANA

Kirk Gordon

Category: Cell Biology, Genetics and Genomics, Section 3

Poster: 134

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Federica Brandizzi (Plant Biology)

Protein molecules must be folded properly in order to work, but under certain environmental conditions, plant cells begin to accumulate large amounts of unfolded proteins, which put stress on the endoplasmic reticulum. To combat this, plants possess a set of genes that recognize this stress and in turn evoke the unfolded protein response (UPR). One gene vital in this response is Ire1, which is a trans-membrane protein within the endoplasmic reticulum that alternatively splices RNA transcripts of transcription factors that activate UPR genes. These activated genes assist with protein folding and management. We were interested in the in how a loss of this gene might affect photosynthesis, particularly in high light conditions. By using spectroscopic cameras that can quantify both photosynthetic and light-quenching activity, we were able to observe that Ire1 deficient seedlings struggle to quench excess light compared to wild-type plants, and that this phenomena becomes less significant as the plants mature past two weeks. This connection may be of novel importance to elucidating Ire1's role in plant stress response.

THAPSIGARGIN TREATED CFTR DELTA-F508 MOUSE MAMMARY CELLS EFFECTS ON CHLORIDE FLUX AND ION FLUX ASSAYS

Leah Brynaert, Lauren Kustasz, Chuck Ternes

Category: Cell Biology, Genetics and Genomics, Section 3

Poster: 135

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Douglas Luckie (Physiology)

Cystic Fibrosis (CF) is most commonly caused by the deletion of phenylalanine 508 (F508) in the cystic fibrosis transmembrane conductance regulator (CFTR) (Welsh et al. 1995). Thapsigargin has been shown to increase the number of CFTR inserted in the cell membrane, by acting as a corrector (Egan et al. 2002); however, rescued F508CFTR remains susceptible to quality control mechanisms leading to accelerated endocytosis, ubiquitination and lysosomal degradation (Valentine 2012). The purpose of this experiment is to further examine the effects that Thapsigargin has on cultured cells by performing ion flux assays on F-508 cells. Mouse mammary epithelial cells with the F-508 mutation will be incubated in 1M Thapsigargin solution and then iodide efflux measurements will be taken. We hypothesize that by adding Thapsigargin to F-508 cells we will see experimental results indicating Thapsigargin is successful at prohibiting the degradation of the CFTR protein and will allow the protein to successfully bind to the cell membrane (Egan 2002). Therefore, we predict to see an increase of iodide flux through the cell membrane (with stimulation from forskolin) resulting in a higher reading of iodide ion concentration in extracellular fluid. When 1M Thapsigargin was added to the cells and incubated for two and eighteen hour time spans the rate of ion flow out of the cell increased during the fourth minute time increment before the addition of forskolin. Interference with efflux rates are possibly affected by destabilization of scaffolding interaction due to the Thapsigargin treatment (Valentine 2012).

VITAMIN B12 MALABSORPTION WITH PROTEINURIA IN BORDER COLLIES

Shelby Hemker

Category: Cell Biology, Genetics and Genomics, Section 3

Poster: 136

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): John Fyfe (Microbiology and Molecular Genetics)

Vitamin B₁₂ malabsorption accompanied by low molecular weight proteinuria is an autosomal recessive disorder previously described in dogs including border collies (BC). The resultant vitamin deficiency causes dysmaturational anemia, weakness and lethargy, failure to thrive, and hyperammonemia in the juvenile period. Recently, we ascertained a 19-member BC family including 4 affected dogs. DNA samples were genotyped on the Illumina® canine 170 K HD SNP array for homozygosity mapping. One 2.9 Mb region of homozygosity common to the affected dogs was discovered on dog chromosome 2. The region included CUBN, a gene that encodes a component of the intrinsic factor-vitamin B₁₂ receptor in intestine and kidney tubules. Therefore, we PCR amplified and sequenced all 67 CUBN exons with flanking splice sites of an affected dog and his dam. We found a single base deletion in exon 53 that predicts a frameshift and early truncation of the protein. Alleles of the putative mutation site segregated with the deduced disease alleles in the 19-member BC family, relatives of the BC family, and sporadic cases. It was not observed in 25 unrelated BC. We expect reduced CUBN mRNA in affected dogs because the early stop codon may cause nonsense mediated decay. We are currently testing this hypothesis by quantitating CUBN mRNA in ileum and kidney via quantitative-reverse transcriptase PCR. We are also collecting DNA samples from additional cases of the BC disorder locally and worldwide. A convenient carrier test has been designed to allow BC breeders to avoid producing affected dogs in the future.

AGE RELATED CHANGES IN MUSCLE ENERGETICS AND OXYGEN KINETICS

Lucas Friedli

Category: Cell Biology, Genetics and Genomics, Section 3

Poster: 137

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Jill Slade (Radiology)

Aging is associated with declines in muscle and physical function. Muscle aerobic capacity as measured by mitochondrial function may undergo changes with aging. The initial responses of muscle energetics during exercise may be reduced with aging. Any delay in initial energetic responses could relate to activity limitations associated with aging. Phosphocreatine recovery (PCr) kinetics was evaluated in the anterior leg compartment after brief maximal contractions. The PCr recovery kinetics reflect oxidative ATP synthesis and serve as a measure of mitochondrial function; this study evaluates the initial rate of PCr resynthesis. Phosphorus (31P) magnetic resonance spectroscopy was used to acquire high energy phosphates during leg contractions. This approach permits high temporal sensitivity (~ 4 sec) which permits the evaluation of initial kinetic changes. Initial PCr changes were compared in young (aged 18-35 years old) and older adults (aged 60-75 years old). This research

contributes to the understanding of the bioenergetic consequences of aging.

EVOLUTION OF EUGLENOID CHLOROPLASTS

Chelsea Markunas

Category: Cell Biology, Genetics and Genomics, Section 3

Poster: 138

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Richard Triemer (Plant Biology)

Euglenoids are an ancient eukaryotic lineage that may have existed as early as 2 billion years ago. For most of their existence they survived as phagotrophic or osmotrophic organisms. Following the origin of the green algae ~800 million years ago, some euglenoids acquired chloroplasts through secondary endosymbiosis from a green algal donor. By sequencing the chloroplast genomes throughout the lineage of photosynthetic euglenoids, we can follow the evolution of the chloroplast genome since its acquisition. Previous studies comparing taxa at the base and crown of the photosynthetic lineage have shown great changes in the organization of the chloroplast genome. This project compares the chloroplast genomes of *Phacus inflexus* and *Lepocinclis tripteris* to determine how rapidly the chloroplast is evolving in two closely related basal euglenoids. Following sequencing, assembly and annotation of the genomes, my data shows that, despite significant difference in genome size, both genomes contain the same 87 chloroplast genes suggesting a high level of gene conservation within the lineage. However, pairwise comparison of individual genes shows marked differences in nucleotide sequence, individual gene size, intron number and intron position. In addition, through the use of MAUVE, a gene mapping program, I have been able to demonstrate large gene arrangements in which entire blocks of genes change position within the genome or move from one DNA strand to the other. This data indicates that chloroplast genomes can show marked differences in organization, suggesting a rapid evolution of the genome, even between closely related taxa.

THE EFFECTS OF DIFLUBENZURON, ACTIVE INGREDIENT IN THE PESTICIDE DIMILIN, ON GAP-JUNCTION INTERCELLULAR COMMUNICATION IN WB-144 RAT LIVER CELLS

Kim Vi, Maris Polanco

Category: Cell Biology, Genetics and Genomics, Section 3

Poster: 139

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Brad Upham (Human Development and Pediatrics)

The inhibition of gap-junction intercellular communication is a known mechanism of carcinogenicity in polycyclic aromatic hydrocarbons (PAHs). Of specific interest are compounds that pose a “bay region,” a structural property of the molecule that includes an incomplete ring formed by the junction of multiple aromatic rings (Weis et al 1998). The pesticide Dimilin (active ingredient diflubenzuron) is a chitin inhibitor that is marketed as “nontoxic” to mammals and bees (Clarke et al 1976). Based on the bay-like molecular structure observed in diflubenzuron, we are testing the compound for inhibition of gap-junction intercellular communication in WB-144 rat liver cell cultures. This effect can be observed by measuring the distance traveled by fluorescent dye administered via scrape-load procedure. Preliminary data support our hypothesis that gap-junction intercellular communication inhibition will follow a dose-dependent response curve following incubation with diflubenzuron.

USE OF PCR TO DIAGNOSE DMD IN HUMAN CELLS BY THE DELETION OF EXON 47 ON THE DYSTROPHIN GENE

Kim Vi

Category: Cell Biology, Genetics and Genomics, Section 3

Poster: 140

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Doug Luckie (Physiology)

Duchenne muscular dystrophy (DMD) occurs as a result of a mutation on the dystrophin gene, 65% of which come from deletion mutations (Forrest et al, 1988). PCR was used to detect the deletion of exon 47. DNA samples for this study were extracted from human cells using Generation Capture Column Kit (Qiagen 2013). It was hypothesized that by placing primers in the introns flanking exon 47, thereby annealing to both wild-type and mutant genotypes, the presence or deletion of exon 47 could be determined for both wild-type and mutant genotypes (Chamberlain et al, 1988). The DNA amplified from PCR was then analyzed using agarose gel electrophoresis and the presence or deletion of the exon was determined by examining the position at which the bands in the gel appeared. It was predicted that a band at 853 bp would signify the presence of exon 47, while a band at 703 bp signified mutant genotypes that lacked the exon (Chamberlain et al, 1988). These results led to greater understanding of the genotypes of those afflicted with DMD, and additional investigation would help increase the knowledge of how to treat the disease.

FREE-FATTY ACID EFFECTS ON LIVER CANCER METASTASIS: ACCELERATING THE EPITHELIAL-MESENCHYMAL TRANSITION

Irene Li

Category: Cell Biology, Genetics and Genomics, Section 3

Poster: 141

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Christina Chan (Biochemistry and Molecular Biology)

The breakdown of cell-cell junctions, such as desmosomes, contributes to cell motility and metastasis of HepG2 liver carcinoma cells through the epithelial-mesenchymal transition (EMT) mechanism – exacerbating and spreading liver cancer’s already-debilitating symptoms. In these cells, the protein desmoplakin (DSP) is an integral component of desmosome structure. Previous studies have established its decreasing incidence when treated with the free fatty acid palmitate. We hoped to clarify the effects of various free fatty acid treatments and their combinations on DSP expression and, subsequently, the EMT mechanism. Through quantitative analysis of wound closure percentage in various combinations of free fatty acid silicone barrier test assays, we determined that treatment with palmitic and oleic acid induced increased epithelial-mesenchymal transition, while linoleic acid had an opposite effect. Western blots for the presence of common EMT markers vimentin, and E-cadherin revealed a reduction in E-cadherin and an increase in vimentin levels in EMT-increased well. This suggests that different free fatty acid environments do have a marked effects on EMT, with possible widespread pharmaceutical and health-related consequences. Our study supports previous findings on the relationships between certain FFA treatment and components of the EMT mechanism and provides a basis for further investigation of DSP and different free fatty acids’ specific roles in EMT initiation.

Communication Arts and Sciences

Oral Presentations, Section 1

FREELANCE WRITING

Ian Heslip

Category: Communications Arts and Sciences, Section 1

Location: MSU Room, 1:00 PM

Mentor(s): Kathryn Houghton (Arts and Letters)

My goal as an undergraduate research assistant is to gain an understanding of how freelance writers choose the genres they write and publish in. By researching freelance writing blogs and interviewing the authors behind those blogs, I hope to gain a personal insight into the freelance writing world and market. By compiling all of this research into one common place, (our website) I am hoping that those who view the results will come away with a fairly complete understanding of what to expect as a novice freelancer writer. Throughout my research I have come across many websites that offer advice for freelancers, but none that tackles the issue of what genres are particularly successful. The interviews I conduct will be over email and the questions will focus on why they picked the genre or subject area that they write in, and what influences a change in their freelancing. I expect to find that most freelancers write about topics that they are passionate about or are easily marketable. However, I am interviewing these freelancers to discover if there is one genre or topic that is more marketable or successful than others. By doing so and by publishing this data on our website, I hope to have collected helpful and tangible evidence on what kind of articles or manuscripts novice freelancers should consider writing in order to break into the freelancing world.

PHOTOGRAPHIC EXHIBITION AND BOOK: AN EXTRAORDINARY DOCUMENT OF OUR WORLD AND DETROIT RESURGENT

Marisa Hamel, Kathleen McLain

Category: Communications Arts and Sciences, Section 1

Location: MSU Room, 1:15 PM

Mentor(s): Howard Bossen (Journalism)

The research we are conducting concerns two projects on work and worker culture both by French photographer Gilles Perrin and his wife, Nicole Ewencyk. They have been traveling internationally for the past 25 years making portraits of workers and gathering details about the lives of their subjects. *An Extraordinary Document of Our World* is a retrospective exhibition curated by Professor Bossen. *Detroit Resurgent* organically sprouted from *An Extraordinary Document*. The couple was commissioned in spring 2012 by the Michigan State University Museum to make a series of workers' portraits and conduct interviews of the subjects who include entrepreneurs, small business owners, urban farmers, community activists, artists, and people who are invested in Detroit's economic and community redevelopment. We have many roles in this project: transcription of over 60 interviews, which were conducted by Nicole, categorizing the initial portraits, sifting through the interviews for quotes to accompany Gilles' portraits, and researching historical data about Detroit. In the original *An Extraordinary World* project we have worked on cataloging, selecting, and sequencing the photographs for display in the exhibition. The exhibition will feature 50 to 60 portraits culled from over 4,000 original portraits. Both exhibitions will be held at the MSU Museum in the fall of 2013. *Detroit Resurgent* will travel to Detroit in 2014, with the accompanying book published by the MSU Press to be released in the same year.

REVISITING VERGER'S DAHOMEY: A PHOTOGRAPHIC CONTRAST

Julia Grippe, Danielle Turcotte

Category: Communications Arts and Sciences, Section 1

Location: MSU Room, 1:30 PM

Mentor(s): Darcy Greene (Journalism)

It is widely accepted that Benin is the birthplace of Vodun (voodoo). Spread by the slave trade, Vodun is practiced in many parts of the world in evolving forms. The focus of this project is on the comparison of photographs of Vodun traditions taken in Abomey, Benin, by the French photographer Pierre Verger (1902 - 1996) in the 1950s and by Professor Darcy Greene taken in the summer of 2012. Greene followed the methodology formalized in 1977 by the Rephotographic Survey project and used a specific contemporary camera that provided the same shooting experience as the Rolleiflex used by Verger. The photographs taken 70 years apart of the same places and events, allow the viewers to experience Vodun culture for themselves in a way that can only be done through photography. The paired photographic documents provide a historical record that will be valuable to historians, sociologists, ethnographers and anthropologists. In preparation for an exhibition of the Verger/Greene photographs, to open February of 2014 at the MSU museum, we researched the content of the photographs and compared the pairs for

similarities and differences. Using this research, we wrote captions for each pair of photos. Our method involved library research using journals, articles and books (one in Portuguese) followed by critiques by primary sources in Benin to validate our captions. We found that many of the traditions have retained their integrity with slight variations over the past 70 years. Our presentation will include the compelling paired images of Verger and Greene.

GREAT LAKES ECHO

Celeste Bott

Category: Communications Arts and Sciences, Section 1

Location: MSU Room, 1:45 PM

Mentor(s): David Poulson (Journalism)

Great Lakes Echo is an online news website covering environmental news for the Great Lakes Basin. As an Echo reporter, I'm expected to research the issues that impact the environment of the Basin, and effectively tell the stories behind them for the diverse audiences in the eight Great Lakes states. I do such research by conducting interviews with experts and by consulting data from environmental journals and agency studies. I then convey those findings in ways that will best keep the public informed. Based on the work I've done, it's clear to me that information is best received by using as many alternative story forms as possible. Long narratives about research don't allow for extensive public interest or dialogue on environmental issues. At Echo, the use of interactive graphics, videos, audio files (such as radio programs), photography, data charts, polls, and social media encourages continued public dialogue about the Great Lakes regions. Topics covered in some of the stories I've done include fundraising for the restoration of Belle Isle, the invasive species of Asian carp, the environmental hazards of carbon release into the atmosphere, and the effects of weather - storms, ice buildup, etc - on the Great Lakes. In addition to Great Lakes research, I continue to strive to find the most effective environmental reporting methods for online media outlets in this technology age.

Poster Presentations, Section 1

ONE SMALL STEP FOR (A) MAN: FUNCTION WORD REDUCTION AND ACOUSTIC AMBIGUITY

Stephanie Schmidt, Jesse Nagel

Category: Communications Arts and Sciences, Section 1

Poster: 145

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Laura Dilley (Communicative Sciences and Disorders), Melissa Baese-Berk (Communication Sciences and Disorders)

On July 20th, 1969, millions of people watched as Neil Armstrong took his first steps onto the surface of the moon and uttered his famous quote: "That's one small step for man, one giant leap for mankind." This quote has been repeated countless times since it was first broadcast; however, for years Mr. Armstrong insisted he said, "That's one small step for a man..." Whether or not the word was actually said is undetermined, as the sound files of the transmission are inconclusive. This may be attributed to coarticulation, which commonly occurs with function words and those adjacent to them. This renders acoustic and spectral similarities in phrases such as "for a" and "for" not followed by "a." It is possible that Armstrong did indeed speak the word "a," but its presence was not perceived by listeners. In our study, we analyzed samples of spontaneous speech from the Buckeye Speech Corpus. This corpus contains recordings given by speakers from the Columbus, Ohio area, the same region Armstrong called home. We compared durational and acoustic characteristics of utterances containing a reduced "for" not followed by the word "a" with those containing the reduced phrase "for a." Durational and acoustic similarities between the two sets of data support Armstrong's claim, as speaking "for a" can result in a production that may be perceived by listeners to lack the "a." Therefore, it is possible Armstrong produced the "a," but individuals simply did not perceive it.

PROACTIVE AND REACTIVE RESPONSES IN THE FACE OF PR THREATS

Jessica Sun, Justin Blair, Nicole Lawrence, Arielle Viviano, Yue Zhu

Category: Communications Arts and Sciences, Section 1

Poster: 146

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Constantinos Coursaris (Telecom, Information Studies and Media), Wietske Van Osch (Telecom, Information Studies and Media)

In this study, we engage in a longitudinal, multiple case study comparing significant events in social media and traditional media. Based on a content analysis of social media posts by 10 brands over a 6-week period, and a content analysis of traditional media articles for the same period of time, we deduce the crisis management strategies utilized by these brands as enabled and enacted on their respective Facebook Pages. The 10 brands fall under 3 purchase involvement categories, namely

high-involvement (i.e., Airlines including Delta, KLM, and JetBlue), mixed-involvement (i.e., Big Box Retailers including Walmart, Target, and Meijer), and low-involvement (i.e., Consumer Packaged Goods including, McDonald's, Starbucks, Coca Cola, and Pepsi). Results speak to: i) how brands respond to or anticipate potential reported threats in traditional media sources; and ii) in what ways brands use social media to anticipate or respond to potential reported threats in traditional media sources. We end by proposing the "4A Crisis Communication Framework", which consists of the four observed strategies of Averting, Avoiding, Apologizing, and Acknowledging.

INTERNET SAFETY ADVICE AND THE CHALLENGES OF COLLECTING BEHAVIOR ANALYSIS DATA

Tyler Olsen, Nicholas Saxton

Category: Communications Arts and Sciences, Section 1

Poster: 147

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Emilee Rader (Telecommunication, Information Studies and Media), Rick Wash (Journalism)

A majority of the public interacts with the internet on a daily basis but has a limited understanding of how to be secure while using it. The goal of our research is to understand if people are following the security advice of experts. To reach this goal we are designing software that will track what users do online and categorically determine whether they are following expert advice or not. Deciding if a user is following advice is difficult because advice from different sources can be conflicting, and there isn't necessarily a 'right' answer. For example, an internet security article might say that a user should use a "strong" password, but each article defines "strong" differently. In order to know whether a user is following this piece of advice, we must first define what constitutes a strong password. We are also interested in how users make decisions that affect their security, and will be correlating our data with interviews conducted in the lab. This will result in a better understanding of how to inform end users about potential risks and ultimately help them behave more securely. Our poster will outline some of the challenges in collecting behavior data and determining whether advice is being followed or not.

IS SIMPLICITY THE KEY TO CAPTURING ATTENTION: EYE TRACKING ANALYSIS OF DISPLAY

Holly Manciero

Category: Communications Arts and Sciences, Section 1

Poster: 148

Location: Parlor AB, 9:30 AM - 11:30 AM

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

Understanding Point of Purchase (POP) displays is critical in helping to understand consumer-buying decisions. We used Tobii eye-tracking technology to analyze the responsiveness of consumers to garden center plant displays. We manipulated signs to vary product information or price. We collected data from 25 volunteers at 4 locations in the United States and Australia. Participants viewed 32 to 36 plant display slides. The plant products analyzed included boxwood, cyclamen, crepe myrtle, assorted herbs, and flowering annuals. Participants were compared on their responses to the displays, eye fixations, and their likelihood to buy. We extracted three visual measures of attention: time to first fixation, first fixation duration, and total visit duration. We compared visual measures of attention and likelihood to buy by display complexity (simple vs. complex) and type of sign. Our results showed the likelihood to buy (LTB) and attention are positively correlated. We found that product information is more influential than price in purchase intention and leads to more of an increase in the likelihood to buy. Future research should further the influence of display complexity on attention and purchase intention. Our findings offer suggestions how retailers might construct merchandise displays and create areas of interest.

EFFECTS OF AVATAR CHARACTERISTICS ON USER FOOD PREFERENCE

Justin Tokarski, Daniel Allen, Joey Sprow, Kimberlee Vroman

Category: Communications Arts and Sciences, Section 1

Poster: 149

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Rabindra Ratan (Telecommunication, Information Studies and Media)

Digital avatars are used every day for entertainment and social interaction. Though these avatars are seen as tools or media for interacting with a digital world, they can have significant effects on the user. We are investigating the relationship between physical characteristics of an avatar and the food preference of the user after interacting with it. Our participants are allowed to design facial features of their avatar to encourage identification, but we manipulate the avatar's physical characteristics to represent it as healthy or unhealthy. After playing several short games with their avatar, we use a combination of surveys, physiological data, and physical food choice to determine whether the characteristics of their avatar have a significant effect on short term food preferences. While our survey data provides us information regarding the participants perception of their

avatar's food preferences, our physiological data will show us the effect of avatar use on physical reaction to particular foods. We also offer the participants a selection of food after completing the game tasks and surveys, providing another measure for analyzing food preference. Understanding the connections between avatars and their users has descriptive power, but this work provides us with a better understanding of how those connections can be manipulated to encourage specific effects in the user.

WHAT MAKES SPEECH SOUND FAST OR SLOW? AN INVESTIGATION OF THE RELATIONSHIP BETWEEN SPEECH RHYTHM AND SPEECH RATE

Elaine Foster, Lauren Congdon, Megan O'Donovan

Category: Communications Arts and Sciences, Section 1

Poster: 151

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Laura Dilley (Communication Sciences and Disorders), Tuuli Morrill (Communication Sciences and Disorders)

How do humans use different aspects of the acoustic speech signal to understand spoken language? Previous studies have shown that speaking rate can affect whether a word within a sentence is detected at all (e.g. Dilley and Pitt, Psychological Science, 2010). The purpose of this experiment is to investigate which factors cause us to interpret speech as faster or slower by examining whether rhythm (realized as a pattern of high and low pitches) affects the perception of speaking rate itself (how fast a sentence seems). Two types of rhythmic patterns were used: a binary rhythm, in which high and low pitches alternate every other syllable (high-low-high-low-high-low), and a ternary rhythm, in which every high pitch is followed by two low pitches (high-low-low-high-low-low). In addition, speech rate was manipulated by slowing down sentences by a factor of 1.0, 1.4, or 1.8. The stimuli consisted of 32 ten-syllable sentences. After hearing each sentence, participants rated the sentence from 1 to 6 with "1" being very slow and "6" being very fast. Tests of statistical significance were conducted to determine whether the binary sentences were rated as faster on average than the ternary sentences despite both types having the same average speed. It was hypothesized that given two sentences that differed only in rhythm, the sentences using binary rhythm would seem faster despite both sentences having the same duration, because the binary pattern results in a more frequently occurring accent pattern.

Poster Presentations, Section 2

AN ANALYSIS OF THE ELEMENTS OF PERSUASION IN COACH'S LOCKER ROOM SPEECHES

Jason Pearson

Category: Communications Arts and Sciences, Section 2

Poster: 152

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Sandi Smith (Communication)

The aim of this research is to analyze videos of college coach's pre-game and halftime locker room speeches for elements of persuasion. The elements will include vivid language, gain versus loss frame, and one-sided versus refutational arguments. In addition to the elements the importance of the game will be assessed and the relationship of these variables will be analyzed in terms of the outcome of the game. This research will employ content analysis of twenty or more clips of numerous college coaches' locker room speeches found online. Operational definitions of variables will be created. Coding reliability will be established for all variables. Prevalence of each variable will be reported. Chi square analysis will be completed on frequencies of variable categories, persuasion elements, importance of game, and outcomes such as win versus loss and margin of victory. This research will give a deeper look at how motivational speeches work in an athletic setting. The athletic setting is an ideal place for the use of persuasion and finding which elements of persuasion are ultimately more prevalent and convincing.

MOVING A PRINT-ONLY PUBLICATION TO THE DIGITAL WORLD

Eric Walters, Kathleen Conley

Category: Communications Arts and Sciences, Section 2

Poster: 153

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Laura Julier (Writing, Rhetoric and American Cultures)

Fourth Genre is a creative nonfiction literary journal published by the Michigan State University Press. Although the journal is a print-only publication, it has recently begun to expand its readership through digital means by translating the traditions of the journal to new digital mediums and platforms. In the past, Fourth Genre published interviews with writers and other members of the creative nonfiction community. As editorial interns, we will engineer a series of podcasts that will be featured on the

journal's newly redesigned website to analyze the use of technology to present a classic print form. The podcasts will be produced at the Association of Writers and Writing Programs' annual conference, held this year in Boston, MA, and will feature interviews with authors previously published in Fourth Genre. The podcasts will also include a "roundtable" discussion with some of the journal's contributing editors. We will examine how the inclusion of these pieces on our website can promote the journal and increase its clout within the creative nonfiction realm. In the future, these podcasts may be broadcast as part of WKAR's "Current State," a program that focuses on the news and arts happenings of the mid-Michigan creative class. By implementing these marketing strategies, we will explore how the identity of the journal can best be communicated.

PROTECTING YOURSELF ONLINE: AN ANALYSIS OF COMPUTER SECURITY ADVICE

Zachary Girouard

Category: Communications Arts and Sciences, Section 2

Poster: 154

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Rick Wash (Telecommunication, Information Studies and Media)

I am analyzing computer security education materials provided by institutions, organizations, and corporations in order to understand the recommendations given to users. These materials are designed to educate users in computer and information security. The content includes a range of advice and definitions to help users protect themselves and their computer. I will explore the variations in content each organization includes in their educational materials. Are there differences in the information emphasized depending on whether it is an educational institution, government organization, or corporate entity? Will the information also change depending on the specific identity of the group or is all education material generally the same? For example, does Facebook provide different advice than the FBI on how to protect your personal information? I will be analyzing the security education materials from twenty six organizations. My poster addresses the types of advice given and how the advice differs across these organizations. Having an accurate understanding of the types of advice given to users can aid both researchers and companies in improving their public education.

USER UNDERSTANDING OF SECURITY SOFTWARE UPDATES: AN INTERDISCIPLINARY APPROACH

Michelle Rizer

Category: Communications Arts and Sciences, Section 2

Poster: 155

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Emilee Rader (Telecommunication, Information Studies and Media)

Software updates are crucial for keeping devices and their users protected from security threats such as viruses and hackers. When an update is not installed, the user is at an increased risk of harm. Computer security professionals believe that they solved the update problem by having programs automatically download and install updates; the efficacy of these automatic updates has not been tested from the user's perspective, so it is possible that people are still at risk. Has this solution really solved the problem or are users still at risk? I am interested in determining what home users think about updates as well as how they think about updates because these thoughts are what fuel update decision making. My research involves surveys, interviews, and a data collection computer program in order to analyze patterns between what people think they do and what people actually do with regard to updating. This multi-method approach will allow us to determine patterns of update thoughts and behaviors. In my poster I will present the results of the interviews, surveys and computer usage data collection as well as the analysis of patterns between the three. This analysis of update mental models and behaviors will allow us to predict the best ways to protect users from security threats.

TRANSLATING PRINT TO DIGITAL: LEARNING THE PROCESS

Bridget Waldron, Christine Scales

Category: Communications Arts and Sciences, Section 2

Poster: 156

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Laura Julier (Writing, Rhetoric and American Cultures)

Digital essays, such as "How To Be Alone" by Andrea Dorfman and Tanya Davis (<http://www.youtube.com/watch?v=k7X7sZzSXYs>), are an emerging form of nonfiction. Because Fourth Genre has existed as a print journal for 15 years, the digital essays that we are producing began in print. This project has presented us with several questions: What kinds of issues emerge when reimagining print essays as digital or visual? Where is the line between collaboration and appropriation? How are decisions made about what pieces to turn into images? How do we express abstract or lyrical concepts visually or aurally? We will attempt to answer these questions and explore this process by interviewing the

authors of the essays and the people translating them into digital essays.

DECONSTRUCTING STRATEGIC MARKETING MESSAGES

Jessica Sun, Justin Blair, Nicole Lawrence, Arielle Viviano, Yue Zhu

Category: Communications Arts and Sciences, Section 2

Poster: 157

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Constantinos Coursaris (Telecommunication, Information Studies and Media), Wietske Van Osch (Telecommunication, Information Studies and Media)

In this study, we engage in a longitudinal, multiple case study comparing strategic Facebook marketing messages. Based on a content analysis of social media posts by 10 brands over a 6-week period on their respective Facebook Pages, we empirically propose a typology for classifying as well as creating strategic Facebook messages using a multi-grounded theory approach. The 10 brands that represent our empirical cases fall under 3 purchase involvement categories, namely high-involvement (i.e., Airlines including Delta, KLM, and JetBlue), mixed-involvement (i.e., Big Box Retailers including Walmart, Target, and Meijer), and low-involvement (i.e., Consumer Packaged Goods including, McDonald's, Starbucks, Coca Cola, and Pepsi). Results of phase one speak to: i) overall messaging strategies; ii) various messaging categories; iii) media types; and iv) consumer engagement. We conclude with proposing inductive and generalizable Facebook marketing message strategies.

Oral Presentations, Section 1

LUCID

Justin Ceckowski, Evan Cox, Matthew Vorce

Category: Digital Media, Section 1

Location: Green Room, 9:00 AM

Mentor(s): Brian Winn (Telecommunication, Information Studies and Media)

Nightmares put us in worlds filled with our worst fears with little to fight back with. But what if you had some control over your dream... what if you were lucid dreaming during a nightmare? Would you be able to put your fears aside and fight back, or would you fall victim to your own imagination? Lucid puts the player in control of Ralphy during one of his worst nightmares. The player must wake Ralphy up by fighting their way through rooms filled with creatures that have been lurking deep within his subconscious. Even though things look grim, Ralphy is not completely powerless within his own nightmare. Because he is lucid dreaming, he is able to imagine powerful weapons and upgrades to aide in his escape. Lucid follows the format of traditional roguelike games. Characteristics of roguelike games include randomly generated levels and permanent death. They also provide a myriad of weapons and items for the player to use, similar to popular action RPG (role playing game) games like Diablo 2. Because of the permanent death, roguelikes tend to be smaller, faster paced experiences rather than traditional action RPGs. Players are drawn to this genre because of its fast paced action and the ability for the game to be very different every time they play. Lucid was created in the Game Design Specialization at Michigan State University. Six hard working students built the game from the ground up in one semester.

EFFECTS OF THE MOBILIZATION OF SHAME IN HUMAN RIGHTS ADVOCACY

Charla Burnett

Category: Digital Media, Section 1

Location: Green Room, 9:15 AM

Mentor(s): David Kim (Linguistics and Germanic, Slavic, Asian and African Languages), Sandra Logan (English)

Not many know that between 400 and 700 refugees are resettled in the Lansing area each year. There are currently between 10,000 and 13,000 refugees living in mid-Michigan. The Lansing refugee community includes Afghans, Bosnians, Burmese, Bhutanese, Burundians, Congolese (DR and Brazzaville), Croats, Cubans, Ethiopians, Eritreans, Hmong, Iranians, Iraqis, Kurds, Liberians, Meskhetian Turks, Somali, Bantu Somali, Sudanese, and Vietnamese, along with a few others. These refugees may have been relocated to Lansing because of religious or racial persecution, poverty, torture and may have lived in refugee camps for years. They arrive here with minimal clothes, no homes, no furniture and no money. They have only a short period of time before they must find housing, a job and integrate themselves into American culture so that they can pay back a rotating fund. Little to no governmental help is given to these at risk minorities so it is up to local organizations to help them adapt to the language and culture. The leading resource in Lansing is the Refugee Development Center (RDC). Refugees particularly have been misrepresented in media leading to stigmatization. The way in which non-profits have used guilt as a tactic for mobilization has led to a desensitization. My thesis has proposed new ways to create a sense of community empowerment through positive perspectives. I have created an educational advocacy film for the RDC that not only creates community involvement through positive and empowering media but also an understanding for this amazingly diverse population within our own community.

8 MILE, MEET WOODWARD

Victor Lord, Brad Kinnan

Category: Digital Media, Section 1

Location: Green Room, 9:30 AM

Mentor(s): Sue Carter (Journalism)

8 Mile, Meet Woodward is a documentary that sets out to understand the intersection of 8 Mile Road and Woodward Avenue near Detroit. The areas surrounding the location serve as a literal and figurative crossroads between many different social demographics. From socioeconomic status, to race, to religion, and many other cultural differences, the intersection proves to be a microcosm for Metro Detroit. Our film aims to give audiences a sense of awareness and understanding for the development of such a strikingly diverse community all surrounding the geographic petri dish of 8 Mile and Woodward.

FICTION FILM SPECIALIZATION

Bret Miller

Category: Digital Media, Section 1

Location: Green Room, 9:45 AM

Mentor(s): Bob Albers (Telecom, Information Studies and Media), Jeff Wray (English)

As a group, the 20 of us have worked together in a professional environment to create a short fiction film. We have gone through the entire professional process, from casting to location scouting, to shooting and editing the piece.

FEATHER FEUD

Antonio Revard, Dan Sosnowski, Benjamin Szymczak

Category: Digital Media, Section 1

Location: Green Room, 10:00 AM

Mentor(s): Brian Winn (Telecommunication, Information Studies and Media)

The iPad is a popular gaming platform that is owned by a large variety of people. However, it is not yet common enough for entire families or groups of friends to have a personal iPad. Additionally, there is a noticeable lack of local multiplayer games, or games that support multiple people using one device simultaneously. For these reasons, we wanted to create a game that emphasized on intuitive controls, easy to learn mechanics, support of up to four players a single iPad, and promoting a family friendly competitive atmosphere that supported nearly all ages. The result is our game: Feather Feud.

THE ELEPHANT IN THE BEDROOM

Karlee Humphry, Andrew Kelleher, Ava Makal

Category: Digital Media, Section 1

Location: Green Room, 10:15 AM

Mentor(s): Bob Albers (Telecommunication, Information Studies and Media)

The evolution of culture has produced two extreme sects within society. On one hand, virginity remains a highly revered aspect of personal identity. Conversely, popular media instigates and encourages an immersion in sex. Our documentary, *The Elephant in the Bedroom*, investigates the effect of this dichotomy in the modern world. Examining how heightened sexuality, technology, urbanization, and pop-culture interact with our common perception of virginity, *The Elephant in the Bedroom*, searches to ascribe general value to an extremely interpersonal topic.

COLLEGE STUDENTS, HOOKUP CULTURE, AND DIGITAL COMMUNITIES

Siobahn Jones, Emily Dallaire, Brooklyn Pluger

Category: Digital Media, Section 1

Location: Green Room, 10:30 AM

Mentor(s): Stephanie Amada (Professional Writing)

This research project explored the following: With so many academics and writers talking about hookup culture, how is this relevant to us as students? Is there a valuable conversation that can happen amongst us? Is there a way to use digital media to encourage student conversations about hookup culture? Why is “hookup” so ambiguous, and how can we answer these questions in relation to college-aged men and women? We began by examining the current academic research and popular writing on this topic. We explored the ways and the places digital communities are created. We engaged in reading, interviewing, researching online, and writing. We are working toward creating a digital community that engages students in conversation as well as educates about hookup culture. Research responsibilities included searching for and discussing readings, examining online communities to determine how we might enter into the discussions already taking place, and create our own. Results show that the vast majority of college students has accepted hookup culture as a normal part of their young adult lives. Women have grown more comfortable with their sexual autonomy. The ambiguity behind the phrase “hookup” is often over time accepted as the norm, and eventually even thought of as a benefit to a casual sexual lifestyle. Social media plays a role in both perpetuating hookup culture and also as a tool to study hookup culture in a more casual and comfortable setting.

Oral Presentations, Section 2

SPACE BALLOON PROJECT

Erik Tobeler

Category: Digital Media, Section 2

Location: Green Room, 1:00 PM

Mentor(s): Troy Hale (Telecommunications, Information Studies and Media)

The MSU space balloon project will launch a capsule to 60,000-80,000 feet in the air. The capsule will contain 5 HD cameras placed in a way to capture a full 360 degree view of near space. The footage will be displayed in a unique spherical room at the Impression5 museum in Lansing, MI. The project is about pushing the boundaries of both science and documentary production. From my documentary student perspective I will be pushing my personal limits to a new height (pun unintended) by pursuing the very best in the space exploration and meteorology industry. From an overall project perspective, our viewers will gain an unseen 360 degree view of the limits of earth in a fully immersed setting. They will see the entire process from start to finish of what it takes for amateurs to reach space. Upon completion both my team and the viewers will have experienced outer space and what it takes to leave earth on a limited budget.

U.S. V. NARCISO, PEREZ and THE PRESS

Alyssa Firth, Alex Barhorst, Andrea Raby, Simon Zagata

Category: Digital Media, Section 2

Location: Green Room, 1:15 PM

Mentor(s): Geri Zeldes (Journalism)

In the summer of 1975, two Filipino nurses were accused of poisoning patients with the drug Pavulon at the Ann Arbor VA Hospital. Over the next two years, Filipina Narciso and Leonora Perez were tried, convicted, and granted a retrial before ultimately being released from prison after serving four months. This unique and complicated story has been the focus of our documentary film. Through research, headlines, newsreels and interviews with those who have been affected by the case, U.S. v. Narciso, Perez and the Press explores how these two nurses came to be accused, how it affected the Ann Arbor and Filipino communities, and why this story has been forgotten over so many decades.

VEGANIZR

Caron Creighton, Kathleen Sarkady

Category: Digital Media, Section 2

Location: Green Room, 1:30 PM

Mentor(s): Laura Julier (Writing, Rhetoric and American Cultures)

Veganizr.com is a mobile web app we created based on a need we found in our everyday lives. We both enjoy vegan baking, but struggle when attempting to change "average" recipes into vegan recipes. This app will be accessible on computers, tablets and smartphones, and will allow the user to add a non-vegan recipe to the website, and have all non-vegan ingredients converted to fit a vegan recipe. We hope that our app will encourage users to attempt new, healthier versions of baked goods, in addition to encouraging creative and adventurous baking.

WHO SAYS THERE'S NO MUSIC SCENE IN LANSING?

Amy Ashley

Category: Digital Media, Section 2

Location: Green Room, 1:45 PM

Mentor(s): Jon Ritz (Writing, Rhetoric and American Cultures)

In 2010 a nonprofit organization called Middle of the Mitten (MotM) was founded to help support the local music community in the Lansing area, understanding that a thriving local music scene is a vital part of Lansing's emerging creative class culture. At times it may seem as if the music scene in the area is long gone, but in my research I found our music scene alive and well. I will present a video which includes video interviews, live shows, and photographs that highlight a culture many feel doesn't exist. So who says there's no music scene in Lansing? I invite you to come see for yourself.

IN THE MOMENT

John Siciliano, Olivia Barrett

Category: Digital Media, Section 2

Location: Green Room, 2:00 PM

Mentor(s): Bob Albers (Telecommunication, Information Studies and Media)

What is it like to be in the moment? Another term for “in the moment” is “in the zone”. While in the moment, an individual reaches the peak of performance in a way that appears to be incredibly focused and effortless. Professionals and the average person experience this phenomenon from activities such as music, dance, athletics, and even everyday actions. *In The Moment* explores these activities, and how one enters this lucid state. This feature length documentary's intention is to reveal a sample of these valuable experiences from professionals and nonprofessionals alike. *In The Moment* strives to create a deeper appreciation for the rare occasions when “the moment” is a reality.

SUSTAINING STATE

Simon Schuster

Category: Digital Media, Section 2

Location: Green Room, 2:15 PM

Mentor(s): Bonnie Bucqueroux (Journalism)

Efforts towards sustainability at MSU are highly publicized and well-lauded affairs, to the point where being “Spartan Green” has become an ubiquitous slogan symbolic of administrative doctrine. This documentary will serve as an in-depth examination of Michigan State's commitment to sustainability, at the center of which is the Energy Transition Plan. Adopted in April 2012, the plan sets forth concrete benchmarks for the university's development, with the ultimate goal of a transition to 100% renewable energy. The first benchmark, set for fiscal year 2015, calls for 15% of campus energy to be renewable and a 30% reduction in greenhouse gas emissions. Yet the plan itself offers little detail about how any of the goals will be achieved. Currently, approximately 97% of campus energy is obtained from the T.B. Simon Power Plant, which generates electricity from a mixture of coal, natural gas, and biofuel. The film will first discuss MSU's current energy infrastructure and the aims of the Energy Transition Plan, relying on publicly available data and interviews with representative from the MSU Physical Plant. From that exposition, the film will focus primarily on interviews with officials in the Office of Campus Sustainability and administrators about how precisely the short-term benchmarks will be met, and what these strategies will mean for the plan's long-term goals.

GRAVITY MATTERS LITTLE

Jennifer Berggren

Category: Digital Media, Section 2

Location: Green Room, 2:30 PM

Mentor(s): Henry Brimmer (Advertising)

Gravity Matters Little is a documentary following the MSU Professor and artist Henry Brimmer through the creation of his piece for Art Prize 2012. Starting from the basic creative brainstorming, the video showcases how art is transformed and how Henry comes to his final piece. "Gravity Matters Little" is a 12 foot man made from metal framework, covered in foam ad sealed with fiber glass and hanging from a wire in downtown Grand Rapids. In the video you see all aspects of the process and into Art Prize, seeing the reactions of festival goers and voters are they crank their necks to see his larger than life display as it hangs between two buildings.

Education

Oral Presentations, Section 1

THE PEDAGOGY OF A READER: EDUCATIONAL TECHNIQUES IN LITERARY ATTENTION AND AN FMRI STUDY OF JANE AUSTEN

Paige Fouty

Category: Education, Section 1

Location: Lake Erie Room, 1:00 PM

Mentor(s): David Kirkland (Writing, Rhetoric and American Cultures), Natalie Phillips (English)

This interdisciplinary presentation focuses on pedagogical implications of a recent fMRI study of literary attention, using the results to model a reciprocal relationship between education and neuroscience. The original study compared two types of readerly attention: 1) pleasure reading, a more relaxed mode of textual perusal; and 2) close reading, a technique emphasized in classrooms for deep critical analysis of a text. In the experiment, 18 Ph.D. candidates in literary studies moved between these two states of concentration while reading a chapter of Jane Austen's *Mansfield Park*. After leaving scanner, participants wrote a short essay, providing us with a rich map of readers' engagement, including passages and themes found worthy of literary attention and examination. The cross-group analysis of these essays demonstrates complex patterns of shared attention to this text across subjects as well as unique interpretations. Because participants often quote from the text, these patterns from the essays can be correlated with the neuroscientific data from the brain scans as well as with the eye-tracking, giving us a truly complex cognitive picture of attention during reading. In concluding, I explore how studies from the field of education can improve and enrich this study, as well as how its results—suggesting the cognitive benefits of both literary analysis and pleasure reading—can inspire teachers to develop new models of a “good” reader. At the broadest level, I advocate using educational methodologies to improve our understanding of neuroscientific data and create new experiments growing out of mutual points of interest.

EXAMINING SELF ESTEEM IN AND PERCEPTIONS OF DISCRIMINATION AND AMONG MULTIRACIAL MIDDLE SCHOOL STUDENTS

Robyn Hubbard, Christopher Thomas

Category: Education, Section 1

Location: Lake Erie Room, 1:15 PM

Mentor(s): Christy Byrd (Teacher Education), Dorinda Carter (Teacher Education)

The predominant discourses in education generally focus on the perceptions of one particular race or another, but do not usually discuss students who do not fit into one specific racial category. The current study examines students' (n=82) self-esteem and perceptions of discrimination by using prompts about discrimination, motivation, and ability from a school culture and climate survey. The School Culture and Climate Survey (developed by Dr. Carter Andrews) was administered to middle school students (n=477) in a predominantly white school in the Midwest. Questions included prompts about experiencing discrimination from peers and faculty, various types of and reasons for discrimination, opinions about faculty members' supportive relationships with students, students' confidence in their schoolwork, and their the belief that they attend a good school environment. Students' relationships with friends and faculty as well the school climate are all closely related. The results of the current study find that multiracial students who perceive to be discriminated against more often than their peers are more likely to be unmotivated in their school environment. They are also less likely to rate their middle school as a good school environment. These findings have several implications for students, teachers, and administration regarding addressing the academic and social needs of students who are not monoracial. By allowing students to detail their own experiences with motivation and discrimination, it gives insight for educators on how to provide a more positive schooling experience for students that identify outside of the traditional racial boxes.

BUILDING A FUTURE, MENDING THE PAST: HISTORICAL DISADVANTAGES, RACIAL STRATIFICATION, AND MEASURES OF POLICY IMPLEMENTATION WITHIN SOUTH AFRICAN EDUCATION

Mara Willemin

Category: Education, Section 1

Location: Lake Erie Room, 1:30 PM

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

The current state of education in South Africa seeks to rid the injustices of apartheid legacies by creating and implementing policies, which equalize quality and availability of education for all. However, its current state can be characterized by low measures of academic achievement, subject to quality gaps between formerly black and white schools, lack of teacher education and training, linguistic repressions, and is known to charge high costs to attend. Because there is still much to be

done in addressing some of these major issues, my research will present two theses, which attempt to account for the causes of educational shortcomings and inequalities in South Africa's current structures. The first thesis suggests the current system is best explained by understanding South Africa's historical context, or the policies enacted during the apartheid-era. These policies took extreme measures to legalize the racial inferiority and repression of all non-white populations leading to a racial stratification that is still seen today. The second thesis, then suggests that while the historical components of apartheid are important factors, the problems facing modern day education are more adequately explained through the inability of the democratic government to effectively implement policy measures, which address the extreme structural inequalities. My research will show that neither explanation works alone to explain the current state of education. Finally, the significance of this paper and its research lies in its ability to use the investments in human capacity as a means to solving issues of inequalities within South African education.

UNINTENDED CUING IN TEST DESIGN: COLLEGE STUDENT DATA AND SPATIAL ANALYSIS OF EYE TRACKING

Nicholas Martin

Category: Education, Section 1

Location: Lake Erie Room, 1:45 PM

Mentor(s): Julie Libarkin (Geological Sciences)

The design of a test itself may be just as important for performance as the student's knowledge of the material being tested. In this study, a set of multiple choice questions containing common test designer errors was created to evaluate the extent to which design influences performance. Common errors included: longer answers, answers containing technical language, and answers that correspond to language in the stem of the question. Results from roughly 700 incoming college freshmen indicate that long or technical answers are chosen much more often than other answers. Eye tracking data from 15 students indicate that attention is unequal across all answer options; for example, participants spend much less time gazing at response option "d" than at other options. Differences in attention to salient features of long or technical answers provide evidence for mechanisms underlying the test taking observed in college freshman. These results suggest that some students are able to use basic fundamental design in test taking. As a consequence, test scores are likely to be reflective of not only the student's knowledge of the material, but their ability to pick up on cues in the question itself.

INVESTIGATING THE CONSTRUCTIVIST LEARNING THROUGH DIGITAL TOUR CREATION

Tatum Walker

Category: Education, Section 1

Location: Lake Erie Room, 2:00 PM

Mentor(s): Scott Schopieray (Arts and Letters)

Between video games at home and use of iPads in the classrooms, the Millennial generation is using more and more digital tools to take in mass amounts of information. The influence of new forms of technology is undoubtedly changing the learning styles of this generation. Recent research focuses on new learning models to accommodate the millenials. This research's objective is to continue furthering teaching practice, by examining a web-based mobile learning platform, Tourguide, to create tours in a museum environment. Rooted in Bloom's taxonomy model of learning, Tourguide facilitates learning through creation by providing a user-friendly digital platform. A set of middle school students were given an objective to build a tour of the MSU Museum. One half was trained and given Tourguide to build with and the other half was given traditional classroom tools. The student's projects were quantitatively analyzed based around their end result and survey. The outcome objective compares the group's interest, continued outside research, and media components. In this presentation I will discuss results of their project and how they illuminate the level of creation and higher learning involved in both groups. I will explain the findings and their important role in aiding in evaluating the best learning practices with middle school age level students.

MOTIVATIONAL FACTORS TOWARDS SCHOOL FOR CULTURALLY DIVERSE STUDENTS: INTEREST AND RESPECT.

Andrea Grafstein, Alayna Washington

Category: Education, Section 1

Location: Lake Erie Room, 2:15 PM

Mentor(s): Dorinda Carter (Teacher Education)

Interest in school and motivation are often looked at as factors that influence academic achievement. Within school climate, some factors that affect interest and motivation towards school for students are perceptions of respect and student cultural differences. Research indicates that respect and demographics play a role in affecting student interest and motivation in school. Studies may not focus on multiple demographic factors at the same time when assessing student interest and motivation. The current study examines how student perceptions of respect and their demographics, such as gender, race, learning ability, and socioeconomic status, can reflect their interest and motivation towards school. Study participants (n=477)

included middle school students enrolled in a predominantly white middle school in a Midwestern city in the 2011-2012 school year. Quantitative and qualitative data was collected through a survey developed by Dr. Carter-Andrews. Data collected included questions pertaining to student perceptions of respect from their peers, administrators, and teachers, their interest levels in school and curriculum, as well as their individual demographics. The results of this study indicated that perceptions of respect for cultural differences do not highly correlate with student interest in school; however, the study does indicate that students from different demographical groupings show variations in interest in school. This study shows that there are implications that illustrate differences in motivation towards school based on demographics. An understanding of this research could lead to additional research on how teachers can better motivate culturally diverse students in the classroom.

Poster Presentations, Section 1

COMPARING FEEDBACK REPORTS: HUMAN AND AUTOMATED ANALYSIS OF CONSTRUCTED RESPONSE QUESTIONS IN BIOLOGY

Michele Weston

Category: Education, Section 1

Poster: 165

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Joyce Parker (Geological Sciences), Mark Urban-Lurain (Center for Engineering Education Research)

Constructed response questions can offer a detailed look into students' reasoning skills and understanding of key concepts, but take a considerable amount of time to analyze. This trade-off between the amount of time it takes to analyze constructed response questions and their ability to reveal student thinking has made them a desirable, but out-of-reach option, for instructors in large enrollment courses. Automated text analysis can potentially alleviate the time burden of constructed response questions by speeding up the scoring process, while still revealing the level of detail a human reader looks for. This report compares the quality and time needed for an instructor's analysis of a hand-scored sample of responses to a constructed response question on cell metabolism with an analysis done by machine scoring. We found that the analysis done by machine scoring can give more information than a quick read of a sample can, and summarizes the entire set of responses. In this study the machine scoring process along with creating a feedback report took more time than an instructor's analysis of a subset of data, but most of the time consuming work would not need to be repeated with new data in the future.

CAPITALISTIC DEGRADATION OF SOCIAL INTELLIGENCE, REDEFINING CRITICAL PEDAGOGY, AND THE TRANSFORMATIVE POWER OF CREATIVITY

Cooper Franks

Category: Education, Section 1

Poster: 166

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Austin Jackson (Residential College in the Arts and Humanities)

According to the Eli and Edythe Broad Foundation, "a student drops out of school every 26 seconds. That's 1.2 million per year-- or 6,000 a day." That is 6,000 growing minds that cease to pursue the pleasure of knowledge, dismantle their aspirations and submit to a life of ignorance as a cog in the social machine. Not only is "the poverty rate for families headed by dropouts more than twice that of families headed by high school graduates," but "65 percent of U.S. convicts are dropouts," and "increasing the high school completion rate by just one percent for all men ages 20 to 60 would save the U.S. up to \$1.4 billion per year." The current schools "utilize their material and ideological resources to reproduce the social relations and attitudes needed to sustain the social divisions of labor necessary for the existing relations of production," and as a result, deconstruct the conditions that foster critical, intellectual and innovative minds. The question is, how can we reform a system that has its foundation set in the outdated industrialized model of the 19th century? Through analyzing the educational, structural and individual factors within the educational atmosphere, redefining critical pedagogy and personalizing education through embracing creativity, true progress can be made.

COMPARING THE LONGITUDINAL IMPACTS OF THREE FORMATS OF MSU GENERAL CHEMISTRY COURSES

Rebecca Tauscher

Category: Education, Section 1

Poster: 167

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Ryan Sweeder (Lyman Briggs College)

At MSU, there are three different ways that general chemistry classes are taught. In university general chemistry classes

(CEM141, CEM142, CEM151, CEM152), information is presented in the basic lecture format. In addition, Lyman Briggs general chemistry classes (LB171, LB172), offer the information in more engaging ways for the students, such as using Clicker questions and student discussions. Furthermore, Lyman Briggs has offered a general chemistry class that uses Chemistry Modules (LB 172). These modules allow for general chemistry to be taught using real world examples and the students have to find the answers instead of being given the answers. However, does the teaching technique of general chemistry at MSU really impact students in their future science classes? Since no systematic research has been done to understand the impact that varying teaching styles have on students, this question goes unanswered. This research project compares the three different ways general chemistry is taught using both qualitative (open-ended and Likert scale questions) and quantitative (grades) data received from surveys. A survey was given to the students who took a general chemistry course in the 2008-2009 academic year. Since then, the same survey has been given to the same students, resulting in three years worth of data. The goal of the project is to see if there is a difference in students' performance in upper-level classes based on they way they were taught in general chemistry.

IMPROVING SCHOOL QUALITY: PARENTS' USE OF DATA TO DETERMINE THE QUALITY OF A SCHOOL

Melissa Vader

Category: Education, Section 1

Poster: 168

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Rebecca Jacobsen (Teacher Education)

States create school report cards and disseminate them to parents in the hopes that parents will use the information to hold schools accountable for poor performance. But is the information in the report cards useful to parents and if not, what other information do they use to determine if a school is a good school? In this project, I analyze survey data from the Commonwealth Institute for Parent Leadership in Kentucky to understand how parents prioritize different forms of data and sources of information. I find that most parents do not see the school report card as the most important source of information. However, parents do use other sources of objective data (like school rankings) but most often in conjunction with subjective data. Specifically, parents reported that interactions with teachers and staff at their child's school was a significant factor in shaping how parents viewed their child's school. Based on these findings, I conclude that parents want to see improvement in more than just the areas analyzed in the school report card. If schools only focus on test scores, they may be taking away focus from other areas that parents consider very valuable.

ART FOR THE BLIND

Augusta Morrison, David Baum, Emily Ekdom

Category: Education, Section 1

Poster: 169

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Laura Cloud (Sculpture)

Art for the Blind provides the public with an understanding of blind peoples relationship and interaction with their accessibility to Art and Education. Whether in a classroom setting, museum, or any educational facility, this project explores the theory and practice employed. Through site visits to different facilities for the blind, survey analysis, interviews, and the final creation process, our research will lead to a first hand understanding of the meaning of accessibility. By taking an active and civic role in the community, we will better learn how to serve our immediate environment. Our research will provide us with the capability to generate innovate practices for making and interacting with art. Contemplating previous work by American Education for the Blind, we will focus on creating contemporary art that focus on a philosophical, educational, historical, and conceptual approach to the exhibition. Furthermore, the medium, message, and material will reflect the artwork as it being created and facilitated by our research.

SOCIAL AND LINGUISITIC INTERACTIONS ON THE AUTISM SPECTRUM: A CASE STUDY

Carly Krull

Category: Education, Section 1

Poster: 170

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Cary Roseth (Counseling, Educational Psychology and Special Education)

The objective of this case study is to observe Noah, a four year old African American child labeled on the autism spectrum, in peer social interactions during free play time. The emphasis will be on the social and linguistic cues that the child follows with his peers as well as his peers' and teacher's perceptions of him. Data for this study was collected using naturalistic observation

methods over two months. The child under observation was videotaped at 4 time points during data collection, and sociometric nominations of relationships were collected on the child. Video coding of the child's behavior will focus on language utterances and play type (e.g., social play or parallel play). Preliminary analyses of the videos indicate that the child is socially interactive but rarely initiates communication or physical interaction with peers. Teacher surveys indicated that the focal child was rated as low in dominance and moderate in prosocial behavior. The child's peers sociometrically nominated him as being a special friend, helping others, as well as saying mean things. More in-depth analyses will determine the quality of interactions between the focal child and his peers. The results of this study could have implications for the understanding of children on the autism spectrum, namely their impaired social interaction (Wing, 1996). Perhaps children on the spectrum show more varied social patterns than typically perceived. Further, this study could inform teaching practices that encourage social interaction amongst children on the autism spectrum and their peers.

HOW DO STUDENTS CHANGE THEIR USAGE OF RELATIONSHIPS BETWEEN TWO BIOLOGICAL CONCEPTS CHANGE OVER TIME IN AN INTRODUCTORY BIOLOGY COURSE?

Etiowo Usoro

Category: Education, Section 1

Poster: 171

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Tammy Long (Plant Biology)

Biology instructors strive to comprehend how students learn and describe scientific processes to more effectively teach science. System models are one type of classroom assessment that provides feedback about students learning. In system models, concepts are represented in boxes linked by arrows that explain their relationships to one another. I looked at student-constructed models from an introductory biology course and assessed the words students use in model relationships to incorrectly relate concepts and whether these words change over time. I analyzed midterm and final exam data, and selected all relationships where students used biologically appropriate language in an inappropriate context. I then ranked the relationships based using proportions of all incorrectly used relationships. Some relationships (e.g., "Code" and "Make") are used incorrectly across both examinations at high frequency. Others (e.g., "Vary") are rarely used at the midterm, but appear as the third most common incorrectly used relationship on the final examination. These results indicate there are multiple types of words that are being misappropriated. For example, the word "makes" has a well-known meaning. When used incorrectly, we can reasonably conclude that students misunderstand how concepts relate to each other. However, "code", is biological jargon, so we do not know whether students misunderstand how the concepts relate to each other, or if they misunderstand the meaning of "code". Based on these results, I am exploring what concepts are most problematic. These data will allow instructors to recognize common words used in classrooms that may be misused by students.

THE CHALLENGES OF INTERSECTIONALITY

Meredith Chesney

Category: Education, Section 1

Poster: 172

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Kristen Renn (Educational Administration)

There are multiple aspects to an individual that create their identity. This research is a subset of a larger project focusing upon the persistence of LGBTQ students in college, The National Study of LGBTQ Student Success. During the Midwest Bisexual Lesbian Gay Transgender Ally College Conference about 50 interviews and 500 surveys were administered. Questions focused upon the resources that students felt helped them to stay in college and achieve their educational goals. From that research, this sample focuses on what the consequences are when two aspects of a person's identity, sexuality and race, are at odds with one another. Students of color who are part of the LGBTQ community find it more difficult to find support on their campus that nurtures their identity as a whole. The support groups and resources that students use on their campus are not effective in helping students deal with the intersections of their identity. The focus of this research is to find what these groups do to aid students in feeling that the multiple aspects of their identity are supported by all the groups that they are a part of. What do LGBTQ groups and multicultural groups do that help students feel that the other parts of their identity are accepted? This research hopes to find the resources that these groups use to help students feel that their identity is supported as a whole.

MICHIGAN'S EDUCATION ACHIEVEMENT AUTHORITY

Rolika Dalela

Category: Education, Section 1

Poster: 173

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Matthew Grossmann (Political Science)

Due to the low performance of students in schools that are part of Michigan's education system, the need for the reform of these schools is great. Michigan's Education Achievement Authority plan that will help improve such low performance schools, although not voted on last year, will definitely be considered this year. This plan could help many Michigan students who are stuck in schools that do not teach well because of the lack of any better options. If this plan is voted in, it could help improve many schools, but there could also be repercussions to this plan.

Engineering, Computer Science, and Mathematics

Oral Presentations, Section 1

HISTORY OF THE MICROCHIP

Connor Hall

Category: Engineering, Computer Science and Mathematics, Section 1

Location: Parlor C, 1:00 PM

Mentor(s): Carl Boehlert (Chemical Engineering and Materials Science)

I am interested in the history of the integrated circuit (microchip). I will be examining the intricacy of a few microchips under an electron-scanning microscope to show how it has advanced over the past 20 years. I am going to compare an iPhone microchip and a computer microchip from several years ago. With the images I capture, I will have the ability to show the differences in the soldering and compare the semiconductor material used. The microchip is the “brain” of the computer. Most people do not know how a computer works from the inside. People just use a mouse and keyboard to display images on a monitor. I want to give the lay person an in-depth explanation on the complexity of a computer in order to connect their understanding of the external parts with the internal materials. Along with this, I can give people a timeline explanation of the microchip and show them what to look forward to in the future.

APPLICATIONS OF HEMIN IN GREEN CHEMICAL ENGINEERING: EVOLUTION FROM HIGH-TEMPERATURE AND PRESSURE TO AMBIENT CONDITIONS

Charles Chen

Category: Engineering, Computer Science and Mathematics, Section 1

Location: Parlor C, 1:15 PM

Mentor(s): Chi-Kwong Chang (Chemistry), David Hodge (Chemical Engineering)

Metalloporphyrins are a group of inorganic compounds, and many of them can be found in nature, such as hemin and chlorophyll. Metalloporphyrins have been widely applied in pharmaceutical, cancer therapy, solar cell, material, and biochemical industries for many years. In this research, the goal is to develop a novel oxidation process and understand the nature mechanism, especially hemin. The study contains two sections: molecular modeling and actual application. Modification of hemin, ligand and amino acids is a simple way to understand the relationship between their molecular mechanisms. From the proposed work, hydrogen peroxide would lead the iron(III) of hemin to Cpd 1 [Fe(IV)=O] which is an active state to transfer the electron between Cpd 1 and substrate, and ligand stands as an important role of this study. On the other hand, the hemin-ligand complexes and iron-catalyst have been confirmed that the catalysts can enhance the sugar yields in enzymatic hydrolysis from woody biomass by oxidizing the plant cell wall. The catalytic oxidation could reduce the energy consumption than traditional oxidation process by high temperature and pressure, and even become a chloride-free bleaching method. Catalytic oxidation has been developed in wastewater-treatment, paper bleaching and drug synthesis more than 30 years, and searching more catalysts and applications can increase the benefits to make this method closer to the reality in industries.

QUANTITATIVE ESTIMATION OF LEACHED IRON FROM METAL-NITROGEN-CARBON BASED CATALYST USING UV-VIS SPECTROSCOPY

Jennifer Andrews

Category: Engineering, Computer Science and Mathematics, Section 1

Location: Parlor C, 1:30 PM

Mentor(s): Scott Barton (Chemical Engineering and Materials Science)

Due to the increasing cost of precious metals, efforts have been made to replace Pt-group metals with oxygen reduction reaction (ORR), particularly for low-temperature fuel cells. Metal (transition metals, particularly 3d series) and nitrogen doped with carbon (MNC) catalysts show superior activity and stability compared to other non-precious catalysts for ORR. Among the transition metals used in MNC catalysts, iron was found to have higher ORR activity. However, the un-reacted iron during synthesis needs to be removed; otherwise, it may contaminate the fuel cell electrolyte and affect the life span of electrolyte through Fenton’s reaction. Additionally, in order to understand the ORR mechanism of MNC catalysts, it is important to know the exact quantity of iron. In the present study, un-reacted iron was leached from MNC using aq.0.5 M sulfuric acid at 80 °C. A quantitative estimation of Fe²⁺ in the leached solution was performed using UV-VIS spectroscopy. A calibration curve was obtained using various known concentrations of Fe²⁺ solution with 1, 10 phenanthroline, hydroxylamine hydrochloride, and acetate buffer. The peak absorbance at each concentration was obtained, and a linear correlation between peak absorbance at 509 nm and concentration was found. Using this linear correlation as a calibration curve, subsequent tests were performed on

unknown Fe^{2+} solutions of leached MNC catalyst. A quantification of iron in the catalyst was back calculated based on the concentration of Fe^{2+} in the leached solution as opposed to the amount of Fe^{2+} used during synthesis.

CROSS-SHOE TORQUE PREDICTION USING INSOLE PRESSURE TECHNOLOGY

Trevor McSween

Category: Engineering, Computer Science and Mathematics, Section 1

Location: Parlor C, 1:45 PM

Mentor(s): Jerrod Braman (Radiology), Roger Haut (Radiology), Brian Weaver (Engineering Mechanics)

Although traction between the shoe and playing surface is important for various athletic activities, excessive traction has been shown to increase the prevalence of injuries to the lower extremities. The current methodology of assessing shoe-surface traction characteristics involves a mechanical device fitted with a surrogate ankle, which may not represent real-world athletic motions. The use of human subjects is limited to the laboratory setting because it requires the use of an embedded force plate. Previous research has illustrated the possibility of using pressure insole technology to predict the free torque at the shoe surface interface with linear regression analyses. It has been shown that the accuracy of the prediction is dependent on subject specific models. The purpose of the current study was to determine if the linear relationship between torque and plantar pressures is also specific to the footwear. Linear regression models between the force plate measured free torque and simultaneous plantar pressures were developed based on a set of subjects wearing three different shoes. The model for each shoe was compared against each other to determine the cross-shoe prediction accuracy. The results indicate that a shoe specific model is required for accurate predictions. This indicates that prediction of a free moment is not only subject specific, but also shoe specific for these isolated motions. The ultimate goal is to develop linear regression models in the laboratory for a specific subject and shoe to be utilized outside the laboratory to measure the free torques that develop on various playing surfaces.

HARDWARE-IN-THE-LOOP TESTING FOR CONTROL OPTIMIZATION IN HYBRID VEHICLES

Peter Dolce

Category: Engineering, Computer Science and Mathematics, Section 1

Location: Parlor C, 2:00 PM

Mentor(s): Guoming Zhu (Mechanical Engineering)

New hybrid vehicle systems offer improved fuel economy and reduced emissions. In order to develop these systems to provide optimal fuel economy and performance, an effective method for testing must be developed. Several software and hardware-in-the-loop (HIL) systems have been previously developed for different engine and powertrain testing. HIL systems offer improved accuracy over software-based systems and reduce cost in prototype development. The proposed method allows for more efficient testing by using similar hardware and software setups for multiple hybrid modes. Four different test modes were developed: engine only mode, series hybrid mode, parallel hybrid mode, and four-wheel drive parallel mode. These modes are run by several physical components. These include a 6.7L Cummins turbo diesel engine, Chrysler transmission, two electric motors, and three dynamometers. The system can change modes by enabling and disabling different components and changing the software model. The engine and electric motor torques are used to calculate wheel torques using different simulation models. The HIL system then combines the physical performance of the engine and motors with Simulink generated powertrain models and a vehicle dynamics model in real-time to accurately simulate the road performance and efficiency of the vehicle in a federal, drive cycle. The flexibility of the system enables faster control development and flexibility for multiple powertrain systems.

Poster Presentations, Section 1

THE CHEMISTRY OF MAKEUP

Alicia Spees

Category: Engineering, Computer Science and Mathematics, Section 1

Poster: 180

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Carl Boehlert (Chemical Engineering & Materials Science)

I am really interested in makeup. I am curious to learn about the processes and materials involved in the making of makeup. I plan to research the different materials that comprise certain types. I will use samples of expensive, new, and old make up to compare the materials and processes used. I plan to examine various brands of makeup that were processed differently, and compare the different elements and/or the processed used. I will evaluate the chemistry using the SEM. I will learn why different elements are used with certain types of makeup. I also want to look at the contrast between different elements used

for certain shades of color versus inorganic dyes used. With my results and research I want to see how different elements used have any correlation to the price of different makeup. I think the images of makeup under high magnification will be interesting to compare, especially on the poster I present. I will mainly focus on blush, eye shadow, and other powdered makeup. These types of makeup will be easily examined under the scanning electron microscope. The images will provide more interesting visuals for my poster.

UNDERWATER OPTICAL COMMUNICATION SYSTEM

Bin Tian

Category: Engineering, Computer Science and Mathematics, Section 1

Poster: 181

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Xiaobo Tan (Electrical and Computer Engineering)

Mobile networking and collaboration of underwater robots is one of the hot topics in many fields including aquatic environment sensing and robot networked control. In this paper, a LED-based optical underwater communication system is proposed for such applications. Compared with those acoustics-related and laser-based communication systems, the characteristics of small size and low cost of LED-based systems are quite outstanding, especially for small underwater robots networking. Compared to other existing LED-based communication systems, the presented system has a better balance on features of small size (in the order of centimeters), low energy consumption (500 mW on average) and long communication distance (20-30 m, in comparison of several meters from most of similar LED-based systems). System design is presented including the realization of the transmitter and the receiver, as well as the methods for robustness to noise. System performance is experimentally tested in terms of signal strength and waveform shape versus communication distance and transmitting frequency. Experiments of real data transmission is conducted to check the bit error rate under different baud rates. The experimental results show that the presented system has a good balance between communication performance and robustness.

THE AUTOMATION OF CHESTNUT GRADING

Katy Gwizdala

Category: Engineering, Computer Science and Mathematics, Section 1

Poster: 182

Location: Parlor AB, 9:30 AM - 11:30 AM

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

The goal of this project is to research methods to improve the workflow of researchers working with image data. In this case, the focus is automating the process of grading chestnuts using CT scans. In the first experiment, the time annotating images using a touchpad was compared with the time doing the same task using a mouse. After obtaining four sets of data (the CT scans of the chestnuts), it was clearly demonstrated that the mouse was quicker. For the second experiment, several different techniques were compared to estimate the area of the chestnuts in the images using data gathered from the first experiment. These calculations will provide a "ground truth" comparison for establishing the quality of automatic segmentation algorithms being developed. The final experiment and ultimate goal of this project is to calculate the ratio between the total size of the chestnut and the healthy area of the chestnut. This ratio data will be used to determine if a classifier can be developed to automatically grade a chestnut. Although this ratio may be considered a naive approach, the hope is that if it doesn't work in all cases, this simple classifier will provide a baseline for more advanced classifiers.

IMPROVING CHAMVIEW SOFTWARE THROUGH PYTHON PROGRAMMING

Danielle Heger

Category: Engineering, Computer Science and Mathematics, Section 1

Poster: 183

Location: Parlor AB, 9:30 AM - 11:30 AM

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

The software Chamview was created at Michigan State University in part to help analyze movement of chameleon's eyes and feet to help biologist better understand how the animals behave. Researchers must go through video frame-by-frame and mark the location of the right and left front and back feet, as well as the snout, eye center and pupil. This annotation process can be extremely time consuming and labor intensive. For this research we analyzed the time and effort it takes to use the software in order to reveal improvements that can be made to utilize the researcher's time more affective. These workflow improvements will be integrated and tested in the system using the Python programming language.

PREDICTING POWER PRODUCTION IN KREBS CYCLE BASED ENZYMATIC BIOFUEL CELLS

Benjamin Piering

Category: Engineering, Computer Science and Mathematics, Section 1

Poster: 184

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Scott Calabrese Barton (Chemical Engineering and Material Science)

With the increasing power demands of portable electronics, there has been increased interest in the development of alternative portable power sources. The focus of this research has been on the conversion of glucose to electricity in an enzymatic biofuel cell. This fuel cell electrochemically implements the Krebs cycle, in which pyruvate is fully oxidized to CO₂, and NADH is produced that can then be oxidized at an electrode providing fuel cell current. Collaborators have previously explored the feasibility of such a device via experiments, and the goal of this project is to build upon that research to mathematically model the kinetics of the Krebs cycle and power production in such a device. This has been accomplished by combining the published rate kinetics of the individual enzyme reactions into a single model implemented in the biochemical network simulation software COPASI. Through this we will predict production in the fuel cell based on initial concentrations of the enzymes, pyruvate, and other material for future research in the area of Krebs cycle based enzymatic fuel cells.

EMBEDDED CONTROL SYSTEM OF A TAIL ASSISTED JUMPING AND RUNNING ROBOT

Tianyu Zhao

Category: Engineering, Computer Science and Mathematics, Section 1

Poster: 185

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Ning Xi (Electrical and Computing Engineering)

In this research, an embedded control system was designed and implemented to control a miniature jumping and running robot. There are four parts in the embedded system: the central processing unit, the sensing unit, the actuation unit, and the power supply unit. This embedded system wirelessly controls the robot to perform running, steering, self-righting, jumping, and aerial maneuvering functions. Despite of having all the components and required functions, the embedded system was realized in a small printed circuit board with only 22.8mm × 24.8mm in size and 3 gram in weight. Based on the control system, experiments were conducted to measure the linear and angular speeds of the robot running on the flat surface. Jumping experiments were also performed to obtain the jumping performance including the jumping height and distance. Finally, once the robot leaped into the air, the control system actuated an active tail to regulate the robot body to a desired angle so that a proper landing posture can be ensured to minimize the landing impact. Two controllers were designed and implemented in the system. The parameters of these two controllers were tuned base on experimental results. Using the feedback data from the sensors of the robot, the performances for the two controllers were compared. The robot equipped with such embedded control system can be deployed into rugged terrain to create a mobile sensor network for environmental monitoring, military surveillance, and search and rescue applications.

OPTIMIZATION OF DEXTRIN CAPPED MAGNETIC GOLD PARTICLES

Keely Chandler

Category: Engineering, Computer Science and Mathematics, Section 1

Poster: 186

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Evangelyn Alocilja (Biosystems Engineering)

A gold coated iron oxide magnetic particle was optimized that could be used as an extraction and detection tool for pathogenic cells in an electrochemical biosensor system. Previously reported Fe₃O₄@Au nanoparticles were synthesized using citrate as a capping agent. The Nano-Biosensors Lab at Michigan State University has recently developed a unique synthesis approach using dextrin as a capping agent. Dextrin was found to be an effective capping agent of magnetic gold particles (Fe₃O₄@Au), producing particles with stronger electrochemical responses than previous methods using citrate. This stronger electrochemical response creates the potential for a more sensitive biosensor. Synthesis conditions were optimized based on the electrochemical response while maintaining stable, uniformly gold coated iron oxide cores. A systematic optimization of the synthesis procedure was completed by analyzing the effect of pH, temperature, dextrin concentration, gold concentration, number of iterations, and incubation time. The electrochemical response was determined by measuring the change in current response over a voltage range using differential pulse voltammetry (DPV). The DPV results were analyzed and used as the primary indicator to compare the coated particles. The ease of detection of the current signal in the Fe₃O₄@Au nanoparticles, their low toxicity and their unique optical, chemical, and electrical properties make these novel particles a viable option for use in a biosensor system for the detection of harmful agents.

SCREENING PROCESS OF ENZYMES FOR LIGNOCELLULOSIC BIOMASS CONVERSION

Steven Rausch

Category: Engineering, Computer Science and Mathematics, Section 1

Poster: 187

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Timothy Whitehead (Chemical Engineering)

Lignocellulosic biomass is a promising feedstock for biofuel production. Enzymes are used to break down cellulose into fermentable sugars for biofuel production. Lignin is a highly prevalent biopolymer in plant cell walls, and the enzymes currently used to produce lignocellulosic biomass become denatured by adsorbing onto the lignin due to nonspecific interactions. It is proposed that altering of the surface properties of the enzyme can lessen the affinity between the protein and lignin while still maintaining ability to break down cellulose. In order to test the effect, a high throughput screening assay is required. This assay will allow the screening of thousands of different enzyme variants for lignin affinity and activity. The screening process will be designed to work in 96 well plates and will test enzyme activity and affinity towards lignin with the cell lysate. This makes the production of a large enzyme library quick and effective. With a large library, an enzyme with comparable cellulose activity and improved stability in an environment containing lignin can be designed. Assays using commercially available enzymes and recombinantly expressed enzymes can be used to determine both the affinity towards the lignin and activity to process cellulose.

MODELING OF BACTERIAL CONTAMINATION USING DISCRETE ELEMENT METHOD

Quincy Suehr

Category: Engineering, Computer Science and Mathematics, Section 1

Poster: 188

Location: Parlor AB, 9:30 AM - 11:30 AM

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

Bacterial contamination of foods in industry settings is an ongoing concern, contaminated almonds combined with uncontaminated almonds in a mixing machine is a complex system of interactions not easily reduced. In laboratories, experiments are run using quantifiable samples in order to construct a good model for larger order problems. Among many tools, statistical and empirical models provide a simple transfer rate to describe the bacterial cross-contamination phenomenon with macroscale testing results. Because they are not based on the first principles, the models are not easily scalable to the actual industry setting. One of the promising methods is to simulate events particle by particle; this is called discrete element method (DEM) modeling. With the help of parallel computing (High Performance Computer Center, MSU), DEM modeling of an industrial setting with 10^7 particles is obtainable providing fast and efficient ways to simulate the problems. To combine with biological data, two inoculated (10^{8-9} CFU/g Salmonella PT30) almond kernels were added into the bag with 10 g of clean almonds and was tumbled in a rotating tumbler. About 105 CFU/g was transferred to the clean almonds and there was no residence time (1, 3, 10 min) dependency ($\alpha = 0.05$). Using laboratory data of real contamination scenarios, a model of physical interactions of almond particles and bacterial contamination can be validated and simulated into larger scale problems. Quickly producing accurate results in a computer model saves time and money spent on empirical tests that are less robust to apply to real life scenarios.

Poster Presentations, Section 2

AROMATIC HYDROCARBONS FROM BIOMASS FAST PYROLYSIS AND CATALYSIS

Kevin Andreassi

Category: Engineering, Computer Science and Mathematics, Section 2

Poster: 189

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

Mentor(s): Christopher Saffron (Biosystems & Agricultural Engineering)

Plant biomass based energy can provide local heat and power, use existing infrastructure, give impetus to the local economy and increase energy independence of communities, while being carbon neutral. Pyrolysis technologies offer a potentially less expensive route to hydrocarbon liquid fuels. Biomass fast pyrolysis involves the rapid heating of biomass in an inert atmosphere to intermediate temperatures. The products include a solid char, non-condensable gases and a condensable product, bio-oil. The quality and selectivity of pyrolysis products can be altered and improved by using heterogeneous catalysts. Catalytic upgrading of pyrolysis products removes oxygen in the form of coke and non-condensable gases and gives a product richer in hydrocarbons. Catalytic fast pyrolysis produces higher quality bio-oil and reduces the cost and intensity of downstream refining processes. Lab-scale experiments may be performed in a microscale analytical pyrolysis reactor such as a

chromatography pyroprobe unit. In this study, the catalysts red mud, microporous and mesoporous sulfated zirconia, and mesoporous Al-MSU-S (Foam) and (Worm) were evaluated and compared with ZSM-5 for their potential to produce aromatic hydrocarbons. Catalyst properties such as surface area, pore volume and acidity were measured. Catalysts for upgrading poplar (DN-34) were examined using analytical pyrolysis and gas chromatography–mass spectrometry. The product yield, carbon selectivity and yield of hydrocarbon products were evaluated. The char and coke yields of these catalysts were estimated using a thermogravimetric analysis.

EXAMINATION OF STENTS USING ELECTRON MICROSCOPY

Hunter Trafton

Category: Engineering, Computer Science and Mathematics, Section 2

Poster: 190

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

Mentor(s): Joseph Boehlert (Material Science)

Although the research has yet to be completed, I intend to examine the structure and composition of two stents used for veterinary medicine purposes. Both of the stents are self-expanding Nitinol stents obtained from the College of Veterinary Medicine at Michigan State University. Along with comparing and contrasting the two stents, I will also attempt to understand and explain why these stents work the way that they do. All of the research will be performed through microscopy using a Scanning electron microscope. I am very interested in researching these stents because the relation of the composition and structure to function in the real world application fascinates me. The Nickel Titanium combination of the material amazes in its ability to expand and retract. Furthermore, there is still a lot of research to be done on these stents in order to figure out the best, optimal form in which they should be produced.

CORRELATION BETWEEN BRAIN VOLUMES AND AGE IN PEOPLE WITH ALZHEIMER'S DISEASE

David Zoltowski

Category: Engineering, Computer Science and Mathematics, Section 2

Poster: 191

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

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

Alzheimer's Disease is a progressive loss of brain function that usually worsens with age. In this project, MRIs of brains of people with Alzheimer's Disease were run through software called FreeSurfer in the High Performance Computer Center to measure the volumes of regions of interests in the brain. All subcortical gray matter Region of Interests (ROIs), left-cortical gray matter ROIs, right-cortical gray matter ROIs, and white matter ROIs were measured. All of these volumes were compared with the age of the subject to determine if there was a correlation between age and any of the volume sizes. Most of the correlation coefficients had a magnitude of less than 0.5, which indicated rather weak correlations for most regions of interest. Ultimately, from this data it was concluded that outright age and any type of brain volume was not strongly correlated in subjects between the ages of 63-87. However, even though most correlations were weak, the values were overwhelmingly negative. This suggests that the size of the brain shrinks as people in this age range who have Alzheimer's disease get older. Also, the correlations could strengthen with a larger sample size. There are two next steps in this project. The first is to automate the entire process of finding the correlation between brain volumes for a certain independent variable. The second is to have an independent variable of years after diagnosis to correlate with brain volume instead of outright age.

SCRIPT BUDDY: A TOOL TO ASSIST USERS IN SUBMISSION SCRIPT CREATION

Brad Garrod

Category: Engineering, Computer Science and Mathematics, Section 2

Poster: 192

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

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

The High Performance Computing Center uses submission scripts to describe the resources (CPUs, memory, and time) and commands a researcher needs to run a research computation much larger than what they could run on their local computer. To write a submission script, a user must know the BASH scripting language, the syntax the HPCC uses to reserve resources, and the layout of a correct script itself. Some Submission scripts can be quite complex and writing these scripts is a barrier for many new users of the HPCC. Script Buddy is a user interface that makes suggestions and allows the user to simply enter desired values for all of the available options and have the submission script generated for researcher's submission scripts automatically. This saves valuable time for both the researcher and the HPCC resources, as the researcher will not waste time generating faulty scripts, and the HPCC will not waste resources executing incorrect scripts.

BACKGROUND SUBTRACTION

Brock Krygier

Category: Engineering, Computer Science and Mathematics, Section 2

Poster: 193

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

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

Background subtraction is a method for segmenting images into foreground and background regions. This process is extremely useful in that it allows for real world applications such as traffic monitoring, video surveillance and human-computer interaction. The process involves taking a foreground image and subtracting the pixels in that image from a background image. Once these pixels have been subtracted, the value of the differences is used to segment the image into foreground and background regions. If the value of the difference is close to zero then that particular pixel will be labeled as background. And if the value of the difference is large enough away from zero it will be considered the foreground. For this project, I developed a background subtraction program in Python to be integrated into a research platform called ChamView that helps researchers analyze image data for their research. Programs such as mine are not only useful to researchers but can be extremely valuable and beneficial to companies in need of high tech video analysis as well.

METHODS OF TRACING A BULLET USING A SCANNING ELECTRON MICROSCOPE

Adam Terwilligar

Category: Engineering, Computer Science and Mathematics, Section 2

Poster: 194

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

Mentor(s): Carl Boehlert (Chemical Engineering and Materials Science)

The purpose of this study is to look at the various aspects of using a scanning electron microscope (SEM) to trace a bullet to its firearm and shooter. This study will compare different brands of the same bullet in order to determine what brand of bullet was used. From there, impressions left on the bullets by the firing pins of several different handguns will be analyzed to determine which gun was used. Finally, the gunshot residue left behind by the firearm will be analyzed and used to trace the shooter of the original bullet.

NOVEL ALKALINE HYDROGEN PEROXIDE PRETREATMENT ENHANCES THE ENZYMATIC DIGESTIBILITY OF WOODY BIOMASS SUBSTRATES UNDER AMBIENT CONDITION

Charles Chen

Category: Engineering, Computer Science and Mathematics, Section 2

Poster: 195

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

Mentor(s): Eric Hegg (Biochemistry), David Hodge (Chemical Engineering)

Deconstruction of plant cell wall (PCW) in lignocellulosic biomass to optimize the enzymatic hydrolysis and increase the sugar products is an important step of biorefinery processes in industry. Cull(bpy)-AHP pretreatment is an efficient method in removing the lignin and increasing the hydrophilic of cellulose in PCW to improve enzymatic accessibility for hydrolysis. Cull(bpy)-AHP presents significantly high sugar yields on woody biomass in 10 minutes reaction with low chemical loading and energy consumption. The lignin removal and oxidized cellulose enhances the enzyme accessibility of polysaccharides, and reducing mono-sugars from polysaccharides are recovered after the enzymatic hydrolysis. The separation of recovered sugars and lignin removal has widely applications in biofuel and biomaterial, and it has strong potential to become an important step in liberating the lignin without sacrificing the polysaccharides in biorefinery processes than other pretreatments (e.g. dilute acid pretreatment).

Poster Presentations, Section 3

TRANSLATION OF SETS OF DATA POINTS FOR VISUALIZATION AND RESEARCH IMPLICATIONS

Sean Heider

Category: Engineering, Computer Science and Mathematics, Section 3

Poster: 196

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

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

Translation of large sets of data points, positioned by the NAD83ALB geodetic projection system, onto two dimensional satellite

maps will provide accurate visual representations of data. This project explores the use of least squares fit (LSF) regression to properly convert NAD83ALB points to pixel points on flat satellite images. A small sample experiment has been demonstrated that LSF produce a relatively low (within the same order of magnitude) translation error. It is expected as more constraints are added to the calculation, such as elevation, accuracy will continue to improve. This visualization of the data will not only allow researchers to create informative presentations but will also assist the research by identifying previously unseen patterns in their data and enabling correlation of their data with other geographical aligned data sets.

ANATOMY OF A TENNIS RACQUET

Connor McCalmon

Category: Engineering, Computer Science and Mathematics, Section 3

Poster: 197

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

Mentor(s): Carl Boehlert (Chemical Engineering and Materials Science)

In the sport of tennis, there is little equipment used. The only real instrument used in the sport is the tennis racquet. The racquet is composed of an oval shaped frame with strings in a stitch pattern inside, and a handle wrapped in grip tape. The frame is typically composed of graphite or graphite composite. The strings range from natural gut composition, synthetic gut, and a few different polymers are also used. The grip tape is made out of a cloth, rubber, leather, or compound material. Each racquet contains different combinations of each of these, and racquet choice is based on preference of the user. I plan to take cross sections of each of these components of a tennis racquet and examine them under the SEM. The frame will be polished and the graphite flakes will be examined. The different kinds of strings will be looked at and compared for strength and function. The grips will be examined and compared also.

ANTIBODY ATTACHMENT TO GOLD NANOPARTICLES THROUGH COVALENT BINDING

Rachel Kurzeja

Category: Engineering, Computer Science and Mathematics, Section 3

Poster: 198

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

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

Outbreaks of food-borne pathogens are a major problem in the United States and cause severe illness or death if they are not quickly identified. Current detection methods are not rapid enough to prevent outbreaks, as they take over 24 hours to detect the presence of pathogens. The bio-barcode biosensor developed in Dr. Alocilja's laboratory, which involves binding DNA to gold nanoparticles (AuNPs), is capable of rapidly detecting food-borne pathogens. The goal of this research was to develop methods to bind antibodies directly to gold in order to expand the bio-barcode biosensor to whole cell detection. Current methods of binding antibodies to gold nanoparticles require expensive modifications to antibodies or time-consuming addition of Protein A after production of gold nanoparticles. Using covalent binding, the antibody was able to be bound to the surface of the gold nanoparticle after synthesis, creating a more stable and easy method of binding antibodies. The effectiveness of antibody attachment to gold nanoparticles was confirmed by the amount of bacteria captured as determined by an electrochemical method as well as by plating the culture. The result of this research is a method of binding antibodies to gold nanoparticles through non-specific binding after gold nanoparticle synthesis and an optimal time and concentration for such covalent binding to occur. The resulting nanoparticles will be further explored for use in a biosensing system to detect whole pathogenic cells. This functionalization procedure also has an additional application of being used with magnetic gold nanoparticles.

DETROIT ZOOLOGICAL SOCIETY WASTE TO ENERGY FEASIBILITY STUDY

Kaitlin Ward

Category: Engineering, Computer Science and Mathematics, Section 3

Poster: 199

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

Mentor(s): Dana Kirk (Biosystems and Agricultural Engineering)

The Detroit Zoo is home to more than 3,600 animals. Most of the waste from animal exhibits is landfilled. Energy efficiency, sustainability, and environmental education are areas of emphasis for the Detroit Zoological Society, which manages the Zoo. The DZS submitted an application to the Michigan Energy Office to evaluate the feasibility of using anaerobic digestion technology to convert animal waste into energy. Anaerobic digestion is a natural, biological process by which organic matter is decomposed at a temperature range of 95 to 105°F. Animal waste, known as biomass, is an ideal feedstock for anaerobic

digestion. Methane created during anaerobic digestion is a renewable energy source, which can be used to produce heat, electricity, or steam. The first step to evaluating the feasibility of adopting anaerobic digestion technology is to evaluate the feedstocks or sources of biomass. Based on constraints specified by the DZS, dry digestion (fermentation) was determined as the ideal technology. A Biochemical Methane Potential test, estimating biogas potential, was performed on the four waste streams. From these results the estimated usable electrical energy which can be produced from the biogas is 470,000 kWh/yr or 5% to 7% of the electrical energy requirement of the Zoo. If a combined heat and power system is used to produce the electricity, approximately 40% of the thermal energy can also be recovered, equivalent to about 3% of the heat requirement of the Zoo.

THE CASE OF THE MYSTERIOUS FIREBALL

Lafayette Richmond

Category: Engineering, Computer Science and Mathematics, Section 3

Poster: 200

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

Mentor(s): Carl Boehlert (Chemical Engineering and Materials Science)

On the night of September 5, 2012 at least five reports of a fireball were submitted to the American Meteor Society by observers in Ohio and Michigan. Observers reported a large blue streak flashing across the sky. One observer in the Lansing, MI area was able to retrieve the sample after it came to rest in his backyard. Preliminary inspection revealed that the item was not of meteoric descent thus the theory became that it was a piece of "space junk." To get a better understanding of what the object could be, it will be analyzed using a scanning electron microscope (SEM). This analysis will allow for a view of the microstructure of the object enabling me to get a better idea of what the object is made out of. The SEM will also allow X-ray crystallography to be performed on the object, which tells the chemical composition of the object. Using the data collected from the SEM should allow for the object to be identified and solve the mystery of what fell from the sky on the night of September 5, 2012.

GLASS PROPERTIES

Alvin Chiang

Category: Engineering, Computer Science and Mathematics, Section 3

Poster: 201

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

Mentor(s): Carl Boehlert (Chemical Engineering and Materials Science)

The research project I plan to pursue will be centered around the properties of glass. The project will use scanning electron microscopes to analyze various glass specimens for their chemical compositions and microstructure. The specimens will include green glass, tinted glass, clear glass, and Plexiglas. The intention is to discover any correlation between specific glass properties, such as relative strength, color, or degree of transparency, and the microstructure and chemical composition of each glass type. Furthermore, I wish to look specifically into how, if so, can the microstructure or chemical compositions of certain glass types affect the reflection/refraction of light. My project would report the results that I find after the research and provide comments on any unexpected finds and possible conclusions that could be drawn between properties of glass types and their chemical and structural composition.

OPTIMIZING CMEIAS, A NOVEL COMPUTING TOOL FOR MICROBIAL ECOLOGY RESEARCH

Usienemfon Adia-Nimuwa

Category: Engineering, Computer Science and Mathematics, Section 3

Poster: 202

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

Mentor(s): Dirk Colbry (Institute for Cyber-Enabled Research), Frank Dazzo (Microbiology and Molecular Genetics)

CMEIAS is an Image Analysis research tool developed by Michigan State University's Center for Microbial Ecology. It comprises a host of utilities that process and analyze images of microorganisms to produce a wide range of quantitative and qualitative results designed to strengthen microscopy-based approaches for understanding microbial ecology. My project is to develop scripts that provide instructional scaffolding support and others that automate repetitive routines so the program can be utilized more efficiently. Currently, work done on the program has produced a script that automates iterative analyses to test for complete spatial randomness in patterns of microbial colonization within biofilms. This script increases efficiency of the task by 300% for a 100-microbe image. Further work will provide a new fleet of user-defined workflow automation tools to help collaborators around the world.

Poster Presentations, Section 4

FACIAL EXPRESSION ANALYSIS

Goksu Adanali

Category: Engineering, Computer Science and Mathematics, Section 4

Poster: 203

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

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

This research explored methods to distinguish between people's facial expressions in images. The primary goal was to determine the variation between images of individuals with different expressions (in class variation) and the same facial expressions of different people (between class variation). The ultimate goal is to establish if a system can be developed to identify facial expressions. A data set was collected, which involved pictures of people with neutral facial expressions and smiling ones. Multiple anchor points were labeled on each image and then the distance between the nose and right lip corner was calculated. These points were selected because the nose stayed stable and the corner of the mouth had the largest variation. Multiple statistics were run to see whether that difference indicated anything significant. The results showed that the inner class variation was smaller than the between class variation and the data in the groups overlapped considerably. Based on these simple results, it has been shown that a face expression identification system will need more information than is provided by two points.

NEW ELECTRON DONOR MATERIALS FOR ORGANIC PHOTOVOLTAICS

John Suddard-Bangsund

Category: Engineering, Computer Science and Mathematics, Section 4

Poster: 204

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

Mentor(s): Richard Lunt (Chemical Engineering and Materials Science)

Finding new organic molecules for use in photovoltaics (PVs) offers opportunities to enhance performance, functionality, and improve commercialization efforts. In particular, the spectral absorption range of the devices can be targeted to the near-infrared for applications in transparent solar cells or it can be expanded for multi-junction cells to utilize the entire spectrum. Our preliminary small-molecule solar cells have been built exclusively using phthalocyanine based materials as electron donors. In this project the aim is to find alternative substitutes for these donors with higher quantum efficiency in the near-infrared and improved donor-acceptor pairings to achieve higher voltages. Accordingly, this involved material deposition and characterization of new donor materials, as well as direct incorporation into PV structures to test their performance. I will present my findings from the semester, explain the methodology, and provide an overview of the technology and importance of organic and transparent PVs. My results will show current density vs. voltage (J-V) and external quantum efficiency (EQE) data of the materials tested as a function of improvements in efficiency achieved. These results will be compared and contrasted with cutting edge organic solar cells.

GENERIC POLYNOMIALS FOR TRANSITIVE SUBGROUPS OF ORDER EIGHT AND NINE

Jonathan Jonker

Category: Engineering, Computer Science and Mathematics, Section 4

Poster: 205

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

Mentor(s): Rajesh Kulkarni (Mathematics)

We compute generic polynomials for certain transitive subgroups of degree 8 and 9, namely $SL(2,3)$, the generalized dihedral group, and the modular group of order 16: M_{16} . Rikuna proves the existence of a generic polynomial for $SL(2,3)$ in four parameters; we extend a computation of Gröbner to give an alternative proof of existence for this group's generic polynomial. We establish that the generic dimension and essential dimension of the generalized dihedral group are two. Finally, Ledet proved the existence of a generic polynomial for the modular group in five parameters; we lower this number to four.

TRIRINGS AND TRIFIELDS

Brandon Alberts

Category: Engineering, Computer Science and Mathematics, Section 4

Poster: 206

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

Mentor(s): Rajesh Kulkarni (Mathematics)

There are many results on the properties and classification of groups, rings, and fields. These have led to the solutions of many well known problems in mathematics, such as insolvability of the general quintic equation and the impossibility of trisecting a general angle. Rings and fields are extensions of the group structure to two operations rather than one with both operations jointly obeying the distributive law. The content of this presentation will be extending these definitions to three operations rather than two creating structures called trirings and trifields. We will prove some results on classification and properties of these new structures.

WHEY PROTEIN

Tony Singh

Category: Engineering, Computer Science and Mathematics, Section 4

Poster: 207

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

Mentor(s): Carl Boehlert (Chemical Engineering and Materials Science)

Whey protein is a common supplement used by body builders. It helps build muscle strength. It is a ready supply of protein that is easily dissolved by the body that is most commonly used after a workout. Whey protein is also one of the two major proteins in milk. There has been some research that suggest whey protein causes milk allergies while other research suggest it contains anti-inflammatory and anti-cancer properties. I intend to examine the contents of whey protein under a scanning electron microscope. My research will see if there are any harmful or helpful compounds found in whey protein.

TRAPPING BROWNIAN PARTICLES USING CIRCULAR AND NONCIRCULAR TRAPS

Trevor Steil

Category: Engineering, Computer Science and Mathematics, Section 4

Poster: 208

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

Mentor(s): Jeffrey Schenker (Mathematics)

Being able to calculate the proportion of Brownian particles from a release sample caught in a trap up to time t could have wide applications to fields such as entomology. For circular traps, there is an integral formula involving Bessel functions giving the expected proportion of Brownian particles caught when released at a fixed radius from the trap. This formula can be used when circular traps are investigated, but it does not directly offer information when a noncircular trap is used. However, given the proportion of movers caught in a noncircular trap at time t , the parameters for the formula describing the expected proportion caught in a circular trap can be optimized to give a unique effective trap radius for the noncircular trap at the given time. Numerical evidence suggests that this effective trap radius stabilizes over long time scales and is related to the conformal maps which map the exterior of the unit disc in the complex plane to the exterior of the trap used.

WHAT MAKES GODIVA CHOCOLATE SUPERIOR TO OTHER TYPES OF CHOCOLATE?

Jennifer Jones

Category: Engineering, Computer Science and Mathematics, Section 4

Poster: 209

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

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

Scanning Electron Microscopy (SEM) is a very useful scientific tool for performing research. Unlike an ordinary light microscope, which only applies lenses of varying magnitudes, a SEM uses high-energy electrons to form an image. An SEM provides researchers with the ability to examine materials at higher magnifications and resolutions and larger depth of fields. The information provided by an SEM includes a sample's external configuration, chemical composition, and crystalline structure. Through the implementation of a Scanning Electron Microscope, individual samples of chocolate from various brands will be compared and analyzed. The chocolate brands to be examined range from the typical Hershey's bar to the elaborate Godiva Truffle. In an attempt to achieve impartial results, each sample originated from a typical milk chocolate bar and was purchased

from an everyday general store. The results attained by the SEM allow for a comparison between each brand's external morphology. The contrasting textures and chemical compositions from one sample to another provide feedback relating to the unique properties which differentiate one brand from the next, thus singling out the superior chocolate. This presentation will discuss factors influencing the differences between Godiva Chocolate and other types of chocolate.

Environmental Sciences and Natural Resources

Oral Presentations, Section 1

EPIZOOTIOLOGY OF EMERGENT FLAVOBACTERIA IN GREAT LAKES CHINOOK SALMON (ONCORHYNCHUS TSHAWYTSCHA) AND HATCHERY WATERWAYS

Nicole Zokvic

Category: Environmental Science and Natural Resources, Section 1

Location: MSU Room, 9:30 AM

Mentor(s): Mohamed Faisal (Pathobiology and Diagnostic Investigation), Thomas Loch (Pathobiology and Diagnostic Investigation)

Fish diseases caused by bacteria in the Family Flavobacteriaceae are a huge threat to both wild and aqua-cultured fishes worldwide. These flavobacterial diseases are normally attributed to *Flavobacterium psychrophilum*, *F. columnare*, and *F. branchiophilum*; however, recent studies in our laboratory suggest that other *Flavobacterium* spp., as well as *Chryseobacterium* spp., cause disease in Great Lakes fishes. Therefore, this study was conducted to elucidate the epizootiology of these emergent flavobacteria. During 2010-2011, tissues and reproductive fluids were collected from feral Chinook salmon (*Oncorhynchus tshawytscha*) returning to spawn at the Little Manistee River Weir (Lake Michigan watershed) and the Swan River Weir (Lake Huron watershed). Samples were also collected from the fertilized Chinook salmon eggs, the resultant hatchery swim-up fry, and fingerlings just prior to their release into Great Lakes waterways. Additionally, water and tool samples were taken from various points within three Michigan Chinook salmon hatcheries. From these samples, 714 bacterial isolates were recovered using flavobacterial selective media, and their 16S rRNA genes were sequenced and phylogenetically analyzed. Among these, 459 isolates were identified as *Flavobacterium* spp. and 170 isolates as *Chryseobacterium* spp. The results indicate that some flavobacteria could be vertically transmitted since they are present within the parents, their gametes, and resultant progeny. The results also show that some flavobacteria enter the hatchery via source water, are distributed throughout the hatchery water, and can infect fish. The data from this study is essential in minimizing the spread of emergent flavobacteria and preventing future disease epizootics in Great Lakes fishes.

GENOTYPES AND LANDSCAPES USED TO QUANTIFY SEASONAL MOVEMENT OF MICHIGAN BLACK BEARS (URSUS AMERICANUS)

Emily Cannell

Category: Environmental Science and Natural Resources, Section 1

Location: MSU Room, 9:45 AM

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

Ecological, behavioral, and demographic factors influence a species' distribution and movements within a spatially heterogeneous landscape. In many large and vagile mammals such as black bears (*Ursus americanus*), individual movement distance is commonly influenced by sex, age, intraspecific interactions, and seasonal habitat requirements. For example, juvenile females commonly exhibit natal philopatry and establish home ranges adjacent to their mothers' home range whereas juvenile males disperse from their natal area. Males also exhibit extensive home ranges compared to the females. We used baited barbed wire hair snares to non-invasively collect hair samples to perform a mark recapture study of black bears in the Northern Lower Peninsula (NLP) of Michigan. Our objective was to quantify seasonal differences in movement distance and habitats occupied within each of four years (2002, 2003, 2005, and 2009). Annual fall harvests were used as an additional sampling period. Samples were genotyped using five polymorphic microsatellite loci to genetically identify recaptured individuals. We quantified the effects of age, sex, recapture period (summer versus fall), density, and habitat on movement patterns. The relative effects of predictor landscape and demographic variables on movement distances, their effects on spatial genetic structure, and management consequences will be discussed.

ETHICAL EATERS: ADDRESSING THE WICKED PROBLEM OF FOOD-SYSTEMS

Kevin Adams

Category: Environmental Science and Natural Resources, Section 1

Location: MSU Room, 10:00 AM

Mentor(s): Lissy Goralnik (Fisheries and Wildlife), Laurie Thorp (Residential Initiative on the Study of the Environment), Kyle Whyte (Philosophy)

Some key insights of Rittel and Webber's (1973) wicked problems framework concern the ways in which divided scientific discourses can deepen conflicts and impede the development of collaborative coping strategies among parties. Students in

higher education therefore acculturate to wicked scientific discourses that are not conducive to sustainable agriculture. This explorative study investigates pedagogy to address this challenge in the case of sustainable pork production at Michigan State University. Our research also concerns the ethical turmoil that surrounds the intensive/extensive production of pork and how students address a problem of wicked proportions (i.e. a unique problem in which there are no true/false solutions, but the cost of mistakes is extreme). Pre/post free-response surveys were administered to four different courses (IAH201, PHL200, LB492, and PHL342) after intervention points throughout the semester. These surveys were then analyzed for themes in perception changes utilizing qualitative open-coding techniques. Preliminary results suggest that those from different demographic backgrounds respond in different ways to food production methods. The students shared a concern with animal welfare and saw a need for collaboration throughout the food sector. As a result, we are adjusting course content, delivery, experiential learning activities, and striving to encourage meaningful discussion in and outside of the classroom. Perhaps more importantly, thoughtful reflection has been inspired regarding food-systems topics and students are coming into contact with the food web in which they participate. It is our hope that students will build a healthy relationship with the planet and begin to foster an ethic of care.

THE EFFECT OF ENVIRONMENTAL VARIABILITY ON THE REPRODUCTIVE SUCCESS OF LAKE STURGEON (ACIPENSER FULVESCENS)

Karen Beatty

Category: Environmental Science and Natural Resources, Section 1

Location: MSU Room, 10:15 AM

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

During the past century, variability in global air and water temperatures has increased. Because many fish species rely on environmental cues to initiate behaviors such as the timing of reproduction, erratic conditions due to climate change can result in “ecological traps” and can decrease adult reproductive success. Lake sturgeon (*Acipenser fulvescens*) are migratory freshwater fish found throughout the Great Lakes region and a species of conservation concern. Water temperature is one environmental parameter that influences the timing of adult migration. Disruption of natural temperature patterns during spawning could cause females to spawn before environmental conditions are suitable for egg survival. During the 2012 spawning season, qualitative data showed that some lake sturgeon in Upper Black River (Michigan, USA) spawned two weeks earlier than normal and that these adults potentially had decreased reproductive success. Using DNA extracted from 248 adults and approximately 1000 larvae from the Upper Black River population, I obtained genotypic data for each individual at thirteen microsatellite loci. Genetic determination of parentage will allow estimation of reproductive success of adults. Based on variability in hourly stream temperature data during incubation, I will quantify the relationships between adult reproductive success and variability in range in temperature. I hypothesize that egg mortality is directly related to increased temperature range during development. Conclusions from this research can be used when developing management plans for species that rely on environmental cues to time reproduction.

FOSTERING TEENS’ NATURAL RESOURCE AND ENVIRONMENTAL SCIENCE CAREER INTENTIONS THROUGH EXPERIENTIAL LEARNING

Lauren Knollenberg

Category: Environmental Science and Natural Resources, Section 1

Location: MSU Room, 10:30 AM

Mentor(s): Shari Dann (Community, Agriculture, Recreation, and Resource Studies)

Over the past few years the world has recognized the importance of the environment by investing people who are interested in protecting natural resources. This research investigates influences on how youth choose a career in science, environmental science or natural resources. Variables could affect interest and intentions to pursue a science career may include a teen’s personal background and experience, extent of science knowledge, confidence in making science-based presentations, and feelings of stewardship towards the environment. Teen participants in the 4-H Great Lakes and Natural Resources Camp (4-H GLNR Camp) were given a survey before and after the program, intended to measure these indicators and evaluate the camp program overall. 4-H GLNR Camp is a week long program, dedicated to natural resource science learning activities, both in field classes and through recreation experiences. This study included camp participants from 1999-2012 (N=734 cases). Participant gender was relatively even, with 55% being male and 45% being female. Fifty-two percent (52%) of the youth indicated interest in a career in science before attending camp, and 64% reported this interest after completing the program. Slightly fewer (56%) planned to choose a career in science. Experiential learning programs that foster skills and interest in environmental science can have impact on teen career intentions.

INFLUENCE OF PERFORATION HOLES ON THE COMPRESSION STRENGTH OF CORRUGATED CONTAINERS USED FOR FRESH PRODUCE PACKAGING AND DISTRIBUTION

Levi Keepers

Category: Environmental Science and Natural Resources, Section 1

Location: MSU Room, 10:45 AM

Mentor(s): Pascal Kamdem (Packaging)

Perforations in corrugated containers are essential for the natural ripening of the product throughout transport, distribution and storage; as a result these holes may significantly modify the compression and stacking properties and affect the integrity of fresh produce. About 20 to 25% of harvested fresh produce is damaged during the distributions attributed to faulty packaging. Circular holes systematically cut in even lengths have been most frequently used by companies to accomplish this goal. This current approach is flawed due to the fact that the compression and stacking strength is not distributed according to the strength of the edges and faces on a display case or carton. It has been proven that the edges (sides) of a box sustain roughly 1/12th of the weight that a box may hold, whereas corners can maintain an estimated 1/6th of this distribution. A symmetrical perforation on the side of a container results in improper weight management when it comes to maximizing the compression and stacking strength of corrugated boxes. Liner and medium failure results in an increase of corrugated boxes constructed, pulp used in board manufacturing, elevated transportation costs, and also an increase of the carbon footprint for each company manufacturing these containers. This does not include the wasted materials ruined during transport. The present study examines and tests different perforation shapes, dispersion and densities in order to maximize box strength and reduce costs for manufacturers. These results will be used to improve the design of corrugated containers used for fresh produce packaging.

Poster Presentations, Section 1

CHARACTERIZATION OF THE RE-EMERGING EPIZOOTIC EPITHELIO TROPIC DISEASE VIRUS OF LAKE TROUT IN THE GREAT LAKES

Ashley Bourke

Category: Environmental Science and Natural Resources, Section 1

Poster: 260

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

Mentor(s): Mohamed Faisal (Pathobiology and Diagnostic Investigation)

In the mid-1980s, more than 15 million mortalities of hatchery-reared lake trout (*Salvelinus namaycush*) populations occurred in seven hatcheries in three states (lakes Michigan and Superior watersheds) due to a deadly herpesvirus known as Epizootic Epitheliotropic Disease Virus (EEDV). Despite stringent control measures, a major EEDV outbreak killed over one hundred thousand lake trout in Michigan's Marquette State Fish Hatchery in Fall 2012. By using realtime PCR to detect and quantify virus titers in both freshly collected and archived tissues from various salmonid species, this study aims to determine the susceptibility and carrier status of species in order to understand how to prevent the spread of EEDV. In addition to identifying the host range and disease course, the tissue tropism of EEDV will be determined by testing gill, kidney, spleen, heart, and mucous samples. Characterization of EEDV is extremely important for the improved design of control strategies since developing captive lake trout brood stocks are critical for the restoration of the severely depleted lake trout populations in the Great Lakes.

HORMONAL PROFILES OF SISCOWET AND LEAN LAKE TROUT (SALEVINUS NAMAYCUSH) FROM LAKE SUPERIOR

Karishma Chopra

Category: Environmental Science and Natural Resources, Section 1

Poster: 261

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

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

Lake Superior is the only Great Lake to have several different morphotypes of lake trout remaining; each morphotype is adapted to a different habitat. Lake trout were extirpated from the other Great Lakes and are currently a focus of restoration efforts. Lake trout recovery programs have primarily focused on reviving lean lake trout numbers and are only beginning to consider deepwater renewal efforts. Therefore, gathering more information about deepwater trout, like siscowet lake trout, is especially important. Since differences in morphology and lipid levels of siscowet and lean lake trout are well established, we analyzed differences in plasma testosterone levels. Testosterone is an essential steroid involved in vitellogenesis and the production of yolk. We analyzed plasma concentrations of testosterone from the months of September to June. We developed a radio-immunoassay standard using quantities of known radioactive testosterone tracers marked with tritium to determine unknown levels of testosterone in plasma samples. The radioimmunoassay plasma protocol was conducted over a 4 day period

and involved solvent extraction to separate testosterone from the plasma samples. Our results show subtle differences between the morphotypes with testosterone levels peaking in October and decreasing over the later months. Such differences may identify the mechanism behind differences observed in population dynamics from the morphotypes.

DETECTION OF CAMPYLOBACTER UNDER MODIFIED CONDITIONS

Zachery Geurin

Category: Environmental Science and Natural Resources, Section 1

Poster: 262

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

Mentor(s): Joan Rose (Fisheries & Wildlife)

This study aimed to develop improved methods for detecting *Campylobacter jejuni* in waste water. Problems have occurred in the standard operating procedure normally used to detect *Campylobacter*. Following enrichment of the sample culture, PCR analysis usually resulted in higher detected concentrations of *Campylobacter* than biochemical testing. Three modified method samples addressing oxygen exposure, nutrient dilution, and false positives were analyzed alongside an unmodified sample. Samples limiting oxygen and adding enrichment media both resulted in higher recovery percentages over the unmodified samples. We concluded the diluted nutrients inhibited the culture growth more significantly than the exposure to oxygen. The false positive modified samples showed by inhibiting growth of the initially present *Campylobacter*, the PCR analysis was not sensitive enough to falsely detect dead organisms. Further research is recommended to experiment with varying volumes of additional enrichment media, and levels of oxygen.

STAKEHOLDER ENGAGEMENT: WHAT EXACTLY DO WILDLIFE STAKEHOLDERS WANT?

Drew Vandegrift

Category: Environmental Science and Natural Resources, Section 1

Poster: 263

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

Mentor(s): Shawn Riley (Fisheries and Wildlife), Heather Triezenberg (Fisheries and Wildlife)

The Michigan Department of Natural Resources (MDNR) Wildlife Division is currently operating under its 2010-2015 strategic plan. One of the main goals within the plan is to improve communication and engagement with the public regarding wildlife issues. Engaging the public who may affect or be affected by wildlife or wildlife management is considered stakeholder engagement. The main purpose of stakeholder engagement is to improve wildlife management, however, little is known about what state wildlife agency professionals and stakeholders want out of stakeholder engagement. The objective for this study was to understand the different interpretations of stakeholder engagement between stakeholders and Wildlife Division employees. Transcripts from 39 focus groups (n=274), held from 2009-2010 around the state of Michigan with stakeholders and Wildlife Division employees, were analyzed using Nvivo 10 software. From these focus group transcripts, quotes were iteratively analyzed based upon reoccurring ideas or concepts. In my poster I will share the results from the analysis of the data and findings including what stakeholders and Wildlife Division employees want when they discuss "stakeholder engagement." I anticipate that the results from this study will help the Wildlife Division modify its methods outlined in the strategic plan to improve communication and engage the public.

PHYTOPHTHORA ZOOSPORE TRANSPORT IN MEDIA-PACKED COLUMNS

Caitlin Kirby

Category: Environmental Science and Natural Resources, Section 1

Poster: 264

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

Mentor(s): Wei Zhang (Plant Soil & Microbial Sciences)

Phytophthora capsici zoospores are released during the life cycle of this fungi-like oomycete, and travel through the environment to contaminate potential hosts, such as cucumbers, beans, and peppers. Understanding the mechanisms of zoospore dispersal in the environment will allow for potential improvements in crop yields via effective *Phytophthora* control strategies. The zeta potential of zoospores, a measurement characterizing average surface charge of a particle, may be used to predict their movement in porous media. The zeta potentials for the zoospores of 30 environmental *P. capsici* strains were measured in distilled water, and NaCl and CaCl₂ solutions (i.e., 9.6 mM NaCl + 0.4 mM NaHCO₃, and 3.2 mM CaCl₂ + 0.4 mM NaHCO₃) in order to identify strains for further column transport experiments. Three of these strains were then selected and their suspensions in NaCl or CaCl₂ solutions (10 mM ionic strength) were passed through sand-packed columns. Measurements of the outflow absorbance were recorded every 5 minutes to determine the zoospore effluent recoveries and deposition rate coefficient. Triplicate tests were performed for each treatment. A large variability was observed for the zoospore transport through the sand columns. Further study is needed to decrease the observed variability.

TROPISM RESPONSES AND GROWTH PATTERNS OF WIND TREATED PINUS CONTORTA DOUGLAS VAR. LATIFOLIA

Kimberly Ferguson

Category: Environmental Science and Natural Resources, Section 1

Poster: 265

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

Mentor(s): Frank Telewski (Plant Biology)

This study investigates curvature in primary tissue of lodgepole pine (*P. contorta* Douglas) shoots in high velocity winds to determine if the curvature is a biologically active response or a passive strain. A greenhouse wind tunnel was constructed with an average wind speed of 8.67 m s^{-1} . Three to six inch trees were staked below the leading shoot and placed in the wind tunnel, left unstaked in the wind, or positioned on a platform at 17° from horizontal to induce gravitropic responses in a wind-free environment. Tree height, leading shoot extension, and shoot orientation were recorded over 30 days of treatment and compared with a control group. Leading shoot extension was reduced by 6.6% for inclined plants, 6.0% for wind treated plants, and 13.3% for wind-staked plants ($P < 0.001$). The shoot angle parallel to the treatment force (gravity or wind) for staked plants was more windswept than the unstaked plants likely due to the higher drag force of wind on the crown of a rigid, vertical stem. Tree height had a weak negative correlation with the shoot angle parallel to the treatment force (Pearson's $r = -0.399$) which may have been the result of a canopy effect. Signs of heliotropism were observed in leading shoots of wind treated and inclined plants. Inclined plants had reaction wood formation on the lower side of the leading shoot as expected with a gravitropism and phototropism. Reaction wood formed on the windward side of the staked plants which suggests an active response.

Poster Presentations, Section 2

DESIGN AND CHARACTERIZATION OF NEW BIO-BASED MATERIALS

Natasha Baig, Brandon Duquette, Kyle Pachla

Category: Environmental Science and Natural Resources, Section 2

Poster: 266

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

Mentor(s): Ramani Narayan (CHEMS)

Until recently crude oil was the most important source of basic chemicals and value-added polymeric materials. Using different processes and chemical reactions a barrel of oil is converted to a wide range of chemicals in addition to fuel. More recently renewable materials have become increasingly important raw materials for the chemical industry and the need arises to develop a similar wide range of processes that can utilize every component of these renewable resources. The Biomaterial Research Group in the Chemical Engineering and Material Science Department of Michigan State University have been exploring biobased chemical feedstocks, processes and products as alternative to petroleum-base products, using bio-based materials issued from the biorefinery concept. Examples of this biorefinery concept include the hydrolysis of the proteins in the meals and converting the amines to hydroxyl-terminated urethanes which can then be further processed to polyurethane foams, adhesives, etc. or reacted to yield useful polyesters, polyamides and polyureas.

DECISION MAKING IN THREE-STICKLEBACK THROUGH SOCIAL OBSERVATION

Ashley Baird, Sarah LoPresto

Category: Environmental Science and Natural Resources, Section 2

Poster: 267

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

Mentor(s): Jason Keagy (Zoology)

Social cognition through social learned behavior is common among several animal species. Three-spined sticklebacks (*Gasterosteus* species complex) in British Columbia give us the opportunity to test hypotheses about the evolution of this ability. Sticklebacks from multiple lakes (Benthic and Lentic in Enos and Paxton Lake), and a single species in Cranby Lake were used over the course of the experiment. Trials were run in which a contained observer watched two sides containing three female demonstrators. The 'rich' side was fed bloodworms while the 'poor' side was fed bloodworm juice, and for each trial the rich and poor sides were alternated. Demonstrators on the rich side ate from the feeder during the demonstration portion of the trial. After six feedings, demonstrators and residual bloodworms were removed and the observer was then allowed to choose a side based on their observations. Movement was recorded through a program called JWatcher, and analyzed to determine if they chose correctly (the rich side). Observers that did not witness demonstration were used as controls, because choice under these circumstances should have been random. After further review, this was found to be true. In general, fish did not choose the correct side more often than chance. There is some evidence that fish that did choose a

feeder actually avoided the feeder that had previously been rewarded during demonstration. This study will add to our knowledge of how selection acts on social learning behavior.

ECTOPARASITIC ACTIVITY IN INCUBATING BIRDS

Annette Lundberg, Ruth Adamus, Mathieu Gervais, Riley Ravary

Category: Environmental Science and Natural Resources, Section 2

Poster: 268

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

Mentor(s): Jeanette McGuire (Zoology)

Ectoparasites such as wing lice pose a threat to avian species, especially during breeding seasons. Many studies have been done pertaining to the cost of ectoparasites to offspring, but information is lacking as to the susceptibility and impact on adult birds during the time of reproduction and incubation. The goal of our study was to ascertain whether or not there is a correlation between incubating birds and the susceptibility to wing parasites. Birds were collected in the Semuliki National Park, Kibale National Park, and Bwindi Impenetrable Forest natural preserves of Uganda. Mist netting was used in order to temporarily capture a variety of understory passerine species. All captured birds were evaluated for body condition (fat score), presence/absence of a brood patch, and presence/absence of wing lice from the genus *Ischnocera*. A total of 71 birds were captured and data on wing parasites were collected from 62 of the birds. The majority of the birds captured belonged to the species *Cyanomitra olivacea*, *Phyllastrephus xavieri*, *Andropadus latirostris* and *Andropadus virens*. Approximately 30% of birds captured had evidence of wing parasites, and 36% had brood patches. The presence of wing parasites was not associated with incubation status (brood patch) and body condition (fat score). Future work should characterize the nesting ecology of birds to see whether nesting location or behaviors influence the presence of ectoparasites. Additional insight into which sex incubates the offspring and the timing of incubation could also help elucidate the relationships between incubation and ectoparasites.

EFFECTS OF PARASITISM ON MUSCLE LIPID CONTENT IN TWO DIFFERENT MORPHOTYPES OF LAKE TROUT (SALVELINUS NAMAYCUSH)

Andrew Bartholomew

Category: Environmental Science and Natural Resources, Section 2

Poster: 269

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

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

Sea lamprey kill large numbers of lake trout in the Great Lakes, and much research has focused on quantifying mortality. Relatively few studies have tried to quantify sublethal effects on survivors. We analyzed lipid contents of muscle tissue from siscowet and lean trout that had been parasitized by lamprey in their natural ecosystem. Siscowet lake trout support a significant percent of body fat and inhabit the depths of Lake Superior; lean trout contain less muscle lipid and dwell in the shallower waters of the littoral/ pelagic zone. We tested the hypothesis that unparasitized trout would contain higher amounts of muscle lipids than parasitized trout and varying morphotypes would exhibit differences; specifically, leans would display lower lipid levels than siscowets. Field samples of lake trout were collected from Lake Superior and were distinguished as either the siscowet or lean morphotype, and as parasitized or unparasitized. For each category, at least 6 samples were processed, with 3-4 trials per sample, using a lipid extraction protocol (Bligh and Dyer 1959). Lean and siscowet parasitized and non-parasitized samples were found to have 10.525±2.86%, 12.235±3.01%, 28.165±4.95%, and 37.772±5.65% muscle lipid contents, respectively. This research suggests that sea lamprey parasitism may affect the bioenergetic mechanisms of lake trout and potentially disrupt growth and reproductive processes.

EFFECT OF DEGRADATION-PROMOTING ADDITIVES FOR PLASTIC PACKAGING ANALYZED THROUGH SOIL BURIAL TESTING

Alyssa Petz

Category: Environmental Science and Natural Resources, Section 2

Poster: 270

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

Mentor(s): Rafael Auras (Packaging)

As a more sustainable choice, many companies are now promoting different types of biodegrading additives for plastic packaging materials. However, there is little evidence about the actual performance of these materials. This project focuses on the effect of degradation-promoting additives on the biodegradation of polyethylene, a widely used packaging material. The additives are being analyzed in three different environments including compost, anaerobic digestion and soil burial, with this project focusing on the soil burial environment. The three types of additives under evaluation are oxo-biodegradable, non-oxo-biodegradable, and a combination of the two. Samples were manufactured in house and then taken to the field. Once in the

field, they were buried in wooden frames at 0.5 m deep under the soil and put in plots to be dug up at different intervals. Currently plots have been dug up after 2, 6, and the 12 month, with 18, 24 and 36 month plots still to go. Once the samples were removed from the soil the changes in optical, thermal, physical and mechanical properties were evaluated. Preliminary results show that these additives have not made a significant difference on the biodegradability of the polymers. There was not a noticeable difference in data across the three different additives or in the different concentration of additives. When comparing the polymers of PET and LDPE there were also no changes to suggest the polymers are biodegrading.

INCENTIVE CONTRAST EFFECT ENABLES HONEY BEES TO LENGTHEN THEIR OWN LIFESPANS

Andrea Lazzari, Catelyn Jones

Category: Environmental Science and Natural Resources, Section 2

Poster: 271

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

Mentor(s): Fred Dyer (Zoology)

Nectar-feeding bees, like many other animals, show strong negative incentive contrast effects, reducing consumption of low-quality food after intervening experience with high-quality food. This phenomenon implies that there is a fitness benefit of rejecting mediocre food when the environment has signaled that better food might be available, even if the good food is not currently accessible. Few studies have explored what these benefits might be. We tested the hypothesis that bees benefit by living longer, thus increasing the number of days on which they can exploit rich sources that might renew. In a flight cage where all resources were controlled, test bees with prior experience at a low-quality feeder were trained to a high quality feeder, which was available for a brief time each morning. The low-quality feeder was constantly available to the test bees and to control bees that had no experience of the high-quality food. Test bees made about 20% fewer trips per day to the control feeder; however, they also contributed six times more sucrose solution to the hive. Additionally, test bees lived about 70% longer than control bees. Previous experimental studies have shown flight activity affects lifespan in bees. This is the first evidence that the correlation is under behavioral control.

Graphic Design

Poster Presentations, Section 1

INTERACTIVE WATER CYCLE

Jill Zelenski

Category: Graphic Design, Section 1

Poster: 71

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

Mentor(s): Rebecca Tegtmeyer (Art, Art History, And Design)

The objective of my project is to become familiar with how interactive design, specifically an iPad application, functions aesthetically and relays information to an audience. My audience is elementary school students and the task at hand is to create an entertaining experience for them to gain information about a specific scientific process or cycle. I used my knowledge of typography, color, images, and other design elements to establish a screen-based experience. It is important to keep in mind how a child responds to different design elements; whether the gestures needed to “play” with the app are intuitive or not and how to solve that problem. In the course of research I decided how much information was essential to an elementary school student and how the information should be displayed in order to broaden the learning experience. Through the process of wire framing I was able to clearly address the concepts, a plan for design, how the child interacts with my design, and how to organize the content. I used a simple sans-serif typeface to help with readability. Color acts as a trigger for interaction, so I made them vibrant. Along with color, images serve as a great learning device, especially for those children who are visual learners. I used images along with animations for this exact reason and to help them better understand how this process happens in real life.

EDUCATION BY INTERACTION

Andrea Bower

Category: Graphic Design, Section 1

Poster: 72

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

Mentor(s): Rebecca Tegtmeyer (Art, Art History, and Design)

The objective of this project is to create an iPad application targeted towards second through fourth grade students. The app will be used to educate the students on Life Sciences. I have made the app interactive and entertaining in order to hold the attention span of a young child. Through interaction, the child is more engaged than a printed textbook, and therefore possibly capable of learning and retaining more information. The app uses fun typography to engage children in the learning process. Images work with the typography to help students at lower reading levels. Consistency through the use of a grid helps the app to remain intuitive to the student. This consistency allows students to feel confident as they use the app. It is important that they feel comfortable moving forwards and backwards-as well as some trial and error. The process I used to arrive at my final product was wire framing. Wire framing allows one to break down ideas and plans for interaction through a digital sketch. Because of wire framing, problem solving and initial trouble shooting was started right away. It is also a great way to communicate with peers in a visual way to get input. After the process was thought out through wire framing, I moved to the visual design phase adding elements and creating a cohesive whole.

YOUNG MINDS INTERACTING WITH EARTH SCIENCES

Ashley LeVasseur

Category: Graphic Design, Section 1

Poster: 73

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

Mentor(s): Rebecca Tegtmeyer (Art, Art History, and Design)

In order to teach elementary aged children about earth science I have created an iPad application to convey the information in an engaging, multimedia environment working with the topic of the water cycle. I used photographic imagery and scientific diagrams throughout to show the water cycle in a way that will teach a child where, and how this complex cycle takes place in their own environment. The child will interact with these visual elements through animation and narration to further learn about each step of this cycle. Once a step is completed the child will have the chance to engage in an activity to reinforce the information conveyed in previous parts of the application. Overall, this application will help children gain knowledge of the water cycle, and be able to identify 4 steps of the water cycle along with relating it to their own environment.

MITOSIS APPLICATION

Jillian Carroll

Category: Graphic Design, Section 1

Poster: 74

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

Mentor(s): Rebecca Tegtmeier (Art, Art History, and Design)

In a technology-advanced world mobile device applications are being developed in effort to entertain and more importantly, educate. iPad applications are beginning to make large appearances in public school districts starting at kindergarten. These applications are an interactive way of teaching material through making gestures and playing games. With that initiative I am creating an iPad application for children to learn, play and interact with life sciences. My idea walks a child through the process of mitosis. My process begins with simplification. Beginning with simplicity only leaves room for growth and development. My design involves warm, energetic, child friendly colors. The colors help to break up and categorize the information. The typeface is clean and therefore legible for a child to easily read the information. The design is welcoming and cohesive with emphasis on the learning material. The steps are easy to navigate and work through the material. Mitosis is a complex science that is hard to understand, especially for children. From my own experience, breaking something down to its simplest form and adding interest will plant the seed of understanding. With this seed, a child will have a basic understanding and a solid foundation to further learn more complex information. It is not important that they know every detail, but it is important that they understand.

MOON PHASES DESIGNED FOR INTERACTIVITY

Erin Knapp

Category: Graphic Design, Section 1

Poster: 75

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

Mentor(s): Rebecca Tegtmeier (Art, Art History, and Design)

I created an interactive iPad application, designed to teach eight to nine year olds about the phases of the moon. The application includes motion related aspects to keep the child's attention, whether it is the movement of the moon, in the beginning of the app, or the interactive game that lets the child move the sun and moon around the Earth. The game is an important part in teaching the child what the moon looks like in space compared to what they see on Earth; in addition, it allows them the freedom to play with the app while simultaneously learning the phases. I have found, by making an interactive game the information of the phases would be more enjoyable for a person around the age of eight or nine. The app also includes an overview of the phases, if the child wants to learn more specifics about each phase before the game. This process is unique because it begins educating the child to notice multiple viewpoints in their lives; firstly, by something that they are familiar with: the moon. The application also provides the student with a calendar, where phases are on their specified dates, and additional information of the phases, so they can compare the app's information with their personal observations.

IPAD APPLICATION

Hayden Srinebaugh

Category: Graphic Design, Section 1

Poster: 76

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

Mentor(s): Rebecca Tegtmeier (Art, Art History, and Design)

I designed an elementary friendly learning based iPad app on the life cycle of a frog. Creating an iPad app for learning allows younger students to become more interactive in how they learn, making the experience fun as well as more memorable. For my app I keep things simple, fun, and clean. I created a layout in which the user is greeted by a welcome screen where they can choose from different life cycle categories. The user can choose the frog cycle by selecting the cycle icon and tapping start. From there the app takes you through a quick animated introduction that takes you to the life cycle map. The user can then tap a cycle stage which will bounce, and then zoom into that specific stage to learn more about it. Once zoomed into a stage, the user can swipe left or right to move through other stages. The apps usual theme uses fun simple colors, tasteful designs, cartoon styled imagery, and professional text fonts mixed with some similar yet fun themed fonts. Each screen features home, and back button to give the user more control over the app. I think it is important to keep things simple but fun given the age group. This app simple because younger kids may feel overwhelmed from too much information and design aspects. The app is also fun because younger kids learn better when they are having fun doing it.

A JOURNEY THROUGH THE WATER CYCLE

David Brown

Category: Graphic Design, Section 1

Poster: 77

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

Mentor(s): Rebecca Tegtmeyer (Art, Art History, and Design)

Science is a very important part of a child's education but can be challenging for them to understand. Interactive methods have a large impact on a child's learning performance. iPad applications for children support their learning capabilities and offer an easier method for learning. I've designed an app for the water cycle that makes it fun and interactive for children, making it seem less informational and more entertaining will maintain the child's engagement. The design is specific to a young person's performance with large type and easy to understand information highlighted with bright colors. It includes fun images and illustrations with interactive design aspects making the experience more engaging. The most important parts of the water cycle for a child to grasp are the basic processes and what each process is. To allow this information to shine I have incorporated a simple interface with a basic grid function. Showing the complete water cycle will give the viewer a basic perspective of the process as well as the capability to research more on parts will keep the information organized and understandable. A major part of my design is making sure that the water cycle is recognizable as a process in the real world, to accomplish this I have used both real life images and design illustrations that relate to the user. Being able to make learning fun is hard but necessary and an iPad app can teach just as much as it can entertain.

Poster Presentations, Section 2

SIMPLIFYING SCIENCE FOR OUR FUTURE

Natalia Tortora

Category: Graphic Design, Section 2

Poster: 78

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

Mentor(s): Rebecca Tegtmeyer (Art, Art History, and Design)

This application is intended to supplement children's learning in science. My focused area was for the range of children between the ages of seven and ten to comprehend the process of photosynthesis. To obtain focus in children, a more direct approach is needed to efficiently educate this age group, which is displayed here. This iPad application engages the child with sound, interaction, and activities, which will give children a longer retention rate. My choice of typeface is Eurostile Std to implement a modern, lucid aura to the screens. The navigation within the application is reduced in complexity from its arrangement of hierarchy of text and color. The use of color visually organizes its features, making this application more relatable to the child. These also bring a cohesive interpretation throughout the screens for easy legibility. I've created my illustrations with the intention of them holding and engaging the children's understanding of photosynthesis. Video and photo elements are also implemented as an option for selection for increased learning. The grid compliments the application differently than the color by organizing the different topics/activities that are offered within the LifeSciences application. The wire frames enabled my ability to create ideas regarding layout and "feel" of the application, while the design comp organized my aesthetic thought process, clarifying the idea and learning experience of this children's application.

THE WATER CYCLE: AN INFORMATIONAL STORY

Emily Trexler

Category: Graphic Design, Section 2

Poster: 79

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

Mentor(s): Rebecca Tegtmeyer (Art, Art History, and Design)

The water cycle is typically introduced during first or second grade. At this time, students are beginning to learn about science, and many are learning to read. An interactive application offers a more enjoyable experience for learning about scientific processes as opposed to print. The user is not simply consuming information about a cycle, but is engaged in their learning process through play. Imagery is integral for children to learn visually. The illustrations of the cycle show exactly what is happening. This way, even if they can't read, they will still know what is being explained. When developing this application, a wire framing process was used to establish the final design. I worked with creating hierarchy between the type sizes and font to construct an appealing atmosphere. Separating paragraphs and increasing the size of the text is an aspect that allows the young user to not be intimidated by too much text. Designing a 3-D look to the illustrations adds an interesting element that the user of this age would respond to. I designed it this way for another aspect of visual interaction. As an additional feature of the

application, the user joins along in a game. Dewey, the raindrop character, has been evaporated and needs to return home to the ocean. The user follows along and decides where Dewey goes next while understanding the scientific process of the water cycle.

THE NEXT WAVE OF TABLET APPS FOR CHILDREN

James Jenks

Category: Graphic Design, Section 2

Poster: 80

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

Mentor(s): Rebecca Tegtmeier (Art, Art History, and Design)

Advancements in the field of Interaction Design and the development of new tablet computer applications have led to innovative resource possibilities in elementary education. Using an interactive environment to facilitate academic growth in children is important because this type of learning experience can help them to retain concepts and information more effectively. By engaging these young students and encouraging exploration through interaction, we are also inspiring and empowering them to become active participants in guiding their own learning. To create this virtual learning environment, it is necessary to pay special attention to screen display and interface as these are especially important when designing for children. Through the process of wire-framing, the designer is able to analyze the layout, pagination, and placement of key points of interaction so that they are intuitive and understandable to children. This application, for example, is careful to avoid dense interaction at the bottom of the tablet's screen as this area is most susceptible to accidental tapping. The design also ensures that all interactive points are clearly identifiable by using a combination of animation and color indicators. Using an open and soft, legible typeface works simultaneously to establish a friendly atmosphere and make text more readable. Working with basic avatars in the app also personalizes the experience, further engaging the child in exploring the topic. With the development of applications like this, it is our hope that we may continue to revolutionize the way our children grow and learn, opening up greater possibilities for their future.

LIFE & EARTH SCIENCES

Savanna Boutwell

Category: Graphic Design, Section 2

Poster: 81

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

Mentor(s): Rebecca Tegtmeier (Art, Art History, And Design)

We live in an age of constant technological evolution, and children have more resources than ever to learn and excel. In many instances, young children are just as tech-savvy as their parents. It only makes sense that education methods adapt and evolve. iPad applications provide a solid and magnetizing educational medium that reaches out to children, and educates via interactive technology. I have designed an iPad application on the subject of photosynthesis, aimed at children ages 8-10, which will be a useful tool to supplement learning from within the classroom. The application allows children to learn about plant anatomy before they the dive into the process of photosynthesis. Once the child begins their informational journey into photosynthesis, the application offer two interactive learning experiences via molecular and atomic demonstration. Additionally, children are not limited to reading, they are able to visually interact with information, which allows children to connect content to reality. Visual features especially facilitate those children that are visual learners. Children will learn at their own pace, since they will control the movement and progression of information. The best method for inspiring educational momentum in school begins with excitement and learning from home.

EARTH SCIENCES FOR ELEMENTARY EDUCATION

Katherine Haines

Category: Graphic Design, Section 2

Poster: 82

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

Mentor(s): Rebecca Tegtmeier (Art, Art History, and Design)

I designed the Earth Sciences iPad app for elementary students to have a unique interactive experience to go along with the learning experience in the classroom. The interaction of this app allows the student to view and learn elements at their own pace; while also making it more hands on to give the learner a different way to view and learn information than a standard text book. It also encourages students to consult and interact with the real world with at home experiments. When I created this app I started with a wireframe, which allowed me to focus on the key basics of how the student would interact, focusing on making it simple and easily navigable. From there I was able to add the visual design, which enhances the decisions I made in

the wireframe stage. I focused on what typography, color, and images would make the environment both fun and educational to appeal to the young audience, while also focusing on continuing to make the app easy to navigate and fun to interact with. I used a clean sans-serif typeface for the bulk of the text because it is easily legible for a young student. For the headers I used a fun sans-serif typeface to make the app more age appropriate while still being easily legible for an early reader. The background and text color is dark to emphasize the environment of space, but color is added for both aesthetic and hierarchy purposes.

A SCIENTIFIC PROCESS: AN IPAD APPLICATION DESIGN ON THE NITROGEN CYCLE

Cassie Rosenquist

Category: Graphic Design, Section 2

Poster: 83

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

Mentor(s): Rebecca Tegtmeyer (Art, Art History, and Design)

Through the iPad application I have designed, elementary-aged children can learn about the nitrogen cycle. The use of a minimal layout and interactive gestures enable users to effectively use the app for educational purposes. Due to the dense information, I have chosen to use construction paper and hand-done typography to give the interface a tactile feel with which children ages seven to nine would be familiar. Compared to a printed textbook, the interactive app will keep the user engaged by creating a visual and hands on experience, further facilitating information retention. In designing this app I have considered the difficulty that an elementary-aged child would have in learning the nitrogen cycle. Thus, the information of the cycle is given with illustrations and opportunities to learn through functions, such as tracing a nitrogen atom.

A CREATIVE IPAD APPLICATION AS AN ENGAGING AND DYNAMIC EDUCATIONAL TOOL

Jessica Stover

Category: Graphic Design, Section 2

Poster: 84

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

Mentor(s): Rebecca Tegtmeyer (Graphic Design)

The iPad inspires creativity and hands on learning with features that textbooks cannot provide. As an educational tool, children can engage with content in interactive screen-based environments and find information instantly. My research addresses how interactive design elements of an iPad application can develop an engaging and dynamic experience for educating elementary children. I have designed an Earth Science Application directed toward elementary children that successfully organizes complex information into a sequence that is easy to understand. It was important to begin my design process with a wireframe in order to articulate concepts, plan for design decisions, user interaction, and organize content. Next, I explored the impact that typography, color, images, illustrations, and grid structures can have within a screen-based environment and how they can function as signals for interaction. By combining the appropriate amount of photographs, typography, and interactivity into a composition I have created an application that is appealing and educational to children. I have limited the amount of text and included full screen photographs that maintain hierarchy and keeps the child interested. My application incorporates a 360-degree view of our solar system looking through a space shuttle allowing the child to explore and engage in an active experience. It also allows the child to become familiar with the visual identity and properties of our solar system. With engaging layouts, interactive images, 3D graphics, and more, my iPad application is one source that students won't want to put down.

MAKING SCIENCE SIMPLE THROUGH DESIGN

Sarah Titus

Category: Graphic Design, Section 2

Poster: 85

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

Mentor(s): Rebecca Tegtmeyer (Art, Art History, and Design)

In today's society, new ways of learning are necessary. With so many different learning styles, it is important to help find new methods, in which, to educate children vital information outside of the typical textbook format. iPads are becoming helpful for these different learning styles due to the interactive and informative applications available. I have created an interactive and educational application about the water cycle for elementary school children. My solution is a very simplified application showing the complex information through real life situations. I use realistic photography with a clean typeface and bright colors to annotate over the photo. In addition to illustrations and annotations, overlaid on the photo helps children retain information because it is easy to understand. This app is simple to navigate as the cycle is shown in one screen, instead of spread across multiple screens making it more difficult to navigate. This also allows the children to revisit steps, look at them in different ways and learn how they work together from different areas. Zooming in and out reveals more information about the individual

steps. The simplification of information helps the child retain information pertaining to a specific step instead of trying to learn everything all at once. This also allows the child to learn at their own pace and in various ways that is more sensible to them.

Health, Food, and Wellness

Oral Presentations, Section 1

EXPLORING AGE RELATED CHANGES IN MICROVASCULAR FUNCTION WITH MRI

Kayle Noble

Category: Health, Food and Wellness, Section 1

Location: Lake Michigan Room, 9:00 AM

Mentor(s): Jill Slade (Radiology)

The microvasculature is critical for the control of blood flow and tissue perfusion. With the advent of muscle functional magnetic resonance imaging (fMRI) using blood oxygen level-dependent imaging (BOLD), peripheral microvascular function can be assessed noninvasively. Preliminary data suggest an age related decline in BOLD responses and slowing of muscle oxygen kinetics. A reduced BOLD response is important because it indicates reduced muscle perfusion which impacts muscle metabolism and muscle function. This research examines the effect of age on muscle BOLD by comparing single leg contraction mediated responses in young (aged 18-35 years old) versus elderly adults (60-75 years old). Muscle BOLD is an important measure because it reflects muscle perfusion. We suggest this is a critical parameter that is lost with aging. This study is significant as there is an emerging consensus in the scientific literature that initial vascular responses are pivotal in vascular control and function. As the U.S. older adult population continues to grow, understanding the factors related to poor physical function is imperative.

COMPARISONS OF TRAINING SESSION AND IN-GAME HEART RATES IN DIVISION I COLLEGIATE ICE HOCKEY PLAYERS

Emily Niemyjski

Category: Health, Food and Wellness, Section 1

Location: Lake Michigan Room, 9:15 AM

Mentor(s): James Pivarnik (Kinesiology)

PURPOSE: To compare the intensity of off-ice training (24 sessions), on-ice practices (22 sessions), and games (four) through HR telemetry throughout an ice hockey season. **METHODS:** On-ice practices consisted of game simulations and high-intensity drills. Off-ice training consisted of total-body circuit resistance training and interval cycling. HR was divided into five intensity zones (50-59%, 60-69%, 70-79%, 80-89%, and 90-100% of maximal HR) for analysis. Averages (\pm SD) for percentage of training time spent in each HR zone were computed for September, December, January, and February. Averages (\pm SD) for the percentage of games spent in each HR zone were calculated for pre-game activity and each period of play. **RESULTS:** On-ice practice time increased as the season progressed from 102.0 ± 0 minutes preseason to 131.2 ± 23.4 minutes during the final month. Off-ice training time decreased from 141.4 ± 66.4 minutes preseason to 31.0 ± 27.8 minutes during February. Highest intensity (percentage at 90-100%) of both on and off-ice training decreased as the season progressed (on ice; 15.6 ± 10.6 preseason vs. 1.2 ± 1.7 final month, off-ice; 10.1 ± 9.3 preseason vs. 1.3 ± 4.2 final month). Percentage of games spent in each HR zone indicated similar intensity for each period, including 9% of game time spent at 90-100% of maximal HR. Preseason off and on-ice training/practices most closely resembled game HR zone averages. **CONCLUSION:** Preseason training intensity closely simulates game intensity. In-season training is less intense than games and decreases as the season progresses.

KNOWLEDGE OF CONCUSSION AND REPORTING BEHAVIORS IN HIGH SCHOOL STUDENT ATHLETES

Joseph Schoenherr, Rebecca Crenshaw

Category: Health, Food and Wellness, Section 1

Location: Lake Michigan Room, 9:30 AM

Mentor(s): Tracey Covassin (Kinesiology), Jessica Wallace (Kinesiology)

Concussion is the most common head injury occurring in athletes that can result in immediate and post-concussion symptoms. Somatic and cognitive symptoms associated with this injury may include dizziness, headache, nausea, amnesia, difficulty concentrating, fatigue, balance problems, trouble sleeping, and loss of consciousness. With symptoms that either linger or disappear, symptoms must be reported and changes in mental status must be identified. With the masses of student athletes and the increasing number of concussions, high school athletes are an important population to study. The pediatric population has become more vulnerable to concussion and experience more serious short and long-term symptoms of concussion. Self-reported symptoms are subjective and it is suggested that 50% of concussions go unreported because high school athletes are unaware of the signs and symptoms of a concussion. This study assessed high school student athletes' knowledge of concussion and reporting behaviors. Survey data was analyzed using descriptive statistics. Results revealed that 44% of participants stated they completely understand the dangers of concussion, however, only 14% said they knew the signs and symptoms of

concussion. Almost half (48%) indicated that they did not tell anyone after hitting their head while playing their sport. The main reasons for not reporting symptoms were did not want to lose playing time (41%) and did not think their symptoms were serious (55%). High school athletes are still unaware of the signs and symptoms of concussion and would consider playing with a concussion potentially putting them at risk for further injury.

THE EPIDEMIOLOGY OF YOUTH SPORTS: A SURVEY OF THE TRAINING HABITS OF YOUNG ATHLETES

Ryan Hulteen

Category: Health, Food and Wellness, Section 1

Location: Lake Michigan Room, 9:45 AM

Mentor(s): Joey Eisenmann (Radiology), Daniel Gould (Kinesiology/Youth Sports)

An estimated 35 million youth participate in organized sport in North America. For those involved, youth sports are perceived as having important physical, psychological, and social developmental consequences. Recently, concerns have been raised about potential injury and burnout for athletes competing at extremely high levels. Due to a lack of scientific research to support statements, it is the purpose of this pilot study to describe the current practices of youth athletes participating in highly competitive sports. A short 20-minute survey will be administered to collect physical conditioning, training load, nutrition, sleep, daily schedule, injury history, and parent involvement information from participants. The sample will consist of males and females aged between 13 and 18 who are currently participating in highly competitive organized sport teams in the mid-Michigan area. Data collection is planned for Spring 2013. Collected data will be analyzed to produce descriptive statistics for the sample, which will provide in-depth information on current practices of these young elite athletes. These descriptive statistics and further analysis will improve the lack of scientific knowledge and understanding in youth athlete sporting participation.

NEUROCOGNITIVE AND CONCUSSION SYMPTOM DIFFERENCES BETWEEN MALE AND FEMALE CONCUSSED SOCCER PLAYERS

Adam Lipchik, Kevin Rosenbrook

Category: Health, Food and Wellness, Section 1

Location: Lake Michigan Room, 10:00 AM

Mentor(s): Tracey Covassin (Kinesiology), Jessica Wallace (Kinesiology)

Numerous studies have shown that males and females demonstrate differing performance on neurocognitive assessment following concussion and that males and females endorse different symptoms following concussion. It has been reported that female concussed athletes performed significantly worse on visual memory compared to male concussed athletes and that male concussed athletes report more amnesia and confusion/disorientation, while concussed females report more drowsiness and increased sensitivity to noise. Previous studies have alluded to the varying symptomology among male and female athletes; however, none have exclusively examined males and females playing the same sports. Soccer is a sport where the rules, style of play, and field dimensions are similar among male and female athletes. Heading is allowed in both the male and female game and concussions have been reported to constitute 2% to 22% of all soccer injuries. The aim of this study was to examine neurocognitive performance following concussion between male and female soccer players and to compare concussion symptoms across sex. A total of 39 male and 59 female concussed soccer players participated in this study. Data were analyzed using descriptive and inferential statistics. Results revealed that female concussed soccer athletes scored lower on verbal memory ($p=.03$) as well as visual memory ($p=.05$) compared to male concussed soccer players. Additionally, female concussed soccer players also reported a greater number of total concussion symptoms ($p=.001$). When comparing concussed athletes in the same sport, it appears that sex differences exist on cognitive function and concussion symptoms.

Oral Presentations, Section 2

RELATIONSHIP BETWEEN PRE-PREGNANCY PHYSICAL ACTIVITY LEVELS AND MATERNAL LIPIDS MEASURED AT MID-PREGNANCY

Vinitha Sunkarapalli, Sarah Oliver

Category: Health, Food and Wellness, Section 2

Location: Lake Michigan Room, 1:00 PM

Mentor(s): Lanay Mudd (Kinesiology)

BACKGROUND: Having either extremely high or low lipid levels during pregnancy is associated with a higher risk of preterm delivery; however, little is known about maternal behaviors that may influence lipids during pregnancy. **PURPOSE:** To determine the relationship between pre-pregnancy leisure-time physical activity (LTPA) and maternal lipids measured in the second trimester of pregnancy. **HYPOTHESIS:** Women whose pre-pregnancy LTPA met/exceeded U.S. guidelines (i.e., > 150 min/wk of at least moderate LTPA) will have lower mean levels of total cholesterol (TC), triglycerides (TG) and low-density lipoproteins

(LDL), and a higher mean level of high-density lipoproteins (HDL) in the second trimester, compared to women who were less active pre-pregnancy. **METHODS:** This study was cross-sectional. Pregnant women were enrolled from a prenatal clinic in Lansing, Michigan at 17-31 weeks gestation. A survey asked women to recall LTPA participation for a typical week pre-pregnancy. Women reported time spent in moderate and vigorous LTPA. Total minutes/week of LTPA was calculated and women were categorized as meeting or not meeting LTPA guidelines ($>/< 150$ min wk). A fingerstick blood sample was obtained to determine non-fasting lipid levels (TC, LDL, HDL, and TG) using the Cholestech LDX. Women described and reported timing of their last meal/snack. **STATISTICAL ANALYSES:** Descriptive statistics will be calculated. Student t-tests will be used to determine differences in mean lipid levels according to pre-pregnancy LTPA. **RESULTS:** This is a work in progress with results to be determined. **CONCLUSIONS:** To be determined.

SELF-EFFICACY AND PREVENTION OF CORONARY HEART DISEASE IN MINORITIES AND LOW-INCOME POPULATIONS IN MICHIGAN

Alexis Therman

Category: Health, Food and Wellness, Section 2

Location: Lake Michigan Room, 1:15 PM

Mentor(s): Adesuwa Olomu (Medicine)

Heart disease is the number one killer in America. In Michigan the rates of heart disease, Diabetes, and hypertension are above those of the national average. To reduce the rates in the state there is the initiative called Guidelines Applied in Practice (GAP) that focuses on educating low-income and minority patients with heart disease and/or diabetes about secondary prevention. Participants receive informational booklets about diet, exercise and medications, and complete surveys in hopes of improving the care for their populations. My research objectives were 1) to determine the self-efficacy of minority and low-income populations with CHD/Diabetes in managing their chronic disease in Federally Qualified Healthcare Centers (FQHC) in Michigan; 2) to determine the role of self-efficacy in the control of Diabetes and hypertension in minority patients with CHD/DM in FQHC. Research was conducted through the results of the Self –Efficacy for Managing Chronic Disease 6-Item survey during the education class. Controlled blood pressure was measured $<140/90$ for non-diabetic patients and $<130/40$ for diabetic patients. The results concluded a higher rate of uncontrolled blood pressure for the Black population in comparison to the White population. On average the Self-Efficacy score was higher for patients with controlled blood pressure. Study is on-going.

THE EFFECTS OF MULTIPLE CONCUSSIONS ON NEUROCOGNITIVE PERFORMANCE AND SYMPTOM CLUSTERS IN HIGH SCHOOL AND COLLEGIATE STUDENT-ATHLETES

Kristyn Wilhelm, Samantha Belanger

Category: Health, Food and Wellness, Section 2

Location: Lake Michigan Room, 1:30 PM

Mentor(s): Erica Beidler (Kinesiology), Tracey Covassin (Kinesiology), Ryan Moran (Kinesiology)

Background: Prolonged symptom recovery and an increased risk for future concussions are just some of the issues of concern associated with multiple concussions. Purpose: The purpose of this study was to examine concussed athletes with a history of zero to three concussions with respect to neurocognitive performance and recently revised symptom clusters. Study Design: A prospective cohort design. Methodology: Five hundred and ninety six collegiate and high school athletes who sustained a concussion over a six-year period were used to compare baseline concussion symptom clusters and neurocognitive performance to post-concussion data. The Immediate Post-Concussion Assessment and Cognitive Test (ImPACT) was used to determine neurocognitive performance of attention processing, visual working memory, verbal recognition memory, visual processing speed, reaction time, learning, and numerical sequencing at baseline, 3 days, and 8 days post injury. Results: Concussed athletes with three or more concussions were still impaired 8 days post-concussion compared to baseline scores on verbal memory ($p<.001$) and reaction time ($p<.001$). Athletes with three or more concussions had significantly more migraine-cognitive-fatigue symptom clusters at 8 days compared to baseline scores ($p=.001$) and total concussion symptoms was marginally impaired for athletes with a history of three or more concussions compared to athletes with no history of concussion ($p=.054$). Conclusion: Athletes with a history of three or more concussions took longer to recover on verbal memory and reaction time than athletes without a history of concussion. Athletes also were impaired on the migraine-cognitive-fatigue cluster as compared to baseline levels and those without a concussion.

EXPLORING THE EFFECTS OF A NATURE-BASED PHYSICAL ACTIVITY PILOT INTERVENTION IN FIFTH AND SIXTH GRADERS

Brooke Bouza

Category: Health, Food and Wellness, Section 2

Location: Lake Michigan Room, 1:45 PM

Mentor(s): Karin Pfeiffer (Kinesiology)

Regular physical activity (PA) is associated with a range of physical and psychological health benefits for children, yet national data indicate that less than half of American children meet the Department of Health and Human Services' PA guidelines. Interventions to increase PA in youth are required. Environmental factors are recognized as important correlates of PA, and exposure to natural settings has been shown to improve markers of physical health and personal wellness. Nature-based PA interventions may thus increase PA levels and improve psychosocial wellbeing in children. The purpose of this study was to examine physical and psychological outcomes of a nature-based PA pilot intervention in children from a low socioeconomic status, urban community. A class of fifth and sixth grade students (n=26) was recruited. Children participated in a five-week intervention, delivered by the school PE teacher. Sessions were held during and after school. The sessions included discussions on nature-awareness and life skills, and nature-based physical activities such as hiking, cycling and fishing. Height and weight were measured by trained assistants. PA, self-efficacy and connection with nature were assessed by questionnaires administered pre- and post intervention. Paired t-tests revealed no significant differences in any of the outcome variables from pre- to post-intervention. Focus group feedback from the children and PE teacher was positive and confirmed that the intervention was feasible in the school setting and well received by children of a low socioeconomic status, based in an urban community. A longer time frame for intervention is necessary in future investigations.

Poster Presentations, Section 1

THE EFFECTS OF ANTIBIOTIC USAGE IN FARM ANIMALS ON HUMAN HEALTH

Chelsey Klein, Ben Bailey, Ryan Guysky

Category: Health, Food and Wellness, Section 1

Poster: 275

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

Mentor(s): Mark Largent (James Madison College), Nathan Praschan (Public Health)

In today's society, "organically raised" is a rare sight to behold on a product label. To the everyday customer, this label speaks of more expensive prices while offering no difference in nutritional value or taste. However, if one looks beyond the label, and into the exact processes used in raising livestock in the agricultural sector, they may find an ugly, inescapable truth. The organic label may yet hold some significance for consumers and the meat market. By researching agricultural practices, antibiotics, and antibiotic resistance using various studies and journal articles, we found a connection not only between livestock and the increasing bacterial resistance of antibiotics, but also to America's rising obesity rates.

ANTIBIOTIC RESISTANCE AMONG HUMAN USAGE

Paveenuch Sriragul, John Peleman

Category: Health, Food and Wellness, Section 1

Poster: 276

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

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

Since the advent of antibiotics, bacterial infections have become relatively easy to treat. But as time passes, question like "Will these antibiotic treatments I am taking have any side effects on me?" has become increasingly pertinent. Antibiotics have only been around for about seventy years, and this might not be the case in the near future. This topic is especially interesting and extremely relevant, and it deals with everyday life. This research focuses on the types of the adverse (unintended) side effects, the system that the government has imposed to keep track of those adverse effects, and antibiotic resistance trends. We found out that there are three categories of adverse effects, while the FDA (U.S. Food and Drug Administration) creates a reporting system that includes both mandatory and voluntary reports from many stakeholders. Regarding antibiotic resistance, it was found that there are series of antibiotic groups that have been discovered to treat antibiotic resistant bacteria of the previous groups. But nature persists, and bacteria mutate, and these drugs become useless against certain strains. With declining amounts of new antibiotic groups being discovered, the future of antibiotic treatment is being analyzed to an even greater extent: what would be its replacement when certain treatments run out? How should protocol change to combat or slow down this trend toward resistance? This research is extremely useful for those affected negatively by antibiotic treatment, and explores many of the future options for treating bacterial infections in addition to current government regulation.

RELIABILITY AND VALIDITY OF THREE PHYSICAL ACTIVITY MEASUREMENTS DURING PREGNANCY AND POSTPARTUM

Deanna Phelan

Category: Health, Food and Wellness, Section 1

Poster: 277

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

Mentor(s): Jim Pivarnik (Kinesiology)

Our purpose was to assess reliability and validity of three PA measures used during pregnancy and postpartum: the Omron pedometer (PED; steps/day/hr) the SenseWear Armband (SA; kcal/kg/hr), and the Pregnancy Physical Activity Questionnaire (PPAQ; met.min/week). Participants (n=20) wore the PED and SA devices in free-living environments for two consecutive weeks at 20 weeks gestation, 32 weeks gestation, and 12 weeks postpartum. At the end of each week of wear, subjects completed the PPAQ recall instrument to evaluate the prior week's PA. Intraclass correlation coefficients (ICC) and standard errors of measurement (SEM) were calculated to estimate reliability for the two weeks of wear/recall at each of the three time points. Convergent validity was assessed by averaging consecutive week values for every measure at each time point and performing Pearson correlations among the three modalities. Across the study period, PA estimates were 497±192 steps/day/hour, 13.3±3.7 kcal/kg/hour, and 15853±5702 met.min/week. ICC (SEM) values for PED at 20 weeks, 32 weeks, and 12 weeks postpartum were 0.42 (126), 0.89 (53), and 0.86 (93), respectively. Reliability of SA was lower than PED and PPAQ at all three time points (20 weeks=0.55 (1.3), 32 weeks=0.42 (1.2), postpartum=0.19 (2.8)). The PPAQ was more reliable across both pregnancy time points, compared to postpartum (0.88 (3867) and 0.83 (3820) versus 0.57 (5592) for postpartum). Validity estimates were low and variable (-0.37-0.30). Overall, reliability was acceptable for use of these measurement techniques to assess PA in free-living environments during pregnancy. However, convergent validity was poor among the three instruments.

DOES IDENTIFICATION WITH PARTNERS IMPROVE EXERCISE INTENSITY IN A TWO-PERSON EXERCISE VIDEO GAME?

Kayla Kurzawa

Category: Health, Food and Wellness, Section 1

Poster: 278

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

Mentor(s): Deborah Feltz (Kinesiology), Samuel Forlenza (Kinesiology), Rabindra Ratan (Telecommunication, Information Studies and Media)

The purpose of this study was to explore how identification with a partner during a two-person exercise task influences the Köhler motivation gain effect on subsequent exercise. The Köhler effect occurs when a team member performs a task better with a more capable partner under conjunctive task conditions than what would be expected by observing that team member's individual task performance. In conjunctive task conditions, the group's total performance is equal to the performance of the least capable member. Participants were randomly assigned to one of three partner conditions: software generated, altered virtually-real (i.e., pre-recorded real person with a blurred image to look software generated), virtually-real (i.e., pre-recorded real person), and to either shared interest or unshared interest conditions, or to an individual control condition. Participants completed a series of isometric plank exercises individually, and were then introduced to their partner via a simulated Skype connection. Following the introduction, participants were asked to write down either three interests they believe they shared with their partner (shared condition) or three interests they believed their partner had (unshared condition). It is hypothesized that participants who believe they share interests with their partner will lead participants to put forth more effort on subsequent plank exercises due to increased identification compared to participants who do not share interests with their partner. This research would extend the identification literature to partnered exercise. Results of this study are pending.

INCORPORATION OF DIETARY EPA & DHA INTO THE PHOSPHOLIPIDS OF ERYTHROCYTES AND SYSTEMIC TISSUES

Sophia Hemmrich, Christina Morkam

Category: Health, Food and Wellness, Section 1

Poster: 279

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

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

The popularity of omega n-3 supplementation and fortification in the United States is concerning due to the current lack of a recommended daily allowance (RDA) or an upper tolerable limit (UL) for n-3 long chain polyunsaturated fatty acids (LCPUFA). The principle bioactive n-3 LCPUFAs, eicosapentaenoic acid (EPA, 20:5 n-3) and docosahexaenoic acid (DHA, 22:6 n-3), can be derived from the parent n-3 essential fatty acid α -linolenic acid (ALA, 18:3 n-3), or more importantly, directly absorbed as a preformed nutrients. Despite the large number of clinical trials showing both positive and negative impact of dietary LCPUFA supplementation on health outcomes, interpreting the data is difficult due to the lack of a universal biomarker that can reliably assess n-3 LCPUFA dietary intake. One assessment tool that has gained attention is determining EPA and DHA levels in the red

blood cell membrane – known specifically as the HS-Omega-3 Index®. In this study, we tested the validity of the Omega-3 index as a biomarker for LCPUFA intake. Using a murine model, we compared how different amount of dietary EPA and DHA influence the fatty acid composition of red blood cell membrane. In addition, we examined whether these changes reflect membrane LCPUFA changes in the brain and liver, two important organs involved in n-3 lipid metabolism.

THE ROLE OF SPECIALIZATION IN THE ATHLETIC SUCCESS OF COLLEGIATE FOOTBALL AND SOCCER PLAYERS

Veronica Wilson

Category: Health, Food and Wellness, Section 1

Poster: 280

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

Mentor(s): Eric Martin (Kinesiology)

The debate on whether or not athletes should specialize in one sport or sample multiple sports to cultivate athletic success is long withstanding. The majority of the research on sport specialization has focused on general sport participation and more can be learned from investigating the differences in specialization in specific sports. Although these types of sports are difficult to measure, research is necessary to understand what type of athletic involvement generates successful student athletes. The purpose of this study is to examine the relationship between sport specialization and athletic success in football and soccer players. The criteria for specialization is participating in one sport during a student's senior year of high school, and athletic success is defined by the amount of time spent in competition and scholarship status. Surveys were distributed to collegiate athletes across three universities with questions concerning sport involvement, types of play, and an open ended question about participants personal opinion sport specialization. Data was collected from 205 football players and 108 men's and women's soccer players. Other sports were omitted in this analysis due to small sample sizes. Results of the study indicated that football players tended to specialize later and played fewer sports in elementary and middle school than soccer players. Also, male soccer players specialized earlier than female soccer players. These findings indicate that specialization rates may differ according to sport or gender.

CYBER EXERCISE

Justin Ceckowski, Evan Cox, Matthew Vorce

Category: Health, Food and Wellness, Section 1

Poster: 281

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

Mentor(s): Deborah Feltz (Kinesiology), Samuel Forlenza (Kinesiology), Brian Winn (Telecommunication, Information Studies, and Media)

Previous research has established that the principles underlying the Köhler motivation gain effect (i.e., indispensability and social comparison in a group setting) lead to an increase in the duration and intensity of exercise (Feltz, Kerr, & Irwin, 2011). However, this research has always used a real person as the partner. The purpose of this study was to explore if the Köhler effect still occurs with software generated partners in an exercise video game. Cyber Exercise was developed and built using Autodesk Maya and the Unity 3D game engine. Male and female characters were modeled, rigged, and animated to perform the various plank exercises. After performing a series of five isometric plank exercises individually, participants were randomly assigned to one of three partner conditions: software generated, altered virtually-real (i.e., pre-recorded real person with a blurred image to look software generated), virtually-real (i.e., pre-recorded real person), or an individual control condition. Thus, participants were led to believe they were working out with a computer generated partner (software-generated, altered virtually-real conditions), a live partner (virtually-real condition), or no partner at all (control). After a brief introduction with their partner and performance feedback, participants completed the same series of exercises a second time with their partner under conjunctive task conditions or alone (control condition). This study has wider implications for the development of exercise video games and motivational strategies for increasing exercise intensity. Results of this study are pending.

Poster Presentations, Section 2

THE RELATIONSHIP BETWEEN DOMAINS OF PHYSICAL ACTIVITY AND LIPID LEVELS DURING PREGNANCY

Stefan Jones, Angela Amaniampong, Molly Griffin, Kevin Nash

Category: Health, Food and Wellness, Section 2

Poster: 282

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

Mentor(s): Lannay Kazmirzack (Kinesiology), Alicja Stannard (Kinesiology)

Lipid levels are known to increase during pregnancy, but the relationship between the lipid levels and physical activity (PA) in

pregnant women has limited research available. The purpose of the study was to examine the relationship between serum lipid levels and various domains of PA during the second and third trimesters in low socioeconomic status (SES) pregnant women. It was hypothesized that higher PA levels, regardless of the domain, would be associated with lower total cholesterol (TC), triglycerides (TG), and low-density lipoprotein (LDL) levels and have no effect on high-density lipoprotein (HDL) levels. Pregnant women completed the validated Pregnancy Physical Activity Questionnaire (PPAQ). The PPAQ asked for time spent (min/wk) performing PA in domains of household/caregiving, transportation, exercise, and work; this was scored based on a validated method. A finger stick was performed to collect a non-fasting serum sample to measure the women's TC, HDL, LDL and TG in mg/dL using LDX Cholestech. Linear regression was used to determine the relations between lipid levels and time spent in each PA domain. Results: In progress.

Conclusions: To be determined.

COLLEGE STUDENTS' PERCEPTIONS ON THE MASCULINITY AND FEMININITY OF SPORTS

Allison Gola, Thien Le, Tasha Maiville, Sarah McParlin

Category: Health, Food and Wellness, Section 2

Poster: 283

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

Mentor(s): Dan Gould (Kinesiology)

The purpose of this study was to examine how masculine or feminine certain sports are stereotypically perceived by college students, as there is still a large discrepancy that exists between boys and girls' high school sport participation (NFHS, 2012). Earlier research (Kane, 1988; Matteo, 1988; Metheny, 1965) has illustrated mixed results in terms of which sports are seen as socially appropriate for females, with there also being changes in these perceptions over time. However, considering these changes, some contend that sport appropriateness is still "linked to traditional femininity" (Ross & Shinew, 2008, p. 48). Therefore, the investigators were specifically interested in; (a) if perceptions of masculinity and femininity have changed; and (b) how participants' sport experiences influence these perceptions. To address this, 484 undergraduate students completed a survey in various classrooms. The researchers hypothesized that sports viewed as very feminine in the past, may now be perceived as more neutral, and that one's involvement in a sport influences these perceptions (e.g. participation in a masculine sport will lead to a more masculine view of that sport). The analysis of the data is currently being conducted.

PREVALENCE OF OBESITY AND DIABETES IN A POPULATION ISOLATE IN RURAL MID-MICHIGAN

Katelyn Prieskorn

Category: Health, Food and Wellness, Section 2

Poster: 284

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

Mentor(s): Brian Schutte (Microbiology and Molecular Genetics)

The CoSAGE project is a health research partnership between MSU researchers and a rural community in mid-Michigan. Many residents in this community are descendents of 500 immigrants from the Eifel region of Germany that settled in 1836-1870. Our preliminary studies suggest that this "settler community" represents a population isolate. Research partnerships with population isolates are important because they can accelerate the identification of inherited and environmental factors that contribute risk for common health problems. However, since residents of this community are of Northern European descent, we hypothesize that the prevalence of obesity and diabetes in the settler community are not statistically different from county, state, and national data. To test this hypothesis, we used a cross-sectional population study design. We obtained informed consent from 270 participants. We calculated BMI from height and weight measurements and collected a health questionnaire that included self-reported diabetes diagnosis. In order to compare the community data with broader data sets, we obtained vital statistics (2004-2009) from demographically matched counties, the state of Michigan, and the US population. Demographic data was obtained from the 2010 census. We identified six counties that were demographically similar to the settler community. Since most data from community were obtained in 2011 and 2012, and since vital statistics were not available for those years, we extrapolated the vital statistics to project prevalence rates for obesity and diabetes. We observed a linear increase in both obesity and diabetes in the six counties. Comparisons with the settler community will be presented.

QUANTITY AND QUALITY OF FOOD CONSUMED BY SPECTATORS AT AN NCAA DIVISION I FOOTBALL GAME

Sarah Parks

Category: Health, Food and Wellness, Section 2

Poster: 285

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

Mentor(s): Jim Pivarnik (Kinesiology)

The quantity and quality of food a person consumes is an integral part of the energy balance equation, which is related to an individual's body weight and overall health. Little research has directly examined the food consumption behaviors of people at sporting events. College football games attract thousands of spectators where a number of concession items are served. The purpose of this study was to investigate the quantity and quality of food consumed by spectators at NCAA Division I football games. Data on concession sales from 2012 Michigan State University (MSU) home football games were obtained from the MSU Culinary Services Office. Overall and individual food consumption was estimated from concession food sales records and game attendance figures. Weather conditions were also considered in analyses. Over the course of the season, there were 582,421 total sales and concession items were divided into four categories: entrees, beverages, sweets and snacks. The top selling items were bottled water, 32-ounce pop, hot dogs, hot coffee/cocoa and large pretzels. It was found that each spectator consumed an average of 1.1 items per game, translating to 249 kilocalories/game (30.4% from fat). Food consumption increased when the games occurred during normal mealtimes, and fluctuated with weather conditions. Considering spectators are typically at the game for approximately four hours, average energy intake was likely less than that expended. Therefore, while some food choices were high in kilocalorie expenditure and fat content, on average, consumption did not appear to be excessive.

POORER AEROBIC FITNESS PREDICTS REDUCED INTEGRITY OF COGNITION ACROSS MULTIPLE MEMORY SYSTEMS

Adriel Egner

Category: Health, Food and Wellness, Section 2

Poster: 286

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

Mentor(s): Matt Pontifex (Kinesiology)

As epidemiological investigations within industrialized societies have revealed increases in the prevalence of sedentary behaviors, a greater understanding of the implications of those lifestyle choices for cognitive health and function is of increasing importance. Purpose: To determine the extent to which cardiorespiratory fitness relates to the integrity of multiple memory systems. Methods: A cross-sectional sample of sixty-four college aged young adults (32 female) were tested over the course of three days in areas related to implicit memory, working memory, long-term memory, and aerobic fitness. Results: Findings revealed an association between aerobic fitness and memory function such that individuals with lower cardiorespiratory fitness exhibited poorer implicit memory acquisition, poorer performance on tests of working memory – with the greatest effects observed for task conditions requiring the greatest amounts of working memory, and poorer long-term memory retention. Conclusion: These data indicate that chronic physical activity behaviors leading to increased cardiorespiratory fitness may be necessary for the optimal development of neural networks underlying these memory systems.

SLOW-PACED BREATHING ACUTELY REDUCES CIRCULATING STRESS HORMONES

Justin Drobish

Category: Health, Food and Wellness, Section 2

Poster: 287

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

Mentor(s): Erica Wehrwein (Physiology)

It is commonly thought that slow-paced breathing is associated with relaxation. We tested the hypothesis that slow-paced breathing (~6 breaths/min) for 20 minutes would lower circulating stress hormones. Young, healthy subjects (n=14, 10M/4F, ages 18-35) were studied. Subjects were instructed to rest supine for 20 minutes (baseline) followed by 20 minutes of slow-paced breathing before returning to 20 minutes of normal breathing (recovery). Blood samples were taken at the end of each of these intervals from a brachial arterial catheter and analyzed for circulating stress hormones. All data were analyzed using One Way RM ANOVA followed by a Tukey's posthoc and are reported as mean \pm SEM. Average respiratory rate was 12.1 ± 0.5 breaths/min during baseline and 5.5 ± 0.4 breaths/min during slow-paced breathing. Cortisol (μ g/dL) significantly decreased from baseline by 3.5% after the slow-paced breathing (8.22 ± 2.46 vs. 7.26 ± 1.87 , $p < 0.05$). Norepinephrine (pg/mL) also significantly decreased from baseline by 15.9% (173.9 ± 48.89 vs. 135.6 ± 42.89 , $p < 0.05$). After recovery, cortisol continued to fall significantly, resulting in a 3.2% decrease as compared to slow-paced breathing (7.26 ± 1.87 vs. 6.39 ± 1.54 , $p < 0.05$). Norepinephrine levels returned to baseline during recovery ($p > 0.05$). Therefore slow-paced breathing reduces the circulating

stress hormones norepinephrine and cortisol. This may be associated with perceived relaxation, especially given that cortisol levels continue to fall after the cessation of slow-paced breathing.

Poster Presentations, Section 3

QUALITATIVE ANALYSIS OF CANCER PATIENTS' STRATEGIES TO ADHERE TO ORAL ANTI-CANCER AGENTS AT HOME

Kimberly Ridenour

Category: Health, Food and Wellness, Section 3

Poster: 288

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

Mentor(s): Barbara Given (College of Nursing), Charles Given (Family Medicine), Sandra Spoelstra (College of Nursing)

With the use of oral anti-cancer agents, cancer treatment has shifted from supervised clinical settings to the home environment; patients must take the initiative to take their medication as prescribed and to manage their symptoms. Symptoms from cancer treatment can lead to complications, with patients stopping their prescription, resulting in non-adherence to the oral anti-cancer treatment. An 8-week exploratory analysis was conducted. Ten baseline interviews from adult patients with cancer who are prescribed an oral agent were examined for common themes relating to how patients manage their oral agent at home. Research questions were addressed through thematic analysis, providing the information needed to investigate how patients manage their oral agent. The process of combining and recording related patterns to determine information allowed themes to be formed from the patient's own words, rather than posing themes from an existing theoretical framework, enabling the depiction of the patients' overall experience. An argument was then created to support themes. The study is ongoing, and results and conclusions will be reported. With cancer being one of the most prevalent diseases today, the need for effective treatment and education is essential. Oral anti-cancer agents enable patients to be treated in the convenience of their home, thus, supporting quality of life. Discovering strategies to assist patients in managing their oral anti-cancer agents at home can aid nurses in tailoring education and support for those patients who are treated with pills, thus improving adherence to their cancer treatment regimen.

OBSTRUCTIVE SLEEP APNEA AND PARENTING STRESS

Aubree Kugler, Heather Gilmore

Category: Health, Food and Wellness, Section 3

Poster: 289

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

Mentor(s): Joanne Riebschleger (Social Work)

The problem: People with obstructive sleep apnea (OSA) have problems breathing while sleeping. They stop breathing many times a night with autonomic system alarm leading to startled awakenings. A long term lack of restorative sleep results in elevated daytime fatigue and sleepiness, sad and/or irritable mood and impaired cognitive functioning. Serious physical health conditions associated with OSA include cardiovascular problems and cerebrovascular problems. Mental health conditions associated with OSA include high incidence of depression and a greater likelihood of having a childhood diagnosis of attention deficit hyperactivity disorder and oppositional defiant disorder. The study: Little is known about the impact of OSA on parenting. The purpose of this study is to examine the levels of parenting stress reported by adult patients with OSA who are also parents. This is a descriptive, exploratory research study. The research asks "Do parents with OSA report high levels of parental stress?" Data are collected from adult patients in five sleep clinics (Okemos, Gaylord, Saginaw, Petoskey, and West Branchy, MI) under the umbrella health care organization of Sleep Diagnostics. Instruments include the Parenting Stress Inventory (Abidin, 1995) and clinical assessment using the Epworth Sleepiness Scale (Johns, 1991). The poster: Since this study is beginning, the poster will portray the need for the study, theoretical foundation, study purpose, methods of data collection and analyses using a small number of pre-intervention subjects. Implications for health and child welfare are indicated.

ASSOCIATION OF THE FAMILY NUTRITION AND PHYSICAL ACTIVITY SCREENING TOOL WITH ACANTHOSIS NIGRICANS IN CHILDREN

Marion Bakhoya

Category: Health, Food and Wellness, Section 3

Poster: 290

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

Mentor(s): Karin Pfeiffer (Kinesiology)

The Family Nutrition and Physical Activity (FNPA) screening tool has shown the ability to predict a child's risk of becoming overweight in certain populations. However, it is not known if the FNPA is associated with other risk factors/health outcomes or

other populations. PURPOSE: To examine the association of the FNPA screening tool with Acanthosis nigricans (AN) in children from a low socioeconomic, ethnically diverse, urban community. METHODS; Children (n=462) from four elementary schools located in/near Flint, Michigan were measured for height and weight, which were used to calculate BMI (kg/m²). Presence and grade of AN (a marker of insulin resistance) was assessed by trained personnel. Parents completed the FNPA and returned it to the schools. Descriptives were calculated, and the Mann-Whitney U test was used to assess differences in FNPA score by AN (present vs. not). Logistic regression was used to evaluate the association of the FNPA (tertiles) with AN. RESULTS: Mean BMI (19.5.+5.2 kg/m²) approximated the 69th percentile, with 16.0% overweight and 22.5% obese. AN prevalence was 14.3%. Children with a total FNPA score in the lowest tertile (high-risk) had an odds ratio of 2.9 compared to children with a total FNPA score in the highest tertile (low-risk) for having AN; however, this association was no longer significant when race was included as a covariate. CONCLUSIONS: The FNPA screening tool did not predict risk for AN. Ethnicity was a strong predictor of AN and outweighed any behavioral effects assessed by the FNPA screening tool.

EXTRACTION OF E. COLI O157:H7 FROM SPINACH USING MAGNETIC NANOPARTICLES

Kasey Pryg

Category: Health, Food and Wellness, Section 3

Poster: 291

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

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

When the food safety industry tests foods for E. coli O157:H7, long incubation periods and expensive testing hinders them. However, using magnetic nanoparticles attached to an antibody, E. coli O157:H7 can be magnetically separated from the spinach in a timely, efficient, and cost-effective manner. My research will focus on using magnetic polyaniline attached to an anti-E. coli O157:H7 antibody to extract E. coli O157:H7 from a spinach matrix. Further, after extraction is performed, detection can also be done using a separate reporter particle and a potentiostat, allowing for rapid detection to be coupled to a rapid and effective separation. This procedure of magnetic separation will shorten the time needed for testing spinach samples for E. coli O157:H7 contamination in the field, thereby allowing more samples to be tested in a shorter amount of time. This increase in productivity will, hopefully, reduce the number of foodborne illness outbreaks.

THE IMPACT OF AGING ON PERIPHERAL BLOOD FLOW

Mitchell Rozman

Category: Health, Food and Wellness, Section 3

Poster: 292

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

Mentor(s): Jill Slade (Radiology)

Initial vascular responses are pivotal in vascular control and function. Reduced or delayed vascular responses may affect tissue perfusion and muscle function. Further, these may be related to age related declines in muscle function. Of particular importance, slower or blunted early hemodynamic responses may contribute to altered perception of physical work and exercise ability. The purpose of this study is to examine the effect of aging on initial peripheral blood flow responses. Brief single contractions of the anterior leg compartment were used to evoke functional blood flow responses in the anterior tibial artery. Magnetic Resonance Imaging was used to measure blood flow immediately following single maximal leg contractions. Blood flow responses were compared in young (aged 18-35 years old) and older adults (aged 60-75 years old).

EFFECTS OF PROCESSING ON THE STRUCTURE OF FOOD

Zachary Koch

Category: Health, Food and Wellness, Section 3

Poster: 293

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

Mentor(s): Carl Boehlert (Material Science)

Processing food has been a common practice ever since ancient times when humans began cooking and adding compounds like salt to preserve food. When going to the grocery store nowadays, almost every food has been processed in some way to increase shelf life, improve look or flavor or increase nutritional value. All these processes change the underlying structures of the food in some way. The Scanning Electron Microscope (SEM) is the perfect tool for examining these structural changes of the food. If needed, samples will be prepared for the SEM by cleaning and coating them. Various samples of foods that have undergone different types of processing as well as their unprocessed counter parts will be used to give a complete understanding about how processing changes the food. Samples will be imaged and observations will be made about the structure. I will then draw conclusions from the images and information on the sample about how certain processing changes structures of food and how this change leads to the intended consequence of the processing.

History, Political Science, and Economics

Oral Presentations, Section 1

IMAGINING A BETTER WORLD: REFORMERS, THINKERS, NOVELISTS, POETS AND HOW THEY REINFORCE ONE ANOTHER

Sarah Robinson

Category: History, Political Science and Economics, Section 1

Location: Lake Erie Room, 9:00 AM

Mentor(s): Malcolm Magee (History)

From Ralph Waldo Emerson to the 1950s, there has been a connection between reform in America and poets and novelists. This talk will focus on the connections between authors and writers and reform movements and how they reinforced each other to create a public discourse. The prose from the authors and poets of the time provides another perspective to the reform that is happening during the Progressive Era. The talk will primarily focus on women's rights reforms, education reforms, the temperance movement and the abolitionist movement, while including other reforms such as prison reform and the development of rights for the mentally ill. The research consists of an examination of primary sources, current historiography and fiction novels, including Alice Felt Tyler's *Freedom's Ferment*, Henry May's *The Enlightenment in America*, and Nathaniel Hawthorne's *The Blithedale Romance*.

PROBLEMS OF URBAN MIGRATION, SETTLEMENT, AND GROWTH IN ULAANBAATAR, MONGOLIA

Alexander Acton

Category: History, Political Science and Economics, Section 1

Location: Lake Erie Room, 9:15 AM

Mentor(s): Louise Jezierski (Comparative Cultures and Politics)

Ulaanbaatar, the capital of Mongolia, is the leader of economics and trade in the country, with currently 42% of the nation's population and generating 60% of its GDP. The city has recently become increasingly centralized and cosmopolitan around commercial and service industries, along with a huge boom in mining and natural resource production. Job opportunities and increased living conditions have led to a giant migration of people from rural Mongolia to Ulaanbaatar. Through my research and personal observations, the city is experiencing massive urbanization dilemmas such as pollution, overcrowding, inefficient housing, and a lack of resources and basic living services. Ulaanbaatar has relied on the City Master Plan of 2002 which implements control of spatial expansion, land usage, and housing developments to be fulfilled by 2020. Conversely, the government has not effectively followed the Plan, and as a result, Ulaanbaatar has not improved its urban structure. With my undergraduate research, which has included accumulating data on various aspects of the city, interviews with leading Mongolian urbanists, city officials, and professors, and in depth investigations, I have determined that to effectively manage the urban sprawl of the city, Ulaanbaatar needs to administer better urban planning strategies through imposing the regulation and mixed usage of land, construct more adequate housing units to accommodate the massive urban population, direct the growth of its informal economies, and to provide basic infrastructures to increase the overall standard of living throughout the Ulaanbaatar population.

RISKY BUSINESS: LGBT YOUTH AND MICHIGAN'S SEX EDUCATION CURRICULUM

Emily Snoek

Category: History, Political Science and Economics, Section 1

Location: Lake Erie Room, 9:30 AM

Mentor(s): Julia Grant (James Madison College)

In American sex education, issues of morality are continually at war with the agenda of sexual health professionals. The battles concerning curriculum-controlling laws and policies have been hard-won yet we are still seeing disturbing figures on the health of our nation's youth. This is nowhere more apparent than in the lives of LGBT students, who are not only more likely to contract an STD than their straight peers, but also more likely to get pregnant. Clearly, the needs of LGBT youth are not being met by sex education curriculums that attempt to balance sexual health needs with concerns about community standards. My research investigates how the sexual health needs of LGBT youth are not being met by their formal sex education curriculums, focusing on the curriculum used by the majority of Michigan schools. I have analyzed primary and secondary source material, government documents, curriculums, and meetings, in addition to speaking with several key stakeholders within Michigan sex education. Finding that LGBT health issues were not being addressed in formal sex education curriculums led me to investigate Gay-Straight Alliances and the possible role they play in providing informal sex education for these youth. The needs of LGBT youth must be considered in sex education, but until the voices of sexual health advocates outweigh the community standards

concerns of legislators, there will not be an easy solution. Therefore we must also work with Gay-Straight Alliances in order to provide these youth with this form of informal sex education.

WOMEN IN PRIMARY AND SECONDARY EDUCATION ADMINISTRATION: NAVIGATING SPHERES OF SUBORDINATION

Adam Harrison

Category: History, Political Science and Economics, Section 1

Location: Lake Erie Room, 10:00 AM

Mentor(s): Jennifer Goett (Comparative Cultures and Politics)

Women in primary and secondary education administration navigate spheres of subordination in a multitude of ways. Many scholars have described barriers-to-entry for these women in the education sphere, but fail to describe the experiences once the women attain such positions. I interviewed four successful women in education administration of the Plymouth-Canton Community School (PCCS) district. Each has expressed a unique testimony that helps to not only define barriers-to-entry, but focuses on lived subordination in the workplace. The accounts of these women, combined with my primary analysis, aim to contribute to better understanding of how many women navigate around masculine administrative norms in primary and secondary education. The anthropological methodology of qualitative research allows for a better consideration of the nuanced environments in which women are not accepted, welcomingly. Through these fruitful interviews, it is much easier to depict that range of coping mechanisms and strategies that women engage in, to deal with their underrepresented status. They not only face the rigor of prestigious positions of power, but attempt to achieve this success through inherently patriarchic norms.

THE STATE OF AMERICAN EDUCATION

Nicholas Kowalski

Category: History, Political Science and Economics, Section 1

Location: Lake Erie Room, 10:15 AM

Mentor(s): Ross Emmett (Political Theory & Constitutional Democracy)

Education policy in the United States is a hotly contested subject that has captured the minds of many citizen activists and think-tanks. Politicians talk about the need for reforming educational practice and standards but routinely fail to implement genuine reforms. Billions of dollars are allocated and spent on K-12 educational endeavors annually – one of the world’s most expensive systems. Yet overall, our national efforts rank fourteenth globally. What is the root cause of the disparity between investment capital and outcome? Is the current focus where it ought to be, on student achievement? Why are not elected legislators and Members of Congress acting to reform the status quo? Through an examination of America’s public education institutions and government funding schemes, I will introduce a set of innovative means for educating the next generation and beyond. Alternative measures, such as increased charter and private school options, are to be seriously considered within a scholarly context. Voucher programs will be analyzed for merit and possible expansion.

GERMAN ENERGY SECURITY: POSSIBILITIES FOR THE FUTURE

Cody Schulz

Category: History, Political Science and Economics, Section 1

Location: Lake Erie Room, 10:30 AM

Mentor(s): Norman Graham (International Relations)

After the nuclear disaster at Fukushima-Daiichi in March of 2011, Germany reacted quickly and decisively, accelerating the decommissioning of its 17 nuclear reactors and committing to increase renewable energy production to 18% of total production by 2020. However, Germany must overcome technological, residential, and economic obstacles in order to make this a reality. At the same time, Germany remains highly dependent on Russian imports of natural gas and oil, and is seeking to diversify its supply. Substantial new finds of oil and natural gas in the United States and pipelines from Eurasia bypassing Russia may provide alternative sources of fossil fuels, but their utilization will face political opposition from Russia and possibly the United States as well as logistical and economic complications. As such, this paper explores Germany’s medium and long term energy supply options and evaluates their feasibility.

Poster Presentations, Section 1

PLANNING POLICIES AND REGULATIONS THAT CAN REDUCE THE PRACTICE OF PRIVATE PROPERTY ABANDONMENT IN THE UNITED STATES

Michelle LeBlanc

Category: History, Political Science and Economics, Section 1

Poster: 305

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

Mentor(s): Rex LaMore (Urban and Regional Planning)

This report examines the feasibility implementing policies that are likely to result in ending the practice of private sector property abandonment. Specifically this research examines practices by the public sector to require financial assurance through performance guarantee bonds or insurance, on newly constructed commercial and industrial structures. These financial instruments will ensure that at the end of a structure's useful life there are available funds for deconstruction, thus ending the cycle of private property abandonment in Michigan. The practice of "throwing away" or abandoning parcels is a hazard to public health and safety, presents a real threat to the public welfare, and is an unsustainable base of limited public resources. Several industries such as wind turbines, surface mining, cellular towers, landfills, rail companies, and oil rigs use similar practices to ensure the safe removal/decommissioning of infrastructure at the end of their useful life. The act of requiring financing assurance on commercial and industrial development will hold private sector companies, and the consumers of their products, accountable for their properties and help stop the perpetual cycle of private sector abandonment and encourage a more equitable system of TRUE product costs and property management.

EFFECT OF GREY WOLF HUNTING IN MICHIGAN

Alex Schenk

Category: History, Political Science and Economics, Section 1

Poster: 307

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

Mentor(s): Matt Grossmann (Political Science)

Grey Wolves have been a symbolic animal in Michigan's history and culture. Until recently, wolves have been on the endangered species list in order to protect this special species. Under recent Michigan legislation, Grey Wolves have the possibility to be added to the game species list. Wolf-hunt supporters make claims saying hunting is justified in order to protect livestock and pets in addition to managing wolf populations. On the contrary, those opposed to wolf hunting say it is too soon and a hunt is not necessary. Which side of the legislation will best balance the needs of society and the environment? My research aims to educate the public about the environmental and economic drawbacks of a wolf hunting season while also explaining the possible benefits.

AN EXAMINATION OF EDUCATION IN SOUTH AFRICA DURING APARTHEID: THE ROLE OF POLITICAL AND SOCIAL ACTIVISM IN RESTRUCTURING THE EDUCATION SYSTEM

Marie-Lynda Akono

Category: History, Political Science and Economics, Section 1

Poster: 308

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

Mentor(s): David Walton (African American & African Studies)

According to the Anti-Apartheid Movement (AAM), the South African government spent thirty times more on the education of a white child than that of an African child during the Apartheid era. Therefore, my objective is to analyze the ways in which laws under Apartheid, such as the Bantu Education Act of 1953, limited the education of young South Africans and hence inspired the people of South Africa to resist and insist on the amelioration of the education system. This project is also a way to show how the past shapes the future. Using the lenses of Critical Race Theory, I will look at the works of scholars, major organizations, and draw testimonies from memoirs. Among these sources are Steve Biko, Mark Mathabane, SASO (South African Students' Organization), and John Biyase. Employing an African-centered methodology, I will examine the Soweto Uprising as an event that exemplifies social activism. Comparative education is also reflected in this project. Furthermore, in this study I am also posing broader questions such as: What challenges have South African students faced during civil uprising? Were there social, class, and cultural clashes on the school grounds? Which popular culture figures played role to motivate equal rights?

DO INSTITUTIONS MATTER?: EXAMINING SOURCES OF INFORMATION FOR STATE LEGISLATORS

Kent Dell, Elayna Creed, Desmond Kearsley

Category: History, Political Science and Economics, Section 1

Poster: 309

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

Mentor(s): Cynthia Jackson-Elmoore (Political Science/Honors College)

State legislators are busy people. Constrained for time, and with multitudes of decisions to make, they rely on certain actors and groups as trusted sources of information throughout the stages of the policy process: identifying public problems, drafting legislation, doing committee work and deciding how to vote. These actors and groups vary from legislative insiders, such as legislative staff, and mid-range actors, including the Governor, to legislative outsiders like business/industry. Based on original survey data, this project explores the influence of state legislatures' institutional characteristics on how often state legislators rely on three specific information sources across the four stages of the policy process. Specifically, we examine the effects caused by term limits and legislative professionalism—the degree to which a state legislature mirrors Congress. We examine the roles of legislative staff, the Governor and business/industry as sources of information for state legislators in 24 U.S. states, based upon state legislator demographics and perceived demographics of state legislators' districts.

Humanities and Performing Arts

Oral Presentations, Section 1

A BLOG OF ONE'S OWN: THE CHANGING DIGITAL IDENTITIES OF MORMON WOMEN

Allegra Smith

Category: Humanities and Performing Arts, Section 1

Location: Lake Superior Room, 9:00 AM

Mentor(s): Amy DeRogatis (Religious Studies)

With the expansion of Internet technologies in the last decade, Mormon women in both the home and the professional realm are taking to the blogosphere in droves. Female bloggers within the Church of Jesus Christ of the Latter-day Saints are situated within a unique religious tradition, and often use the Internet to profess both their religious and personal identities. Many contemporary Mormon women use the Internet and blogging platforms to assert facets of their Mormon identity in three different arenas: 1) Her reproductive role in the family, in bearing and raising children (as demonstrated through motherhood and lifestyle blogs); 2) Her place in relation to her husband, in the heteronormative Mormon couple and sexual division of labor (as demonstrated through lifestyle blogs, particularly those where young Mormon women serve as sole breadwinner as their husbands pursue higher education); 3) Her performance of a feminine gender identity and preservation of her God-given modesty (as demonstrated through Mormon fashion and style blogs). Through my review of blogs from over 25 different self-identified LDS women, I analyze how these different roles either reinforce ideals laid down in the Mormon scriptures and by church officials, or create and assert a new identity for Mormon women. I argue that these blogs provide a powerful forum for LDS women to reassert or subvert prescriptive norms without leaving the confines of the domestic sphere.

TRAINING IN THE ETHICS OF HUMANITARIAN MEDICINE

Jaya Gupta

Category: Humanities and Performing Arts, Section 1

Location: Lake Superior Room, 9:15 AM

Mentor(s): Fred Gifford (Philosophy)

NGOs in developing countries commonly face ethical dilemmas when implementing medical humanitarian aid. Many such dilemmas involve allocation or priorities: Should we pick up and move because the situation is sufficiently stable in the locale where we have been working (even though there are still needy people there)? Should we avoid taking on a project in a new needy location because, given its degree of importance and our level of resources, it isn't warranted? How are such judgments to be made? Is it just cost-benefit analysis, or something else? Is it ever acceptable to ration care? How do cultural differences affect moral dilemmas in these contexts? Who are NGOs responsible to when they make these decisions? We are studying these ethical dilemmas in order to create educational materials so that humanitarian workers are prepared for these situations when they arise in their own work. This is part of a larger project to develop a module on ethics and global health for practitioners, which is also part of a larger initiative in the Department of Philosophy to create an online certificate program for workers in development and aid workers.

BAODINGSHAN: A STUDY OF HELL IMAGERY THROUGH POPULAR AND REGIONAL NARRATIVES AT A SONG BUDDHIST COMPLEX

Kristin McCool

Category: Humanities and Performing Arts, Section 1

Location: Lake Superior Room, 9:30 AM

Mentor(s): Anning Jing (Art History)

During the Song dynasty, the Buddhist complex of Baodingshan was executed from 1177 and 1249 CE under the leadership of layman Zhao Zhifeng. The site located approximately 12 kilometers outside the city of Dazu was carved into the side of a cliff in China's Sichuan province. Baodingshan served as a teaching center for Buddhist laity through its monumental style sculptural programs. The site's programs reflect popular beliefs shared by the local Sichuan population during the Song dynasty. Among the thirty-one colossal narrative works, the Hell Tribunals and Punishments tableaux combined images with explanatory inscriptions. It vividly represents the solidification of the medieval Chinese view of an "intermediate existence." Some of the earliest extant examples of hell and its associated imagery appeared in manuscripts and hanging scrolls dated from the early to mid 10th century. During this period illustrated texts such as The Scripture on the Ten Kings were commissioned by relatives on behalf of the deceased. Indigenous ancestor rituals coupled with the merit gained from image making could ensure their loved ones a speedy rebirth. This project investigates the hell imagery of Baodingshan in relation to popular depictions during the

late Tang and Song dynasties. It examines how the imagery at the site was influenced by Chinese popular belief and its efficacy achieved through a distinctly Sichuan style of Buddhist art.

CARS, COWBOYS, AND REPUBLICANS: THE RUGGED AARON COPLAND?

Sarah Tomlinson

Category: Humanities and Performing Arts, Section 1

Location: Lake Superior Room, 9:45 AM

Mentor(s): Marcie Ray (Musicology)

Composer Aaron Copland (1900-1990) is widely credited with creating the American sound in classical music. Despite the fact that Copland was a gay, Jewish musician, a strong supporter of left wing liberal politics and an expatriate to France in the 1920's, Copland's music has been used not only to evoke American nationalism in film and television, but even to promote conservative American political agendas and ideals of rugged masculinity. One recent example is that music very similar to Copland's renowned orchestral suite, *Appalachian Spring*, accompanied a political campaign advertisement where Rick Perry conversationally champions pro-religion, anti-gay, and politically right wing ideals. I show that Copland's music helps construct a particular vision of American identity—one invested in rugged, individualistic, and masculine ideals, despite the fact that the composer himself would not be considered to constitute the American identity his music helps construct. In the presentation I explore how Copland's music has been appropriated to develop a particular kind of American-ness, and which aspects of his music seem to help shape it.

ARTIFICIAL MEMORY SYSTEMS

Austin Gorsuch

Category: Humanities and Performing Arts, Section 1

Location: Lake Superior Room, 10:00 AM

Mentor(s): Natalie Phillips (English)

Using the lens of the long eighteenth century, particularly eighteenth century literature, as an interpretative springboard, this program works to articulate a model of extended cognition encompassing an array of artificial memory systems (e.g. Blackberries, journals, calendars, cell phones) as physical extensions of cognitive processes.

GREEK MUSICAL NOTATION

Milan Griffes

Category: Humanities and Performing Arts, Section 1

Location: Lake Superior Room, 10:15 AM

Mentor(s): Denise Demetriou (History)

The collegiate study of music focuses almost exclusively on the period of "common practice," roughly 1600 CE – 1900 CE. The music of ancient Greece and Rome receives particularly little attention. It is studied not at all in the discipline of music, and only by a few scattered scholars in the field of classical history. This research project is undertaken with the aim of developing a more accessible understanding of ancient Greek and Roman music and the contexts in which it was played. The project will result in a regularized, relatively simple procedure with which to interpret Greek musical notation. Applied to surviving samples of ancient notation, the procedure will result in an unambiguous translation into modern musical notation. The ancient music will thus be able to be performed once more.

A SOCIAL HISTORY OF THE AFRICAN PRINT

Chelsea Gallagher

Category: Humanities and Performing Arts, Section 1

Location: Lake Superior Room, 10:30 AM

Mentor(s): Candace Keller (Residential College in Arts and Humanities)

From large cities to small villages, it would be difficult to visit the countries of Nigeria, Ghana, Senegal, Mali and Côte d'Ivoire without coming into contact with the vibrant and colorfully printed fabrics worn by men and women, sometimes referred to as African Prints. While certain occasions warrant the wearing of particular prints or designs (such as weddings or funerals) they are also worn in everyday settings. Recently, these fabrics, as well as imitation fabrics, have found their way to new contexts: on fashion runways and in contemporary art galleries and museums in Western Europe and the United States. On the surface, these new spaces may appear entirely foreign for these "West African" printed textiles to appear in. However, further investigation into the history of these fabrics reveals a complex and global narrative.

Oral Presentations, Section 2

BODIES THAT PERFORM: AN ANALYSIS OF THE FEMALE BODY IN CONTEMPORARY PERFORMANCE ART THROUGH SELECTED WORKS OF MARINA ABRAMOVIC

Chelsea Gallagher

Category: Humanities and Performing Arts, Section 2

Location: Lake Superior Room, 1:00 PM

Mentor(s): Linda Racioppi (James Madison College)

The contemporary art world, as part of a greater Western art tradition, has maintained male dominance in artist representation and control. Performance art is itself a marginal medium within the contemporary art world. The female performance artist therefore is placed within a marginal and prescribed representational structure in the gallery space. Their gender is not only made known by wall text or curatorial motivations for bringing them into the exhibit, it's explicit through the presence of their female body within the art. Additionally, their choice of performance as a channel for their art continues to separate them from the traditional medium of expression in the contemporary art gallery space. Judith Butler's theories of performative gender have a unique application in the realm of the female performance artist. This is due to the performers occupation of being female in a patriarchal society, who is performing as a female artist within a patriarchal art society. This presents multiple layers of performance in which the female body is central to its analysis. Through the application of multiple theorists, in the fields of art and gender, selected works of Marina Abramovic will be used to produce broader conclusions on the role of the female body in contemporary art. Abramovic has gained mainstream success in the art world and describes herself as the "grandmother of performance art" due to her championing of the medium in the contemporary art world.

"BECAUSE EVERY WAY OF SEEING IS A WAY OF NOT SEEING:" THE INFLUENCE OF GENRE ON PUBLIC MEMORY

Rebecca Zantjer

Category: Humanities and Performing Arts, Section 2

Location: Lake Superior Room, 1:15 PM

Mentor(s): Terese Monberg (RCAH)

My research focuses on the ways that the public memory of the past is restricted and constrained by the various genres of officialized memory works and the effects this limited remembrance has on individuals' ability to recall specific details of the past and to create connections between their personal experiences and large-scale social movements. Specifically, I investigated the way memories of integration in Kalamazoo Central High School from 1968-1971 were (or were not) remembered in the officialized public memory works of that time (e.g., yearbooks). To answer these questions, I conducted a series of oral history interviews with members of the 1968-1971 yearbook staff. These interviews demonstrated that the genre of yearbook (with its implicit focus on telling stories of progress and maturity) white-washed the officialized memory and excluded the instances of racial tension and violence that were recounted by narrators 40 years later. Furthermore, the interviews revealed how this lack of attention to the reality of what was happening in the school led to narrators systematically discrediting, forgetting, or misrepresenting their own memories in order to reconcile the differences between their lived experiences at Kalamazoo Central and the officialized history written for that time. The results are a continued non-acknowledgment of institutionalized instances of racism in the Kalamazoo community and a lack of scaffolding by which survivors of that time period can effectively process their experiences in a way that promotes mutual understanding and healing

"ARTS AND THE INNOVATIVE WORKPLACE:" AN EXPLORATION OF METHODOLOGIES

Amy Lazet

Category: Humanities and Performing Arts, Section 2

Location: Lake Superior Room, 1:30 PM

Mentor(s): James Lawton (Art, Art History, and Design)

As part of a research team that is exploring the link between creativity, productivity, and workplace design, my project encompasses the methods and methodologies employed in our study. Titled "Arts and the Innovative Workplace," the study is funded by grants from both the Michigan Council for Arts and Cultural Affairs as well as the College of Arts and Letters. This study is a continuation of prior analysis of the significance of an education in arts and crafts, either formal or informal, during formative childhood years and beyond, and the impact that background has on professionals in the fields of science and technology. Our current study extends the prior research to examine the relationship between arts and cultural activities and entrepreneurial productivity, particularly focusing on how workplace ecology can stimulate creativity and productivity. Our team has developed a survey instrument which will be implemented through in-person interviews. A major component of this survey consists of visual aspects, specifically photo-elicitation: our researchers will utilize a photo survey to spur recognition of

specific workplace settings that encourage employee productivity. While visual methodologies have been commonly employed by researchers for several decades, it is only fairly recently that these methodologies have come to be widely accepted, due in no small part to the eminence of technology and the increasing role of the visual in contemporary culture. My presentation explores the different methodologies used in our survey, and how our current investigation fits within the larger scope of previously conducted research.

SPINOZA'S MIND-BODY IDENTITY

Jenny Carmichael

Category: Humanities and Performing Arts, Section 2

Location: Lake Superior Room, 1:45 PM

Mentor(s): Debra Nails (Philosophy)

Baruch Spinoza's appealing mind-body identity theory has defied attempted reductions to materialism, idealism, and contemporary physicalism. It has attracted the support of one of the giants of contemporary philosophy, Donald Davidson (1999:103), who defends what he calls Spinoza's anomalous monism, arguing that "no class of particulars picked out by the mental vocabulary ... corresponds to (is identical with) a class picked out by the physical vocabulary." In other words, laws govern the physical world, but not the psychological world. Davidson's position has come under attack from another powerful defender of Spinoza's identity theory of mind, Michael Della Rocca. Della Rocca denies anomalous monism on Spinoza's behalf (2008: 103-4), invoking a strict explanatory barrier between Spinoza's attributes of thought and extension. Both anomalous monism and the explanatory barrier generate puzzles. For example, how is anomalous monism really a monism at all? If such a barrier exists, how could we ever be certain of it? We investigate the prospect for a clearer account of Spinoza's identity theory lying somewhere between Davidson's and Della Rocca's views: that Davidson may overplay the role of language in ontology, and that Della Rocca's barrier may yield to a sharper description of the attribute of thought.

THREE CHINESE STUDENTS' TRANSITIONAL LIVES AT MSU

Feiran Chen

Category: Humanities and Performing Arts, Section 2

Location: Lake Superior Room, 2:00 PM

Mentor(s): Scott Chiu (Writing, Rhetoric, and American Cultures)

This project investigates how Chinese students adjust their lives (living and learning) at MSU, and especially focuses on how they make their transitions from China to MSU. This project employs the interviewing techniques to study three Chinese students' perceptions of and experiences in their academic and social lives. In particular, this project aims at shedding light on how they balance their social life and academic life, how they struggle with the language, and how the Chinese language and knowledge helps them in their writing. At this presentation, I will focus on a particular question: How their minds and languages are involved in the processes to complete English essays; how their writing processes and strategies change throughout the semesters. The audience can get some insights into how and what the Chinese students learned exactly and how those knowledge and skills help them with their writing.

THE POWER OF SOCIAL MEDIA: BUILDING A FREELANCE CAREER

Brooke Hawkins

Category: Humanities and Performing Arts, Section 2

Location: Lake Superior Room, 2:15 PM

Mentor(s): Kate Fedewa (Writing, Rhetoric, and American Cultures), Kathryn Houghton (Writing, Rhetoric, and American Cultures)

The Professional Writing program at MSU prepares students to be successful communicators in a variety of fields and work environments, exemplified by the alumni who currently work in vastly different places all over the world. Some graduates of the program also become successful entrepreneurs as freelance writers. Specifically, many of these successful freelancers market their skills online to gain clients and exposure for their work. By interviewing current students, alumni, staff, and freelance clients, I hope to elucidate specifically how aspiring freelance students can best utilize social media platforms to help them craft a successful career. By showcasing interviews and surveys with current freelancers and students, I hope to provide a strategy for students to begin careers as freelance writers by crafting networks online. Though these students will have the skill-set and technical know-how of the writing and editing field, these resources will provide more specific information about how to enter the field of freelancing and will give examples of successful freelancers who are crafting their skills into professional experiences by networking and socializing through social media platforms. I plan to collect this information through interviews (with students, professionals, teachers) to determine the ways they use social media networks. Also, I plan to conduct surveys of current PW students and how they are using social media in order to determine how they differ.

Together, this data will demonstrate how students can alter their social media usage to best market their skills and proficiencies as professional writers online

GENDER AND THE MSU COLLEGE OF MUSIC

Linnea Jimison

Category: Humanities and Performing Arts, Section 2

Location: Lake Superior Room, 2:30 PM

Mentor(s): Chris Scales (RCAH)

This brief ethnography examines the experiences of female faculty in the Michigan State University (MSU) College of Music in order to understand the challenges and benefits of being a woman in music academia. These experiences depend largely on age, area of teaching (e.g. performance, music education, music theory, or musicology), personal and professional background, and level of employment (e.g. tenure-track or tenured). While most female faculty indicated that overall they are satisfied with their experiences in the College of Music and at MSU, there remain subtle areas where a higher level of gender awareness can be achieved and would prove beneficial to both male and female faculty as well as their students.

NEUROSCIENCE OF READING: FMRI SHOWS HEIGHTENED BRAIN ACTIVATION IN CLOSE READING OF JANE AUSTEN

Craig Pearson, Truman Silvasi

Category: Humanities and Performing Arts, Section 2

Location: Lake Superior Room, 2:45 PM

Mentor(s): Natalie Phillips (English)

Advancing our understanding of the brain systems involved in reading is a priority for emerging interdisciplinary research in neuroscience, psychology, and the humanities. Our project seeks to identify neural signatures involved in various degrees of focused reading, offering a more nuanced view of this intricate mode of top-down cognition. Our experiment utilized fMRI and eye tracking technologies to examine brain mechanisms engaged by the attentive perusal (or "close reading") of a literary work versus reading for pleasure. In an MR scanner, 18 subjects with backgrounds in literary studies read passages from Mansfield Park in a block-design paradigm, which alternated relaxed "pleasure reading" blocks with passages designated for close reading. In the latter, subjects were told to read critically, paying attention to structure and literary technique, concluding with the composition of a short essay. Activation during reading blocks was measured via full-brain scan (BOLD EPI, 2.9mm, 42 slices). Early results showed strong cognitive differences between close reading and pleasure reading. During close reading, individual subjects displayed almost global changes in activation, including, in one example, heightened activity in brain areas we use to place ourselves in the world, as well as those dedicated to motor function. This suggests that we may bring fundamentally different types of attention to the reading of a work of literature, which carries implications for understanding both pedagogical and psychological effects of literature.

Poster Presentations, Section 1

WHERE IS RACE LOCATED?: AN EXPLORATION OF RACIAL IDENTITY IN HARLEM RENAISSANCE LITERATURE

Nicole DiMichele

Category: Humanities and Performing Arts, Section 1

Poster: 245

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Eric Aronoff (Residential College in the Arts and Humanities), Terese Guinsatao Monberg (Residential College in the Arts and Humanities)

For my research, I looked at how different Harlem Renaissance authors used their fictional novels to comment on the larger debate going on about race during the 1920s: the "location" of race, whether it be determined biologically, culturally, socioeconomically, etc. I show how each author uses literary techniques to depict different definitions of the location of race in their novels: Passing, Plum Bun, and The Blacker the Berry. Through this research, it became very clear that there was much disagreement about the true nature of race, even amongst the African American community, and that looking at race in a historical context may prove to be useful when dissecting current racial issues.

DOLLHOUSE

Peter Martino

Category: Humanities and Performing Arts, Section 1

Poster: 246

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Kirk Domer (Theater)

In order to expand the scope of student/internship possibilities and on-the-job experiential learning, a partnership will be explored between MSU and Stages Repertory Theatre (SRT) in Houston, TX. In order to enhance the artistic contributions of young theatrical designers/technicians in professional internships, my research assistant, Peter Martino, prepares to research, develop and implement a creative internship as part of the Stages 2012-13 Season. Our entrée into SRT lies with their request for me to design Dollhouse, a contemporary adaptation of Henrik Ibsen's A Doll's House which explores the role of women in modern American society. Through the design negotiation, I was able to acquire a MSU design assistant who will remain in residence 7-days after my residency concludes to train and education early-career theatre students in the scenic and digital design practices that are outside of the purview of SPT (Small Professional Theaters) throughout the country. Throughout this 8-month process, Mr. Martino would serve as a creative liaison to Stages Repertory Theatre, under my guidance, to develop a series of workshops and artistic/media intensives that will promote the exploration of bleeding-edge technologies currently unknown, but obtainable by repertory theatres throughout the country.

CHANGING URBAN LANDSCAPE FIBER ART INSTALLATION

Aubrey Owada

Category: Humanities and Performing Arts, Section 1

Poster: 247

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Xia Gao (Art, Art History, & Design)

Art has the ability to help one relate to or grasp information on a deeper level/assign more meaning to information. The subjects of the Changing Urban Landscape Fiber Art Installation Project were urban landscapes and the construction and deconstruction of Detroit. Because economic, spatial, social/cultural and political spheres make up an urban space, information was compiled on all of the 39 sub communities of Detroit during the early planning stages of research and experimentation. Different methods were explored to connect the numbers (cut out of non-woven fiber) that would be used to reflect Detroit's composition. The purpose was to turn the research into a visual art creation where one could see the numbers and grasp the construction and deconstruction of Detroit. Displaying information physically turns the data into something tangible. In this way one can understand the relationships between the numbers and the individual numbers in an alternative way that is more impacting than reading lists of data. Being a sight specific piece developed for a certain gallery, the exhibit evolved from the original Detroit project. The final installation presented urban social structural data and involved contrasting elements. The gallery space had 2 wings leading to the natural progression of having the wings contradict. My research assistanceship concluded with the construction and installation of the final exhibit that consisted of three pieces titled "Separate", "Mirage", and "Shared", and was displayed in the Lookout! Gallery from Oct. 1st-19th, 2012.

CREATIVITY AND INNOVATION: PRACTICE-BASED EXPLORATION IN THE HUMANITIES

Anna Myers, Carly Mangus, Ethan Tate

Category: Humanities and Performing Arts, Section 1

Poster: 248

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Daneille Devoss (WRAC), Scott Schopieray (Arts & Letters)

Due to the expectation of facing a competitive job market upon graduation, university students are turning away from studies in the Humanities in favor of occupationally oriented programs with high job placement rates. Humanities programs have developed a reputation for being inadequate in providing students with relevant and applicable skills for today's careers. To address this problem, the College of Arts at Letters at Michigan State University has emphasized access to hands-on, creativity and innovation driven Humanities opportunities as a core part of research and curricular efforts. The Creativity Exploratory (CE) was introduced by the College of Arts and Letters to provide students with an environment in which they can gain practice-based experience in the Humanities to enrich their classwork. In this presentation, representatives from the CE will discuss the theoretical and practical framework of the CE. We will address the infrastructural and institutional support that scaffolds the CE; share best practices that situate our work; and provide an argument for the importance of hands-on Humanities experience in preparing students to enter the professional world.

517*THEORY: GRAFFITI IN CREATIVE COMMUNITIES

Ethan Tate, Anna Myers

Category: Humanities and Performing Arts, Section 1

Poster: 249

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Danielle DeVoss (WRAC)

Graffiti has long been a controversial art form. Cities around the world are constantly having conversations about how to fit what is traditionally viewed as vandalism into a thriving creative community. The Lansing area is no different. Neighborhoods throughout Lansing and East Lansing feature commissioned graffiti murals alongside tags and other illegal pieces. Graffiti is simultaneously a sign of strong creativity in a community as well as the vandalism that damages it. Our group will go into these neighborhoods, (particularly REO Town, Old Town, and neighborhoods in East Lansing) and talk with community members to collect their views on graffiti. What do they view as art? What do they view as vandalism? Where is the line between the two? We will present these findings as a way of answering the larger question of the Lansing area's relationship with graffiti and public art. We will ultimately show how graffiti can be successfully integrated into creative communities.

LITERARY COGNITION: AUSTEN AND LITERARY ATTENTION- SUBJECT ESSAY ANALYSIS

Angelo Hankes, Katherine Grimes

Category: Humanities and Performing Arts, Section 1

Poster: 250

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Natalie Phillips (English)

This research project focuses on a recent fMRI study of literary attention at MSU and Stanford. The study compared two types of attention: pleasure reading, reading for entertainment or relaxation, and close reading, reading to study literary concepts and narrative factors. In the experiment, 18 Ph.D. candidates in literary studies moved between these two states of concentration while reading a chapter of Jane Austen's *Mansfield Park*. When they left the scanner, they wrote a short essay and completed a survey on their levels of absorption. The essays reveal individual comprehension levels and interpretation of the Austen text while cross-group analysis enables us to see emerging patterns. Additionally, the neuroscientific data from the experiment, the brain scans and eye-tracking, gives us a complex picture of the whole brain during reading which can be correlated back to the participant essays for instances like using a quote from *Mansfield Park*. This presentation focuses on one of three research groups that studied the various data of the aforementioned study. This group studied the essays and their attention to material from the source work. Using a tagging system created especially for the experiment, the essays of each subject were analyzed and categorized. These essays, in conjunction with their tags, were linked to data from the eye-tracking system in order to plot attention dense areas and support essay-tagging patterns. The results were compiled with the brain data and narrative groups to fully understand the complexities of attention.

Poster Presentations, Section 2

PARTICIPATORY MEMORY

Christine Scales

Category: Humanities and Performing Arts, Section 2

Poster: 251

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

Mentor(s): Liza Potts (WRAC)

Participatory memory deals with the ways in which people publicly interact with a space in order to commemorate, pay homage, or remember. Examples include "love locks" locked on bridges and unsanctioned memorials left at the location of Princess Diana's death. My research involves finding sites where participatory memory is being carried out and learning how and why people are contributing. In addition, I am looking to address some of the questions and concerns that come with these sites; specifically, how can they be archived and digitized in a way that will preserve and respect their historical and cultural significance? Besides researching locations in Europe for the upcoming study abroad program about participatory memory, I am also looking at the small town of Bath, Michigan, the location of the worst school tragedy in American history. Using Bath as a sort of "pilot site," I will explore methods for digitizing the space and memorializing the tragedy.

THE BUILT ENVIRONMENT: EAST LANSING'S TAKE ON MODERNISM

Amy Lazet, Katelyn Lewis

Category: Humanities and Performing Arts, Section 2

Poster: 252

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

Mentor(s): Susan Bandes (Art, Art History and Design)

Our project expands on the historical relationship of East Lansing and the Modernist movement of the 1940s-1970, following the research of Dr. Susan Bandes. With respect to the changes in both architecture and household amenities, our research explores the stories of East Lansing and how poured concrete, steel, and flat roof designs developed in our local architecture. As a result of post-WWII GI Bill funds, returning military personnel flooded MSU, leading to the expansion of the University and subsequently East Lansing. We investigate the influence of architects such as Frank Lloyd Wright and Alden B. Dow on the local Mid-Michigan architecture. We characterize the differences between this new Modernist design and the changing family lifestyle and the traditional, comfortable homes of yesteryear. Our research examines homes designed by Alden B. Dow (researched by Katelyn Lewis) and the Lantern Hills subdivision, 1951 (researched by Amy Lazet) as well as commercial buildings like the Michigan State Medical Society designed by Minoru Yamasaki in 1959. The project will culminate in digitally-assisted walking and driving tours in conjunction with the State Historic Preservation Office. An exhibition opening April 28th at the MSU Museum, will include photographs of many of the Modernist buildings researched, along with examples of interior design from the period such as ceramics by Russel Wright, and chairs by Charles and Ray Eames produced by Michigan's own furniture company, Herman Miller.

FOLDING AND CUTTING AND FOLDING AGAIN: KIRIGAMI INSPIRED PATTERN DRAFTING STUDY

Martin Flores

Category: Humanities and Performing Arts, Section 2

Poster: 253

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

Mentor(s): Theresa Winge (Art, Art History, and Design)

This research explores the geometric spatial relationships created when fabric is constructed around the body. I seek to understand pattern drafting (and draping) techniques for apparel design from a variety of cultures in order to develop an innovative pattern design methodology. Currently I am examining the ways Japanese kirigami (i.e., folding and cutting paper to create innovative shapes and designs) offers new knowledge for space and structure, especially the potential for extensions and innovations beyond the body's traditional silhouette in fashion design. This pattern drafting study focuses on researching kirigami for development of pattern drafting techniques that innovatively approach and extend the human form. It also allows the designer simultaneously develop the garment pattern and the textile design. In order to create a kirigami design, I secured certification for an Epilog Laser Cutter and developed skills in CAD (Computer Aided Design) software. The resulting fashion design is the product of thoughtful synergy between Japanese kirigami, textile design, inspiration, technology, and fashion design.

VOICE-LEADING DISTRIBUTION AND JUDGEMENTS OF DISTANCE BETWEEN TETRACHORDS

Joseph VanderStel

Category: Humanities and Performing Arts, Section 2

Poster: 254

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

Mentor(s): Leigh VanHandel (Music Theory)

An intuitive way to measure distance between chords is to calculate the smoothest voice-leading between them, and then sum the absolute (non-directed) semitonal displacements of each voice. Known informally as "taxicab distance", this metric has gained currency in recent music-theoretic scholarship. However, empirical evidence (Callender 2006) suggests that, when taken alone, it fails as a model for how we perceive distance between chords: many variables in addition to sum semitonal displacement likely contribute to an overall perception of distance. The present study introduces a new variable, "voice-leading distribution", explores the constraints imposed upon it by set class interval structure, and investigates the role it plays in our intuitions of distance between tetrachordal pitch-class sets. Although the effects of voice-leading distribution on distance judgements have been considered indirectly in previous scholarship (Callender 2006, Kuusi 2007), the notion itself has yet to be treated as a variable. This task is taken up here, in a behavioral study that tests two related hypotheses: 1.) Given a constant taxicab distance, perceived distance between two tetrachordal pitch-class sets will be an inverse function of their common pitch-classes. 2.) Given a constant voice-leading distribution, perceived distance will be less for common practice than for non-common practice tetrachords. The concluding discussion will interpret the results of the experiment, and suggest directions for future research.

NEW ZEALAND FRESHMAN SEMINAR ABROAD

Jessica Prieskorn, Olivia Larsen

Category: Humanities and Performing Arts, Section 2

Poster: 255

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

Mentor(s): Nancy DeJoy (WRAC)

This project is the result of applying travel writing strategies to process experiences of students in a freshman study abroad program to New Zealand in the Summer of 2012. The methods of analyzing place, engaging journey metaphors, and sharing experiences were engaged to process and express the ways that writing can enhance our understandings of new places. It contributes to the field of study abroad by opening new avenues for including student voices in conversations about how to expand interpretive lenses in ways that enhance short study abroad experiences.

Linguistics, Languages, and Speech

Poster Presentations, Section 1

TEMPORAL CHARACTERISTICS OF SPEECH TO CHILDREN WITH COCHLEAR IMPLANTS

Bridget Molnar, Sara Kerbs, Kathleen Moon, Christina Nguyen

Category: Linguistics, Languages, and Speech, Section 1

Poster: 315

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

Mentor(s): Laura Dilley (Communicative Sciences and Disorders), Jessica Gamache (Cognitive Science)

While there is a growing knowledge on how children gain linguistic competency, many questions remain. While it is known, for example, that maternal speech and its characteristics have significant impacts on how children develop linguistic competency, little research exists on how maternal speech input differs to children who are not typically developing. To better examine the relationship between maternal speech input and the hearing ability of children, we examined voice onset time (VOT) in maternal speech to cochlear implanted children, from a few months pre-implantation to 1.5 years post-implantation. VOT is the temporal distance between the release of the closure in a stop consonant (/b,d,g,p,t,k/) and when the vocal folds begin vibrating. Studies have shown that VOT is hyperarticulated (i.e., longer) in speech to normal-hearing infants, reaching the peak of hyperarticulation around age one, when normally developing children begin to show robust linguistic abilities. Given that the speech and language skills of cochlear-implanted children are delayed relative to normally developing children, there are two possibilities concerning the nature of maternal speech input: (i) to compensate for children's delayed abilities, mothers of cochlear implanted children may hyperarticulate their speech relative to speech to normally developing children or (ii) given that the children are receiving degraded auditory input, mothers may not hyperarticulate their speech when talking to children relative to their speech to other adults. Understanding the relationship between maternal speech input, children's hearing, and linguistic abilities has clinical applications on how to counsel mothers in talking to their children with cochlear implants.

THE USE OF DOUBLE NEGATION BY JAPANESE TEENS

Yui Totsuka

Category: Linguistics, Languages, and Speech, Section 1

Poster: 317

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

Mentor(s): Cristina Schmitt (Linguistics)

This study investigates cases of apparent double Negation in Japanese. In standard Japanese, much like Standard English, two negative words do not co-occur in the same clause, and, if they do, we have a positive interpretation. Recently, young adults in Japan have been using two negative words in the same clause. These users seem to diverge into whether they interpret two negatives as 'NEG + NEG = POS' or 'NEG + NEG = NEG' in questions. In the first case they would be having an English standard-speaker interpretation and in the second case they would behave as speakers of a language that have negative concord (non-Standard varieties of English or French). In this project we propose a study investigating the conditions under which the two interpretations are, or not available. One hypothesis is that the so called double negative is just a frozen expression and it should not be "counted" as part of the clause. However, given that speakers seem to diverge, the other hypothesis is that the 'frozen expression' is actually being reanalyzed as concord. We hypothesize that some speakers are using this expression as concord in questions. We explore this hypothesis using data collected from blogs and experimentally in order to determine the conditions under which the concord interpretation is available.

MAKING LINGUISTICS RELEVANT TO SECONDARY SCHOOL STUDENTS

Heidi Little, James Shaouni

Category: Linguistics, Languages, and Speech, Section 1

Poster: 318

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

Mentor(s): Suzanne Wagner (Linguistics)

Although instruction on language variation and change is often offered at the collegiate level through linguistics courses, rarely is this subject addressed in primary and secondary school. This project involved the creation of teaching materials for an eighth grade language arts class from the Hillel Day School in Farmington Hills, Michigan. We developed several activities for the students that focused on the sociolinguistic concept of "language change from above", i.e. language change caused by overt pressure to speak "properly". These were utilized in preparation for their attendance at an IAH class at Michigan State

University discussing the topic of “language change from below”, i.e. language change as a result of covert pressure to sound “non-standard”. As part of the activities, we collected data from the Hillel students on peer groups within their school to be compared to similar survey results collected from the IAH students as to the peer groups present in their high schools. From these, we created word clouds which illustrate the similarities and differences between peer groups in the two environments with more diverse groups noted by the IAH students. In addition, a future visit to the Hillel Day School is planned to see the students’ own work on linguistic variation and change. The results of our work demonstrate the feasibility of teaching linguistic concepts to younger learners as well as how relatively simple, informal linguistic research can be used to enhance student learning.

A SEMANTIC ACCOUNT OF LOGICAL POSSIBILITY

Evan West

Category: Linguistics, Languages, and Speech, Section 1

Poster: 319

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

Mentor(s): Matthew McKeon (Philosophy)

The notion of logical possibility has been of central importance to many areas of philosophy. One way that philosophers have tried to cash this notion is with a modal analysis. Sentences that are logically possible could have been true even if they aren't, and sentences that are logical truths couldn't have been false. Modal claims are often analyzed in terms of possible worlds. To say that a sentence could have been true is to say that there is a possible world in which that sentence is true. To say that a sentence couldn't have been false is to say that it is true in all possible worlds. But what notion of possibility is at work here? That is, on what notion of possibility are these worlds possible? The familiar answer is that these worlds are logically possible. If this answer is correct, then it is clear that this sort of analysis of logical possibility is circular. I offer an alternative account that analyzes logical possibility reductively in terms of semantic possibility.

CORPUS EXTRACT: A TOOL FOR ANALYZING CODED SYNTACTICALLY ANNOTATED LINGUISTIC CORPORA

Kenneth Hanson

Category: Linguistics, Languages, and Speech, Section 1

Poster: 320

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

Mentor(s): Cristina Schmitt (Linguistics)

Corpora, which are collections of text or transcribed speech, are an important resource for studying language variation and change. Corpora in the Penn-Treebank format are annotated with part-of-speech tags and syntactic trees (showing sentence structure), which make it easier for linguists to study syntactic variation and change. A tool called CorpusSearch can be used to quickly search many source files for linguistic structures with certain features, and the program also supports coding queries that mark these structures for statistical analysis. However, the output of the program is difficult to examine by hand, a step which is typically required when using automated searching. To solve this problem, I am writing a small program called “CorpusExtract”, which will convert the coded search results from CorpusSearch into a spreadsheet by extracting the linguistic structures the researcher is interested in, the full sentences containing those structures, and all coding variables attached to the structures. The resulting file can be easily viewed in any spreadsheet program. In addition to speeding up automatic coding, this will also greatly improve the speed of further manual coding and checks for reliability among coders.

DISSOCIATIONS AMONG SPEECH-LANGUAGE SCORES IN STUTTERING CHILDREN

Ashley Clark

Category: Linguistics, Languages, and Speech, Section 1

Poster: 321

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

Mentor(s): Soo-Eun Chang (Communicative Sciences and Disorders)

Many past studies have reported decreased performances in children who stutter (CWS) relative to controls in standardized tests measuring articulation, receptive/expressive language, and vocabulary. Few studies have assessed cognition conjunctively with speech/language measures, although IQ may mediate some group differences found among these measures. This study examined dissociations among speech, language, and IQ scores assessed with statistical models allowing systematic comparisons in the correlations among different measures. Participants included 74 children (40 stuttering, 34 controls) between 3-11 years, all monolingual English speaking, and right-handed. Speech-language tests that assess articulation (GFTA), receptive/expressive (PPVT/EVT) vocabulary, and language development (Fluharty, TACL, TOLD) were administered. IQ testing (WPPSI-3 or the WASI) and Purdue pegboard test (assessing motor-skill performance) were also administered. A speech sample

was video-recorded while the child conversed with a clinician and a parent. Stuttering severity was calculated using the SSI-4. Standardized test performances were compared between groups using MANOVA, and correlation analyses were performed examining relationships between performances on different measures. Dissociations among measures were identified using 95% confidence interval density ellipses. Results showed that the two groups did not differ in any of the measures, except verbal IQ. Verbal IQ scores were significantly correlated with PPVT and EVT scores, especially in CWS. However, CWS exhibited attenuated correlations between PPVT-GFTA and between EVT-GFTA relative to controls, indicating possible discrepancies in speech sound versus vocabulary development. Results suggest the importance of examining possible dissociations among speech-language measures, and including verbal IQ when interpreting performance differences in CWS relative to controls.

Poster Presentations, Section 2

THE EFFECT OF COLLEGE CHOICE ON STANDARD SPEECH

Shelby O'Brien, Kelly Christopherson, Alyssa Webster

Category: Linguistics, Languages, and Speech, Section 2

Poster: 322

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

Mentor(s): Suzanne Wagner (Linguistics and Languages)

Studies of language change over generations are increasingly paying attention to language change over the lifespan of the individual. An earlier panel study looked at thirteen young adult female speakers, and our project looked at the (ing) use of four of them. (ing) refers to the alternation in pronunciation of words like “running,” as compared to “runnin’”. We looked at the four speakers’ frequency of –in at three life stages: high school, college, and mid-twenties. Two of the speakers studied at universities whose student bodies were drawn from the local population. The other two studied at universities whose student bodies were pulled from the national population. We extracted 30 tokens of (ing) for each speaker (n=120), and coded each token as velar (-ing) or alveolar (-in’). We then calculated each speaker’s percent usage of the non-standard –in’ variant. Our results indicate that all four speakers’ use of the non-standard variant has continued to decrease as the speakers grow older. The two national college speakers showed a steeper decline in non-standard –in’ usage post- high school, while the regional speakers showed a large decline post-college. We hypothesize that these differences are due to a higher pressure to sound standard in national colleges. Our results suggest that regional college students do not feel this social pressure until they enter the workforce. This project is important in furthering the understanding of the social motivations of lifespan linguistic change.

LISTENER SENSITIVITY TO (ING)

Shelby O'Brien, Abigail Diedrich

Category: Linguistics, Languages, and Speech, Section 2

Poster: 323

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

Mentor(s): Suzanne Wagner (Linguistics and Languages)

There have been prior studies of people's sensitivity to the frequency of non-standard linguistic features, including (ing). These studies show that people have a range of sensitivity to this variable. Very few studies, however, have included a post-task survey. This study included 108 participants who listened to a woman’s newsreader auditions, and rated each of the seven auditions on a 7-point scale of professionalism and suitability. The audition contained 10 tokens of (ing). Each audition produced a different percentage of the non-standard alveolar variant (-in’). Participants also completed an Autism Spectrum Quotient (AQ) questionnaire. We hypothesized that post-task surveys would help us identify people who were inherently better at perceiving differences in speech. The surveys were useful for distinguishing these subgroups. The analyses revealed that there was a mild interviewer effect. The participants whose task was administered by a British speaker had lower than average mean scores across all seven trials. Participants who said they “noticed no difference” between the auditions had a narrower than average range of scores across all 7 trials. Our data also revealed that participants who admitted to counting the alveolar tokens exhibited less linear judgments than those who did not admit to counting. The range of the counters' scores was greater than non-counters; counters scored the extremes more harshly, particularly the 100% alveolar speech sample. The difference in mean AQ scores between counter and non-counter groups was not significant. This study is important in understanding how social capacity influences listeners’ sensitivity to sociolinguistic variants.

DOCTOR'S ORDERS: USE OF "IT IS IMPORTANT TO/THAT" IN PEDIATRICIAN-PATIENT INTERACTIONS

Karthik Kovuru

Category: Linguistics, Languages, and Speech, Section 2

Poster: 324

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

Mentor(s): Suzanne Wagner (Linguistics)

Treatment/lifestyle instructions are central to the practice of medicine, where a lack of clarity can lead to undesirable health outcomes. The task of instruction-giving is often accomplished using modal language, as in (1) 'It is important that you lose weight.' Previous work suggests that physicians differentially use modal language to give instructions, where usage patterns may have implications for patient adherence. With respect to (1), physician use differs based on patient characteristics (Hesson 2012). In a population of adult diabetics, patient race predicted physicians' use of (2) versus (3): 2) 'It is important to...' 3) 'It is important that you...' This paper explores the use of (2-3) by pediatricians. We identify the physician, patient, and linguistic factors that predict pediatrician use of (2) and (3). We expect that patient characteristics will play less of a role in predicting pediatrician use of (2)/(3) than in adult populations. We coded our data for social/linguistic factors and conducted a multiple regression analysis to identify the factors favoring (2)/(3). The multiple regression model yielded two significant social factors: physician years-in-practice and physician gender, affirming our hypothesis. The to-form, which is indirect (i.e., NOT explicitly obligating the patient), is correlated with less time in practice and female physicians. Female use of the to-form is intuitive inasmuch as female physicians are associated with indirect language (West 1990). As for years-in-practice, physicians seem to be using more direct instructions as they gain experience. Thus the that-form may represent a possible effort to clarify instructions for parents/children.

MAKE, BE AND GET IN THE SPEECH OF LATE TALKERS AND TYPICALLY DEVELOPING CHILDREN

Olivia Catt

Category: Linguistics, Languages, and Speech, Section 2

Poster: 325

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

Mentor(s): Hannah Forsythe (Linguistics), Cristina Schmitt (Linguistics)

There are many reasons that children may begin talking later than their peers: delayed motor development, cognitive impairment, or simple shyness, to name a few. Rescorla (2005) identifies late talkers (LT) as children under three years with a delay in expressive language. LTs have been shown to have a late onset and slow rate of lexical development and to be at risk for Specific Language Impairment (Weismer et al 1994; Paul, 1991; Rescorla, 1989). In this project we compare the development of copula verb *be*, light verb *get*, and causative *make* in LTs and their typically developing peers in order to develop them as a tool to diagnose language delays. These verbs are a hybrid of lexical and auxiliary verbs; therefore we hypothesize that, if lexical learning is delayed for LTs, they will rely more heavily on these verbs than do their peers with richer lexical vocabularies. To test this hypothesis we examine the spontaneous speech of LTs and age-matched typically developing children in the Weismer Corpus, a five-year longitudinal study with samples taken regularly at ages 2;5, 3;6, 4;6, and 5;6.

SLEEPING-BAG AS A BAG FOR SLEEPING OR A BAG THAT IS SLEEPING? HOW NATIVE AND NON-NATIVE SPEAKERS USE PROSODY TO DISAMBIGUATE COMPOUNDS AND PHRASES

John Sheets, Kyle Latack

Category: Linguistics, Languages, and Speech, Section 2

Poster: 326

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

Mentor(s): Jessica Gamache (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)

When faced with a string of words that has more than one possible meaning, English speakers use prosody cues to disambiguate. For example, stress on 'sleeping' in 'sleeping-bag' signals that this is a compound meaning a bag for sleeping. Stress on 'bag' signals that this is a phrase meaning a bag that is sleeping. Previous work has shown that speakers do well at using prosody to resolve purely phrasal ambiguities where both meanings are compositional. However work on disambiguation of compound meanings compared to phrasal have used compounds whose meanings were non-compositional. For example, the compound 'green-house' is a glass building used to grow plants, a meaning that is not obvious from 'green' and 'house'. The ability to use prosody in these cases appears to be completely dependent on knowledge of the compound-specific, non-compositional meanings. In this project we look at strings of words that are compositional both as phrases and as compounds, as in the 'sleeping-bag' example above. We will test both native and non-native speakers using an eye-tracker, which tracks participants' eyes as they move across the screen. In the task the participants will hear either the compound or phrasal prosody and see both images on the screen (e.g., a bag that is sleeping and a bag for sleeping in.) The participants' task is to decide

which image best fits the audio description that they hear. The results of this study will give insight into how both native and non-native speakers process prosodic cues to syntactic structure.

HOW CHILDREN FIND A BIRD IN ICEBERG: EXPLORING NOUN-NOUN COMPOUND USAGE IN CHILDREN

Kyle Latack, Mina Hirzel, John Sheets

Category: Linguistics, Languages, and Speech, Section 2

Poster: 327

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

Mentor(s): Jessica Gamache (Linguistics and Languages), Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)

There are many ways in which we can create words on the fly. Compound words, such as iceberg or mousetrap, are a productive and efficient way of creating new names for things that are otherwise missing a label. We know that children can produce novel noun-noun compounds from age two in languages in which compounds are productive. However, we do not know how the input affects children's ability to produce novel compounds, or how differences in frequencies affect what relations children entertain between the two nouns. If the adult uses many compounds, children can assume that it is ok to produce compounds as well. Alternatively, we could imagine that some particular compounds signal to the child that their language is a language with productive compounding. In this project we examine both child directed speech and child speech in order to determine how different types of frequencies in the input affect children's usage of noun-noun compounds. The speech data comes from mother-child interactions of two children from ages 2;6 to 4;6 from the CHILDES database (McWhinney 2000). We examine the frequency of compounds in the input, types of relations between the compound nouns, frequencies of particular nouns as heads and as modifiers, and noun usage before and after they appear in compounds. Understanding the relationship between frequency and children's successful production of compounds has implications for theories of language acquisition.

Poster Presentations, Section 3

DOES GRAMMATICALITY AFFECT WHETHER LISTENERS HEAR A CO-ARTICULATED WORD? A STUDY OF THE INTERACTION BETWEEN SPEECH RATE AND SYNTAX

Amanda DePelsmaeker, Marisa Reynolds

Category: Linguistics, Languages, and Speech, Section 3

Poster: 328

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

Mentor(s): Melissa Baese-Berk (Communicative Sciences and Disorders), Laura Dilley (Communicative Sciences and Disorders), Tuuli Morrill (Communicative Sciences and Disorders)

To understand speech, humans use many different kinds of information, including top-down information like syntax and bottom-up information like speaking rate. Previous research has shown that speech rate at the beginning of a sentence (the context) affects whether or not a short, co-articulated word is heard in the context of a sentence (e.g., Dilley & Pitt, Psychological Science, 2010). In these studies, when the context speech rate was slowed down, listeners were less likely to report hearing the co-articulated word than when the word occurred at the same rate as the context. The current study examines how grammaticality and speech rate interact when listeners hear these co-articulated words. Participants in the study will be asked to listen to sentences with altered speech rates, and differences in grammatical correctness. They will then be asked to indicate whether or not the sentence was grammatically correct, before being asked to type the second half of the sentence that they heard. This will indicate whether or not they heard the function word. Stimuli consisted of 13 grammatical sentences and 13 ungrammatical sentences, each presented at three context speech rates. There are two competing hypotheses: (1) A bias for a proper syntax will cause listeners to hear a function word even when it is relatively short in the slowed context or (2) The effect of context speech rate will cause listeners to miss the function word even if it makes the sentence ungrammatical.

ACQUISITION OF LIGHT VERBS IN SPANISH: FREQUENCY OR GRAMMATICAL FUNCTION?

Anaite Castaneda, Camila Alfonso, Brandon Grenier

Category: Linguistics, Languages, and Speech, Section 3

Poster: 329

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

Mentor(s): Andrew Armstrong (Linguistics and Languages), Hannah Forsythe (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)

A naïve view of language acquisition holds that what is more frequent is learned earlier than what is less frequent. Although this is true to a large extent (ex. children learn truck before they learn automobile), when the comparison is between auxiliary verbs vs. regular verbs, the pattern is reversed: although auxiliaries are more frequent than even the most frequent regular verbs, children produce regular verbs much earlier than auxiliaries. An interesting question arises as to when the so-called light verbs are learned. Light verbs are hybrids in the sense that they have less semantic content than regular verbs, and yet they also have auxiliary-like properties: they can combine with verbal predicates, as in (1). a. Se puso a llorar. "S/he started crying." b. Se quedó llorando. "S/he kept crying." In this project we contrast the relative frequencies of two light verbs (poner(se), quedar(se)) versus two verbs frequently used as auxiliaries (ser, estar) in child-directed speech, as well as in child speech. If children treat all four verbs as belonging to the same group, then mere frequency should determine the rate of acquisition. But if they make a principled distinction between copular and light verbs, a different property should determine age of acquisition: the more auxiliary-like verbs will be acquired more slowly. Samples are taken from the Miller-Schmitt corpus (2012).

THEORETICAL ACCOUNT OF SPANISH LIGHT VERBS

Camila Alfonso, Anaite Castaneda, Brandon Grenier

Category: Linguistics, Languages, and Speech, Section 3

Poster: 330

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

Mentor(s): Andrew Armstrong (Linguistics), Hannah Forsythe (Linguistics), Cristina Schmitt (Linguistics)

Every language has a class of so-called "light verbs," identified by their ability to combine with a wide variety of predicates. For example, the English verb "get" can combine with nouns, adjectives, prepositions, and even verbs: get a present, get cold, get there, get going, etc. It is agreed that these verbs are very flexible due to their minimal semantic content, but there is no consensus on the proper way to analyze them. In this paper, we present a contrastive analysis of two such verbs, Spanish poner(se) and quedar(se) both of which can have an interpretation something like "to become." First, we compare the differences in interpretation. While both verbs can receive a "become" interpretation, only quedar(se) can also mean "to stay". Additionally, only poner(se) can have a causative reading. Second, we examine the restrictions they impose on the predicates they appear with. Although both allow adjectival and locative predicates, they do not always permit the same exact items. For example, cruel ("cruel") is possible with ponerse but not quedarse, and embarazada ("pregnant") has the reverse pattern. While abajo ("below") is possible with both verbs, en la casa ("at home") is possible only with quedarse. We attempt a unified analysis of the interpretive and selective contrasts between these two verbs beginning with the fact that ponerse is causative. Since causatives have more structure, we expect poner(se) to permit fewer possible interpretations and impose more restrictions in the selection of predicates.

STUDYING THE ACQUISITION OF BOUNDEDNESS IN CHILDREN: LEARNING NOVEL VERBS AND ADJECTIVES

Brandon Grenier

Category: Linguistics, Languages, and Speech, Section 3

Poster: 331

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

Mentor(s): Curt Anderson (Linguistics and Languages), Alan Munn (Linguistics and Languages), Cristina Schmitt (Linguistics and Languages)

An important question in first language acquisition is how children learn the meanings of words. Individual words have subtle properties that native speakers intuit but aren't necessarily consciously aware of, and children have to learn those properties. In this study we focus on the property of "boundedness," which has to do with inherent endpoints in verbs and adjectives. For instance, straight is a bounded adjective, because there is a maximal amount of straightness an object can have, while long is unbounded because there are no inherent limitations on length. Verbs have similar properties. A class of verbs called degree achievements (DA) (straighten, lengthen) provides a link between the adjectival and verbal domains, since DAs are derived from adjectives. A DA only allows a bounded reading if the adjective it is derived from is also bounded. We investigate children's ability to learn novel adjectives and DAs and their ability to transfer knowledge of boundedness from ADJ to VERBS. Syrett and Lidz (2010) show that children use adverbs to learn the meanings of new adjectives, and we follow them in using adverbs to

teach children the boundedness of novel adjectives and DAs. We test childrens' knowledge of the boundedness of the related DA using a covered box task. We predict that children can transfer knowledge of boundedness from one linguistic domain to another. This work informs research on word learning in children, how semantic knowledge is learned, and supports recent theoretical research into representations behind boundedness.

SPEECH MOTOR ADAPTATION TO AUDITORY PERTURBATION IN CHILDREN WHO DO AND DO NOT STUTTER

Kait Ayres

Category: Linguistics, Languages, and Speech, Section 3

Poster: 332

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

Mentor(s): Shanqing Cai (Speech, Language and Hearing Sciences at Boston University), Soo-Eun Chang (Communicative Sciences and Disorders), Elizabeth Wieland (Communicative Sciences and Disorders)

Few studies have examined how stuttering children learn and refine speech motor skills by using auditory feedback (AF). Research by Cai and colleagues (2012) found that the magnitude of compensatory responses to manipulated AF was smaller in stuttering than non-stuttering adults. To elucidate the developmental course of this abnormality, we examined auditory-motor adaptation by stuttering and non-stuttering children (aged 7-11 years) compared to a non-stuttering adult group in a modified formant perturbation paradigm (N = 14 in each group). During the experiment, participants performed a speech motor task (e.g., saying "head", "bed"), while in real-time were given auditory feedback of their own voice with a formant shift. Namely, the feedback that they heard sounded different from their intended productions (e.g., hearing "had" when they were saying "head"). For data analysis we measured latency and extent of participants' compensation to the perturbation. Preliminary results suggest a trend towards children having a greater adaptation to AF than non-stuttering adults, but no significant differences were found between the stuttering and non-stuttering children. These findings may have implications for the role of auditory-motor deficits in stuttering as well as clinical interventions.

THE SEMANTICS OF 'INA' IN DEGREE MODIFICATION OF MEASURE PHRASES IN KOREAN

Taehoon Kim

Category: Linguistics, Languages, and Speech, Section 3

Poster: 333

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

Mentor(s): Marcin Morzycki (Linguistics)

In Korean sentences that contain measure phrases (MP), the measure terms (e.g., cm) are expressed along with the gradable nouns (e.g., khi 'height') that are in relation to them. In other words, those of which the measure terms gauge are to be overtly stated unless they are contextually salient. However, when the morpheme 'ina' follows the measure term, the sentence gets the non-neutral entailment along with its neutral interpretation of the gradable noun. I postulate that 'ina' presupposes a set of epistemically accessible worlds that are compatible with the speaker's expectation from the actual world. Adopting Watanabe's (2006) syntax of classifiers, I provide analyses on how the gradable noun in sentences including 'ina' obtains the non-neutral interpretation. In light of Watanabe (2011), semantic composition of MP and the degree modification takes place in NumP. Under this analysis, MP and the morpheme POS (Kennedy & McNally, 2005) are not seen as incompatible anymore because MP appears in a projection lower than the one that hosts 'ina,' thus eliminating competition for structural placement between two. In sum, I suggest a possible role of the speaker's expectation in the degree modification of MPs, and its interaction with the standard of comparison of the speaker, and that this 'dimension of expectation' should be considered to be part of the semantic representation.

Microbiology, Immunology, and Infectious Disease

Poster Presentations, Section 1

INVESTIGATING DIFFERENCES IN THE ABILITY TO APPLY RECOMBINEERING IN LACTOBACILLUS REUTERI ATCC PTA 6475 AND ATCC PTA 4659 THROUGH ANALYSIS OF THE SINGLE NUCLEOTIDE POLYMORPHISMS

Denise Sirias

Category: Microbiology, Immunology and Infectious Disease, Section 1

Poster: 215

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

Mentor(s): Robert Britton (Microbiology and Molecular Genetics)

Lactic acid bacteria (LAB) are commonly used in industry and medicine. They are generally regarded as safe; some strains have been shown to have health-promoting properties. Our lab studies individual strains of the LAB *Lactobacillus reuteri* as a potential probiotic. Genetic tools that can be applied to LAB are available; there is a lack of tools that create targeted point mutations without antibiotic selection. One tool that can perform targeted mutagenesis in the chromosome is single-stranded recombineering, an oligonucleotide-mediated method. We are using recombineering to investigate the differences between two strains of *L. reuteri*: ATCC PTA 6475 and ATCC PTA 4659. A phenotypic difference between these strains is that recombineering can only be applied in *L. reuteri* 6475; cell lysis will occur in *L. reuteri* 4659 after being subjected to electroporation. Surprisingly, comparison of their genomes reveals that these strains differ only by four single nucleotide polymorphisms (SNPs). In *L. reuteri* 4659, these SNPs cause amino acid changes in a chloride channel protein, MutL protein, and ATPase gamma subunit; the fourth SNP is a silent mutation. Currently, we are using recombineering to recreate these SNPs in *L. reuteri* 6475; our goal is to observe if one or a combination of these SNPs results in the inability to apply recombineering in *L. reuteri* 4659. With recombineering, we hope to improve the beneficial qualities of *L. reuteri*, and gain insight on applying recombineering to other Gram-positive bacteria.

IDENTIFICATION OF HIS1069GLN MUTATION OF ATP7B GENE USING ALLELE-SPECIFIC PCR

Thayer Morton

Category: Microbiology, Immunology and Infectious Disease, Section 1

Poster: 216

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

Mentor(s): Douglas Luckie (Physiology)

The purpose of this study was to use PCR and allele specific primers to confirm or deny the presence of the His1069Gln (H1069Q) mutation located on the ATP7B gene on chromosome 13, which causes Wilson's Disease. Three allele-specific primers, two forward and one reverse, were designed. One forward was designed to anneal to the wild-type sequence, and the other to the mutant sequence. It was hypothesized that the mutant and wild type designed primers will anneal only to the targeted DNA sequence on the ATP7B gene, leaving a single-band for each sample on an agarose gel. This would come as a result of intentional base pair mismatches that will prevent the binding of Taq polymerase to the primer, preventing attachment and elongating an unwanted strand of the genomic DNA (Yaku et al., 2008). A 541 base pair product was expected, due to the distance between the primers in addition to the length of the primers (Chenevert et al, 2013). PCR was used to amplify the target sequence before gel electrophoresis was used to analyze the results visually. Knowledge of the location of a mutation that causes WD allows for diagnosis of the disorder. In future endeavors, scientists could improve the quality of life of patients with the disease through genetic therapy that could counteract the His1069Gln mutation. Additionally, it is hypothesized that through artificial simulation, some experiences of a WD patient could be recreated. The team could, therefore, investigate potential social difficulties of a WD patient.

A DEGENERATE VIBRIO CHOLERAЕ DIGUANYLATE CYCLASE REGULATES BIOFILM FORMATION AND MOTILITY THROUGH SYNTHESIS OF CYCLIC DI-GMP

Jessica Hunter

Category: Microbiology, Immunology and Infectious Disease, Section 1

Poster: 217

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

Mentor(s): Benjamin Koestler (Microbiology and Molecular Genetics), Christopher Waters (Microbiology and Molecular Genetics)

Diguanylate cyclases (DGCs) regulate biofilm formation and motility in bacteria by synthesizing or responding to the second

messenger cyclic di-GMP (c-di-GMP). DGC activity is believed to be dependent on the presence of a GG(D/E)EF active site motif, however approximately 25% of known DGCs contain a degenerate active site with one or more unconserved substitutions. The *Vibrio cholerae* protein VCA0965 is a DGC presumed to be incapable of c-di-GMP synthesis because it contains a degenerate AGDEF active site. However, overexpression of VCA0965 in *V. cholerae* causes a 3-fold reduction in flagellar-based motility. Additionally, overexpression of a VCA0965 mutant protein in which the the RxxD allosteric inhibition domain was disrupted resulted in an almost 7-fold reduction in motility and hyper-biofilm formation. We also observed significant increases in intracellular c-di-GMP levels, as measured by liquid chromatography coupled with tandem mass spectrometry, upon overexpression of the VCA0965 RxxD mutant protein in both *V. cholerae* and *Escherichia coli*. Based on these results, we conclude that VCA0965 is capable of synthesizing c-di-GMP and that the GG(D/E)EF motif is more tolerant of substitutions than is currently believed. We are purifying VCA0965 to determine if it is capable of c-di-GMP synthesis in vitro. Our findings suggest that DGC enzymes that encode degenerate active sites presumed to be enzymatically inactive might be capable of c-di-GMP synthesis.

SPATIAL ANALYSIS OF MICROBIAL COMMUNITY IMAGES AT SINGLE CELL RESOLUTION USING CENTER FOR MICROBIAL ECOLOGY IMAGE ANALYSIS SOFTWARE

Iniyan Ganesan

Category: Microbiology, Immunology and Infectious Disease, Section 1

Poster: 218

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

Mentor(s): Frank Dazzo (Microbiology and Molecular Genetics)

Center for Microbial Ecology Image Analysis Software (CMEIAS) is a program used to analyze the ecophysiology and spatial features of microbial community images. The spatial analysis module of CMEIAS generates many measurement features at single cell resolution, including the first, second and third nearest neighbor distances for each object in an image. Here, the CMEIAS spatial analysis module is developed to include many spatial statistics useful for analyzing the spatial measurement features that are generated by CMEIAS. A data set of scanning electron micrographs of Sakha 102 rice roots colonized by *Rhizobium leguminosarum* bv. trifolii E11 was used to test new spatial statistics, including point pattern, plot based, and geostatistics. The rice roots were grown in agar tubes and some were grown with a thin layer of sand at the agar surface, which generated more clustered and more rapid colonization. The point pattern analysis that best discriminated between the sand treatments was Holgate's aggregation index. The most useful plot based analysis was Ripley's K function, which shows the spatial scales of clustering. Geostatistical analysis was found to be useful in determining the range of positive bacterial interaction and also to generate a krigging map, which interpolates the level of clustering on the surface of the entire image. Many of these statistical analyses are being integrated into CMEIAS, while CMEIAS will prepare data for export into external programs for other statistical analyses. The updated spatial analysis module will be released as part of CMEIAS 3.0.

USE OF FLAVIBACTERIA TO REGULATE VECTOR POPULATIONS

Collin Fitzgerald

Category: Microbiology, Immunology and Infectious Disease, Section 1

Poster: 219

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

Mentor(s): Shicheng Chen (Microbiology and Molecular Genetics)

The world-wide efforts to prevent the spread of malaria, dengue and other mosquito borne disease might recently have shifted with the failure of vaccine trials in late 2012. To protect the public against epidemics of these diseases, other alternative strategies should be examined. One of those efficient strategies is to control the mosquito itself, the vector. To this end, it is a popular way to utilize the bacteria associated with the mosquito larvae or their habitats to deliver the larvaecidal toxins. Flavobacteria are a group of bacteria ubiquitously distributed in nature including soil, freshwater and animal guts. Our previous studies showed they are predominant in tree hole habitats of *Aedes triseriatus* larvae, a mosquito vector of arboviral disease in the U.S. However, we failed to express the Bit genes Cry11A and P20 in flavobacteria, possibly caused by the toxicity of the overexpressed toxins against the host cells. Therefore, an inducible flavobacterial expression system is warranted to alleviate the above deficiency. The *lacI* gene encoding the repressor of *Plac* expression system from *Escherichia coli* was cloned downstream of the *Prpl* promoter from *Flavobacterium johnsoniae*. Furthermore, we modified the *LacI* binding sites O3-O1 and inserted into immediate downstream of the strong *PompA* promoter functional in flavobacteria. The *Prpl-lacI* and modified *PompA* regulatory elements were fused together by overlap PCR and next assembled upstream of the reporter gene *gfp* in flavobacterial plasmid pFj29. Our results demonstrated *gfp* expression was regulated with by IPTG with the optimal concentration of 100 μ M.

NONI FRUIT AND THE LIFESPAN OF C. ELEGANS

Colin Wiebrecht

Category: Microbiology, Immunology and Infectious Disease, Section 1

Poster: 220

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

Mentor(s): Evangelyn Alocilja (Biosystems Engineering)

Morinda citrifolia, or the noni fruit, is a tropical fruit that is believed to offer many health benefits. This project uses *C. elegans*, a transparent nematode species that is often used as a model organism. This gives an idea of the effects of the Noni fruit when taken by humans as an herbal supplement or vitamin. Bacterial resistance and anti-carcinogenic properties were studied. *Salmonella* will be the bacterial pathogen used to infect the *C. elegans*. Ethidium bromide will likely be the carcinogen. The *C. elegans* will be given the noni fruit in powdered form and at different times. One group will be given the noni fruit before the bacterial pathogen or carcinogenic agent is added, while another group will receive it after exposure to the pathogen or agent. A control group will not be treated with the fruit. One group will receive absolutely nothing to give an estimate of average lifespan and behavior. Lifespan is the main variable being observed. It will provide some sort of an idea as to how effective noni fruit is as an agent of bacterial resistance or anti-carcinogenic properties.

Poster Presentations, Section 2

ALZHEIMER DRUG MODEL IMPROVEMENT WITH UNDERSTANDING OF NR2A SUBUNIT OF N-METHYL-D-ASPARTATE RECEPTOR (NMDAR) PROTEIN WITH X-RAY CRYSTALLIZATION

Janice Chiou

Category: Microbiology, Immunology and Infectious Disease, Section 2

Poster: 222

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Ronald Patterson (Microbiology and Molecular Genetics)

This study focuses on N-Methyl-D-Aspartate receptors (NMDAR) that could potentially improve the drug model that is responsible for treating Alzheimer disease (AD), Parkinson's disease, and other neurological disorders. NMDARs are a part of ionotropic glutamate receptors (iGluRs) that mediate excitatory synaptic transmission in vertebrates and invertebrates through ligand-induced opening of transmembrane ion channels. The NMDAR plays an important role in episodic and spatial memories (Armstrong 1998). NR2A is a subtype of NMDAR ionotropic glutamate receptor that confers unique pharmacological properties; it has been implicated as a host of chronic and acute neurological disorders. Conantokins are characterized as natural peptide antagonists that specifically target NMDAR subunits—observations of the NR2A ligand interactions with specific conantokin antagonist supports in revealing structural and functional properties of NMDA subunits with that could serve as a neuroprotective agent. Ca²⁺ dependent kinase protein is a mediator that is thought to be important in memory and learning. ConantokinT is a peptide that inhibits glutamate binding of NR2A that further blocks transport of Ca²⁺; in which protects neuron cells from over-excitement that is caused by Ca²⁺ over-flow. It is believed that evaluating the relationships in structure-function of the ligand-binding core of NR2A and interactions between the conantokin-T (Con-T) peptide could provide the aiding model in developing drugs for treating neuro-dysfunction linked to NMDAR. We are working on the crystallization of NR2A protein structure that allows us to understand NR2A ligand interactions with ion flow inhibition of Con-T.

EFFECTS OF PACKAGING ATMOSPHERE AND SIZE ON THE GROWTH OF LISTERIA MONOCYTOGENES ON FRESH-CUT CELERY STICKS DURING REFRIGERATED STORAGE

Chelsea Kaminski

Category: Microbiology, Immunology and Infectious Disease, Section 2

Poster: 223

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Elliot Ryser (Food Science and Human Nutrition)

From January to October 2010, 10 cases of hospital-acquired listeriosis, including 5 deaths, were traced to commercially diced celery from Texas. In response to this outbreak, the impact of packaging atmosphere and package size on growth of *Listeria monocytogenes* on celery was assessed. In each of three experiments, celery stalks were cut into 4-in sticks and inoculated with *L. monocytogenes* to obtain 2.74 log CFU/g. Following centrifugal drying and overnight storage at 4°C, the celery was immersed in tap water containing 50 ppm available chlorine for 1 min, air-dried, and packaged in two different sized ultra-high barrier film pouches (53 x 25.5 or 25.5 x 20 cm) containing air, 99% O₂, 99% N₂, or 15% CO₂/5% O₂/80% N₂. Celery sticks were analyzed for numbers of *Listeria* after 0, 1, 3, 5, 7, 10, and 14 days of storage at 7°C by plating on Modified Oxford Agar for 48 h of incubation at 37°C. After the large pouches were stored for 14 days at 7°C, *Listeria* populations were significantly lower ($P <$

0.05) using 99% O₂ (0.92 log CFU/g) as compared to N₂ (4.87 log CFU/g) with no differences observed between air (1.61 log CFU/g) and CO₂/O₂/N₂ (3.65 log CFU/g). However, no significant differences ($P > 0.05$) in numbers of *Listeria* were seen for the small pouches during storage. Only two instances occurred where package size impacted *Listeria* growth, with populations 1.51 and 1.50 log CFU/g higher in small pouches containing CO₂/O₂/N₂ at day 5, and O₂ at day 14.

EFFECTS OF PH AND NUTRITION DEPLETION ON GROUP B STREPTOCOCCUS CELLS THAT EXIST IN BIOFILMS, SUSPENSION, AND CELL AGGREGATES

Clare Laut

Category: Microbiology, Immunology and Infectious Disease, Section 2

Poster: 224

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Carl Boehlert (Chemical Engineering and Materials Science), Shannon Manning (Microbiology and Molecular Genetics)

Group B Streptococcus (GBS) is a pathogenic, gram-positive bacterium that is known to cause disease in babies and immunodeficient adults. GBS exhibits great genomic diversity but there are some isolates that are more commonly collected from diseased individuals. Two such strains are ST-1 and ST-17, ST-17 being the more pathogenic of the two. The research will aim to explain the levels of infectiousness of each strain based on the cells' shapes and interactions. This project will compare, using Scanning Electron Microscope (SEM) pictures, the phenotypic variation that occurs in the ST-1 and ST-17 strains under various stresses such as acidic pH and nutrition depletion. When GBS is grown in a broth culture, such as Todd Hewitt Broth (THB), GBS forms a biofilm on the bottom of the vial. Cells are also suspended in the broth, and under select conditions, will form aggregates of cells that are also suspended. Using a light microscope, the chains of bacillus shaped GBS cells and the aggregates of chains are visible. The specific aim of the project will be to use the SEM to confirm the physical differences in the biofilms, suspended cells, and cell aggregates in the ST-1 and ST-17 strains of GBS under the various stresses.

THE BLACK QUEEN HYPOTHESIS

Spiridon Papoulis

Category: Microbiology, Immunology and Infectious Disease, Section 2

Poster: 225

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Richard Lenski (Microbiology and Molecular Genetics)

Over the last few months, several experiments have been performed testing The Black Queen Hypothesis, a new evolutionary theory named after the game of hearts. In the basis of the theory, microbes will shed vital functions that are leaky, as long as their fellow community members are performing this function. In these experiments, two strains of *e. coli*, one containing a vital leaky function, and the other "cheating" off of the hard work of the other *e. coli* strain, were competed. The frequency of the expression of the leaky function was seen to depend on the combination of strains, but the populations would always converge on their respective equilibrium. This mechanism can help explain how microbes adapt to form cooperative communities.

USING LIPOPOLYSACCHARIDE TRUNCATION MUTANTS TO INVESTIGATE SURFACE CHARACTERISTICS AND METAL REDUCTION IN GEOBACTER SULFURREDUCTENS

Michael Paxhia

Category: Microbiology, Immunology and Infectious Disease, Section 2

Poster: 226

Location: Parlor AB, 1:30 PM - 3:30 PM

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

Lipopolysaccharide (LPS) is a major component of the outer membrane of gram-negative bacteria. Its general structure of a Lipid A base, phosphorylated core and polysaccharide O-antigen protects cells from harm, retains their cell envelope integrity, and allows attachment to different surfaces. In pathogenic bacteria, LPS is well characterized as a means to attach to host cellular membranes. However, LPS is also present in non-pathogenic bacteria. The metal-reducing bacterium *Geobacter sulfurreducens* has a unique form of LPS lacking the O-antigen and is believed to improve binding of metals through hydrophobic interactions. We created several truncated LPS mutants and characterized their hydrophobic properties and ability to reduce both soluble and insoluble electron acceptors to determine the role of LPS in the reduction of metals, such as iron and uranium. In addition, we investigated the role of LPS in uranium immobilization and reduction, examining the preservation of cell integrity throughout the process. This characterization will broaden our understanding of metal reduction in *G. sulfurreducens* and lead to the development of biomimetic devices for in-situ remediation of uranium-contaminated environments.

AUTOIMMUNITY IN MICE FOLLOWING INFECTION OF GUILLAIN BARRÉ SYNDROME-ASSOCIATED STRAINS OF CAMPYLOBACTER JEJUNI

Melisa Bailey

Category: Microbiology, Immunology and Infectious Disease, Section 2

Poster: 227

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Linda Mansfield (Large Animal Clinical Sciences)

Campylobacter jejuni is the leading cause of food-borne enteritis in the United States and is known to cause the development of Guillain Barré Syndrome (GBS), an autoimmune disease causing acute peripheral neuropathy and neuromuscular paralysis. In order to study how infection with some C. jejuni strains leads to autoimmunity, our goal is to further develop a murine model for GBS. Our hypothesis is that anti-ganglioside and anti-myelin autoantibody binding will be found in the axons of mice with GBS. In 2 experiments non-obese diabetic (NOD) mice were inoculated with C. jejuni strains isolated from human patients with GBS. In experiment MC22, NOD wild type, NOD IL10^{-/-}, and NOD B7-2^{-/-} mice were challenged with C. jejuni HB93-13 and sacrificed 80 days post inoculation. In experiment MC23, NOD wild type and NOD B7-2^{-/-} mice were challenged with C. jejuni 260.94 and sacrificed 56 days post inoculation. We developed indirect enzyme-linked immunosorbent assays (ELISA) for both detection of anti-ganglioside and anti-myelin antibodies. In experiment MC23, antibodies directed against single gangliosides and combinations of gangliosides were detected using indirect ELISA. Results for our anti-myelin antibody ELISAs are pending. To date, we conclude that anti-ganglioside autoantibodies are produced by mice infected with C. jejuni GBS patient strains of and that these autoantibodies are associated with presence of nerve lesions in mice with GBS.

Poster Presentations, Section 3

BLOOD FEEDING PERIODICITY OF CULEX PIPIENS FORM MOLESTUS AND CX. P. F. PIPIENS

AJ Yunker

Category: Microbiology, Immunology and Infectious Disease, Section 3

Poster: 228

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Edward Walker (Microbiology and Molecular Genetics)

The vectors of West Nile Virus, Culex pipiens form molestus and Cx. p. f. pipiens overlap in their geographic distribution. Yet their host-use ranges are divergent in nature. Cx.p. f. molestus is mammal-seeking and Cx.p. f. pipiens is avian-seeking. In nature, host availability modifies vector-host contact rates, and thus host-use patterns by disease vectors. One possible explanation for the observed differences in host preference by Cx. p. f. molestus and Cx. p. f. pipiens is that their peak blood feeding times, and thereby access to hosts differs. We wished to know whether the unique host selection tendencies of these important human disease vectors was driven by differences in their blood feeding times. When CO₂ was absent, the average elapsed time from the onset of scotophase to blood feeding (95% CIs) was 1.5 h (1.2, 1.9) for Cx. p. f. pipiens PENN, 5.2 h (4.7, 5.7) for Cx. p. f. pipiens CHI, and 5.3 h (4.7, 6.0) for Cx. p. f. molestus. Addition of CO₂ as an activator for host seeking did not significantly change the average time to blood feeding for Cx. p. f. pipiens PENN, or Cx. p. f. molestus. However, the presence of CO₂ advanced average time to blood feeding by 1 h for Cx. p. f. pipiens CHI. Our results show that without the additional cue of CO₂, blood feeding times did not differ between Cx. p. f. pipiens CHI and Cx. p. f. molestus.

RELATIONSHIP BETWEEN FITNESS AND INVASION IN LONG-TERM E. COLI EVOLUTION POPULATIONS

Daniel Mitchell

Category: Microbiology, Immunology and Infectious Disease, Section 3

Poster: 229

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Richard Lenski (Microbiology and Molecular Genetics)

In an ongoing experiment, 12 initially identical populations of Escherichia coli bacteria have been evolving in the laboratory under identical conditions for over 50,000 generations. Over time, the populations have accumulated different mutations and characteristics, which results in some strains having higher fitness than others. Our work seeks to determine whether fitness values can be used as an indicator of a population's ability to invade another population. Relative fitness values compare growth rates of two strains competing in the same flask at a 1:1 initial ratio. However, fitness values may be subject to change as the frequency of the two competing populations changes. This frequency dependence could cause fitness values measured using a 1:1 ratio of two populations to not be reliable predictor of the ability of one population to invade another. By invasion, we mean the ability of a strain to overcome an extreme initial disparity in population size compared to the target population and maintain a stable population. We measured relative fitness and invasion rates for 24 pairs of mixed populations from the

long-term evolution experiment at generation 50,000 and found that fitness values are significantly correlated to a strain's ability to invade. However, in a few pairs, invasion occurred that was not predicted by fitness values which could be due to a frequency dependent interaction.

IDENTIFYING CONDITIONALLY ESSENTIAL GENES IN MYCOBACTERIUM SMEGMATIS BY SCREENING AN INDUCIBLE ANTISENSE RNA LIBRARY

Jessica Hallesy

Category: Microbiology, Immunology and Infectious Disease, Section 3

Poster: 230

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Robert Abramovitch (Microbiology and Molecular Genetics)

Antisense RNAs have the potential to regulate bacterial physiology when interacting with mRNA. In *Mycobacterium smegmatis*, certain antisense RNAs express growth delays when introduced to sub-lethal amounts of tetracycline (20ng/ml). The goal of this project is to use and employ a tetracycline-inducible system to identify antisense RNAs that have expressed a growth delay in *M. smegmatis*. Previously, a genomic library of *M. smegmatis* was created using *M. smegmatis* DNA that has been cloned downstream from a tetracycline-induced promoter in the plasmid pMIND. *M. smegmatis* was transformed with the inducible genomic DNA library and Dubos rich plates with well defined, separated colonies were generated. Transformants were then replica plated onto plates with tetracycline and onto plates without tetracycline. Those colonies with observable growth delays will be confirmed and the plasmid will be isolated to identify the genomic insert. Bioinformatic analyses will be conducted to determine if the plasmid does contain a possible antisense RNA and its potential target in *M. smegmatis*.

LYME DISEASE IN THE MIDWEST AND NORTHEASTERN UNITED STATES

Matthew VanDeusen

Category: Microbiology, Immunology and Infectious Disease, Section 3

Poster: 231

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Jean Tsao (Fisheries and Wildlife)

Lyme Disease cases have been around for centuries in the United States and now there seems to be a high prevalence of Lyme Disease infected people in the northeast and in the Midwest (particularly Minnesota and Wisconsin). Using literary analysis from presettlement to the present, there has been convincing data that suggests there's a big void between the northeast and the Midwest concerning a huge drop in Lyme disease cases. By analyzing the number of deer, the number of ticks, the size of the state, etc I was able to conclude that there's a connection between the number of ticks and the number of deer in each state.

CHARACTERIZATION OF THE HUMAN GUT MICROBIOME

Lillian Jensen

Category: Microbiology, Immunology and Infectious Disease, Section 3

Poster: 232

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Jennifer Auchtung (Microbiology and Molecular Genetics), Robert Britton (Microbiology and Molecular Genetics), Donna Koslowsky (Microbiology and Molecular Genetics)

The vast amount of bacteria in the human gut plays a huge role in maintaining health. The resident microbial population in the gastrointestinal tract is vital in the prevention of many diseases. Clostridium difficile is a bacterial pathogen that is becoming the most common cause of hospital acquired infections. It is understood that when a patient is placed on antibiotics the resident microbiota is perturbed, which allows Clostridium difficile an opportunity to infect. The main goal of this project is to identify, then isolate, the individual killed off species that may prevent colonization of Clostridium difficile. We have used a variety of selective media and isolation techniques to isolate anaerobic microbial species from human feces. To date, we have isolated approximately 2500 potentially different species and we are in the process of sequencing each isolate's V3V5 region of the 16S rRNA gene using 454 next generation sequencing technology. Future goals of this project include characterization of the growth characteristics of isolates and identification of the ability of single isolates and combinations of isolates to inhibit Clostridium difficile growth in culture. The ultimate goal of this project is to find a combination of species that can be used clinically for the treatment and/or prevention of Clostridium difficile infection.

VIRUS DETECTION AND CONCENTRATION IN WATER SAMPLES

Chad Burton

Category: Microbiology, Immunology and Infectious Disease, Section 3

Poster: 233

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Amber Peters (Fisheries and Wildlife)

The intention of this project is to concentrate and detect VHSV (viral hemorrhagic septicemia virus), genotype IVb, 10 L samples of water collected from Budd Lake (Clare County, Michigan). Budd Lake is one of the few inland lakes in the Great Lakes Basin where VHSV has been detected in the past. There are many research studies that have focused on concentrating VHSV and similar enveloped viruses using tangential flow filtration (TFF). However, this study investigated a novel system for designing the TFF system which eliminated a majority of the cost compared to other systems. Methods involved comprise, building our TFF system, determining techniques to pre-filter water samples, concentration of 10 L samples down to less than 500 mL using TFF, ultra-centrifugation of the concentrated sample to a pellet, determination of the efficacy of the system by calculating the percent recovery of a known amount of VHSV IVb stock, and troubleshooting problems we ran into while building and running our system. Depending on the capability of this system to sufficiently detect small amounts of virus, it may be a beneficial, lower-cost application for future VHSV surveillance efforts.

Poster Presentations, Section 4

HISTOLOGICAL AND MOLECULAR PROFILE OF TFAP2A KNOCKOUT EMBRYOS REVEAL CRITICAL FUNCTION IN SKIN DEVELOPMENT

Ari Walter

Category: Microbiology, Immunology and Infectious Disease, Section 4

Poster: 234

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Brian Schutte (Microbiology and Molecular Genetics)

Cleft lip and palate (CLP) is a common disease and afflicts one in every 1,000 individuals. Mutations in IRF6 cause syndromic forms of CLP including Van der Woude Syndrome and Popliteal Pterygium Syndrome. DNA variants in IRF6 also significantly increases risk for nonsyndromic cleft lip and palate. Mice that lack *Irf6* have craniofacial and limb defects. Mutations in *Tfap2a* cause Branchiooculofacial Syndrome (BOFS), which can also be associated with CLP. Mice that lack *Tfap2a* have a similar constellation of symptoms as the *Irf6* knockout mice. We tested the hypothesis that *Irf6* and *Tfap2a* interact genetically, and found changes in skin and craniofacial development. In this present study, we performed immunofluorescence and quantitative PCR to examine *Tfap2a* knockout skin for the expression of *Irf6*, p63, Keratin-14, Keratin-6, *Tfap2c*, Activated Caspase-3, 14-3-3sigma, *Grhl3*, *Tgm1* and *Ikka*, all markers of skin development. We report histological, transcriptional and translational changes in skin lacking *Tfap2a*. These findings are consistent with our hypothesis that *Irf6* and *Tfap2a* interact during embryonic development and co-regulate critical pathways in utero.

CHARACTERIZATION OF ARCHAEA 4021 HULK

Rachel Galante

Category: Microbiology, Immunology and Infectious Disease, Section 4

Poster: 235

Location: Parlor AB, 1:30 PM - 3:30 PM

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

The archaea strain 4021 Hulk is classified as an anaerobic extremophile with the ability to reduce iron, Fe(III), to magnetite. Extremophilic environments have large significance in the science community due to their similarity to the harsh environment in which life first arose on Earth. Furthermore, planets such as Mars, which are rich in iron, share many characteristics with early Earth and can shed insight into how organisms adapt to their environments. The study of the iron-reducing organism Hulk is important to understanding how life originated and evolved in such extreme temperatures. Characterizations of Hulk revolved around determining its optimal temperature, pH and salt-tolerance. Quantitative results were obtained for these three parameters as well as qualitative results for the ability of the organism to use different compounds, other than iron, as an electron acceptor. Hulk was able to grow from a range of 70°C-105°C and optimal growth occurred at 90°C. Hulk grows optimally at pH of 6.67 but generation times were tested over a range of pH 3.33-7.67. Salt tolerance of Hulk was measured from 0.5%-4.5% NaCl and optimum growth occurred at 2% NaCl. Variations were seen in generation time based upon the salinity, pH and temperature of the media, however, some factors had increased effects when compared to others. When electron acceptors were tested it was determined that Hulk could use sulfate, sulfite, thiosulfate, and ferric citrate as acceptors

when iron is absent. These characterizations provide a better understanding to the conditions these extremophilic archaea can grow in.

ACUTE AND CHRONIC EFFECTS OF CYANOTOXINS ON THE MOSQUITO *Aedes triseriatus*

Stephen Ireland, Guillermo Moreno

Category: Microbiology, Immunology and Infectious Disease, Section 4

Poster: 236

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Edward Walker (Microbiology and Molecular Genetics)

Blue-green algae, or cyanobacteria, produce molecules called microcystins that can be toxic to plants and animals. When exposed to certain environmental conditions, mosquito larvae undergo an oxidative stress response which is thought to reduce their ability to harbor disease. Little is known about the interactions between microcystins and mosquito species developing within the water column. This experiment is to determine the acute and chronic toxicity effects of microcystin producing cyanobacteria *Microcystis aeruginosa* on the eastern treehole mosquito *Aedes triseriatus*. We will observe mean larval mortality per milliliter water over a range of cell concentrations from 1×10^2 to 1×10^7 . Identical experiments will be performed using early, mid-, and late-stage larvae. A non-producing strain of cyanobacteria has been acquired as a control. We will determine the LD_{50} for each experimental unit, and predict the value will be around 1×10^4 for early, 1×10^5 for mid-, and 1×10^6 for late-stage larvae. Pearson's exact tests will be used to compare experimental groups and to draw conclusions. We hypothesize that microcystin producing cyanobacteria induce mortality in *Aedes triseriatus* larvae. To discover the chronic effects, we will consecutively administer a low dose of microtoxin producing cyanobacteria to larval containers and observe notable developmental differences such as mortality, time to emergence, and mean adult weight. Chronic exposure to low levels of microcystin are not thought to induce a statistically significant change in mosquito development.

ANALYSIS OF MRNA AND GRNA SEQUENCES IN *TRYPANOSOMA BRUCEI*

Benjamin Swanson, Stephen Kazmer, Callie Vivian

Category: Microbiology, Immunology and Infectious Disease, Section 4

Poster: 237

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Donna Koslowsky (Microbiology)

The edited mRNAs of the mitochondrion of *Trypanosoma brucei* were sequenced over 20 years ago. Over that time, the sequences of the strains kept have not been resequenced in response to potential changes brought about by evolution. When the guide RNAs were analyzed by deep sequencing in 2011, it was found that some of the expected gRNAs were extremely rare. For example, the initiating gRNA for ATPase 6 gA6-14 was found with only one read of such a gRNA present in over 30 million reads. Interestingly, there was another abundant gRNA sequence that could initiate ATPase 6 at this location, but with an alternative sequence. Because this sequence is downstream of the stop codon, these mutations may be tolerated and this possible error could be evolution in action. Our hypothesis is that this alternative sequence will be more prevalent given the resultant populations of gRNA observed with deep sequencing. The first part of this experiment is to reanalyze the sequence of ATPase 6, looking specifically at the location in question to see if the sequence actually changed. The second part is meant to further analyze these potential changes by comparing populations of the gRNAs present in a sample. This will be done by binding primers to the current gRNA and extending them to a certain point, when a ddNTP will attach and terminate extension. The resulting sequences will be analyzed to determine the actual populations of these gRNAs.

DISCRIMINATION OF NATURAL MICROBIAL BIOFILM ARCHITECTURES USING CMEIAS LANDSCAPE ECOLOGY METRICS

Kyle Card

Category: Microbiology, Immunology and Infectious Disease, Section 4

Poster: 238

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Frank Dazzo (Microbiology and Molecular Genetics)

My project focuses on using various statistical methods to rank the discriminating power of multiple landscape ecology metrics used in the analysis of biofilm architecture at different spatial scales. The goal of my project is to determine the accuracy of these metrics so they may be included in the latest version of CMEIAS, or Center for Microbial Ecology Image Analysis Software; a suite of bioimage informatics analysis software.

THE DEVELOPMENT OF LACTOBACILLUS REUTERI AS A BIOTHERAPEUTIC PROTEIN DELIVERY VEHICLE

Anthony Findley

Category: Microbiology, Immunology and Infectious Disease, Section 4

Poster: 239

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Robert Britton (Microbiology and Molecular Genetics)

Recently, scientists have recognized that bacteria can be used as delivery vehicles capable of secreting therapeutic proteins directly into the intestinal tract. Oral administration of recombinant bacteria can ameliorate certain gastrointestinal illnesses, such as inflammatory bowel disease. To date, most experiments utilizing bacteria as protein delivery vehicles have been conducted in *Lactococcus lactis*, which is not a natural inhabitant of the human gastrointestinal tract, or *Escherichia coli*, which is not a robust organism. I, along with other members of the Britton Lab, have been working towards establishing *Lactobacillus reuteri*, a robust, natural inhabitant of the human gastrointestinal tract, as a potential biotherapeutic protein delivery vehicle. To illustrate its use as a biotherapeutic, I cloned a phage-derived endolysin gene from *Clostridium difficile* into *L. reuteri*. I predict that when the endolysin is secreted from *L. reuteri*, it will be capable of combating *C. difficile* infection, a hypothesis I am currently testing. Also, I have recently closed the genome of *L. reuteri* ATCC 6475, the particular strain we are using, by aligning contigs to a reference genome of a closely related *L. reuteri* strain. I amplified and sequenced any gaps or overlapping regions, generating a full genome sequence. Having the complete genome of the strain will be useful in implementing it as a biotherapeutic. In the course of closing the genome, I discovered a variable phage region that I am currently working towards curing from the genome by cloning in selection and counter-selection markers.

THE USE OF PHYLOGENETIC ANALYSIS TO SEPARATE LAGENIDIUM ALBERTOI FROM THE OTHER MAMMALIAN PATHOGENIC LAGENIDIUM SPECIES

Behirda Karaj, Hamza Ansari, Driton Gacaferi, Kyle Hildebrandt, Brady Parr

Category: Microbiology, Immunology and Infectious Disease, Section 4

Poster: 240

Location: Parlor AB, 1:30 PM - 3:30 PM

Mentor(s): Leonel Mendoza (Biomedical Laboratory Diagnostics Program)

Langenidium species are aquatic oomycetes, some of them are pathogenic of animals and few pathogens of mammals. In humans and lower animals the development of skin lesions is common. Since some *Langenidium* species have been commonly found causing disease in mammals of the Americas; our study will investigate the unusual *Langenidium* pathogen, *L. albertoi*, isolated from a Thai patient. The purpose of our research is to examine the *Langenidium* specie found in Thailand form that found in the Americas using molecular tools. We will do DNA extraction from this pathogen, sequencing and then the obtained DNA sequences used to perform phylogenetics with the available DNA data base at the NCBI. Our research highlights the importance of the molecular tools to specifically identify unusual pathogens around the globe.

Poster Presentations, Section 1

CADMIUM AND ZINC COORDINATION POLYMERS CONTAINING BIPYRIDYL LIGANDS AND SHORT-CHAIN ALIPHATICS

Jacob Uebler

Category: Physical Sciences, Section 1

Poster: 335

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Robert LaDuca (Chemistry)

Room temperature solvent layerings afforded novel metal-organic frameworks consisting of transition metals, short-chain aliphatics, and bipyridyl coordinating ligands. X-ray crystallographic analysis followed by topological study revealed polymer structures varying in both dimensionality and penetration depending solely on the bipyridyl ligand used. The results imply that certain coordinating ligand-metal combinations produce predictably variable topological environments.

FABRICATION OF SCANNING TUNNELING MICROSCOPY TIPS

Eric Goodwin

Category: Physical Sciences, Section 1

Poster: 336

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Stuart Tessmer (Physics)

Scanning Tunneling Microscopy is a type of microscopy that utilizes the concept of quantum tunneling to get atomic resolution of a sample surface. A sharp, conducting tip is brought close to the conductive sample being imaged, and a bias voltage is applied between the two. Quantum tunneling is when an electron “jumps” from the tip to the sample. A tunneling current is then produced, as a function of tip position, voltage applied, and density of electronic states of the sample, and from these data an image of the sample can be formed. For measurements like STM, sometimes the geometry of the sample requires tips of incredibly small radius of curvature (sharpness). My methods for obtaining these tips have been improved over time, and presented is the latest iteration to fabricate tips with a radius of curvature of ~25nm. First, platinum-iridium wires are cut to a length of about an inch and cleaned. These wires are then mounted on a micropositioner attached to an atomic force microscopy-tip holder. With epoxy, the AFM tip is broken off onto the platinum iridium wire. Next, 20 angstroms of titanium, and 40 angstroms of gold are deposited onto these tips to promote conductivity. Lastly, tip quality is evaluated using Scanning Electron Microscopy, to ensure the sharpness and cleanness. With a recent success rate of 50%, the method has been refined and proven to be reliable in constructing viable tips to be used to yield atomic resolution in Scanning Tunneling Microscopy.

REDUCTION OF LASER POWER FLUCTUATIONS FROM A TI:SAPPHIRE RING LASER

Benjamin Johnson

Category: Physical Sciences, Section 1

Poster: 337

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Paul Mantica (Chemistry), Kei Minamisono (NSCL)

A laser power controller, an instrument that monitors and regulates the power of a laser, was installed in the path of the single-state continuous-wave, solid state Ti:Sapphire ring Laser that is part of the laser system of the Beam Cooling and Laser Spectroscopy (BECOLA) facility at the National Superconducting Cyclotron Laboratory (NSCL). Collinear-laser spectroscopy (CLS) experiments planned at BECOLA are intended to determine the hyperfine structure (HFS) of an ion or atom, through the detection of laser-induced fluorescence by the ion/atom as a function of effective laser frequency. The laser power controller reduces the fluctuations in the power of the laser-light, thereby improving the sensitivity of the CLS technique and the signal-to-noise ratio in the measured HFS. The effectiveness of the laser power controller is dependent on the alignment with optical elements, polarization, and power of incoming laser-light. The power of the laser was measured upon entering and exiting the controller as a function of time for various placement configurations, and the noise reduction was determined from the ratio of the standard deviation in the power readings from incoming and outgoing laser light. An optimal configuration within the BECOLA laser system was determined through comparing the noise-reduction factors in various placements of the laser power controller. This work was supported in part by the NSF under grant PHY-11-02511 and by the MSU Honors College Professorial Assistantship program.

IMPLICATIONS FOR EXHUMATION AND SEDIMENT DISPERSAL DURING THE MIDDLE- AND LATE-STAGE DEVELOPMENT OF THE MIDCONTINENT RIFT SYSTEM

Aiman Shahpurwala

Category: Physical Sciences, Section 1

Poster: 338

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Brian Hampton (Geological Sciences)

The Midcontinent Rift System is a continent-scale, Precambrian, tectonic feature that has been geophysically imaged throughout the subsurface of Michigan, Wisconsin, Minnesota, Iowa, Nebraska, and Kansas. Sedimentation associated with rifting occurred over a ~200-million-year period and some of the best outcrop of the Keweenaw Supergroup occurs in northern Michigan. Presented here are new provenance (source) data that include modal composition trends and detrital zircons ages from the Copper Harbor Conglomerate and Jacobsville Sandstone of the Keweenaw Supergroup. Modal composition trends from the Copper Harbor Conglomerate reflect pervasive occurrences of feldspar and lithic volcanic detritus while trends from the Jacobsville reveal a relative abundance of mono- and polycrystalline quartz. U-Pb detrital zircon ages from rift-fill strata of the Copper Harbor Conglomerate reveal one age peak between 1100–1200 Ma and isolated zircon ages at 1400, 1800, 2100, and 2700 Ma. U-Pb ages from rift-flank strata of the Jacobsville Sandstone include peak ages between 1100–1600 Ma with isolated occurrences at 1700, 2000, 2700, and 2900 Ma. Preliminary compositional data from Copper Harbor Conglomerate are interpreted to reflect primary contributions from volcanic source areas while trends from the Jacobsville may reflect contributions from both volcanic, continental block, and recycled orogen source areas. Detrital zircon ages from the Copper Harbor closely overlap with Grenville/Keweenaw magmatic source provinces. U-Pb ages from the Jacobsville overlap with magmatic source provinces of the Grenville, Granite/Rhyolite, Yavapai-Mazatzal/Central Plains/Labrador, and Penokean/Trans Hudson orogens.

MELTING OF THE EARTH'S MANTLE: A MODELING APPROACH WITH RESEARCH AND EDUCATIONAL APPLICATIONS

Emily Movsesian

Category: Physical Sciences, Section 1

Poster: 339

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Tyrone Rooney (Geological Sciences)

Earth's typically solid mantle may melt over a range of temperature and pressure conditions, yielding liquid magma that feeds volcanic eruptions. The resulting basalts exhibit geochemical variation that is a function of mantle heterogeneity, melting depth, and degree of melting. The most effective fingerprint of these processes is the geochemical composition of the basalts, especially regarding trace elements that are present in low concentrations. Certain trace elements partition into liquid melt before others do; these "incompatible" elements concentrate in the melt rather than in minerals in consistent proportions described by empirically-determined partition coefficients. An Excel spreadsheet was developed using equations from Zou and Reid (2001) to predict the trace element concentrations in a melt, using inputs including original source rock composition, dominant chemical reaction coefficients, trace element partition coefficients, and degree of partial melting. The model was applied within the context of the East African continental rift system by systematically varying inputs to best fit existing trace element datasets from two locations in Ethiopia. Results showed that compositional differences between data from the two locations could be explained by different degrees of partial melting and variable range in melting depth. The spreadsheet and its user guide were also introduced to MSU undergraduates in the Geological Sciences major to facilitate understanding of melting processes and trace element geochemistry.

ACOUSTIC PRESSURE THRESHOLDS OF XE-GAS IN SINGLE-BUBBLE SONOLUMINESCENCE

Jacob Parsons, Erin Blauvelt

Category: Physical Sciences, Section 1

Poster: 340

Location: Parlor AB, 9:30 AM - 11:30 AM

Mentor(s): Chong-Yu Ruan (Physics and Astronomy)

Sonoluminescence was generated in a water tank using Xenon-gas bubbles. Bubbles were observed in water doped with trace amounts of Xe as well as in pure water. A major difference in bubble behavior was identified: at the same acoustic pressure threshold the Xe sparged bubbles in pure water were stable whereas the Xe sparged bubbles in Xe-doped water were not. Furthermore, we established a threshold in acoustic pressure that drives these changes in the Xenon-doped water for two cases. The absence of observing this instability threshold in the pure water at similar acoustic pressures suggests that observed bubble stability depends upon factors beyond the composition of the bubble itself.

Poster Presentations, Section 2

FEASIBILITY OF Q-VALUE DETERMINATIONS USING A THICK GE DETECTOR

Brittany Abromeit

Category: Physical Sciences, Section 2

Poster: 341

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

Mentor(s): Sean Liddick (Chemistry)

The rapid-neutron capture process is responsible for the creation of about half of the neutron-rich heavy elements above Fe. The path of the r-process depends sensitively on the nuclear masses of the isotopes involved. To better constrain the r-process path, experimental masses can be determined and compared with theoretical calculations. The relative mass between two members of an isobaric chain can be calculated from the beta-decay Q value inferred from a measurement of the beta-decay electron energy distribution. The National Superconducting Cyclotron Laboratory has a successful beta-decay spectroscopy program exploring the characteristics of the decay of neutron-rich nuclei which was recently upgraded with a 1-cm thick central implantation Ge detector. To determine the feasibility of using a thick planar Ge detector to determine relative masses based on Q-value determinations, a measurement of the beta-decay electron distribution was performed. A cocktail of radioactive ions were implanted into the detector around ^{67}Fe and their subsequent beta-decays were monitored. To further examine the beta-decays of these radioactive ions and the feasibility of using a planar Ge detector to obtain relative masses from Q-value measurements, the system will be compared with Geant4 simulations and previously measured mass differences. Results will be shown.

BETA-GAMMA COINCIDENCE DETECTION OF RADIOACTIVE XENON ISOTOPES IN A HIGH-PURITY PLANAR GERMANIUM DETECTOR

Alexander Chemy

Category: Physical Sciences, Section 2

Poster: 342

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

Mentor(s): Sean Liddick (Chemistry)

The proliferation of nuclear weapons has led to nuclear weapon tests, as well as subsequent attempts at banning nuclear weapons tests. Though able to detect explosions in water, air, earth, and space, it is only through the collection of radioactive materials that observers may determine if it was a nuclear explosion, or merely a very large conventional blast. Underground weapons testing requires special detection equipment to verify an explosion's nuclear nature; the materials selected for analysis must escape through fissures in rock, have sufficiently large half-lives to be measured after some elapsed time, and be produced in large quantities from a successful nuclear blast. Xenon is an element with several isotopes that fit the bill, and we may determine important information from the isotopic/isomeric ratios of xenon-133, -135, -131m, 133m, and 135m. From these isotopes and isomers, we may determine the nature (conventional or nuclear) of the blast, the fuel used, the success of the blast, and diagnose any shortcomings in the weapon design. This project is simulating the beta-gamma coincidence detection of radioactive xenon isotopes in a high-purity planar germanium double-sided strip detector.

DIVALENT COPPER TRANS-1,4-CYCLOHEXANEDICARBOXYLATE COORDINATION POLYMERS WITH ISOMERIC DIPYRIDYLAMIDE LIGANDS: NEW PILLARED AND SELF-PENETRATED BINODAL NETWORKS

Sultan Qiblawi

Category: Physical Sciences, Section 2

Poster: 343

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

Mentor(s): Robert LaDuca (Lyman Briggs College)

Hydrothermal synthesis has afforded a pair of divalent copper coordination polymers containing trans-1,4-cyclohexanedicarboxylate (t14cdc) and one of two isomeric dipyridylamides, 3-pyridylnicotinamide (3-pna) or 3-pyridylisonicotinamide (3-pina). $[\text{Cu}(\text{t14cdc})(3\text{-pna})]_n$ (1) manifests $[\text{Cu}(\text{t14cdc})]_n$ 4.82 layers featuring embedded anti-syn axial-equatorial bridged $[\text{Cu}(\text{OCO})]_n$ chain motifs, pillared by anti-conformation 3-pna ligands into a new yet very simple binodal 3,5-connected (4.6.8)(4.66.83) network topology. $\{[\text{Cu}_2(\text{t14cdc})_2(3\text{-pina})_2(\text{H}_2\text{O})] \cdot 5\text{H}_2\text{O}\}_n$ (2) shows two different copper/t14cdc chain motifs with isolated copper ions and $\{\text{Cu}_2\text{O}_2\}$ dimeric units, respectively. These are linked together by 3-pina ligands to afford a new self-penetrated 4,6-connected binodal net with (4.64.8) $_2$ (426128) topology. Variable temperature magnetic susceptibility experiments reveal very weak ferromagnetism ($g = 2.01(1)$, $J = 0.04(1)$ cm $^{-1}$) along the $[\text{Cu}(\text{OCO})]_n$ chains in 1 and weak antiferromagnetism ($g = 1.906(3)$, $J = -3.4(3)$ cm $^{-1}$) within the $\{\text{Cu}_2\text{O}_2\}$ dimeric units in 2. Thermal properties are also presented.

XENOLITHS SHOW EVIDENCE OF LITHOSPHERIC THINNING OF THE EAST AFRICAN RIFT SYSTEM

Kaitlyn Trestrail

Category: Physical Sciences, Section 2

Poster: 344

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

Mentor(s): Tryone Rooney (Geology)

Breaking apart of a continent to form a new ocean requires that continental lithosphere be thinned and eventually converted into oceanic lithosphere. While the most obvious example of this thinning is the formation of rift valleys, this process only affects the continental crust. Continental lithospheric mantle, which is twice as thick as the crust, must also be thinned, but the processes involved in this thinning are difficult to observe. We present a study of continental mantle lithosphere adjacent to the East African Rift System in Ethiopia. We studied samples of the mantle lithosphere (termed 'xenoliths') brought to the surface by magmas related to rifting. By examining thin sections of these xenoliths, we have observed that the samples have undergone stress related to lithospheric thinning and introduction of fluids to the system. We inferred these processes on several observations. The xenoliths we observed contained two generations of crystals: a coarse-grained generation with large deformed crystals, and a fine-grained generation with smaller undeformed crystals. The presence of these two generations of crystals within the same xenolith indicates that stress due to lithospheric thinning was imposed on these rocks bringing about recrystallization. Secondary crystallization of foreign minerals such as amphibole requires that fluids interacted with the system causing disequilibrium between minerals, therefore promoting new crystal growth. The samples examined also exhibited fine exsolution lamellae indicating re-equilibration under conditions different from which the crystals initially grew. The textures preserved within these xenoliths therefore record the processes of deformation associated with lithospheric thinning.

ELECTROCATALYTIC HYDROGENATION OF BIO-OIL COMPONENTS

Kelsey Longe, Michaelyn Lux

Category: Physical Sciences, Section 2

Poster: 345

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

Mentor(s): James Jackson (Chemistry)

Bio-oil, a pyrolysis product of biomass, is a potential energy source except for its low energy density and its capability to polymerize. The aim of this project is to utilize a Solid Polymer Electrolyte (SPE) system for electrocatalytic hydrogenation (ECH) to increase the energy density of various components of bio-oil. The SPE system implemented involves a Nafion membrane plated with different metals such as silver, nickel, and copper. A silver-nickel catalyst bilayer has shown to yield a higher concentration of the reduced product, specifically with acetol as the substrate. CTAB, a surfactant, has been shown to increase the current efficiency of these reductions. By varying catalyst groupings and CTAB concentrations, the overall goal is to reduce substrates with greater current efficiency to make the reduction of bio-oil a more feasible process.

TUNNELING OBSERVATION OF THE LONG RANGE TRIPLET CORRELATIONS IN A SUPERCONDUCTOR/FERROMAGNET SYSTEM

Kevin Werner

Category: Physical Sciences, Section 2

Poster: 346

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

Mentor(s): Norman Birge (Physics and Astronomy)

Due to a phenomenon known as the proximity effect, Cooper pairs in a superconductor can pass into an adjacent metal. If that metal is a ferromagnet, electrons with opposite spins lie in different bands that are separated in potential energy. Therefore singlet pairs, with the electrons having opposite spin, dephase quickly as they enter the ferromagnet, making them very short ranged. However pairs in one of the two triplet states with electron spins in the same direction do not suffer from this affliction. Because of their long-range effect, these spin-triplet pair correlations are often called long-range triplet correlations (LRTC). It turns out that singlet pairs can be converted to spin-triplet in the presence of non-collinear magnetization between several ferromagnets in the system. Theory predicts a peak in the density of states (DOS) near the Fermi level as a result of these LRTC. To test this theory, I fabricate tunneling junctions with varying ferromagnetic layer thicknesses and measure the tunneling DOS. For junctions with relatively thick ferromagnetic layers, which could only be penetrated by the LRTC, I expect to see a peak in the tunneling DOS. This very small signal has been very difficult to find, and so there is an ongoing process of systematically optimizing the fabrication parameters. I am currently working on optimizing the multilayer design for consistency across samples by trying several different geometries.

SAR OPTIMIZATION OF AN IMIDAZOLINE SCAFFOLD

Jake Ludwig

Category: Physical Sciences, Section 2

Poster: 347

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

Mentor(s): Jetze Tepe (Chemistry)

Protein degradation is a fundamental biological event that is essential for the regulation of intracellular processes. The 26S proteasome is a multi subunit enzyme responsible for protein degradation. The 26S proteasome consists of a 20S subunit and a 19S subunit. The 20S subunit is responsible for catalyzing peptide bond cleavage, and the 19S subunit is responsible for various regulatory processes such as the recognition, unfolding, and translocation of peptide substrates. The regulation of protein degradation by the proteasome plays an important role in many cellular signaling cascades, and this reason makes it an important therapeutic target for the treatment of many diseases and conditions including cancer. Tumor growth is dependant on proteasome-responsive intracellular processes and therefore proteasome inhibition can have a large impact on the growth of a tumor. Proteasome inhibition is the standard method for the treatment of cancers such as multiple myeloma (MM) and mantle cell lymphoma (MCL). Bortezomib is a clinically used proteasome inhibitor that slows the progression of both cancers to a median survival rate of around 3 years. Bortezomib, along with all other reported proteasome inhibitors, bind in the catalytic site of the 20S proteasome through a competitive type mechanism. The imidazoline scaffold discovered by the Tepe group inhibits the proteasome through a non-competitive allosteric mechanism. My research involves the structure activity relationship (SAR) of this imidazoline scaffold to yield nanomolar proteasome inhibitors.

Poster Presentations, Section 1

THE ROLE OF OREXINERGIC SIGNALING IN MEDIATING THE EFFECTS OF LIGHT IN DEPRESSION-LIKE BEHAVIOR

Widya Adidharma

Category: Psychology, Section 1

Poster: 90

Location: Ballroom, 9:30 AM - 10:30 AM

Mentor(s): Lily Yan (Psychology)

Seasonal affective disorder (SAD) is caused by a reduction in environmental lighting. Replenishing this lack of light with bright light therapy has been effective in alleviating SAD depressive symptoms. Though monoaminergic systems are implicated in SAD etiology, the underlying neural pathways through which light regulates mood are not understood. To help identify a neural pathway, the diurnal grass rat, *Arvicanthis niloticus*, was developed as an SAD animal model. Utilizing a Dim Light:Dark (DLD) paradigm that mimics lower winter light intensity reveals that animals housed in DLD conditions demonstrated more depression-like behavior compared to animals housed in bright light (BLD). The objective of this study is to suggest that the orexinergic pathway mediates the effects of light on mood-regulating brain regions. I assessed hypothalamic orexin expression in grass rats exposed to the DLD and BLD paradigm. A significant reduction of orexin in the DLD group was found. I next determined light-induced activation of orexin neurons and dorsal raphe nucleus (DRN), a major target of orexinergic outputs. Light-induced increase in Fos expression was observed in orexin neurons and the DRN, which contains a high 5-HT concentration. To assess orexin's role in mediating light's effects on the DRN, animals were injected with selective orexin receptor type 1 antagonist SB-334867 prior to light exposure, which significantly inhibited DRN Fos induction. The results collectively point to the role of orexin neurons in mediating the effects of light on mood-regulating monoaminergic areas, suggesting an orexinergic pathway underlying light-dependent mood fluctuation and light therapy's beneficial effects.

THE EFFECTS OF SELF-DISTANCING ON NEGATIVE ATTENTION BIAS IN SOCIAL PHOBIA

Erin Garbarino

Category: Psychology, Section 1

Poster: 91

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

Mentor(s): Jason Moser (Psychology)

Previous work has consistently shown that social phobia biases attention towards socially-relevant threat information. In the current study, I hypothesize that this attentional bias can be attenuated by reducing anxiety and rumination via a self-analysis mechanism. The self-distanced method of analysis - that is, viewing a negative event from an objective/third person perspective - has been shown to reduce rumination and negative effect. The opposite, but more common, strategy of self-immersion involves the individual reliving an event through a first-person point of view. Participants completed two dot-probe tasks between which they engaged in an expressive writing task adopting either a self-immersed or self-distanced perspective. Preliminary data suggests participants in the self-distanced condition were able to disengage from the threatening stimuli. The immersed condition shows no such effect.

EFFECT OF PITCH EXPECTANCY WINDOW ON PERCEIVED DURATION OF AUDITORY ODDBALLS

Brad Seegert, Brad Perry

Category: Psychology, Section 1

Poster: 92

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

Mentor(s): J Devin McAuley (Psychology)

When a salient (oddball) tone is presented in a sequence of standard tones, the duration of the oddball tends to be overestimated. Either increased attention to the oddball itself or habituation to the standard tones preceding it is thought to cause this distorted perception. The saliency of an oddball tone can be affected by both its likelihood and pitch distance from the standard. The first experiment investigated the hypothesis that, when multiple oddball tones varying in likelihood and pitch distance are presented, a pitch expectancy window is formed between the repeated standard tones and likely oddball tone. The prediction was that the perceived duration of the unlikely oddball tone will be longer when it is outside of the pitch window than when it is inside of the pitch window. Two conditions were created that varied the pitch distance of the likely oddball while holding the pitch of the unlikely oddball constant. Consistent with our hypothesis, the duration of the unlikely oddball

was overestimated when outside of the pitch window and underestimated when inside of the pitch window. In a second experiment we will compare two equally unlikely oddballs of differing pitch distance from the standards instead of one, which will be either both inside or both outside of the pitch window. The goal of this experiment is to establish equivalent pitch ranges across conditions, which was not the case in the first experiment.

MAPPING THE TIME COURSE OF CONFIDENCE JUDGMENTS: CAN TAKING MORE TIME IMPROVE CONFIDENCE ACCURACY?

Patrycja Zdziarska

Category: Psychology, Section 1

Poster: 93

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

Mentor(s): Tim Pleskac (Psychology)

The confidence we have in the accuracy of our decisions can serve as convincing evidence in favor of the decision. When considering eyewitness testimonies, a highly confident eyewitness may convince a tough jury to convict an alleged criminal despite the fact that confidence and accuracy are shown to be weakly correlated. Since confidence plays such an important role in criminal proceedings, this study investigated whether the accuracy of confidence judgments can improve with time at the millisecond level. To map the time course of confidence judgments, we implemented a facial memory recognition task that manipulated the time people took between making a choice and making a confidence judgment regarding a set of faces. In the first experiment, we compared the time between decision and confidence when participants alternated in making either fast or accurate decisions. In a second experiment, we manipulated the time participants took to make a decision along with the time they took to estimate the confidence in their decision by fixing the decision time and varying the confidence time from 500 ms to 4000 ms. In both studies, we predict that the well-known speed-accuracy tradeoff in decision-making would also apply to confidence judgments after choice where confidence judgments made quickly would be less accurate than ones made by taking more time. Taken together, these findings can provide support for post-decisional processing positing that people do not stop processing decision information once they enter their response, but continue to process relevant information until they make a confidence judgment.

EXPLORING ASSOCIATIONS BETWEEN GENETICS, PARENTAL CONTROL AND INTERNALIZING DISORDERS

Justyne Ortuist

Category: Psychology, Section 1

Poster: 94

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

Mentor(s): S Alexandra Burt (Psychology)

Extant literature suggests that controlling parenting is one factor that influences the development of internalizing symptoms (e.g., depression and anxiety) in children. Critically, however, not all children who experience high levels of parental control go on to develop internalizing symptoms. These imperfect associations are suggestive of a gene-environment interaction, whereby the influence of a given environmental risk factor on an outcome is moderated by the child's genetic risk for that outcome. Put differently, it may well be the case that children at genetic risk for internalizing symptoms are more susceptible to the effects of controlling parenting than are children without genetic risk for internalizing. The goal of the current study is to examine this possibility, evaluating whether and how children's genetic risk for internalizing moderates the relationship between parental control and their internalizing problems. The sample will include roughly 750 families with twins aged 6-10 years (total N=1,500) from the Twin Study of Behavioral and Emotional Development in Children, one arm of the Michigan State University Twin Registry (MSUTR). Our assessment of parenting will include measures of parental control from observed parent-child interactions. Symptoms of internalizing problems will be measured using self-reports, parent-reports, and teacher-reports. Finally, a series of genetic variants will be analyzed using DNA from saliva samples. Analyses will consist of a series of moderated regressions conducted using Hierarchical Linear Modeling (to account for the non-independence between siblings), in which internalizing is regressed onto genetic risk, parental control, and genetic risk X parental control.

THE AVERSIVE INTERPERSONAL BEHAVIORS ASSOCIATED WITH PATHOLOGICAL TRAITS

Trevor Williams

Category: Psychology, Section 1

Poster: 95

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

Mentor(s): Brent Donnellan (Psychology), Christopher Hopwood (Psychology)

Interpersonal dysfunction is often cited as a defining feature of personality disorders (PDs), however relatively little is known about how PD features negatively affects others. In the current study, students (N=225) reported on the pathological traits and

aversive interpersonal behaviors of an individual with pathological personality features whom they reported knowing fairly well. Aversive behaviors were measured using the Interpersonal Sensitivities Circumplex (ISC) and pathological traits were assessed using the proposed DSM-5 traits. Following an analysis of each measure's psychometric properties, traits were examined in terms of the degree of their interpersonal aversiveness and the way in which they were aversive. Results suggest that people see personality pathology as generally aversive, with some aspects of this pathology being aversive in a specific way.

SEXUAL DIMORPHISM IN THE PREFRONTAL CORTEX DURING PUBERTY IN RATS

Susie Sonnenschein

Category: Psychology, Section 1

Poster: 96

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

Mentor(s): Cheryl Sisk (Psychology)

Adolescence is a time of physical, cognitive, emotional, and social maturation, which is reflected by changes in the brain. These changes are associated with the emergence of sex differences in the susceptibility of several mental illnesses, including eating and mood disorders and schizophrenia. The prefrontal cortex (PFC) is an area that's often dysfunctional in mental illnesses. It has been shown that in adulthood, the number of neurons in the PFC is larger in males than in females and this sex difference is not present in prepubertal rats. This study looked at whether sex difference in cell proliferation during puberty underlies the ultimate difference in cell number. The rats received injections of cell birth-date marker bromo-deoxyuridine (BrdU) and were then sacrificed at different time points. Immunohistochemistry and light microscopy were used to count BrdU-labeled cells. We looked for differences in cell number between sexes, regions of the PFC, and stages of puberty. Preliminary data showed fewer new cells present later in puberty than there were in earlier stages. Additionally, a male-biased sex difference was observed in the overall number of BrdU-labeled cells in the prelimbic region. This data supports the hypothesis that new cells are added to the PFC during puberty and there appears to be a difference in the number of cells that are added and maintained in males and females. Further investigation into whether the new cells are neurons or glia will provide additional information about how the PFC develops during puberty.

THE ROLE OF PARENTAL PERSONALITY IN CHILD TEMPERAMENT AND PARENTAL DEPRESSION

Sindes Dawood

Category: Psychology, Section 1

Poster: 97

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

Mentor(s): Emily Durbin (Psychology)

Psychopathology is related to certain personality (temperament) traits. For example, depression is associated with low positive emotionality (PE) and high negative emotionality (NE). Research with children has shown that both psychopathology and personality traits are heritable and stable over time. This implies that the transmission of risk for mood disorders from parent to child may be mediated through the transmission of temperament traits. However, few studies have looked at how personality traits and psychopathology of parents are related to their offspring's temperament. The current study was designed to examine children's (ages 4-7) temperamental PE and NE in relation to both their parent's normal and abnormal personality traits as well as parental mood disorders. Children will participate in a series of videotaped laboratory tasks designed to elicit a range of temperament-relevant behaviors. Trained coders will score the videotapes of the laboratory tasks to assess child temperamental PE and NE. Moreover, the children's biological parents will complete several self-report questionnaires to assess personality traits and mood disorders. I predict that children's temperament will be associated with parental personality. I expect to find that parents with mood disorders are more likely to have offspring with low PE and high NE.

Poster Presentations, Section 2

THE EFFECT OF LANGUAGE BACKGROUND ON THE PERCEPTION OF TONAL GROUPINGS

Neelima Wagley

Category: Psychology, Section 2

Poster: 98

Location: Ballroom, 9:30 AM - 10:30 AM

Mentor(s): Devin McAuley (Psychology)

When listening to tone sequences, individuals tend to hear groupings of the tones, even in sequences comprised of physically identical sounds. When successive tones contrast in duration, listeners tend to form binary groupings with final prominence,

eliciting a “weak-strong” (iambic) perceptual pattern. When successive tones contrast in intensity, listeners tend to form groupings with initial prominence, eliciting a “strong-weak” (trochaic) pattern. Previous studies investigating iambic/trochaic biases in tone sequences have suggested that these preferences may be influenced by language background. Iversen, Patel, & Ohgushi (2008) proposed that the iambic bias for duration contrasts may be related to the phrasal structure of English whereby short duration (weak) function words tend to precede long duration (strong) content words (e.g., ‘a bus’). The current study aims to test this hypothesis. Experiment 1 tested native English speakers for their perception of grouping of simple rhythmic sequences consisting of alternating tones varying in duration. Participants were instructed to respond whether they heard a ‘strong-weak’ or ‘weak-strong’ rhythmic pattern for each sequence. Results show a significant iambic bias, but not for all duration contrasts. Experiment 2 will test speakers of Bahasa Indonesian using the same paradigm. Of interest is that Indonesian phrasal structure contrasts with English, in that longer duration content words tend to precede shorter duration function words (e.g., ‘palu itu’ [hammer the]). If language background influences grouping biases in accordance with the phrasal structure, then speakers of the Indonesian language should show a trochaic rather than an iambic bias for tone sequences.

CHILDREN’S USE OF FRONT-OF-PACKAGE LABELS TO RECOGNIZE HEALTHY AND UNHEALTHY FOODS

Amanda May, Courtney Heilig, Marisa Kelly

Category: Psychology, Section 2

Poster: 99

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

Mentor(s): Mark Becker (Psychology), Laura Bix (Packaging), Judith Danovitch (Psychology)

It can be difficult for individuals to properly use nutrition labels on food products to guide food choices, and this is especially true for young children. Research indicates that consumers have difficulty comprehending dietary values expressed on nutrition labels, and there is a need for a more straightforward system indicating nutritional values (Levy, Patterson, Kristal & Li, 2000; Hawley et al. 2012). We hypothesize that adding easy-to-comprehend labels to the front of food packages will assist children in understanding whether foods are healthy or unhealthy. To test this hypothesis, we presented 4- and 5-year old-children (n =22) with labels consisting green smiley faces, yellow neutral faces, and red sad faces that were placed on the front of food packages to indicate healthy and unhealthy foods. After a brief training session with familiar foods, children were presented with packages of unfamiliar foods and asked to choose either healthy or unhealthy foods to give to a fictional character. Pilot data suggests that the addition of front-of-package labels assists children in recognizing whether foods are healthy; however, children still had difficulty recognizing unhealthy foods. Findings from this study have implications for policy makers, who may use the results to alter their current packaging standards and aid consumers in making healthier choices when purchasing food products.

AFFECT & ALTRUISM: HOW EMOTIONAL STORIES INFLUENCE GENEROSITY IN YOUNG CHILDREN

Marisa Kelly, Courtney Heilig, Amanda May

Category: Psychology, Section 2

Poster: 100

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

Mentor(s): Judith Danovitch (Psychology)

Generous behaviors displayed by young children, such as sharing, exemplify prosocial behaviors that are crucial to the successful development of social skills. Talking about happy, sad, or neutral events can influence a child’s willingness to share previously earned rewards with others (Barnett, King, and Howard, 1979). Similarly, inducing negative feelings in children can activate the need to adjust the way that others perceive them, leading to an increased likeliness to display generosity (Isen, Horn, & Rosenhan, 1973). The current study investigated how emotional state affects children’s generosity. Sixty-three 4- to 6-year-old participants listened to a novel happy, sad, or neutral short story about a gender neutral alien and the alien’s pet. Immediately following the story, children were given the option to donate stickers to an unknown child. Our hypotheses were children would not only be influenced by the story character’s affective state, but children would also be more likely to display generosity after being exposed to sadness. Results showed that the children’s generosity levels were not strongly affected by the story they heard. These results have implications for future studies on the relationship between emotions and generosity, including the development of stimuli that may be more likely to influence young children’s behaviors.

LONG-TERM EFFECTS OF DIVORCE ON CHILDREN: THE ROLE OF RECOLLECTION AND ATTRIBUTION

Keli Peterson

Category: Psychology, Section 2

Poster: 101

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

Mentor(s): Adrian Blow (Human Development and Family Studies), Brent Donnellan (Psychology)

This study seeks to explore the connection between long-term adjustment and recollection of the parental relationship. Over the years, extensive research has been done in the area of marriage and divorce, particularly on the effects that divorce has on children. Children with divorced parents are known to suffer various long-term and short-term adverse effects. In terms of recollection, episodic memory has been shown to play an important role in meaning making and the development of both identity and maturity (McLean, 2005; Wilson & Ross, 2003). While research has been done on episodic memory, meaning making, and the long term adjustment of children who experience parental divorce, as of yet, no research has been done on the role of episodic memory in the long-term adjustment of children of divorced parents. This study seeks to explore this area and determine the role that episodic memory plays in the adjustment of children over time, as prior research indicates that episodic memory may play an important role in long-term adjustment (McLean, 2005).

THE EFFECT OF SOCIAL MEDIA ON FALSE MEMORY FORMATION

Nicholas Griffin, Spencer Gregerson

Category: Psychology, Section 2

Poster: 102

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

Mentor(s): Kimberly Fenn (Psychology)

Social media has become pervasive in society and may act as a learning platform that supplements traditional sources. Because the information posted to social media sites is not always accurate, individuals may create false memories about a given event. Previous research has shown that when participants are given information that conflicts with a previously-encoded memory, they will often report the false information instead of the original memory. We were interested in whether individuals would produce differential amounts of false memory depending on whether they read conflicting information from a social media source or a source that was not a social media platform. Participants viewed a series of images that depicted a story and read sentences that described the images. Most of this information was consistent with the images but some of it conflicted with the original memory (misinformation). One group of participants viewed the misinformation in a Twitter ticker and was told that the information had been tweeted by other participants. The other group watched a feed containing the same information, but in a format unrelated to social media. All participants were then given a memory test. Correct recognition did not differ between the groups but participants in the Twitter condition showed lower false memory than participants in the non-Twitter condition, showing greater overall memory accuracy. This suggests that social media may protect against the development of false memory, potentially because individuals are wary of information they acquire via social media outlets.

THE EFFECT OF SLEEP DEPRIVATION ON SUSCEPTIBILITY TO FALSE MEMORY

Rudra Joshi, Leah Panourgias, Soham Parikh, Matt Waldrop

Category: Psychology, Section 2

Poster: 103

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

Mentor(s): Kimberly Fenn (Psychology)

Although there is strong evidence that sleep deprivation impairs veridical memory, the effect of sleep deprivation on false memory is still unclear. Recent research has yielded ambiguous results, and has mostly been conducted using the Deese-Roediger-McDermott (DRM) paradigm, testing false memory of semantically-associated word lists. We sought to test the effects of sleep deprivation on false memory using the misinformation paradigm, in which participants encode information and are later given misinformation that conflicts with the original memory. During the experiment, participants completed three phases. They encoded an initial picture-based story, were exposed to misinformation through a text-based narrative, and were tested on their memory for the original picture story. Half of the participants were given 8 hours to sleep in the lab and half remained awake all night. We varied sleep deprivation at encoding of the original information and encoding of the misleading information. All participants were tested in the morning, after a period of sleep or sleep deprivation. Our results suggest that sleep deprivation during encoding of the original memory results in higher false memory but that sleep deprivation may help protect against false memory in certain situations. This could be due to reduced consolidation of the misinformation during the period of sleep deprivation, preventing the formation of false memories. The findings of this study are discussed in situations where memory accuracy is essential, such as eyewitness memory.

MEASURING THE SOCIAL VALIDITY OF EVIDENCE-BASED INTERVENTIONS FOR BUILDING SKILLS IN AUTISM SPECTRUM DISORDERS

Lauren Manston

Category: Psychology, Section 2

Poster: 104

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

Mentor(s): Brooke Ingersoll (Psychology)

There is a significant need to develop a valid and reliable scale to assess the social validity of skill-building interventions for children with autism spectrum disorders. While the literature has established scales for examining the social validity of interventions aimed at decreasing unwanted behaviors, there is a lack of literature looking at social validity for interventions aimed at increasing skills in this population. As such, we will evaluate the psychometric properties of a social validity scale that has been modified from two existing scales to better assess skill-building interventions. We will also compare the degree to which undergraduates find four evidence-based comprehensive interventions to be socially valid ways of increasing skills in children with autism spectrum disorders.

PREDICTORS OF SUICIDE IDEATION AND ATTEMPT AMONG ASIAN AMERICANS IN COMPARISON TO EUROPEAN AMERICANS USING A NATIONAL SAMPLE

Jennifer Thach

Category: Psychology, Section 2

Poster: 105

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

Mentor(s): Brent Donnellan (Psychology), Frederick Leong (Psychology)

Suicide is a very catastrophic event that affects many people, including both survivors and family members alike. Suicide is the third leading cause of death for children between the ages 15 and 24 years old in the United States (National Center for Health Statistics, 2010). Among Asian Americans, suicide is the second leading cause of death for individuals 15 to 34 years old (Heron, 2011). Previous research has found that much information about suicide among European American adolescents, however suicide among Asian Americans is still unclear when compared to other ethnic/racial groups. This study examines how Joiner's social isolation, Cacioppo's social isolation theory through the lens of social capital and Bandura's academic self-efficacy theory may be related to an adolescent's suicidal ideation and attempt. Using the National Longitudinal Study of Adolescent Health (Add Health) we examine these factors among European American and Asian American adolescents.

Poster Presentations, Section 3

GUILT CORRELATES IN YOUNG CHILDREN

Michael Tiura

Category: Psychology, Section 3

Poster: 106

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

Mentor(s): Brent Donnellan (Psychology), C Emily Durbin (Psychology)

Around the time children reach the age of two years they begin to exhibit the capacity to feel guilt and empathy. Children's level of expression of such guilt has been correlated with age, gender, and temperament, particularly the dimension of fearfulness. In this study thirty seven young boys and girls between the ages of two and five years of age were observed in a guilt evoking picture tearing task. The children's behavior and vocalizations were recorded and this data was compared to the age, gender, and fearfulness of the participants previously gathered by the MSU Child Emotions Laboratory. This comparison was then used to see if any of the three previously mentioned factors were correlated with specific guilt behaviors or vocalizations in the participants. Guilt behaviors that were recorded and analyzed in this study included indications of picture tearing, gaze avoidance, bodily tension, stuttering, and laughter.

STEREOTYPE THREAT SUSCEPTIBILITY IN PRESCHOOL GIRLS

Megan Fisher, Margaret Levasseur

Category: Psychology, Section 3

Poster: 107

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

Mentor(s): Judith Danovitch (Psychology), Christine Shenouda (Psychology)

Activation of negative stereotypes can decrease performance on stereotyped tasks, an effect known as stereotype threat (Steele & Aronson, 1995). These effects are also observed in elementary-school children on math tests (Ambady, Shih, Kim, & Pittinsky, 2001). Currently, no research exists showing this effect in preschool children. In this study, we examined stereotype threat susceptibility in preschool girls on a spatial task. Twenty-four 4- and 5-year-old girls' gender identity was either activated by coloring a gender-stereotyped picture (a girl holding a doll), or not activated by coloring a gender-neutral picture (a landscape). Following the gender activation task, participants completed a timed Lego block task in which they were asked to re-create a series of block shapes as quickly and accurately as possible. Children's explicit and implicit gender stereotypes were measured using widely cited measures (Ambady et al., 2001; Liben & Bigler, 2002). Gender identity activation significantly decreased girls' performance on the Lego block task compared to girls in the control group. Girls did not show strong explicit gender stereotypes; however, implicit measures showed that they endorsed gender stereotypes. These results suggest that negative stereotypes affect girls' performance on stereotyped activities beginning early in life, even when they do not explicitly acknowledge these stereotypes. Such decreased performance may contribute to girls' avoidance of such activities, and negatively affect their developing spatial skills, as well as their interest in mathematics, science, and engineering later in life.

HEALTHY VS. UNHEALTHY: ANALYSIS OF FMRI IMAGES IN RELATION TO FOOD CHOICE

Amy Dentlinger

Category: Psychology, Section 3

Poster: 108

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

Mentor(s): Dirk Colbry (Institute for Cyber-Enabled Research), Issidoros Sarinopoulos (Radiology)

Does our brain respond differently when choosing a healthy snack over an unhealthy one? The purpose of this project is to determine the answer to this question by comparing the amount of stimulation in the brain when choosing healthy versus unhealthy snacks. Volunteers will be shown pictures of various foods one at a time indicating whether or not they want each snack. Simultaneously, the participants brain is scanned using an fMRI machine. Food options include fresh fruits and vegetables (healthy) and various candy bars and chips (unhealthy). Following collection of data, the fMRI images will be analyzed using a fMRI software analysis tool called AFNI. This information will identify the brain regions that control food choice and how the stimulation of these regions vary in relation to nutrition quality.

THE ELEPHANT IN THE ROOM: AN INTERDISCIPLINARY APPROACH TO INCREASING THE EFFECTIVENESS OF ZOO ANIMAL PRESENTATIONS

Stephanie Bousseau

Category: Psychology, Section 3

Poster: 109

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

Mentor(s): Brent Donnellan (Psychology)

The past few decades have seen a drastic shift in the main focus of zoos. Although zoos initially existed primarily for entertainment purposes, they have now shifted focus to animal and conservation education for both children and adults. This new focus on education takes varying forms, including keeper talks, docent stations, and graphics with pro-wildlife messages located around the facilities. With these new pro-animal and pro-conservation based goals, it is more important than ever to ascertain if the programs and features currently found in zoos in the United States are actually effective. In this project, I synthesize the current literature that is available regarding visitor behavior and effectiveness of different elements of modern zoos and examine which of these succeed in their objectives and which are out-dated or ineffective. Additionally, I describe the design for an interdisciplinary study, integrating research in communication, psychology, and zoology to determine whether small or large visitor group zoo presentations have the greatest potential of positively influencing retention and performance of desired pro-animal behaviors.

SIMILARITIES BETWEEN PARENT AND CHILD REPORTS OF THE CHILD'S ELICITED EMOTIONS

Kendall Hendler

Category: Psychology, Section 3

Poster: 110

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

Mentor(s): Emily Durbin (Psychology)

This study aims to find the similarity between the emotion self-report questionnaires of children and the report of their emotions from their parents. It is hypothesized that the children's self-reports of their emotions will be closely correlated to the parents' reports of the children's emotions. It is important to test this data to determine how well parents can accurately identify their children's emotion. We brought children ages 4-7 into the lab and asked them to participate in 15 different tasks built to elicit certain emotions. Afterward we asked those children to report how they felt during the task and to what intensity. We also had the parents report how they saw their children feeling. We then took the data from each of those reports and determine how similar they are. Future research would include coding the videos for the emotions of the children during each task to determine how accurate the child was at reporting his or her own emotions and using it as a contingent as to how accurate the parent report was.

AN INVESTIGATION INTO THE RELATIONSHIPS BETWEEN TEMPERAMENT AND PEER INTERACTIONS IN PRESCHOOL CHILDREN

Shelby Parks

Category: Psychology, Section 3

Poster: 111

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

Mentor(s): Brent Donnellan (Psychology), C Emily Durbin (Psychology)

The potential consequences of peer rejection extend far beyond childhood socialization into a vast array of negative life outcomes. These long-term consequences make the identification of children that are at risk for severe peer rejection an area that has much to be desired. Temperament is one such area that has received much attention as a potential factor in peer rejection, particularly the temperament traits of inhibition/extraversion, emotionality, and self-regulation/effortful control. In the present study, preschool peer interactions will be observed with an emphasis on temperament traits and types of interactions. We will use correlations to identify the degree to which temperament traits are related to aspects of social interactions. While this study will not be able to prove causation between temperament and variety of peer interaction, the identification of temperament traits that are common in children who engage in negative versus prosocial peer interactions may help with the identification of children who are at risk of peer rejection, allowing for the specific targeting of intervention programs.

EFFECT OF TOP-DOWN IMPOSITION OF A SYNCHRONIZED VS. SYNCOPATED DOWNBEAT ON PERCEIVED DURATION OF AUDITORY ODDBALLS

Jonathon Walters

Category: Psychology, Section 3

Poster: 112

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

Mentor(s): Devin McAuley (Psychology)

Subjective time perception varies continuously throughout daily experience. The allocation of attention to events has been shown to influence their perceived duration. One way this relationship has been studied is using an oddball paradigm, in which a deviant (oddball) event is presented amidst a sequence of identical (standard) events. Generally, the duration of the oddball is overestimated relative to the standards. In the present study, we investigate the possibility that oddball duration judgments are modulated by top-down imposition of a "downbeat" in an auditory oddball sequence. Participants heard a contextual-sequence followed in anti-phase by an oddball-containing sequence. Instructions varied whether the oddball was heard in syncopation or synchrony with the beat. We hypothesize that, if rhythm guides the allocation of attention (with stronger/weaker beats corresponding to increased/decreased attention) then oddballs heard in synchrony versus syncopation should be perceived as longer. Each trial in both synchrony and syncopation conditions contained a series of two five-tone isochronous sequences. Following the contextual-sequence was a phase-shifted oddball-containing sequence with a variable-duration oddball in the 2nd-4th sequence position. Participants judged whether the oddball was "shorter" or "longer" in duration than the standards. Preliminary results from musically-trained participants indicate 1) an effect of oddball sequence-position (i.e., later-position oddballs perceived as longer in duration than earlier-position oddballs) in syncopation condition and control (in which no beat-imposition strategy was required) and 2) a tendency in both synchrony and syncopation to underestimate the duration of the 2nd position oddball relative to the later-position oddballs.

Poster Presentations, Section 4

IS THE EFFECT OF MOVEMENT ON THE AUDITORY ENCODING OF RHYTHM AN ARTIFACT OF DEMAND CHARACTERISTICS?

Karli Nave, Abid Ahmad, Lauren Smith

Category: Psychology, Section 4

Poster: 113

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

Mentor(s): Devin McAuley (Psychology)

Music and movement are commonly coupled across cultures. Previous studies have shown that playing an ambiguous training rhythm and bouncing participants to one of two metrical patterns – duple or triple – affects the auditory encoding of the rhythm (Phillips Silver and Trainor 2005, 2007). Participants, given two choices, picked the test rhythm with accents matching the metrical pattern to which they were bounced. The investigators concluded that movement influences the encoding of a rhythm’s metrical pattern, therefore changing how a beat is perceived. However, one concern with these results is the possibility that participants were able to guess the hypothesis. If this occurred, participants may have altered their performance on the task to try and “fit” the experimenter’s hypothesis. The current study, investigated the role of demand characteristics. We use the same experimental design as Phillips-Silver and Trainor. Participants were given a series of questions after completing the test trials that attempted to gauge their awareness of the research question. Data collected to date suggests that many participants do indeed assume their movement experience is linked to the rhythm they are “supposed to” choose on the test trials. These results highlight the potential role of demand characteristics in all previous work using this experimental design, and serve to guide further research investigating the encoding effect of movement on beat perception.

USING EEG MEASURES TO PREDICT THE PERCEIVED DURATION OF AUDITORY ODDBALLS

Connor Geil, Courtney Cox, Sean McNeil

Category: Psychology, Section 4

Poster: 114

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

Mentor(s): Elisa Kim (Psychology), Devin McAuley (Psychology)

Presenting an irregular (“oddball”) tone within a sequence of identical standard tones tends to cause the perceived duration of the oddball to be overestimated. Two theories have been proposed to explain this effect: (1) an attentional hypothesis, in which the oddball stimulus receives an increased amount of attention relative to the standard stimuli, resulting in overestimation or (2) a repetition suppression hypothesis, in which the neural responses to the repeated standard stimuli are reduced due to repeated presentation, in this case oddball overestimation is a byproduct of a reduced response to the standard. Recently, Kim and McAuley (2012) used an auditory oddball paradigm to show that reaction times in response to an oddball predicted the perceived duration of the oddball. In electroencephalogram (EEG), stimulus events can be linked to event-related potentials (ERPs), which are represented by the major peaks of an EEG associated with various neural processes. Oddball stimuli have been shown to generate a P3 ERP component, which has been associated with deviance detection and context updating. In this experiment, participants judged the duration of auditory oddballs in which pitch and likelihood of the oddball were manipulated as in Kim & McAuley (2012). Consistent with the relationship found between response times and perceived durations in the previous experiment, we predict that the amplitude of the P3 component in response to oddball stimuli will predict their perceived duration.

THE ROLE OF MOTOR AREAS OF THE BRAIN IN BEAT PERCEPTION: AN INVESTIGATION USING TRANSCRANIAL MAGNETIC STIMULATION (TMS)

Prashanth Rajarajan, Courtney Cox

Category: Psychology, Section 4

Poster: 115

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

Mentor(s): Florian A Kagerer (Kinesiology), J Devin McAuley (Psychology)

In a recent study using an ambiguous tempo paradigm, a connection has been found between beat perception and areas of the brain associated with movement, such as the supplementary motor area (SMA), basal ganglia, and cerebellum (Grahn & McAuley, 2009). This study revealed substantial individual differences in beat perception, which correlated with distinct patterns of brain activation. Specifically, participants classified as “strong” beat perceivers display a larger activation of the SMA than do “weak” beat perceivers, supporting an important role for the SMA in internal beat generation and beat-based encoding (Grahn & McAuley, 2009). The present study investigates the causal role of SMA in beat perception by using transcranial magnetic stimulation (TMS). We used TMS to stimulate and interfere with the normal functioning of the SMA during the

performance of the ambiguous tempo task. We expect to observe a systematic change in performance such that strong beat perceivers will respond similarly to weak beat perceivers. The present study extends a previous UURAF presentation by looking at decision and motor response times during this task. We hypothesize that decision response times will be longer in response to TMS stimulation as compared to baseline or control conditions, implying that an interruption of SMA function impairs beat perception. This potential involvement of the SMA in beat perception could be applied to research involving movement disorders, such as Parkinson's disease.

CAN KNOWING WHEN A CHANGE WILL OCCUR HELP YOU DETECT IT?

Monique Daignault

Category: Psychology, Section 4

Poster: 116

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

Mentor(s): Mark Becker (Psychology), J Devin McAuley (Psychology)

Previous studies have found that knowing when something is going to happen can improve the detection of it. Additionally, the ability to detect a change has been shown to increase in a "mud splash" paradigm in which black figures were flashed repeatedly at a regular rhythm before flashing simultaneously with a change (Becker and Vera, 2007). Detection of the change with the rhythmic series of flashes was much better than without the flashes. One possibility is that the flashes could have been used to predict and prepare for the change that occurred with the last flash. The current experiment investigates this possibility. A similar paradigm is used to Becker and Vera (2007). Participants view a circle of letters and are asked to detect a change in one of the letters with and without a preceding rhythmic series of flashes. On some of the trials, the last flash (and to-be-detected change) occur at the expected time relative to the preceding flash rhythm. On other trials, the last flash (and to-be-detected change) occur unexpectedly early or late relative to the preceding flash rhythm. If rhythmic expectancy aids change detection, as hypothesized, the results of this ongoing study will show better detections for changes that occur at expected time compared to those that occur at unexpected times.

DISTAL PROSODY FACILITATES WORD SEGMENTATION IN AN ARTIFICIAL LANGUAGE

Patrycja Zdziarska, Brian Chivers, Ashley Elliston, Mitchell Reddan

Category: Psychology, Section 4

Poster: 117

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

Mentor(s): J Devin McAuley (Psychology), Tuuli Morrill (Psychology)

Unlike written language, fluent speech has no obvious breaks that signal where one word ends and another begins. Instead, distributional cues as well as local prosodic cues such as word-initial stress serve to indicate the boundaries between words. Additionally, distal prosodic cues such as intonation patterns established in the beginning of an utterance have been shown to influence word segmentation at the end of an ambiguous speech stream. In this study, we investigated how distal prosody influences the segmentation and learning of words in an artificial language when distributional cues are held constant. Participants listened to sequences of syllables where the final portions of the sequences contained target words. In each sequence, distal prosodic cues were either congruent or incongruent with the word boundaries of target words. After exposure to the artificial language, listeners heard test items consisting of words that had been heard with congruent or incongruent distal prosody during exposure along with nonwords that were never heard. For each test item, listeners judged whether the item was a "word" or a "nonword" from the artificial language using a 6-point confidence scale. If distal prosodic cues guided segmentation and facilitated word learning, listeners should better identify congruent items as words in the language than incongruent items. Consistent with this hypothesis, our results show that congruent words were better learned than incongruent words. These findings signify the importance of rhythmic and timing aspects of speech in the perception and learning of a language.

GENDER ACKNOWLEDGMENT STUDY

Fion See, Rikita Shah, Danica Verderbar

Category: Psychology, Section 4

Poster: 118

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

Mentor(s): Christine Kermond (Psychology)

Gender has been an issue in relation to traditionally-masculine work contexts (e.g. engineering) and higher job positions (e.g. top management). In this study, we are examining responses towards men who are applying for traditionally-masculine and higher job positions. A study of female acknowledgment has been previously conducted and this is a follow-up study, in which

we are comparing the evaluations of male applicants to the evaluations of female applicants. Specifically, we are looking to see if gender acknowledgment during an employment interview would have a positive or negative influence on the employer's evaluations of men who apply for traditionally-masculine job positions. Participants read a job advertisement describing a traditionally masculine position, (i.e., engineering manager) and watch a video of a male candidate interviewing for that particular job position. Participants are randomly assigned to 2 (acknowledgment Vs. non-acknowledgment) X 3 (role-congruent X role-incongruent X neutral traits) conditions. After watching the video, participants will be evaluating the male candidate. This study allows us to compare the interviewing strategies of men and women regarding gender acknowledgment when applying for a traditionally-masculine job. We hypothesize that participants in the gender acknowledgment conditions will report less positive evaluations compared to participants in non-acknowledgment conditions. We hypothesize that there will be a significant main effect of role congruity for personal evaluations as well as the participant's feelings towards the applicant.

Social Science: General

Oral Presentations, Section 1

AN EVOLUTIONARY APPROACH TO RACIAL BIAS

Abraham Kim, Naveed Carim

Category: Social Science: General, Section 1

Location: Parlor C, 9:00 AM

Mentor(s): Brent Donnellan (Psychology)

We review empirical and theoretical research examining the nature of intergroup bias. Anthropological research indicates that, given the geographic distribution of racial groups throughout our evolutionary history, our ancestors were unlikely to have ever encountered members of other racial groups. Given this, it is unlikely that humans evolved cognitive mechanisms to process information about race specifically, this is in contrast with the cognitive mechanisms evolved to process information about sex and age specifically. Instead our ancestors lived in large bands, or coalitions, of 10 to 50 individuals whom were identified on basis of features not related to race, such as shared style of dress or a common dialect. This perspective suggests that humans may use race as a cue to coalitional group membership, and that racial prejudice is therefore an evolutionary byproduct of this more fundamental coalitional psychology. This concept of intergroup/coalitional bias has practical implications in the social world where racial and intergroup biases are prevalent. We review this literature and propose a new study to examine the coalitional roots of intergroup bias.

TECHNOLOGY AND SOCIETY

Nicholas Kowalski

Category: Social Science: General, Section 1

Location: Parlor C, 9:15 AM

Mentor(s): Tobin Craig (Political Theory and Constitutional Democracy)

Since the Industrial Revolution, modern technology has accelerated at an incredibly fast pace. Americans and the developed world have access to a seemingly endless amount of gadgets that were not even imagined a generation ago. We, for the most part, rely on technology in order to carry out our daily lives – but at what cost? The twenty-first century introduced cellular and hand-held devices that have become a near-necessity for most people, especially youth. While the world is certainly grateful for the contributions of innovation and free enterprise, the side effect on society is not to be ignored. Social behaviors appear to have inwardly condensed. Individuals would rather talk via text message than in a personal setting. Many feel the urge to be online around the clock. Why are college students compelled to check their smart phones compulsively? Do we truly require constant Internet connectivity in order to remain sane? What does this all mean for mankind in moving forward? I will survey varying studies on the matter and suggest an explanation.

PROBATION/PAROLE OFFICERS ROLE IN RECOVERY: THE IMPORTANCE OF COMMUNICATION

Abigail Wroble

Category: Social Science: General, Section 1

Location: Parlor C, 9:30 AM

Mentor(s): Sandi Smith (Communication)

The relationship that an offender has with their probation or parole officer is an important part of the supervision process. One important outcome of the process is that the female offenders stay drug and alcohol free. This study explores communication from POs to the females in their caseload, and the effect that it has on that offender. This quantitative research was conducted after interviewing four hundred women offenders about their communication patterns with their probation or parole officer regarding staying drug and alcohol free. Only those females who communicated with their PO's about a problem were included in this analysis. By limiting our data set to this, it gave an opportunity to look beyond just the type of communication and also look at the effects that communication had on the offender as well. The approach that the supervision officer took was coded by types of communication that the female had described in the interview. This included offering social support, no social support, tangible assistance, esteem support, network support, or emotional support. By comparing these different approaches and looking at the different effects that they have on the offender, we are better able to understand how the relationship directly impacts the offender in their day to day lives.

WOMEN'S PERCEPTIONS OF UNFAIR TREATMENT IN THE CRIMINAL JUSTICE SYSTEM

Paige Lewis

Category: Social Science: General, Section 1

Location: Parlor C, 9:45 AM

Mentor(s): Jennifer Cobbina (Criminal Justice)

Numerous studies have examined individuals' perceptions of fair treatment by the criminal justice system and its effect on their attitudinal and behavioral outcomes. However, we know less about the negative perceptions of procedural and distributive justice among incarcerated samples. Here I build from insights into previous research by analyzing not only why incarcerated women perceive they were treated unfairly by the criminal justice system but also how race and probation and parole status affects such perceptions. Drawing from the distributive and procedural justice literature, I analyze 20 in-depth interviews with incarcerated women. Results highlight the importance of examining incarcerated women's perceptions towards the criminal justice system and have import for policy.

MENTAL ILLNESS AND SOCIAL NETWORKS AS RELATED TO CRIME

Sara Hughes

Category: Social Science: General, Section 1

Location: Parlor C, 10:00 AM

Mentor(s): Sandi Smith (Communication)

The size and quality of a criminal's social network and their degree of mental illness are two factors contributing to the type of crime they committed. Research has been done to conclude that the size and the proportion of criminal ties in the social network of a prior offender significantly affects their completion of probation terms and recidivism rates. Mental illnesses also play a role in the social functioning of people in this group. This study collected data on the offense the subject committed, their history of mental illness, and the number and types of people in their social network. The respondents identified the type of mental illness they have suffered from; and whether or not each person listed in their network had a criminal record and whether they provided instrumental, emotional, and/or social support. The results of this study will help us to better understand the mental and social factors that are present in the actions of people convicted of criminal offenses.

Oral Presentations, Section 2

THE MARKET FOR INFORMATION IN THE EDUCATION SECTOR OF DETROIT

Daniel Hiaeshutter-Rice

Category: Social Science: General, Section 2

Location: Parlor C, 11:00 AM

Mentor(s): Sarah Reckhow (Political Science)

Recent changes in both state and federal education policies have caused large expansions in the alternative school sector. The most common form of alternative school choice is the public charter school. A nonprofit group or small collections of individuals typically manage these charter schools, as opposed to the local school district. However, varying state laws can create differences in the available market for alternative choice schools. The laws in Michigan have caused the charter school sector to see the rise of the for-profit management company. Since such a crucial aspect of effective and efficient choice in the school market involves the parents of children to have access to information on schools, this research project seeks to understand how the for-profit management companies interact with parent information and choice. This research project is aimed at understanding how parents of children in K-8 search for and utilize information on schools as well as what types of information are shared by those schools. It also aims to find if there is any difference between parent attitudes towards charter schools run by for-profit companies and if there are difference in information provided, both in content and in quantity, by those same charter schools.

UNDERSTANDING NEIGHBORHOOD REVITALIZATION IN MICHIGAN

Erin Cooper, Winters Bruce, Rasmeet Singh

Category: Social Science: General, Section 2

Location: Parlor C, 11:15 AM

Mentor(s): Louise Jezierski (Social Relations and Policy)

This study explores neighborhood vitality and quality of neighborhood life in Lansing. This is a restudy of a similar project completed in 1995-1996 and now we would like to know about how neighborhoods have changed since then. We have been studying 46 face-blocks in the city of Lansing through a short survey and block observations, as well as census data for census

tracts where these blocks are located and real estate data. We asked residents to fill out a quick mail-in survey that includes 33 questions regarding residents' knowledge and opinions about their neighborhood block and quality of life. They also added their own additional inquiries and concerns. The questionnaires were distributed to households in person or left in the door, if no one was home. The block observations note the quality of the physical landscape and improvements and assets around the neighborhood. This presentation involves an in-depth analysis of three neighborhoods, focusing on participation rate, and looking at census and school data. Through census data, this presentation will look at demographics including sex, race and age, and see if there is any correlation between quality of neighborhood, satisfaction with neighborhood, and various demographics.

THE INFLUENCE OF SOCIAL CONTEXT ON THE FREQUENCY AND OUTCOME OF CONFLICT

Justin Cochran, Torin Kulhanek

Category: Social Science: General, Section 2

Location: Parlor C, 11:30 AM

Mentor(s): Carey Roseth (CEPSE)

It is understood that conflict occurs between preschool students in classroom settings. However, less is known about how social goals influence conflict frequency and resolution. This naturalistic observation study aims to explore the influence of the social context in which conflict occurs. Specifically, we use social interdependence theory to determine whether individualistic or cooperative play goals in conflict conclude with together outcomes. The video data for this study was collected over two months in seven Head Start preschool classrooms. A total of 348 conflicts between dyads were coded using video coding software. In review of these conflicts, we noted specifically the type of play (i.e. social play, parallel play, etc.) in which the conflicts developed and the conclusion of the conflict: whether the conflict was resolved in a together or separate outcome. Based on social interdependence theory, we predict that cooperative play settings will elicit a higher frequency of conflicts than individualistic play settings, and that those conflicts will more frequently result in together outcomes. The findings of this study will contribute to the understanding of the nature of conflict as well as potentially informing strategies for early education teachers to facilitate effective conflict resolution.

INVESTIGATION INTO CAMPUS MENTAL HEALTH

Charles Nicoli

Category: Social Science: General, Section 2

Location: Parlor C, 11:45 AM

Mentor(s): Edward Witt (Psychology)

Recently, mental health issues have become a topic of public discussion. Significant life transitions -- such as the transition to college -- can be risk factors for mental health problems. Therefore, it is crucial that universities provide students access to mental health services. Simply providing students access, however, is not enough. In order to fully address the problem it is crucial that universities also assess knowledge of available resources and potential barriers to treatment (e.g., stigma). The current study sought to assess these factors via an anonymous survey sent to a large random sample of MSU students. Students were asked attitudinal questions concerning the use of mental health services and questions assessing knowledge of available services (i.e., cost, types of service, physical location on campus). In addition, participants completed a short epidemiological depression measure to determine whether attitudes toward mental health services utilization or knowledge of available services differ between students who are most at-risk and those who are not currently experiencing depressive symptoms. Findings from this survey, including open-ended responses from students, and implications of this work for changes at the university level will be discussed.

HOW GENDER AND RACE INFLUENCE THE EFFECTIVENESS OF EXCUSES IN JOB INTERVIEWS

Emily Pacic, Fion See, Rikita Shah, Danica Verderbar

Category: Social Science: General, Section 2

Location: Parlor C, 12:00 PM

Mentor(s): Ann Marie Ryan (Psychology)

Job applicants often have to provide negative information (e.g., being fired from a previous job) during an interview while still remaining a viable candidate. In this study, we are examining how job seekers explain negative information impacts an interviewer's-evaluation of their interview. In this study, job candidates either accepted or denied responsibility for being fired or put a positive/non-positive spin in the firing incident. We also examine how the race and gender of the job applicants affects the effectiveness of the explanations used, such that applicants were a black male, black female, white male and white female. Participants completed a lab-based study in which they watched videos of a job applicant answer interview questions in which we manipulated the type of explanation and race/gender of the applicant. Participants then rated their hiring recommendation for the applicant. Data collection is currently in progress. We hope that our research will inform research and practice about

conducting fair job interviews and to help job seekers reduce potential for discrimination in their job search.

Poster Presentations, Section 1

DO ADULTS FROM DIFFERENT CULTURES EXPRESS EMOTIONAL CUES DIFFERENTLY THROUGH BODY MOVEMENT?

Paola Algarin, Jacqueline Evans, Sam Pastori

Category: Social Science: General, Section 1

Poster: 350

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

Mentor(s): Claire Vallotton (Human Ecology)

Culture is defined as “a shared learning behavior which is transmitted from one generation to another for purposes of promoting individual and social survival; adaptation, and growth and development” (Andersen and Guerrero, 1998). Previous studies have found that culture strongly impacts facial expression and body movements. This is due to the fact that certain emotions in different cultures are seen as more intense than others (Sogon and Masutani, 1989). Our study aims to address whether Chileans and Americans express emotional cues differently through specific body movements. We predict that individuals from these two cultures will use varied body movements to express different emotions, because their cultural background and perception will affect how they express emotions. Specifically, we will be examining how these adults manifest the following: happiness, sadness, anger, pride, embarrassment, and fright. In addition to observing body movements, we will also be looking at how the adults label the emotion and how that correlates to their expressive body movements. This will enable us to understand each subject’s intent in representing an emotion, which will then be compared to the actual emotion they appear to be expressing. Videos of adults from Chile and the Great Lakes region will be used to address this question. Scrutinizing how emotion is depicted through body movements will allow us to interpret how culture and traditions shape the expression of emotion.

CAMPUS ARCHAEOLOGY PROGRAM

Dana Nyquist, Kaitlin Scharra

Category: Social Science: General, Section 1

Poster: 351

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

Mentor(s): Lynne Goldstein (Anthropology)

In 1856, the first dormitory for the Agricultural College of Michigan State was erected and nicknamed Saints’ Rest. This dormitory was located to the southeast of what is now Beaumont tower. The building was inhabited until winter break 1876 when an unexpected fire burnt the building to the ground. A series of archaeological investigations done by the Campus Archaeology Program (2005-2012) offers the opportunity of taking in depth looks into the lives of Michigan State’s first students. By examining the variety of items found, from heavily melted glass and antique metal objects to buttons and porcelain, we can glimpse the lifestyles of the university’s first students. Our plan is to create a functional classification from the artifacts that will allow us the ability to interpret behavior from the details of life outside the class room to construction of the building. A functional analysis - as opposed to other types of classification - allows us to specifically examine and interpret function. However, our planned work has some real challenges due to the effects of conflagration. For example, many of the glass fragments melted due to extreme heat temperatures. Because of the fire, there are no clear indicators for what exactly each glass sherd once was; fire has changed the morphology of the entire glass piece. Nonetheless, the end result of our project should show details of building construction and will also allow us to better interpret student life in the 1800s.

ASSOCIATIONS BETWEEN CAREGIVERS' LEVEL OF EDUCATION AND THEIR USE OF MENTAL STATE LANGUAGE WITH YOUNG CHILDREN

Arika Starostanko, Lauren Prainito

Category: Social Science: General, Section 1

Poster: 352

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

Mentor(s): Claire Vallotton (Human Development and Family Studies)

Mental state language is used to describe thoughts, beliefs, desires, and emotions. Research suggests that parental use of mental state language with young children is related to their belief that their children are thinking, meaningful beings, referred to as mind-mindedness. Parents’ mind-mindedness and use of mental state language help children learn to reason about emotions and develop better theory of mind skills (Taumoepeau & Ruffman, 2008). This research has focused on parents, and little has been done to investigate whether early child educators’ use of mental state language predicts children’s emotional

development. This study will examine teachers' levels of education and training and compare it to their frequency of mental state talk while telling stories to a child in their care. Data were collected from 30 child-educator dyads; we will analyze a subset of educator data from a broader study of 100 children aged 10 to 14 months. The broader study examined the social-emotional behaviors of both parents and educators of varying educational and socioeconomic levels. To measure mental state language, educators were asked to tell children two open-ended stories; they were given a story stem and asked to finish the story however they wanted. Stories will be transcribed and coded for specific types of mental state talk, then compared to educators' educational levels. If educational level is connected to how frequently mental state language is used with children in their classrooms, there may be implications for the training of early child educators.

SPEED DATING TECHNOLOGY: FINDING THE RIGHT PROGRAM FOR ANALYZING AUDIO AND VIDEO DATA

Aaron Beckett

Category: Social Science: General, Section 1

Poster: 353

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

Mentor(s): Dirk Colbry (Institute for Cyber-Enabled Research), Claire Vallotton (Human Development and Family Studies)

From cassette tapes and VCR's to CD's and MPEG video files, technology has changed the way research is conducted. But not all technology is created equal. While cassette tapes are much better than ears and a good memory, digital data can be marked, split, combined, transformed, and cleaned up. Technology helps us get the most out of raw data. However, there are many different software programs that are useful in different ways when working with video and audio files. Some programs are capable of annotating videos, some are used to help write transcripts and analyze audio files, and some are simply better video players than QuickTime or Windows Media Player. It can be difficult to take advantage of technology when there are so many options and little time to explore each one. Thus, this project is a focused review of research tools designed to help researchers find the program most suited to their audio and video data analysis needs. The programs examined include ELAN, ANVIL, Transana, KMPlayer, CHAT/CHAN, and more. This project is intended to be an honest guide so it highlights not only the useful features of each program, but the looming deficiencies and tricky pitfalls as well. Technology is our friend, our complicated and sometimes elusive friend. This project is aimed at making video and audio annotation programs more accessible to ultimately enhance research quality by helping researchers examine data more effectively.

MOVING DOWN THE LADDER: THE POST-RETIREMENT JUDICIAL ACTIVITY OF U.S. SUPREME COURT JUSTICES

Andrew Stone

Category: Social Science: General, Section 1

Poster: 354

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

Mentor(s): Ryan Black (Political Science)

After retiring from their position on the highest court in America, Supreme Court Justices can elect to continue their judicial service by periodically participating as a judge on the lower federal appellate courts. Called serving by designation, this process is one largely overlooked by prior political science research. As Justices are retiring more frequently and in better health than ever before, it remains crucial to understand the intricacies of this process to further our knowledge of the federal courts. By examining every lower court case in which a retired Justice has participated since 1957, this study seeks to answer two key questions. First, I address how Justices change their behavior when moving from the Supreme Court to lower courts. With no further career goals and a diminished policy influence; do Justices' voting habits, methods of precedent citation, opinion writing and other behaviors change when serving on a lower court? Second, I examine whether the behavior of other judges on these lower appellate courts change in response to the presence of a retired Supreme Court Justice. Are these lower judges at all influenced by the presence of a former member of the highest court in the land? More generally, my study helps to inform how institutions affect behavior. From observing how Justices act when moving from a remarkably distinguished seat on the ultimate judicial body in America to a subordinate court, I will be able to analyze how structural changes transform the behavior of political actors.

STATE OF THE COMMUNITY AND ITS AFFECT ON THE RECIDIVISM RATES OF WOMEN OFFENDERS

Malysa Suarez

Category: Social Science: General, Section 1

Poster: 355

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

Mentor(s): Merry Morash (Criminal Justice)

In conjunction with prior research that identifies risks and needs that predict the recidivism rates of women, this research

examined the affects of a community's characteristics on the probability that a woman offender will recidivate. Three hundred convicted women who were on probation or parole for at least two months were interviewed at three different times: a primary interview and two others at three month intervals. In the first and last interviews, the women were asked a series of questions that related to their neighborhoods' characteristics. Census tract data was joined to the data from the interviews to reflect the degree to which neighborhoods were characterized by social disorganization, a known predictor of criminal activity. The final interview also included questions pertaining to any illegal activity they had participated in since the first interview. The hypothesis of this study was that women who viewed their neighborhoods as unsafe and who lived in neighborhoods that were socially disorganized were more likely to report participating in illegal activity by the time of the six month follow-up interview than women who were from better neighborhoods. After controlling for needs and risks known to predict recidivism, a logistic regression analysis was used to determine whether the self reported data of a woman's community along with the social disorganization census tract measures of that community were key predictors of recidivism by the final interview. The results of this study add to previous research on the factors that predict a woman's probability of recidivism.

YUSUF AL-QARADAWI

Julia Johnson

Category: Social Science: General, Section 1

Poster: 356

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

Mentor(s): Mohammad Khalil (Religious Studies)

My research will help Dr. Mohammad Khalil in furthering his book project on the rules of warfare in Islamic thought, particularly in modern thought. His focus will be on the writings of Yusuf al-Qaradawi. Al-Qaradawi, a popular yet also controversial Egyptian theologian, is arguably the most widely recognized Muslim jurist today. Using both al-Qaradawi's works and secondary sources, we will discern and assess al-Qaradawi's interpretation of armed jihad as well as his influence on Islamic thought.

Poster Presentations, Section 2

"POPULAR" ANATOMY: THE HUMAN BODY AT MSU

Abigail Lynch, Jillian Carroll

Category: Social Science: General, Section 2

Poster: 357

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

Mentor(s): Donnie Johnson Sackey (Writing, Rhetoric, and American Cultures)

Medical anthropologists have noted that medical professionals and their patients often have differing views of patients' bodies, which can impede mutual understanding and effective medical care. In order to overcome these detrimental effects, the views of a group of patients united by some factor must first be determined. The students at Michigan State University (MSU), unified by their common age, location, and culture, comprise one such group of patients; however, their views have yet to be looked at from a medical anthropological standpoint. This project does so by examining the beliefs that these student-patients hold about their bodies and the relation between their bodies and identities. Participants drew themselves, wrote answers to open-ended questions pertaining to their identities, and labeled specified organs on a blank outline of the human body. The results of these surveys, along with information gathered by overt non-participant observation, show that the significance of various body parts to individuals in this group varies greatly but shows overall trends. They also demonstrate that student-patients' understanding of their internal organs is different from the anatomically correct view. The presentation of these results introduces "accuracy comparison" and "dynamic anatomical mapping"—not only as methods for displaying research results, but also as methods for encouraging student-patients to gain a more precise knowledge of their anatomy and for enabling doctors to understand how student-patients think about their bodies. In this way, this project combines medical anthropology and the humanities to facilitate understanding between the student-patients at MSU and their medical professionals.

BLAME, PERSONALITY, AND ACCOMPLICES IN CRIMINAL FEMALE OFFENDERS

Jessica Mudge

Category: Social Science: General, Section 2

Poster: 358

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

Mentor(s): Merry Morash (Criminal Justice)

Although studies have been conducted linking personality type to crime, there is no research that targets women, specifically, especially not in regard to crimes involving accomplices. Similarly, although a correlation has been found between blame and

personality, no studies have been done to examine links between accomplices and the object of blame in women. This study seeks to determine if there is a statistical correlation between personality type and the presence of an accomplice for female offenders, as well as if there is correlation between accomplices and the object of blame. These correlations will be determined using interview-based data of 800 female criminal offenders from the state of Michigan, including quantitative data that measures personality type on the Big Five Personality Inventory and qualitative data assessing the presence of an accomplice and the person – if any – that each woman blames for the crime she has been convicted of. The hypothesis is that statistical tests will find a correlation between personality type and both accomplice presence and blame, the outcomes of which will be presented in the presentation. The results of this study will add to previous research analyzing factors that affect crime in female offenders, and may provide insight as to what types of women are more likely to offend, as well as the effect accomplices may have on criminal thinking in females.

UNDERSTANDING USER BEHAVIORAL PATTERNS FOR SUCCESSFUL LIBRARY PLANNING

Marybeth Swan, Jamie Payne

Category: Social Science: General, Section 2

Poster: 359

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

Mentor(s): Young S Lee (Planning, Design, and Construction)

This study intends to discover user behavioral patterns in MSU's main library and offers future recommendations to enhance the library functionality. According to literature review, the library is the second most important physical factor influencing students' selection for a particular institution, and serves as a central location for social exchange of knowledge and collaborative creation. The study aims to uncover how MSU students utilize the library through Trace Observation, a systematic examination of interior environments for signs of earlier activity or indications of how the environment is used. Trace observation is employed to understand the actual human-environment interactions against the planning and design assumptions, suggesting how users interact with the environment and utilize objects within it. Adopting Dr. Young Lee's indoor environmental quality criteria for human performance, health, and well-being, the study analyzes spaces and objects for evidence of user behaviors in MSU's main library. The study investigates various aspects of environment and human behavior issues including spatial, technical, physical, sensory, social, cultural, and/or psychological elements throughout the major user spaces in the library consisting of the Cyber Café, study areas, computer stations, and lounge areas. The study offers insight into user behavioral patterns by providing an understanding of appropriate spatial planning, lighting, furniture arrangements, and material and furniture types better suited for the main library. It highlights evidence-based practice and integrating research to practice as an essential component for successful library planning that contributes to student performance, health, and well-being in order to prepare MSU's students for future success.

FOLLOW MY LEAD: IMPORTANCE OF PARENTAL RESPONSIVENESS TO CHILD'S INITIATIONS

Hiba Naseem, Ashley Martin

Category: Social Science: General, Section 2

Poster: 360

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

Mentor(s): Claire Vallotton (Human Development and Family Studies)

Prevailing literature surrounding the development of language within children asserts the chief importance of a shared intentionality. Shared intentionality in this regard implies "collaborative interactions in which participants share psychological states with one another" (Tomasello & Carpenter, 2007). The goal of this study is to examine whether parents' responsiveness to child's verbal and nonverbal initiations predicts the development of expressive language skills. We hypothesize that parents who are more responsive, specifically to their child's initiations, have children who have higher expressive language scores. The methodology employed in this research includes 30 parent-child dyads with child age ranging from 10 to 14 months. Each dyad participated in a sensitivity exercise, also known as a free play activity, and another exercise to measure the expressive development for each respective child. During the free play parents were asked to interact with their children as they normally would for a total of seven minutes. These episodes were videotaped and later coded on a 19-item scale. We will use a subset of the scale items that are most related to parents' responses to children's initiations. For the second protocol the children's language was measured using the Bayley Scales of Infant Development Language subscales. To address our hypotheses, we will use correlations to assess the relationship between parent responsiveness to children's initiations and children's expressive language scores. The results of this study will have implications for educating parents about the importance of effectively responding to their children's verbal and nonverbal cues in everyday interactions.

FOOD INSECURITY AND COPING STRATEGY AMONG ARIAL MOTHERS IN KENYA

Allison Apland

Category: Social Science: General, Section 2

Poster: 362

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

Mentor(s): Masako Fujita (Anthropology)

Food insecurity is a situation where people do not have the ability or means to get the foods they need. They deal with this problem by using coping strategies to manage the quality and quantity of food that they consume. Coping strategies provide the link between food insecurity and health implications through nutritional intake, so by examining the relationship between food insecurity and coping strategies, it is possible to clarify the pathways between food insecurity and negative health consequences. The goal of this study was to investigate the relationship between food insecurity and a coping strategy among breastfeeding mothers, using 2006 data from Ariaal agropastoral communities in rural Kenya. The study used a food insecurity index based on interview data about access to key food items. A specific coping strategy was identified by analyzing 24-hour dietary recalls from these women, focusing on breakfast. At breakfast, some women were not able to include milk, a traditional part of women's diets among the Ariaal. Not including milk in breakfast can be viewed as a coping strategy to stretch resources. Preliminary results using a chi-square test show significant ($p < 0.05$) association between women with greater food insecurity and women who did not have milk at breakfast. A relationship between food insecurity and this coping strategy provides the foundation for further studies in this population. Future research will continue to investigate the connection between food insecurity, coping strategy, and nutritional intake, as well as other health implications.

CULTIVATING CREATIVITY AND INNOVATION IN MSU EMPLOYEES-ENGAGING THROUGH DISENGAGE SPACES

Larissa Fedoroff

Category: Social Science: General, Section 2

Poster: 370

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

Mentor(s): Young Lee (Interior Design)

This research seeks to address how to improve employee work performance by incorporating the concept of creative workplaces into the current design of campus office spaces at Michigan State University. According to literature on creative economy, employee innovation and creativity are known to be critical to organizational success, especially in this economically challenging period. Using the attributes of creative workplaces, this study aims to analyze how current MSU offices are designed, and offer design strategies to increase MSU employees' creativity and innovation. The study focuses on the concept of "disengage spaces," one of the criteria of creative workplace design developed by Dr. Young Lee. A disengage space physically takes you away from your desk and provides you with a space where you can partake in non-work related activities that encourage innovation and creativity. Through a literature review on workplace design, I have found that this type of space is frequently used in many highly innovative organizations as an effective method to improve employee creativity. The study will carry on a comparative investigation between two facilities: MSU's Hannah Administration Building and the "Design Yard" at Herman Miller, in Zeeland, Michigan, which has been identified as a very innovative workplace. By comparing the Hannah Administration Building to the Design Yard, this study intends to highlight similarities and differences in design qualities and features regarding disengage spaces between the two facilities. Based on this comparative analysis, this study will provide design strategies and considerations for future implications at Michigan State University.

HISTORY OF THE WOMEN'S BUILDING

Bethany Slon

Category: Social Science: General, Section 2

Poster: 371

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

Mentor(s): Lynne Goldstein (Anthropology)

Despite the incredibly large amount of space it takes up on the MSU campus and the large number of students who pass by and through the building every day, there is little common knowledge about the beginnings of Morrill Hall and the women who originally inhabited this building. Through my visitations to the MSU archives, I was able to look at scrapbooks made by female students who attended the college between the years 1900 and 1925. From pictures, invitations to clubs, programs to special events, letters and awards, I can piece together what these students valued most during their years at MAC, and it all eventually traces back to their home, the Women's Building. This presentation will examine the entrance of female students into the college and how their presence led to the construction of the Women's Building, later to be named Morrill Hall. The original design and function of each room will be included, in addition to the impact the building had on the campus. The poster

will highlight what was important to these women, what they learned, what they liked to do in their free time, and how much Morrill Hall acted as a home. Morrill Hall won't be with us much longer; it is planned to be demolished in 2013. It is a huge piece of history on this campus, and it is important that the stories and the information it holds are incorporated into future plans before this information is forgotten.

Poster Presentations, Section 3

PHOTOGRAPHS OF SUFFERING: SOLIDARITY, REPRESENTATION AND PSYCHOLOGY

Katherine Schaller

Category: Social Science: General, Section 3

Poster: 363

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

Mentor(s): David Kim (German and Global Studies)

Joseph Stalin reportedly said that while “one death is a tragedy, a million is a statistic.” Though he was not a figure who exemplified caring for others, what he observed about death proved to be correct. This presentation explores the limits of solidarity through the lenses of psychology, art, and ethics to understand why people are moved by the visual representation of one death, and less so of innumerable deaths. More specifically, I examined photographs from an art exhibit featuring the crisis in Darfur to determine why a photo of one suffering individual compels people to feel more compassion. I will invite visitors to view such photographs themselves to determine if, in reality, they do feel more in solidarity with the suffering individual than with the group.

THE SKELETAL ANALYSIS OF 4-M-142: A MEDIEVAL NUBIAN CEMETERY AT MICHIGAN STATE UNIVERSITY

Valerie Leah

Category: Social Science: General, Section 3

Poster: 364

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

Mentor(s): Todd Fenton (Anthropology)

Although research of human skeletal remains during the Medieval period has been conducted on individuals from other regions of Africa, very little is known about human Nubian life in the area of the 4th Cataract of the Nile River. Thus, the aim of this research was to provide the demographics and skeletal profiles of the Nubian individuals comprising the 4-M-142 Christian cemetery from ed-Doma (in the 4th Cataract), allowing future research projects to be conducted in the MSU Nubian Bioarchaeology Laboratory. The twenty-eight individuals currently housed at Michigan State University were analyzed in two phases: Phase I focused on adults, while Phase II focused on juveniles. Standards for data collection and analysis set forth by Buikstra and Ubelaker (1994) were used during both Phases to assess skeletal age, biological sex, stature, skeletal morphology, trauma, stress indicators, and disease. As mummification was commonly present, some soft-tissue and artifact analysis was also completed as necessary. Specific curation procedures were followed to allow preservation of these individuals. The results of this inquiry contribute to the research conducted on the Mis Island Nubian Skeletal Collection at MSU, and help to provide a better understanding of how life was both similar and different across diverse areas of Medieval Nubia. Further research (e.g.: isotope analysis) on both this cemetery and cemeteries from surrounding areas is necessary for a more complete picture of how life was lived in Christian, Medieval Nubia which, may in turn, provide insight into how lives are lived in the same areas today.

FACTORS AND TRENDS AFFECTING INTEREST IN STEM CAREER PATHS BETWEEN GENDERS FROM GRADE SCHOOL TO COLLEGE

Madalyn Parker, Charlotte Lee, Shayna Taylor

Category: Social Science: General, Section 3

Poster: 365

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

Mentor(s): Ryan Sweeder (Chemistry)

This retrospective study investigates which factors affect change in interest in science, technology, engineering, mathematics (STEM) careers from elementary school to college. An online survey of 279 college students and graduates over the age of 18 was conducted. 66% of respondents were female and 34% were male. 64% of respondents pursued a STEM career while 36% pursued non-STEM careers. Based on this population, there was no significant difference between genders for interest in STEM over time. The aim of this study is to determine the age at which interest in pursuit of a STEM career becomes most defined and the factors contributing to interest and/or disinterest in STEM careers at that age. Hopefully this discovery can influence target populations for outreach events and further decrease the gender gap in STEM fields.

A PSYCHOMETRIC EVALUATION OF SCHEIN'S (1985) CAREER ORIENTATION INVENTORY

Emily Pacic

Category: Social Science: General, Section 3

Poster: 366

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

Mentor(s): Frederick Leong (Psychology)

Research pertaining to careers has typically focused on an individual's initial career selection (Betz, 1991; Holland, 1973). Career decisions following the initial choice, such as mid-career transitions, has been given little attention among psychologists. Schein (1985) developed career anchors and the Career Orientation Inventory (COI) to address such a deficit. The COI was designed to measure the career anchors which were designed to help individuals select an area of expertise within their field. Career anchors are impacted by experience and knowledge thus effectively reflecting a change in a person's disposition. Although the COI could be used as an effective career decision tool, it has not been validated. This study attempts to assess the validity the COI by running an exploratory factor analysis, calculating the reliabilities of its subscales, and by correlating it with an existing career measure to examine its convergent. The COI has 41 items, and we found 11 factors which accounted for 72.49% of the variance among the items. Schein (1985) originally proposed 9 factors for this measure. Reliabilities of the subscales were reasonable, and the anchors showed some convergent and divergent validities with Holland's (1973) career interests subscales. The items in the COI were correlated with Holland's (1973) career interests measure to examine its convergent and divergent validities, and showed limited relationships. Strengths and weaknesses of the COI are discussed based on findings from the study, and suggestions on the use and interpretation of COI are proposed.

EXPLORING THE USE OF PREHISTORIC STONE BOX GRAVES AND THE ROLE OF BURIAL TREATMENTS: A REANALYSIS OF THE EAST ST. LOUIS STONE QUARRY SITE CEMETERY (CA AD 1300)

Kaitlin Scharra

Category: Social Science: General, Section 3

Poster: 367

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

Mentor(s): Lynne Goldstein (Anthropology)

Many small late-Mississippian sites (ca AD 1300) share a common characteristic: inclusion of stone box graves. These features are present in only a small set of larger societies, and they have not been widely explored in Mississippian studies. The East St. Louis Stone Quarry Site Cemetery is a small mortuary site (peripheral to the large town of Cahokia). Its size allows a manageable look at the type and use of stone boxes graves. The site, located in southwestern Illinois, reflects social roles in smaller Mississippian societies. My reanalysis of the 1980 excavation field report takes a temporal approach, focusing on changing patterns throughout the use of the cemetery. I have been able to determine the order in which the graves were laid. By graphically deconstructing the site map based on grave position, I was able to initially divide the site into seven sequential stages. Further analysis of these stages consolidated the site's history into two functional periods, separated by the incorporation of large amounts of limestone. Stage 1 utilized a limestone platform and pit graves with few grave accompaniments and primary burials with few secondary interments, and Stage 2 incorporated box graves and showed an increase in grave goods and more widespread use of secondary burials. This investigation shows alterations in the social structure of smaller Mississippian societies, indicating that they had more intricate social dynamics than previously believed.

OBAMACARE: ITS IMPLEMENTATION AND EFFECTS ON AMERICANS

Rachel Hatt

Category: Social Science: General, Section 3

Poster: 368

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

Mentor(s): Matthew Grossmann (Political Science)

Currently in the United States, our health care system is undergoing a significant renovation after the passing of President Obama's Patient Protection and Affordable Care Act (PPACA), but many Americans are still unsure how this mandate affects them. Under the PPACA, states have many decisions to make such as whether or not they should agree to expand their Medicaid programs and what type of health exchange system they are willing to agree upon. With all these complicated elements that are included in the PPACA, it is not surprising that many Americans are perplexed with how PPACA will be implemented. The focus on this particular research project is to address specifically how the PPACA is being implemented in Michigan, and how this implementation will affect Michigan's people. It will also discuss differences in implementations between various other states and how other states are faring in the same decision making that Michigan is going through. It is important for the public to be informed on the specific workings of this intricate federal health care law because it affects all of us.

SEXUAL WELL-BEING RESOURCES FOR OLDER WOMEN

Angela Bedz

Category: Social Science: General, Section 3

Poster: 369

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

Mentor(s): Anne Hughes (Social Work)

The purpose of this project is to determine if the materials that we have developed are understandable and useful to the desired population (older women in the community). This project aims to provide women with sexual dysfunction resources on self-management and self-care. The women in the focus groups will review the educational materials that we have developed and give feedback about the content's usefulness, coverage, and any missing information that they think would be helpful to include in the educational materials. Developed materials cover the following topics: 1. defining sexual dysfunction 2. how the dysfunction impacts relationships 3. resources to aid in managing the dysfunction 4. living with the dysfunction and utilizing supports 5. reflections on changes and moving forward with the dysfunction. Focus group women will be given a copy of the materials with a brief explanation and asked for feedback. Their responses will be recorded and transcribed. Responses will be used to enhance the educational materials.

Social Work

Poster Presentations, Section 1

BARRIERS TO TRAUMA TREATMENT FOR BIOLOGICAL PARENT POPULATION

Alexa Thompson

Category: Social Work, Section 1

Poster: 295

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

Mentor(s): Paul Freddolino (Social Work)

Project Return Home (PRH), a program of Bethany Christian Services (BCS), provided trauma treatment to children ages 3 through 18 who had been removed from their homes due to child abuse, neglect, or maltreatment. Trauma treatment was also provided to their biological parents, who frequently struggled with their own unresolved sources of childhood trauma. Initial outcomes from data/document analysis and staff interviews have indicated significant barriers to treatment for biological parents, resulting in high withdrawal rates and insignificant PTSD improvement scores. This study analyzes the characteristics of successful versus non-successful cases, and the implications for future trauma-informed work with the adult population.

INTIMATE PARTNER VIOLENCE AND HELP SEEKING IN COLLEGE STUDENT RELATIONSHIPS

Megan Kelly, Michelle Kaiser

Category: Social Work, Section 1

Poster: 296

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

Mentor(s): Hyunkag Cho (Social Work)

Intimate partner violence (IPV) is the perpetration of violence between any two individuals who identify as partners. The purpose of this study was to examine the relationships between self-identification of participation in abusive dating relationships and help seeking behaviors. Researchers contacted students, whose information was collected last year in an online survey, to set up interviews. Interviews focused on gathering qualitative information about college students, their dating relationships, help seeking, and opinions about the prevalence of IPV on college campuses.

COMMUNITY MENTAL HEALTH RECOVERY ENHANCING ENVIRONMENT STUDY

Samantha Morgan

Category: Social Work, Section 1

Poster: 297

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

Mentor(s): Marya Sosulski (Social Work)

In 2010, the Recovery Enhancing Environment Study administered surveys, focus groups, and interviews to examine individual responses to mental health treatment and services and the impact this organizational environment plays in the enhancement of recovery. Research has already shown that personal experiences, peer support, and stigma play crucial roles in mental health recovery. The survey had been re-administered in 2012 to portray questions focused on consumers' experiences with Community Mental Health services, government assistance programs (Medicaid, Housing, and Social Security), and various personal experiences. REE objectives include finding ways that Community Mental Health and federal services can better meet the needs of the mentally ill and how individual experiences may play a key role in recovery. There will be a particular focus on the advantages of peer support, and the effects it has within the Community Mental Health environment. Further research in this area is fundamental to cater to the needs of the mentally ill by enhancing the programs of community and government services.

RECENT VICTIMIZATION, MENTAL HEALTH, AND SOCIAL WORK NEEDS OF WOMEN IN JAIL.

Amanda Freis

Category: Social Work, Section 1

Poster: 298

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

Mentor(s): Sheryl Pimlott-Kubiak (Social Work)

Women are entering jails at increasingly high rates and often present with multiple factors including extensive trauma

histories, mental health and substance use treatment needs with a variety of psycho-social needs post-release. While information exists about the prevalence of abuse and mental health disorders, little is known about the connections of these factors for women in jail. The sample included 463 women in a Midwest, urban jail. A survey was given that included questions about physical and sexual abuse within the past year, as well as screening measures of depression, anxiety, and serious mental illness. Women in the sample were divided into three categories based on their experiences of violence within the past year: (1) women with no experiences of victimization (49.9%); (2) women who had experienced either physical or sexual victimization (34.3%); and (3) women who had experienced both physical and sexual victimization (15.8%). There were significant differences between these groups. A higher proportion of women with any abuse histories had positive screens for depression, anxiety, and serious mental illness than women without abuse experiences. In particular, women who had experienced both sexual and physical abuse within the past year had the highest proportion of positive screens for the mental health disorders. Future assessments on service delivery and support for women in jail should consider the connections between recent victimization types and current mental illnesses that are prevalent in these three groups of women.

ADULT MENTAL HEALTH: THE RELATIONSHIP BETWEEN STIGMA WITH RACE, GENDER, AND CLASS EFFECTS ON CLIENTS PERCEPTIONS OF MENTAL HEALTH RECOVERY

Heather Foster

Category: Social Work, Section 1

Poster: 299

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

Mentor(s): Marya Sosulski (Social Work)

Stigma is cited as a major barrier to receiving or fully participating in mental health services. Although research has been done on mental health outcomes there is more to learn about the perceptions from clients' with severe mental illness regarding their own recovery and how this relates to stigma they encounter. Community Mental Health Authority-Clinton Eaton Ingham County(CMHA-CEI) provides a wide range of community-based services to enhance clients' recovery process. In 2010 the Recovery Enhancing Environment (REE) survey was administered to clients at CMHA-CEI. Due to the substantive results of the first administration, a retest comparison was implemented in 2012 composing a longitudinal study. The new mixed methods pilot study examines the clients' perception of recovery, needs and gaps in mental health care. The 2012 REE survey coupled with focus groups and interviews expands the scope of data. Based on a preliminary sample of quantitative data, 100 REE surveys were re-administered and analysis done in statistical software. Focus groups including 39 participants provided qualitative data and the narratives will be analyzed in a mixed-methods web application. Major themes include stigma of mental illness, race, gender, and class in relation to recovery.

FIELD EDUCATION WORKING TO BRIDGE THE KNOWLEDGE GAP SURROUNDING POLICY FOR BOTH FIELD INSTRUCTORS AND STUDENTS

Alisson Jahr

Category: Social Work, Section 1

Poster: 300

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

Mentor(s): Julie Navarre (Social Work Field Education)

Field education in Social Work provides students with hands on learning experiences that are crucial when developing skills necessary to enter the professional world. At the end of field placement, students and field instructors are asked to rate student's understanding of 10 competencies, one of which addresses social policy. Social policy is considered highly valuable in the learning experience, yet recent literature suggests inconsistencies with effective processes to teach and retain information surrounding policy. According to information gathered from outcome surveys that were collected from 2009-2012 by the Field Education Office, it's assured that Social Work students and field instructors at MSU rate themselves and their students lower in regards to social policy competency. This study hypothesized that students rate themselves lower than field instructors rate them because students feels less competent in policy due to lack of professional practice. Also, field instructors often rate students higher in policy because the instructor feels less confident in their own knowledge. Data retrieved from a follow up survey conducted in 2012 revealed that the qualitative responses of 117 students and 124 field instructors reflect 24.7% of student responses and 24% of field instructor responses correlated directly with the hypotheses. This, along with other supporting data proves that an intervention within the program to better incorporate social policy into field education is a necessary revision. Implications of this study will not only strengthen the education model at the MSU School of Social Work but could influence programs across the entire nation.

LIFE HISTORY REVIEW OF OLDER ADULTS WITH MENTAL ILLNESS: COMPARING EARLY AND LATE ONSET

Megan Fritsch

Category: Social Work, Section 1

Poster: 301

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

Mentor(s): Amanda Woodward (Social Work)

Although previous research has found important differences between adults with early- vs. late-onset mental illness, little research has studied how the use of professional services and informal supports for these two groups changes over the life course. This pilot project used semi-structured interviews and a modified life history calendar (LHC) approach to better understand older adults' experiences of mental illness and mental health service use. Participants were recruited from the Department of Community Mental Health Older Adult Services. Together the respondent and interviewers constructed a life history calendar that described major life transitions such as schooling, marriage and employment, and transitions in and out of treatment. The goal of this process was to better understand the connection between experiences with mental illness and the broader context (e.g., family and community, personal and professional relationships, etc.) The interviews were audio taped and transcribed, then reviewed for common themes. Preliminary results suggest that older adults' experience with mental illness and mental health service use over the life course is consistent with Pescosolido's idea of "muddling through". That is, service users tend to not seek treatment on their own, but do not resist treatment when provided. Results from this study further inform our understanding of aging and mental illness. Future research in this area can help improve access and pathways into care.

THE RELATIONSHIP BETWEEN ASPECTS OF COMMUNITY INTEGRATION AND RECOVERY AMONG PARTICIPANTS IN ADULT MENTAL HEALTH SERVICES OF CMHA-CEI

Jennifer Campbell

Category: Social Work, Section 1

Poster: 302

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

Mentor(s): Marya Sosulski (Social Work)

Research has been done on recovery and community integration, including studies focusing on the effects of deinstitutionalization (physical integration) and the involvement with the community (social integration). There is no uniform definition of recovery or community integration. Research is lacking on psychological integration, which is how people perceive community integration, and its implications for policy and treatment options. This study was a pilot study with Community Mental Health Authority in Clinton, Eaton, and Ingham counties (CMHA-CEI). The research question examined consumers' views of integration in terms of presence in the community (physical integration), quality of social network interactions (social integration), and personal perceptions of relationships (psychological integration), which may be different than the views to which society conforms. Recovery Enhancing Environment (REE) surveys, which gave Likert-scale questions about recovery, community integration, and demographics, and focus groups, which gave in-depth analyses of experiences among adults with severe mental illness, provided mixed-methods data. A sample of eighty surveys analyzed with SPSS and six focus groups (with thirty-five participants total) analyzed with Dedoose, a mixed-methods software, showed qualitative and quantitative trends. Major themes included the intersectionality of physical integration, social integration, and psychological integration and their relationship with the process of recovery.

Research Mentors

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David Arnosti, Biochemistry and Molecular Biology
Eric Aronoff, Residential College in the Arts and Humanities
Per Askeland, Chemical Engineering and Materials Science
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Mark Aupperlee, Physiology
Rafael Auras, Packaging
Mark Axelrod, James Madison College
Melissa Baese-Berk, Communicative Sciences and Disorders
Susan Bandes, Art, Art History and Design
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Scott Barton, Chemical Engineering and Materials Science
Randy Beaudry, Horticulture
Mark Becker, Psychology
Bridget Behe, Horticulture
Erica Beidler, Kinesiology
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Norman Birge, Physics and Astronomy
Laura Bix, Packaging
Ryan Black, Political Science
Adrian Blow, Human Development and Family Studies
Carl Boehlert, Chemical Engineering and Materials Science
Howard Bossen, Journalism
Janette Boughman, Zoology
Dan Brainard, Horticulture
Jerrod Braman, Radiology
Federica Brandizzi, Plant Biology
Brent Donnellan, Psychology
Henry Brimmer, Advertising
Robert Britton, Microbiology and Molecular Genetics
Bonnie Bucqueroux, Journalism
S. Alexandra Burt, Psychology
Daniel Buskirk, Animal Science
Christy Byrd, Teacher Education
Scott Calabrese Barton, Chemical Engineering and Material Science
Dorinda Carter, Teacher Education
Sue Carter, Journalism
Christina Chan, Biochemistry and Molecular Biology
Chi-Kwong Chang, Chemistry
Soo-Eun Chang, Communicative Sciences and Disorders
Shicheng Chen, Microbiology

Scott Chiu, Writing, Rhetoric, and American Cultures
Hyunkag Cho, Social Work
Jose Cibelli, Animal Science
Hilary Clayton, Large Animal Clinical Sciences
Laura Cloud, Art, Art History, and Design
Jennifer Cobbina, Criminal Justice
Dirk Colbry, Institute for Cyber-Enabled Research
Susan Conrad, Microbiology
Constantinos Coursaris, TISM
Tracey Covassin, Kinesiology
Tobin Craig, James Madison College
Faith Cullens, Extension Education
Shari Dann, CARRS
Judith Danovitch, Psychology
Frank Dazzo, Microbiology and Molecular Genetics
Nancy DeJoy, WRAC
Dean DellaPenna, Biochemistry and Molecular Biology
Denise Demetriou, History
Amy DeRogatis, Religious Studies
Daneille Devoss, WRAC
Laura Dilley, Communicative Sciences and Disorders
Kirk Domer, Theater
Emily Durbin, Psychology
Fred Dyer, Zoology
Joey Eisenmann, Radiology
Ross Emmett, James Madison College
Marisa Erasmus, Animal Science
Jayda Erkal, Chemistry
Mohamed Faisal, Pathobiology and Diagnostic Investigation
Louis Faivor, Biosystems and Agricultural Engineering
Eva Farre, Plant Biology
Mark Farrugia, Biochemistry and Molecular Biology
Kate Fedewa, WRAC
Michael Feig, Biochemistry and Molecular Biology
Deborah Feltz, Kinesiology
Kimberly Fenn, Psychology
Jenifer Fenton, Food Science and Human Nutrition
Todd Fenton, Anthropology
Monique Floer, Biochemistry and Molecular Biology
Michele Fluck, Microbiology and Molecular Genetics
Samuel Forlenza, Kinesiology
Hannah Forsythe, Linguistics & Germanic, Slavic, Asian, and African Languages
Paul Freddolino, Social Work
Masako Fujita, Anthropology
John Fyfe, Microbiology and Molecular Genetics
Kathleen Gallo, Physiology
Jessica Gamache, Linguistics & Germanic, Slavic, Asian, and African Languages
Xia Gao, Art, Art History, and Design
Fred Gifford, Philosophy
Barbara Given, Nursing

Charles Given, Family Medicine
 Jennifer Goett, James Madison College
 Lynne Goldstein, Anthropology
 Sabrina Gonzalez-Jorge, Biochemistry and Molecular Biology
 Lissy Goralnik, Fisheries and Wildlife
 Meredith Gore, Fisheries and Wildlife
 Dan Gould, Kinesiology
 Norman Graham, James Madison College
 Julia Grant, James Madison College
 Darcy Greene, Journalism
 Matt Grossmann, Political Science
 Troy Hale, TISM
 Brian Hampton, Geological Sciences
 Min Hao, Biochemistry and Molecular Biology
 Sandra Haslam, Physiology
 Salah Hassan, English
 Robert Hausinger, Microbiology and Molecular Genetics
 Roger Haut, Radiology
 Eric Hegg, Biochemistry
 R. William Henry, Biochemistry and Molecular Biology
 Gretchen Hill, Animal Science
 David Hodge, Chemical Engineering
 Charles Hoogstraten, Biochemistry
 Christopher Hopwood, Psychology
 Kathryn Houghton, WRAC
 Patricia Huddleston, Advertising and Public Relations
 Anne Hughes, Social Work
 Brooke Ingersoll, Psychology
 Rufus Isaacs, Entomology
 Austin Jackson, Assistant Professor
 James Jackson, Chemistry
 Cynthia Jackson-Elmoore, Dean of Honors College
 Rebecca Jacobsen, Teacher Education
 Sanghyup Jeong, Biosystems and Agricultural Engineering
 Louise Jezierski, James Madison College
 Anning Jing, Art, Art History, and Design
 Laura Julier, WRAC
 Florian Kagerer, Kinesiology
 LeeAnn Kaiser, Large Animal Clinical Sciences
 Donatien-Pascal Kamdem, Packaging
 Darrin Karcher, Animal Science
 Kazem Kashefi, Microbiology and Molecular Genetics
 Lannay Kazmirzack, Kinesiology
 Jason Keagy, Zoology
 Candace Keller, RCAH
 Christine Kermond, Psychology
 Mohammad Khalil, Religious Studies
 David Kim, Linguistics & Germanic, Slavic, Asian, and African Languages
 Elisa Kim, Psychology
 Dana Kirk, Biosystems and Agricultural Engineering
 David Kirkland, WRAC
 Jason Knott, Animal Science
 Benjamin Koestler, Microbiology and Molecular Genetics
 Donna Koslowsky, Microbiology and Molecular Genetics
 David Kramer, Biochemistry and Molecular Biology
 Leslie Kuhn, Biochemistry
 Rajesh Kulkarni, Mathematics
 Robert LaDuca, Chemistry
 Rex LaMore, Urban and Regional Planning
 Doug Landis, Entomology
 Mark Largent, James Madison College
 James Lawton, Art, Art History, and Design
 Young Lee, Interior Design
 Richard Lenski, Microbiology and Molecular Genetics
 Frederick Leong, Psychology
 Weiming Li, Fisheries and Wildlife
 Julie Libarkin, Geological Sciences
 Sean Liddick, Chemistry
 Thomas Loch, Pathobiology and Diagnostic Investigation
 Adam Lock, Animal Science
 Sandra Logan, English
 Tammy Long, Plant Biology
 Doug Luckie, Physiology
 Richard Lunt, Chemical Engineering and Materials Science
 Malcolm Magee, History
 Shannon Manning, Microbiology and Molecular Genetics
 Linda Mansfield, Large Animal Clinical Sciences
 Paul Mantica, Chemistry
 Bradley Marks, Biosystems and Agricultural Engineering
 Eric Martin, Kinesiology
 Devin McAuley, Psychology
 Laura McCabe, Physiology
 Jeanette McGuire, Zoology
 Matthew McKeon, Philosophy
 Leonel Mendoza, Biomedical Laboratory Diagnostics Program
 Kei Minamisono, Cyclotron
 Terese Monberg, RCAH
 Ryan Moran, Kinesiology
 Merry Morash, Criminal Justice
 Tuuli Morrill, Communication Sciences and Disorders
 Marcin Morzycki, Linguistics & Germanic, Slavic, Asian, and African Languages
 Jason Moser, Psychology
 Lanay Mudd, Kinesiology
 Alan Munn, Linguistics & Germanic, Slavic, Asian, and African Languages
 Cheryl Murphy, Fisheries and Wildlife
 Debra Nails, Philosophy
 Ramani Narayan, Chemical Engineering and Materials Science
 Julie Navarre, Social Work
 Steve Nocker, Horticulture
 Bo Norby, Large Animal Clinical Sciences
 Adesuwa Olomu, Medicine
 Karl Olson, Physiology
 David Orban, Zoology
 Peggy Ostrom, Zoology
 Joyce Parker, Geological Sciences
 Ronald Patterson, Microbiology and Molecular Genetics
 Amber Peters, Fisheries and Wildlife
 Karin Pfeiffer, Kinesiology
 Natalie Phillips, English
 Sheryl Pimlott-Kubiak, Social Work

Jim Pivarnik, Kinesiology
 Tim Pleskac, Psychology
 Matt Pontifex, Kinesiology
 Liza Potts, WRAC
 David Poulson, Journalism
 Nathan Praschan, Public Health
 Denis Proshlyakov, Chemistry
 Linda Racioppi, James Madison College
 Emilee Rader, TISM
 Rabindra Ratan, TISM
 Matt Raven, CARRS
 Marcie Ray, Musicology
 Sarah Reckhow, Political Science
 Gemma Reguera, Microbiology and Molecular Genetics
 Kristen Renn, Educational Administration
 Joanne Riebschleger, Social Work
 Shawn Riley, Fisheries and Wildlife
 Jon Ritz, WRAC
 Tryone Rooney, Geological Sciences
 Robert Root-Bernstein, Physiology
 Joan Rose, Fisheries and Wildlife
 Carey Roseth, CEPSE
 Brad Rowe, Horticulture
 Chong-Yu Ruan, Physics and Astronomy
 Ann Marie Ryan, Psychology
 Elliot Ryser, Food Science and Human Nutrition
 Donnie Johnson Sackey, WRAC
 Steve Safferman, Biosystems and Agricultural Engineering
 Christopher Saffron, Biosystems and Agricultural Engineering
 Issidoros Sarinopoulos, Radiology
 Chris Scales, RCAH
 Jeffrey Schenker, Mathematics
 Cristina Schmitt, Linguistics & Germanic, Slavic, Asian, and African Languages
 Scott Schopieray, Arts and Letters
 Brian Schutte, Microbiology and Molecular Genetics
 Kim Scribner, Fisheries and Wildlife
 Satyaki Sengupta, Physiology
 Christine Shenouda, Psychology
 Janice Siegford, Animal Science
 Cheryl Sisk, Psychology
 Jill Slade, Radiology
 Sandi Smith, Communication
 Marya Sosulski, Social Work
 Dana Spence, Chemistry
 Sandra Spoelstra, Nursing
 Alicja Stannard, Kinesiology
 Kurt Steinke, Crop and Soil Sciences
 Janice Swanson, Animal Science
 Ryan Sweeder, Lyman Briggs Chemistry
 Xiaobo Tan, Electrical and Computer Engineering
 Rebecca Tegetmeyer, Art, Art History and Design
 Frank Telewski, Plant Biology
 Jetze Tepe, Chemistry
 Stuart Tessmer, Physics
 Laurie Thorp, CARRS
 Richard Triemer, Plant Biology
 Heather Triezenberg, Fisheries and Wildlife
 Nathalie Trottier, Animal Science
 Jean Tsao, Fisheries and Wildlife
 Brad Upham, Human Development and Pediatrics
 Mark Urban-Lurain, Center for Engineering Education Research
 Claire Valotton, Human Development and Family Studies
 Wietske Van Osch, TISM
 Leigh VanHandel, Music
 Pat Venta, Microbiology and Molecular Genetics
 Suzanne Wagner, Linguistics & Germanic, Slavic, Asian, and African Languages
 Edward Walker, Microbiology and Molecular Genetics
 Jessica Wallace, Kinesiology
 David Walton, African American and African Studies
 Rick Wash, TISM
 Christopher Waters, Microbiology and Molecular Genetics
 Brian Weaver, Engineering Mechanics
 Patty Sue Weber, Large Animal Clinical Sciences
 Erica Wehrwein, Physiology
 Tim Whitehead, Chemical Engineering and Materials Science
 Timothy Whitehead, Chemical Engineering and Materials Science
 Kyle Whyte, Philosophy
 Elizabeth Wieland, Communicative Sciences and Disorders
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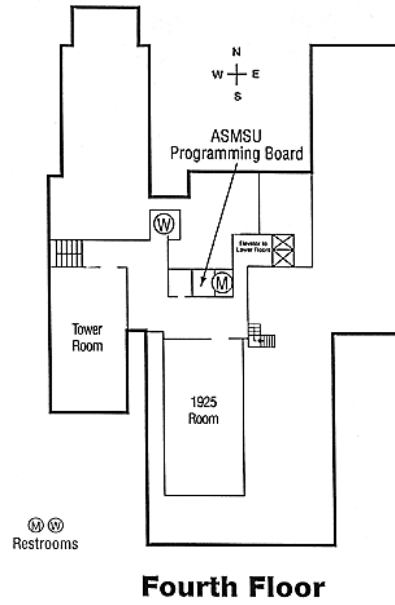
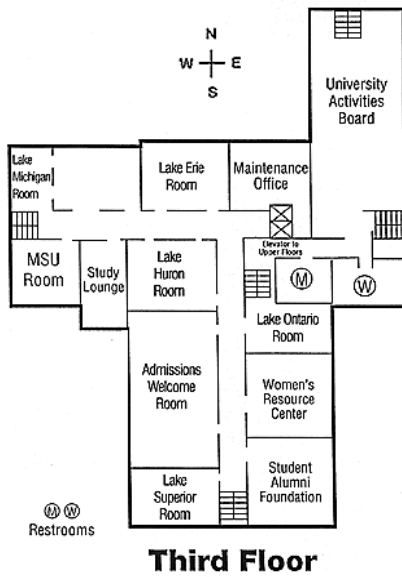
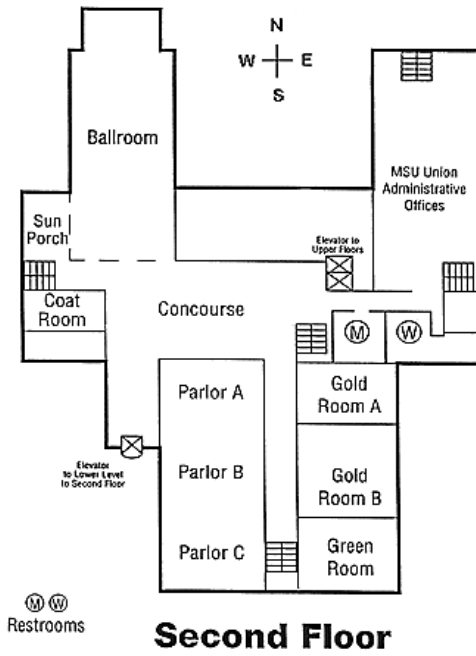
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