

6th Annual
**Student Research and Creative
Activity Fair**



Final Proceedings

March 7, 2014

UNIVERSITY OF
Nebraska
Omaha



Dear UNO Community and Friends,


The 6th annual Student Research and Creative Activity Fair was a resounding success and a highlight of the year for the entire campus. Participation in this year's Fair reached an all-time high as 203 talented and motivated undergraduate and graduate students showcased their research and creative activity. Their presentations and displays were inspiring examples of the wealth of knowledge, inspiration, and talent that make up the UNO community. The student participants and their faculty mentors have my sincere thanks for their participation in the Fair. The world awaits their continued contributions to knowledge, community service, and artistic endeavors.

This event would not have been impossible without the invaluable contributions of UNO faculty and staff. Our session moderators – Juan Casas, Josh Darr, Paul Davis, Kate Dempsey, Shari DeVeney, Tim Dickson, Angela Eikenberry, Griff Elder, Jeff French, Matt Germonprez, Kristin Girten, Jeanette Harder, Sofia Jawed-Wessel, Brian McKevitt, Jody Neathery-Castro, Roni Reiter-Palmon, Marisol Rodriguez, Jeanne Surface, Jenna Yentes — kept the event running smoothly, and challenged the students with insightful questions. Mary Laura Farnham, Nancy Schlesiger, Mike Mohatt, Beth White, Stacy Newmaster, Catie Miller, and Amanda Overgaard of the Office of Research and Creative Activity assisted generously with logistics and encouragement. Special thanks go to Stacy Newmaster and Amanda Overgaard of ORCA who were the motivational forces behind this celebration and the linchpin of its success.

Community support is vital to the mission of any university and is especially important to UNO and its role as a metropolitan university. Our judges volunteered their time and talents and were rewarded by interacting with an amazing group of students. Our thanks go to judges Rhonda Ahrens, Nebraska Department of Insurance; Jon Anderson, LI-COR Biosciences; Ayanna Boykins, Omaha Community Foundation; Jon Burt, Knights of Aksarben Foundation; Adam Case, University of Nebraska Medical Center; Leandro Castro, MultiMech Research and Development LLC; Shonna Dorsey, Sogeti; John Falconer, University of Nebraska at Kearney; Anthony Flott, University of Nebraska at Omaha Alumni Association; Julie Griffin, ConAgra Foods; Traci Hancock, UNO Innovation Accelerator; Barbara Hayes, Hayes Environmental LLC; Kristina Haynie, Project Harmony; Brian Henkel, Papio-Missouri river Natural Resources District; Kendra Ingram, Omaha Performing Arts; Jef Johnston, Avenue Scholars Foundation; Jenny Kucera, University of Nebraska Medical Center; Glenn Leatherwood, Valmont Industries; Tim McIvor, Omaha Public Power District; Susie Melliger, Millard Public Schools; Monica Messer, Green Schingle; Desarae Mueller-Fichepain, Business Matters; Todd Morris, PayPal; Wendy Patterson, Early Childhood Services; Craig Preifert-Lutz, SectorNow; John Smith, THG Benefits; Mark Spadaro, Dyna-Tech Aviation Services; Lisa St. Clair, University of Nebraska Medical Center; Grant Stanley, CAN (Contemporary Analysis); Scott Tylski, ConAgra Foods; and Jim Vokal, Platte Institute for Economic Research.

A final thanks to all those colleagues, family, and friends who came to watch and learn at this year's celebration. I'm certain that you were as impressed by this collection of scholarship as was I and that you share my belief that our students are full partners in the present and future of research and creative activity at UNO.

Sincerely,



Scott D. Snyder
Associate Vice Chancellor

UNIVERSITY OF NEBRASKA AT OMAHA

**6TH ANNUAL STUDENT RESEARCH AND
CREATIVE ACTIVITY FAIR**

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**AT A
GLANCE:**

- 214 projects
- 94 undergraduate students
- 118 graduate students
- 2 post-doctoral fellows
- participation from all 6 UNO colleges
- 102 faculty advisors



The Student Research and Creative Activity Fair is administered by the Office of Research and Creative Activity at UNO and was made possible through the generous support of the Office of Sponsored Programs and Research and the Dr. C.C. and Mabel L. Criss Library.



SCHEDULE OF EVENTS

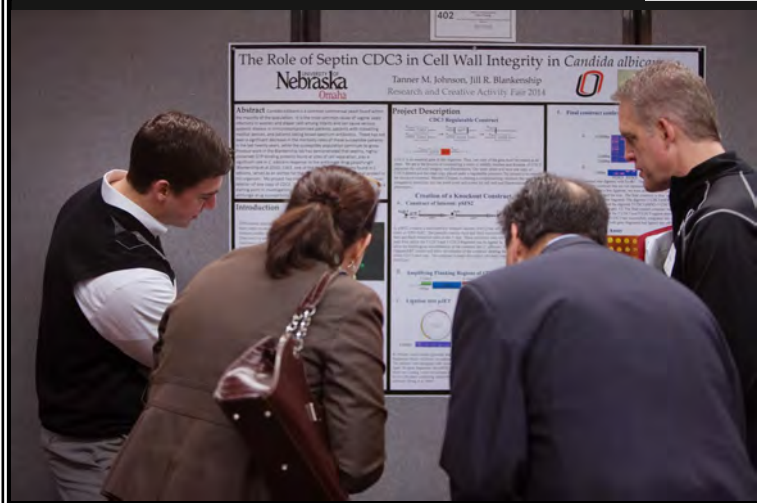
8:00 AM - 9:00 AM	Check-In for Participants	Criss Library
9:00 AM - 12:00 PM	Poster Presentations/Exhibits	Criss Library
	Oral Presentations/Performances	Criss Library
12:00 - 1:00 PM	Lunch Provided for All Student Participants, Faculty Advisors, and Judges	CPACS Commons
1:00 PM - 4:00 PM	Poster Presentations/Exhibits	Criss Library
	Oral Presentations/Performances	

FACULTY MODERATORS

Juan Casas	— Psychology
Jason Coleman	— Health, Physical Education and Recreation
Josh Darr	— Chemistry
Paul Davis	— Biology
Kate Dempsey	— Interdisciplinary Informatics
Shari DeVeney	— Special Education
Tim Dickson	— Biology
Angela Eikenberry	— Public Administration
Griff Elder	— Mathematics
Matt Germonprez	— Information Systems and Quantitative Analysis
Kristin Girten	— English
Jeanette Harder	— Social Work
Brian McKeivitt	— Psychology
Jody Neathery-Castro	— Political Science
Roni Reiter-Palmon	— Psychology
Marisol Rodriguez	— Nebraska Business Development Center
Jeanne Surface	— Educational Leadership
Jenna Yentes	— Health, Physical Education and Recreation

2014 COMMUNITY JUDGES

Jon Anderson —	LI-COR Biosciences
Ayanna Boykins —	Omaha Community Foundation
Jon Burt —	Knights of Aksarben Foundation
Adam Case —	University of Nebraska Medical Center
Leandro Castro —	MultiMech Research and Development LLC
John Falconer —	University of Nebraska at Kearney
Anthony Flott —	University of Nebraska at Omaha Alumni Association
Julie Griffin —	ConAgra Foods
Traci Hancock —	UNO Innovation Accelerator
Barbara Hayes —	Hayes Environmental LLC
Kristina Haynie —	Project Harmony
Brian Henkel —	Papio-Missouri River Natural Resources District
Kendra Ingram —	Omaha Performing Arts
Jef Johnston —	Avenue Scholars Foundation
Jenny Kucera —	University of Nebraska Medical Center
Glenn Leatherwood —	Valmont Industries
Maria Malnack —	University of Nebraska at Omaha Alumni Association
Tim McIvor —	Omaha Public Power District
Susie Melliger —	Millard Public Schools
Todd Morris —	PayPal
Desarae Mueller-Fichelain —	Business Matters
Wendy Patterson —	Early Childhood Services
Andy Rikli —	Papillion-LaVista Schools
Marty Skomal —	Nebraska Arts Council
John Smith —	THG Benefits
Mark Spadaro —	Dyna-Tech Aviation Services
Lisa St. Clair —	University of Nebraska Medical Center
Grant Stanley —	CAN (Contemporary Analysis)
Scott Tylski —	ConAgra Foods
Jim Vokal —	Platte Institute for Economic Research



Thank you to our judges for their time and assistance with the 6th Annual Student Research and Creative Activity Fair! Community representatives donated their time and experience to help evaluate the student presentations.

2014 FAIR AWARDEES

UNDERGRADUATE ORAL PRESENTATIONS/PERFORMANCES

Best **SEAN WEST**
“Integration of Domain Knowledge and Gene Expression Data in the Development of Enriched Correlation Networks”
Major: Bioinformatics
Faculty Advisor: Hesham Ali
Co-Author: Hesham Ali

Outstanding **CHRISTOPHER HARRIS**
“Effects of Developers’ Networks on Software Evolution”
Major: Theatre
Faculty Advisor: Sanjukta Bhowmick

Meritorious **OLAJIDE COOPER**
“Target language Acquisition Methodology Regarding Spanish Speaking Families with Deaf Children”
Major: Elementary Education
Faculty Advisor: Arturo Miranda

UNDERGRADUATE POSTERS/EXHIBITS

Best **BINA RANJIT**
“Localization ADAM Proteins Expressed by the MMD Gene in Neuronal Cells of Drosophila”
Major: Biotechnology
Faculty Advisor: Bruce Chase

Outstanding **SAMANTHA WORACEK**
“Nortorious: A Case Study of Marketing and Management Practices in Two Terrorist Organizations”
Major: Business Administration
Faculty Advisor: Gina Ligon
Co-Authors: Kay Connealy, Gina Ligon

Meritorious **BENJAMIN KNUTSON**
“A 2D Shape Recognition Package for Applications in Weapon Detection”
Major: Mathematics
Faculty Advisor: Renat Sabirianov
Co-Author: Renat Sabirianov





2014 FAIR AWARDEES

GRADUATE ORAL PRESENTATIONS/PERFORMANCES

Best **CHRISTIAN JANOUSEK**
"Examining Differences in Local Government Management Among U.S. States"
Major: Public Administration
Faculty Advisor: Robert Blair

Outstanding **MARYLEE MOULTON**
"Power Play: The Rhetoric of the NRA After Newtown"
Major: Communication
Faculty Advisor: Barbara Pickering

Meritorious **ZACH JACOBS**
"Something Worth Writing: The Antiochia Ad Cragum Arcaheological Research Project, Summer 2013"
Major: English
Faculty Advisor: Tammie Kennedy

GRADUATE POSTERS/EXHIBITS

Best **SAMANTHA WEISS**
"Women in Substance Abuse Treatment"
Major: Social Work
Faculty Advisor: Jeanette Harder

Outstanding **MAGGIE GOSSARD**
"Are You Man Enough? Exploring Compensatory Masculinization in Homosexual Men"
Major: Psychology
Faculty Advisor: Lisa Scherer
Co-Author: Dusten Crichton

Outstanding **DANIELLE SLAKOFF**
"Newsworthiness & The 'Missing White Woman Syndrome'"
Major: Criminal Justice
Faculty Advisor: Pauline Brennan
Co-Authors: Hank Fradella, Ryan Fischer

Meritorious **MICHAEL HOUGH**
"Improving Elderly Gait with a Structured Auditory Stimulus"
Major: Exercise Science
Faculty Advisor: Sara Myers
Co-Authors: Sara Myers, Steven Harrison, Shane Wurdeman, Denise McGrath, Nicholas Stergiou

UNDERGRADUATE ABSTRACTS

LAURA ALLEN

Undergraduate

The impact of perturbations on biochemical signal transduction networks

Majors: Mathematics and Biology

Faculty Advisor: Tomas Helikar

Anomalies within signal transduction networks can greatly affect a cell's function and result in disease. Approaching these anomalies from a systems perspective means studying the networks as a whole, rather than its constituents in isolation. Dynamical computer models of complex biological/biochemical processes can be simulated under thousands of environmental conditions, including diseased states, which can result in novel and improved drug therapies. Herein, we present a computational approach to study the systematic effects of various perturbations on a network as a whole using the Cell Collective (www.thecellcollective.org) platform, which allows laboratory scientists from all over the world to collaboratively build and simulate large models of different cell types. R statistical tool was used to analyze accumulated data from the Cell Collective of a large-scale dynamic model of signal transduction in fibroblast cells. Under death, growth, motility, quiescence, and random external conditions, we have identified proteins that have the most and least influence on the rest of the network, as well as proteins that are most and least susceptible to these perturbations. Also, we found proteins that are most and least sensitive to perturbations. We have also found the combination of protein properties (e.g., in-/out-degree, canalizing functions, etc.) is a better predictor for perturbation effects on the network than each individual property. Together, this supports the notion that dynamic, mechanism-based models allow for insight into potential identification of novel drug targets as well as the side effects of existing drugs.

BRETT ANDERSEN

Undergraduate

Seasonal activity of migratory tree bats (*Lasiurus* and *Lasionycteris*) in southeastern Nebraska using acoustic detectors

Major: Biology

Faculty Advisor: Jeremy White

Wind energy, while a valuable and growing source of renewable energy, has resulted in a significant impact on migratory bat populations throughout North America. Three of these species, the eastern red bat (*Lasiurus borealis*), the hoary bat (*Lasiurus cinereus*), and the silver-haired bat (*Lasionycteris noctivagans*), migrate through southeastern Nebraska, an area where there is potential for wind farm development. In this study, an acoustic detector was used to record echolocation calls as bats flew through a forest clearing in Otoe County from April to December 2013. Bat calls were identified by automated software programs and nightly counts of identified calls were tallied for each species. Based on our acoustic data, the three migratory species had different patterns of seasonal activity in southeastern Nebraska. Eastern red bats had the longest period of activity in the area; they were recorded consistently from early April until early December. Silver-haired bats were recorded from early April until early October, but most calls of this species were recorded in spring and few were detected in summer or fall. Hoary bats were consistently detected beginning in mid-May and their number of calls peaked in July, but dropped drastically by the beginning of August. Although more data needs to be collected over a broader area, this study contributes to our understanding of migratory patterns of tree bats in eastern Nebraska, which is an essential step in developing strategies to minimize bat fatalities at proposed wind energy facilities in the region.

BRETT ANDERSON

Undergraduate

Behavioral Research Concerning the Effects of Orally Administered Capsaicin on the Trigeminal Systems of Sprague-Dawley Rats

Major: Philosophy

Faculty Advisor: Suzanne Sollars

This research sought to discover whether exposing rats to increasing concentrations of capsaicin, the compound which is found in chili peppers and makes them spicy, would result in increased tolerance over time. To this end, 40 day old, female Sprague-Dawley rats were placed in one of two treatment conditions; receiving either capsaicin (starting at 2 ppm) in 30% sucrose in distilled water solution, or a control solution of 30% sucrose only. Since earlier studies observed an avoidance of capsaicin concentrations of 5 ppm and over, this study aimed to surpass that threshold by slowly increasing the concentration by 1.5 ppm every five days in hopes of slowly building up a

tolerance. Three behaviors of interest were recorded: latency to approach, consumption rate, and total amount of solution consumed, with the aim of quantifying capsaicin tolerance as compared to control solution consumption. This study sought to create an animal model of capsaicin exposure, to further reveal the behavioral nuances of tolerance creation in rats. Analysis is ongoing, but the significance of this project lies in the possibility of eliciting a more robust understanding of the connection between behavior and tolerance creation. Significant differences in the behaviors of interest between capsaicin and control animals would suggest possible changes to the trigeminal system as it relates to the tolerance phenomenon in the context of an animal model.

SARA AUSDEMORE

Undergraduate

Born in Service: Birth Experiences in Military vs. Civilian Hospitals

Major: Sociology/Anthropology

Faculty Advisor: Timi Barone

As women have increasingly entered the military or received health care as military dependents, the quintessential feminine experience of giving birth collides with an intensely masculine realm. This study examines if birth experiences differ between military and civilian health care facilities. Specifically, I interviewed women on perceived quality of care, the frequency of self-reported complications, and whether they reported an overall positive or negative birth experience during prenatal care, labor, and delivery. Results suggest that excellent care during delivery occurs in either environment. However, continuity of care (or lack thereof) and the lack of physical space exclusively for birth negatively affected the perceived quality of the birth experience for some military families. I discuss specific recommendations for how military facilities might improve the birth experience through small structural and organizational changes to positively affect the birth environment for women leading to better birth experience outcomes.

ALEX BAKER

Undergraduate

Oral Administration of Ethanol Effects on Taste Bud Volume in Neonatal Sprague-Dawley Rats

Major: Neuroscience

Faculty Advisor: Suzanne Sollars

Many studies of the taste system involve the administration of ethanol as a common solvent for taste solutions. Since the taste system of neonatal rats is still immature until 40 days of age and given that ethanol is a trigeminal irritant (tactile, thermal and/or pain sensation is affected), there are potential implications with the use of ethanol in taste research. In this experiment, neonatal rats were treated with either orally administered ethanol or sham solution to explore the potential interaction between the taste and trigeminal systems across the animals' development. This project measured the differences in taste bud volume between 20 female Sprague-Dawley rat pups, 10 of which received a solution containing ethanol (2.5% ethanol in a 30% sucrose solution) and the other 10 received a control solution (30% sucrose in distilled water). Treatment began at 5 days of age and continued for 40 consecutive days, with animals receiving a treatment once a day for 60 minutes. Half of the rats from each treatment condition were sacrificed 2 days post-treatment while the remaining rats were sacrificed 50 days post-treatments to investigate short and long-term effects, respectively. Animal tissue was sectioned, stained, and traced using NeuroLucida Software (MicroBrightField Inc.). Ongoing analysis aims to reveal if significant differences in taste bud volume are present between treatment groups. Regardless of the results, further research could explore the chemosensory responsiveness to ethanol at higher concentrations and help derive a threshold to ethanol-mediated taste bud morphology.

ELLIOTT BARBER

Undergraduate

The Relationship between Problem Construction and Malevolent Creativity

Major: Psychology

Faculty Advisor: Roni Reiter-Palmon

Co-Authors: Daniel Harris, Roni Reiter-Palmon

Creativity has often been regarded in a positive aspect, generally thought of as benefiting society. Although creativity can be beneficial, it can also be used for malevolent purposes. Malevolent creativity (MC) describes actions that are original and intentionally harmful. Regardless of positivity or negativity, individuals engage in a series of cognitive processes when confronted with a problem. The first step is called problem construction (PC); through this process, individuals restate the problem in a way that suits their understanding of the problem.

UNDERGRADUATE ABSTRACTS

Neither MC nor PC have been studied very much, so we were curious as to whether the originality of problem restatements would relate to the MC of problem solutions. To test that research question, undergraduate students from a Midwestern university participated in our study. Participants responded to a socially-oriented, hypothetical problem that was either positively-valenced or negatively-valenced. It was found that the number of original restatements—operationalized in three ways—positively related to the number of malevolently creative ideas generated to solve the problem. These results indicate that the more original an individual is at PC (in the form of generating original problem restatements), the more malevolently creative he or she may be when responding to the same problem. The practical implications of these results suggest that creativity in the workplace and in schools could yield higher instances of MC when students and employees are asked to think more about the problems they encounter (i.e., engage in more PC).

JUSTIN BARNES

Undergraduate

An Analysis of Physical Activity as a Potential Moderator of Work-School Conflict on Sleep Quality, Incivility, and Caffeine Intake

Major: Psychology

Faculty Advisor: Lisa Scherer

Work-school conflict (WSC) is a challenge facing many working college students. The increasing demands of work and school and hence WSC negative influence students' academic performance (Markel & Frone, 1998), increase their anxiety, stress and depression (Frone, 2000), and lower job and school satisfaction (Butler, 2007). Physical activity has been found to buffer stress (Weir, 2011) and therefore could potentially moderate the influence of work-school conflict on a variety of student outcomes. The purpose of this study was to investigate the negative effects of WSC, the positive effects of physical activity, and the interaction of both on sleep quality, caffeine intake, and incivility. College students (N=87) participated in a six-questionnaire online survey. Results revealed no moderation of WSC by Physical Activity for any outcomes; however, WSC was negatively related to sleep quality and caffeine intake was positively related to incivility.

KRISTIN BARNES

Undergraduate

The Difference in Approach Between Turkey's Kurdish and Alevi Communities: Signs of Intra-group Competition and State Interests

Major: Political Science

Faculty Advisor: Ramazan Kilinc

Why has European Union (EU) pressure been helpful for Kurdish reform in the state of Turkey, but not for Alevi reform thus far? Since independence in 1923, the state of Turkey has marginalized its minority groups. Recent reforms have allowed for increased recognition of some minority groups; however, Turkey's two largest minorities, Kurds and Alevis, have never been recognized by the constitution. The Kurdish issue in Turkey has been analyzed and debated by many scholars in the field of political science, especially in relation to the state's struggle to strengthen its democratic principles towards accession into the EU. The Alevi community, however, has gone largely unnoticed by the international community and pressure from the EU has failed to push significant Alevi reform in the state compared to the Kurdish issue. I hypothesized two different arguments that helped guide my research: first, the group in question, Alevis, have failed to mobilize reform due to competing group dynamics; second, the progression of Kurdish/Alevi reform is linked to serving the interests of strong political actors in Turkey (the ruling AK Party). As part of my FUSE undergraduate project, I wish to present my findings at the fair this spring. Additionally, this topic is a valuable asset for further understanding of the Gezi Park protests that occurred last May in Turkey.

MAGGIE BARTLETT

Undergraduate

Distinct Neurochemical Regions Within the Elephant Shark's (*Callorhincus milli*) Forebrain Suggest Evolutionary Conservation

Major: Biotechnology

Faculty Advisor: Laura Bruce

Co-Authors: Laura Bruce, Elizabeth England, Sean Collins

Neurochemical markers are highly conserved across species. Our objective was to test the hypothesis that the forebrain's major regions have evolved in the ancestors of jawed vertebrates. Using juvenile *Callorhinchus* brains and various stains, eight major areas of the telencephalon were identified which are also present in bony vertebrates. Five antibodies and one enzyme known to stain specific compartments of other vertebrates' forebrains were utilized. Within this shark's brain, major neurochemically distinct regions were present which share expression patterns with those described in mammals, amphibians, and fish: In the subpallium: (1) A rostroventral area comparable to striatum; (2) A rostromedial ventral area comparable to accumbens; (3) A rostromedial dorsal area comparable to the septal area; (4) A caudoventral area comparable to the central amygdala; (5) A caudodorsal area comparable to the medial amygdala. In the pallium: (1) A main olfactory bulb; (2) an accessory olfactory bulb; (3) a dorsomedial pallial area comparable to the hippocampus; (4) a lateral pallial area comparable to olfactory pallium; and (5) an area deep to the lateral pallium comparable to the lateral amygdala. These results indicate that these major regions can be recognized in the *Callorhinchus milli*'s forebrain, which have analogous characteristics and topology to those in bony vertebrate species. Therefore, these compartments most likely evolved prior to the evolution of jawed vertebrates.

BRANDON BAYER

Undergraduate

The Politics of White Identity

Major: Political Science

Faculty Advisor: Gregory Petrow

Racial group interests compete in politics. Blacks account for over twelve percent of the population in the U.S., but hold less than two percent of public offices. Black candidates and policies associated with race bring out white identity among voters. I argue that white identity causes political inequality blacks experience by showing the relationship of white racial identity and conservative policy preferences and election results. I use regression analysis from the American National Election Study from 2012 and The National Politics Study from 2004. The studies show the potential causes of white racial identity. I look at whites' racial policy preferences and the relationship of white identity and other prominent racial attitudes, including racial resentment and negative stereotypes toward blacks.

MIKE BENNER

Undergraduate

Does the Exposure to Agrichemicals on Larval Fathead Minnows Affect the Sensitivity to Atrazine as Adults?

Major: Biology

Faculty Advisor: Alan Kolok

Agrichemicals, such as pesticides and herbicides, applied to row crops make their way into local water sheds due to agricultural runoff. The object of my project was to determine if Fathead minnows, *Pimephales promelas*, exposed to agrichemicals as larvae had an altered sensitivity to agrichemical exposures as adults. Many of these agrichemicals, e.g. the herbicide atrazine, are known endocrine disruptors that interfere with the hormone system of vertebrates, such as Fathead minnows, however, it has not been studied whether exposure to agrichemicals during the crucial stages of development could induce long term endocrine effects as adults. Fathead minnow larvae were exposed at 0 and 5 days post hatch, which is an important time for development and differentiation of these species, to Elkhorn River water at the Elkhorn River Research Station for a week. The exposure coincided with the pulse, which is when the concentrations of agrichemicals peak in the Elkhorn River. After the exposure the larvae were raised for 4 months in laboratory aquaria before being exposed to atrazine as adults to test for altered endocrine responses through hepatic gene expression. This study was beneficial to understand the importance of timing of an environmental exposure as well as a proof of concept for the utility of larval Fathead minnows as environmental sentinels.

KAITLYN BERGMANN

Undergraduate

Studies of Amino Acid Mutations in Neuraminidase and Drug Resistance of Influenza Virus

Major: Pre-Clinical Laboratory Science and Mathematics

Faculty Advisor: Haizhen Zhong

Homology modeling and docking methods were used to explore the effects of different mutants on antiviral drug binding to neuraminidase (NA), a protein important for influenza virus replication. Homology modeling was used to build models of S247G and H275T mutant strains. Other structurally available models of 3CKZ (H274Y), 4B7J

UNDERGRADUATE ABSTRACTS

(I223R), 3CL2 (N924S), and these two new models were aligned to the wild-type NA, 3B7E, using MOE. The structural alignments of these strains on MOE helped to identify the location of mutations in the binding pocket. To understand how these mutations affect the binding affinity, small molecules were built and docked to the different model proteins to determine binding affinity. Amongst these molecules were Zanamivir, Oseltamivir, and Peramivir, three current antiviral drugs. The Glide Dock program in MAESTRO measures how each mutation affects the binding of the small molecules, particularly our three antiviral drugs. In previous studies it was found that the active site of neuraminidase contains Arg371, Arg292, Arg118, and Arg152. Our docking studies not only confirmed amino acid residues Arg371, Arg152, Arg292, and Arg118 form hydrogen bindings to the small molecules, we also identified Asp151, Arg293, and Arg386 as new residues important for ligand binding. The importance of water molecules in ligand binding was confirmed by our observation that absence of water molecules significantly reduced binding affinity, thus emphasizing the significance of water-mediated hydrogen bondings in drug binding.

ARIEL CARLSON

Undergraduate

Mutagenesis as an Approach to Locate the Target of Anti-Parasitic Drug Compound KG3

Major: Biology

Faculty Advisor: Paul Davis

Toxoplasma gondii is an obligate intracellular protozoan parasite that currently infects approximately one third of the global population. *Toxoplasma gondii* infections are a leading cause of birth defects and blindness. The parasite has also been found to cause complications in immunocompromised individuals and is suspected to play a role in the alteration of human behavior. Upon parasite exposure, two stages of infection occur. The first stage is known as the acute stage and is generally asymptomatic. Following the acute infection, the untreatable latent stage occurs. This stage results in a permanent, life-long infection that is non-life threatening in normal, healthy individuals but can be highly problematic for the immune compromised. In a previous experiment, novel drug compound KG3 was shown to be effective against the acute stage of toxoplasmosis. Chemical mutagenesis was performed using the mutagen *N*-ethyl-*N*-nitrosourea (ENU) and novel drug compound KG3 to identify the genetic target of the drug within the parasite. The application of ENU induced 10-100 base pair changes within the genome of each parasite. The mutagenized parasites were then grown in the presence KG3, and resistant parasites were produced. These parasites will be genetically sequenced for the purpose of locating the sequence within their genome that confers drug resistance. The genome of the drug resistant parasites will be compared to the genome of wild-type *Toxoplasma gondii* to locate the genotypic differences between the two strains. Variance between the strains would highlight the sequence responsible for conferring drug resistance to KG3.

BRITTIN CAVANAGH

Undergraduate

Uridine Diphosphate-glucose Dehydrogenase as a Prostate Cancer Biomarker Candidate

Major: Biology

Faculty Advisor: Paul Davis

Prostate cancer is the most common cancer in men. Early detection and diagnosis could potentially lead to a higher cancer survival rate. In this study, the expression of the enzyme uridine diphosphate-glucose dehydrogenase was examined as a possible biomarker, or measurable characteristic, for aggressive prostate cancer. The development of a specific and sensitive biomarker for the initial prostate biopsy would provide information for diagnosis and serve as a guide for additional biopsies. Uridine diphosphate-glucose dehydrogenase is an enzyme that catalyzes the oxidation of uridine diphosphate-glucose, yielding uridine diphosphate- glucuronic acid. Uridine diphosphate-glucuronic acid is a precursor in synthesizing glycosaminoglycans and proteoglycans, hyaluronan, and other molecules. These molecules have been found to promote the progression of prostate cancer. We determined the levels of the enzyme uridine diphosphate-glucose dehydrogenase using quantitative fluorescence imaging analysis by selective binding of a polyclonal antibody with an attached fluorescent tag to the enzyme. Fixed tissue samples were embedded in paraffin-wax, added to slides with antibody incubation, imaged. The image was analyzed by quantifying the signal of the tagged enzyme and comparing the data between pairs of normal appearing prostate biopsies and age-matched noncancerous controls. Previous research has shown significant difference between the levels of Uridine diphosphate-glucose dehydrogenase in cancerous prostate acini compared to non- cancerous prostate acini. These results support the suggestion that the levels of Uridine diphosphate-glucose dehydrogenase found in prostate cancer may serve as a biomarker for the likelihood of prostate cancer disease progression.

MITCHELL CHLOPEK

Undergraduate

Creation of an RFP-tagged construct for complementation of *Candida albicans*

Major: Biology

Faculty Advisor: Jill Blankenship

Candida albicans is a pathogenic fungus. It exists as a commensal in the gastrointestinal and genitourinary tracts of a majority of human beings. It is the major cause of diaper rash in infants and vaginal yeast infections in women. *Candida* species are also the fourth major cause of systemic infections in hospital settings and the mortality rate remains as high as 40% for patients with systemic disease. Our lab focuses on a particular group of genes in the *C. albicans* genome called the septins that code for proteins involved in cytokinesis following mitosis. In addition to their cell cycle role, these proteins also play a vital role in filamentation, required for pathogenesis, and cell wall integrity, important for antifungal drug therapy, in *C. albicans*. Thus, by studying septin function, we can gain insight not only into pathogenesis, but into antifungal drug response as well. Using the strategy of homologous recombination in *Saccharomyces cerevisiae*, a red fluorescent protein was inserted downstream of the *CDC3* gene of interest. The construct will allow for future localization studies and will serve as a complement for a strain that has been created by other members of the Blankenship lab. This will allow for subsequent experimentation to determine the important regions of septin *CDC3* in *C. albicans*.

MATTHEW K. CHRISTENSON

Undergraduate

Characterizing the tachyzoite to bradyzoite stage transition in *Toxoplasma gondii*

Major: Biotechnology

Faculty Advisor: Paul Davis

Co-Author: Paul Davis

Toxoplasma gondii is an obligate intracellular protozoan parasite that can infect all mammals, including humans. It is estimated that more than one third of the world's population is infected with *T. gondii*. Moreover, *T. gondii* is a close relative, and important molecular model, of *Plasmodium falciparum*, the causative agent of malaria. Acute and latent toxoplasmosis, the disease caused by *T. gondii*, involves the tachyzoite and bradyzoite forms of the parasite, respectively, and is generally asymptomatic. On the other hand, toxoplasmosis is one of the leading causes of fetal malformations and deaths in immunocompromised individuals, and has been linked to risky behavior and suicidal tendencies. Furthermore, the transition from tachyzoite to bradyzoite is poorly characterized. To better understand this shift, RNA was extracted from parasites undergoing the tachyzoite to bradyzoite conversion and was submitted for microarray analysis. In total, 71 genes, comprising 0.81% of the *T. gondii* transcriptome, were up-regulated early in the transition. Of these early up-regulated genes, 22 (31%) contained a 25 bp thymidine-rich consensus motif in their upstream regions. In addition, a hypothetical *T. gondii* transcription factor binds to this consensus motif and therefore poses a pivotal target for the development a *T. gondii* vaccine through its deletion.

JEREMY CISCO

Undergraduate

From Apprehension to Appreciation: The Culture Walk Journey

Major: Teacher Education

Faculty Advisor: Connie Schaffer

Demographic trends show that the most significant growth, and therefore greatest need for teachers, will be in schools in an urban setting. However, pre-service teachers often report feeling unprepared, and show low confidence in their ability to teach in an urban environment (Mason, 1999; Schaffer, 2012). Taking a pre-emptive approach to this issue, the College of Education Teacher Education Department (TED) at the University of Nebraska at Omaha developed the *Culture Walk Experience*. Before TED students begin their required 40 hours of urban field experience at their assigned schools, they are split into three groups and assigned a five-hour introductory session to one of three urban centers in the city: North, South and Central Omaha. During this time, students interact with a panel of area representatives to learn about the community, sample local cuisine, and are introduced to a variety of local community centers. The intent of this experience isn't just to break down preconceived notions of that particular urban area, but also for students to discover the community first-hand, with their own fresh perspective, free of third-party or media bias. This experience affords our college students a broader understanding of the cultural concerns and sensitivities needed to teach minority populations, and empowers students with the knowledge and skill sets to create a more effective, welcoming learning environment.

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To recognize the 5th anniversary of the *Culture Walk*, I organized a public exhibit, using qualitative and quantitative data, to display the positive impact this experience has had on the student population.

SHAWN COLLINS

Undergraduate

Godot and the Great Concealer of Truth

Major: English

Faculty Advisor: Robert Darcy

The project uses Samuel Beckett's 1954 play, *Waiting for Godot*, as the principle matrix of investigation in exploring the implementation of the pastoral genre in a postmodern text as a means of criticizing religion. The article explores the text's use of the themes and characteristics found throughout the history of the pastoral tradition including shepherding, idleness, and the intentional passing of time. *Godot* draws heavily on the Judeo-Christian traditions and Hellenistic and Roman mythology (as well as Renaissance literature, eighteenth-century metaphysics, and Cartesian dualism) to implicate an illusory pastoral space in its criticism of religious practices. The text illustrates that Godot, an Edenic or Arcadian pastoral space, is merely a delusion in the minds of its two primary characters, Vladimir and Estragon. It accomplishes this by questioning the specific source of that delusion: religion, which seeks to conceal truth and perpetuate the illusion of the pastoral space. Beckett's text provides its readers with three distinct but intimately related "spaces," which, when set in contrast to one another, do much of the work of furthering the text's argument. The spaces are: traditional pastoral space, the illusory pastoral space of the delusion, and the visual space (that which is real and would be visible in any performance of the play). The article argues that the ultimate significance of the text and its criticism of religion is the implicit warning against the pernicious relationship between mankind and religion, the great concealer of truth.

BRITTANY CONROY

Undergraduate

Title: Characterization of the Role of CAV1 in Cellular Proliferation Pathways in a CD4+ T Helper Cell

Major: Biotechnology

Faculty Advisor: Christine Cutucache

Co-Authors: Matthew Latner, Tomas Helikar, Christine Cutucache

Caveolin-1 (CAV1) is a vital scaffold protein that regulates tumor progression in various types of cancers and is overexpressed in T and B cell lymphocytic leukemias (Sawanda *et al.*, 2010; Goetz *et al.*, 2008). Additionally, previous studies have revealed that CAV1 is involved in cell-to-cell communication, cellular migration, and immune synapse formation—all malfunctions present in hematological malignancies (Mittal *et al.*, 2009; Gilling *et al.*, 2010; Gilling *et al.*, 2012). As these are vital components of the immune response and cancer progression, we hypothesize that CAV1 regulates key functions in immune effector cells such as CD4+ T lymphocytes. Therefore, we examined the mechanism of action of CAV1 on cellular proliferation in a CD4+ T helper cell. Using the Cell Collective model-building software, an *in silico* model with the ability to dynamically model molecular signaling in T lymphocytes was constructed. This model, consisting of 193 nodes and local interactions involving CAV1, was successfully validated with primary literature and *in vitro* immunohistochemistry results. Next, the model was simulated under various conditions, including CAV1 +/+, CAV1+/-, and CAV1-/-, in both normal and diseased samples. Experimental results indicate a signature of molecules that were highly affected by CAV1 knock out. Specifically, CAV1 regulates cellular proliferation, cell survival, and cytoskeletal rearrangement—all of which are documented to be upregulated in lymphocytic leukemias. These results will be further validated with *in vivo* experiments using Cav1-/- mice to determine the impact that Cav1 has on downstream molecules contributing to cellular proliferation. With this comprehensive model, protein expression levels and consequences of gene mutations can be predicted and valuable insight regarding biological systems can be elucidated.

OLAJIDE COOPER

Undergraduate

Target Language Acquisition Methodology Regarding Spanish Speaking Families with Deaf Children

Major: Elementary Education Endorsed in Deaf Education, Spanish, and ESL

Faculty Advisor: Arturo Miranda

The purpose of this research project is to provide a methodology for assisting Spanish speaking families who need to communicate with their deaf children through American Sign Language (ASL). Until now, there have been no materials created specifically for adult learners, for whom Spanish is their first language, to learn American Sign Language. Using second language acquisition (SLA) theory from prominent theorists such as Krashen and Ellis, an activity and vocabulary book was created. All text in the book is written in Spanish as to easily facilitate the acquisition of a second language through the parent's first language. The book contains four chapters each addressing a part of daily life as a parent. More than 150 vocabulary words are presented in this book for beginners by means of photos and written descriptions. The written descriptions and activities utilize the theory of tapping into an adult's vast experiences to aid in making connections to the content. In addition to the aforementioned components there are children's literature recommendations, at home activity suggestions to promote communication between parents and their children, manipulatives, and a DVD that demonstrates the signs in motion. The product of this research project will be used at Boys Town National Research Hospital and will fill the need for instructional materials statewide. It is to be noted that thorough research has shown that the void of ASL instructional materials for Spanish speakers will be filled nationally as well.

APRIL CORBET

Undergraduate

Sentiment Structures in Street Harassment Stories

Major: Computer Science

Faculty Advisor: Parvathi Chundi

Street harassment is a pervasive problem that typically targets women and LGBTQ community. Hollaback! is an international movement aimed at stopping street harassment. Hollaback! servers collect street harassment stories from victims around the globe to share, gather statistics, and create awareness. In this research, we present a simple method aimed at identifying attack severity in Hollaback! stories. Since the Hollaback! dataset encompasses many different levels of attack severity--catcalling, groping, stalking, and assault--and all these levels of attack severity are generally negative, our method analyzes the sentiments and weights at the sentence level to identify harassment severity. Sentence level sentiments are used to construct the sentiment structure of a story which is used to identify subsets of severity amongst Hollaback! stories. The proposed methods are applied to a Hollaback! data set containing around 1900 stories (written in English) posted from different cities in the United States, and cities around the world. Our experimental results illustrate the power of the proposed method.

DREW CRATSENBERG

Undergraduate

Interaction of SpcU with *Pseudomonas aeruginosa*'s Type III Secretion System Loading Platform

Major: Biotechnology

Faculty Advisor: Donald Rowen

Many Gram-negative bacteria, such as *Pseudomonas aeruginosa*, use Type III Secretion Systems in their infection of host organisms. A Type III Secretion System is a complex system that uses a needle-like protein complex apparatus to inject toxins into target cells. Secretion of toxins through Type III Secretion Systems requires additional resources as well, including chaperone proteins which bind to the toxins before secretion. Recent studies in other organisms that utilize Type III Secretion Systems have led to the hypothesis that these chaperone proteins may bring toxins to a three protein loading platform associated with the Type III Secretion System apparatus before they are secreted. To test this hypothesis, we are tagging homologs in *P. aeruginosa* of OrgA, OrgB, and SpaO; the three proteins proposed to form the loading platforms, with epitopes so that we can detect their presence in subcellular fractions. I have constructed plasmids that each express one of the three proteins tagged with a hemagglutinin (HA) epitope. Preliminary experiments indicate that two of the three are expressed and detectable in *P. aeruginosa*. I am currently isolating membrane fractions to determine if the proteins are located in the membrane along with the secretion apparatus. Detection of the tagged proteins in the membrane would lend support to the hypothesis that they form a loading platform associated with the secretion

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apparatus. Our findings will build upon our knowledge of Type III Secretion Systems which could lead to the development of drug therapies that target toxin secretion via Type III Secretion Systems.

CALEB DEWITT

Undergraduate

Toward Fair Representation of Students of Color in the Student Government of UNO

Major: Sociology/Anthropology

Faculty Advisor: Thomas Sanchez

This qualitative study examined the experiences of Students of Color in student government at UNO.

CAMRI DORSEY

Undergraduate

All-in-One Special Needs Planning

Major: Elementary Education/Special Education

Faculty Advisor: Pamela Smith

The process of transitioning a child from the K-12 school system to adulthood can be a long, problematic and frustrating process without adequate support and resources. The lack of help and understanding of the system has left many parents/guardians frustrated. While General Education students and their parents receive hands-on help from the school system (guidance counselors) in their transition to higher education and adulthood, the 10%-19% Special Education/Needs students in the various Omaha school districts and their parents/guardians are given a handbook with options for transition schools and other non-relevant resources. At best these Special Needs students are being aged out of the program at 21 years old, not knowing what to do next. For example, most people are unaware that there is a two-year waiting list for dependent Special Needs adults when applying for housing. When housing is needed, arrangements are not being met due to the lack of prior preparation. For instance, the 8,500 Special Needs students in the Omaha Public Schools district that will be transitioning into adulthood will need government-funded opportunities for a successful transition. To combat this issue I am proposing an "All-in-One Special Needs Planning Resource" which will provide a compilation of existing hard-to-find resources, funded opportunities, and a timeline of essential information for Special Education students who are transitioning to adulthood.

LAUREN DRELICHARZ

Undergraduate

The Impact of Goals and Constraints in Problem Construction and Creative Problem Solving

Major: Psychology

Faculty Advisor: Roni Reiter-Palmon

Co-Authors: Ben Wigert, Roni Reiter-Palmon

The current study examined several key factors that influence creativity and the generation of creative solutions. Tolerance for ambiguity and openness to experience, two aspects of an individual's personality, have been identified as significant factors. Essentially, tolerance for ambiguity refers to one's comfort level in dealing with vague problems, whereas openness to experience pertains to how one approaches unusual problems. The current study also investigated the nature of the task and how differences in length, ambiguity, and content of a task influenced the number of solutions generated by participants. Given the unique influences of tolerance for ambiguity, openness to experience, and task effects on creativity, the aim for the current study was to examine how these factors interacted to influence creativity. A sample of 365 undergraduate students were asked to generate creative solutions to three different problems that ranged from short, highly ambiguous, and unusual to lengthy, specific, and typical. After solving all three problems, participants were given a series of surveys that assessed tolerance for ambiguity and openness to experience. It was predicted that tolerance for ambiguity would be positively related to solution creativity and this effect would be strongest when the problem was highly ambiguous. Similarly, it was expected that openness to experience would be positively related to creativity, especially when the problem was highly unusual.

DANE EWALD

Undergraduate

Effects of Cellulose Polymers on the Hydrate Transformation of the Drug Theophylline

Major: Medicinal Chemistry

Faculty Advisor: Alan Gift

During the drug manufacturing process, active pharmaceutical ingredients (APIs) can potentially transform from the anhydrate to the hydrate form. This transformation can change the effectiveness of the drug, thus it is important to control the anhydrate-to-hydrate transformation. This research is focused on the inhibiting effects of cellulose based polymers on the transformation of the API theophylline. In-line Raman spectroscopy was used to record the anhydrate-to-hydrate transformation of theophylline by collecting spectra of the solutions every 30 seconds. A calibration model was used to construct transformation profiles by quantifying the percent transformation for each of the collected Raman spectra. The results showed that all cellulose polymers inhibited the transformation, and methylcellulose exhibited the greatest inhibition. To better understand the mechanism of inhibition, solubility and intrinsic dissolution experiments were performed on theophylline in the presence of these polymers. The results showed that these polymers had little to no influence on solubility and dissolution. These results indicate the inhibitory effects of these polymers are reducing the crystal growth rate of theophylline hydrate.

MINJIE FAN

Undergraduate

Do larvae contribute to social immunity in a subsocial beetle?

Major: Bioinformatics

Faculty Advisor: Claudia M. Rauter

Burying beetles (*Nicrophorus* spp.) compete with microbes over carrion as food resource. Carrion with its high nutrient content represents a resource of high quality and competition over carrion between invertebrate scavengers and microbes is intense. To outcompete microbes, adult burying beetles secrete oral and anal fluids with antimicrobial properties. The secretion of antimicrobial fluids benefits not only the beetle secreting the antimicrobial compounds, but also its larvae reared on the carrion by increasing the survival of the larvae. While oral and anal secretions of adult beetles are intensively investigated, little is known about larval secretions. The purpose of my research was to determine whether the larval secretions of the prairie species *N. marginatus* have antimicrobial properties and whether the antimicrobial properties of the larval secretions change with larval age. Further, I investigated whether larvae reared without parents produce secretions with stronger antimicrobial properties than larvae reared by a female beetle producing antimicrobial secretions. I assumed that the production of antimicrobial secretions is costly for larvae and that the larvae would therefore reduce these costs in the presence of a parent.

PAUL FARIVARI

Undergraduate

Investigating Antibiotic Resistance in the Heron Haven Nature Center

Major: Psychology

Faculty Advisor: Christine Cutucache

Co-Authors: Shannon Stoffel, LeDawna Strathman, Alyssa Dunlop, Zachary Leaders, Christine Cutucache

The emergence of microbial antibiotic resistance has presented public health challenges and has been facilitated by the overuse of antibiotics. One such example of misuse has been the contamination of natural habitats by antimicrobials used in agriculture. The focus of this study was to screen for antibiotic resistance in the microbes present in the waters of Heron Haven, a local wetland sanctuary susceptible to antibiotic exposure. To differentiate bacteria samples, we inoculated tryptone broth and triple-sugar-iron slants to determine metabolic data, and Gram staining samples isolated on nutrient agar and eosin-methylene blue agar provided details on morphologies and cell wall types. Through Kirby-Bauer analysis, drug resistance was inferred from measuring the capacity for bacteria to grow adjacent to three classes of antibiotics. Various combinations of metabolic and morphological traits were observed. Additionally, we found that most microorganisms were able to grow freely in the presence of penicillin. Further, some microbes could thrive next to tetracycline and novobiocin. These cases of unhindered cell growth implied that microorganisms existed at Heron Haven that were resistant to the antibiotics used in this study. Due to the ability microorganisms have to transfer resistance genes, this revealed that regulatory efforts would need to be taken at Heron Haven to help control prevalence of antibiotic resistance.

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ARIEL A. GLOVER

Undergraduate

Effects of Management Support and Rationale on Diversity Training Effectiveness

Major: Industrial/Organizational Psychology

Faculty Advisor: Carey Ryan

Co-Author: Philip Simmons

Despite widespread implementation of diversity training in organizations, few studies have examined the factors that affect training outcomes. We experimentally examined two factors: high versus low management support and proactive (i.e., to promote an appreciation of differences) versus reactive (i.e., in response to complaints of racism) rationale for implementation. After reading a vignette in which support and rationale were manipulated, White participants (recruited via MTurk) completed an online diversity training that emphasized multiculturalism. Participants indicated their reactions by responding to open-ended questions (yet to be coded) and completing measures of multiculturalism, colorblindness, and perceived usefulness. Results indicated that participants endorsed multiculturalism more than colorblindness, which was consistent with the training message. Further, when the training was implemented proactively, greater management support resulted in lower training effectiveness (i.e., lower endorsement of multiculturalism vs. colorblindness) and lower perceived usefulness, whereas when training was implemented reactively, greater management support resulted in greater training effectiveness and greater perceived usefulness. The management support x rationale interaction effect on perceived usefulness was more evident among men. Overall, these results, combined with other work from our lab, suggest that management support may sometimes backfire—perhaps when participants believe they are viewed as part of the problem.

MOUSSA GUIRA

Undergraduate

Fracture Evolution in the Niobrara Chalks of the Castle Rock Area, west-central Kansas

Major: Environmental Geology

Faculty Advisor: Harmon Maher

Co-Authors: Daniel Bior, Erick Bush, Kristyn Hill, Nathan Schlagel

Castle Rock is a predominantly north-south exposure of the Cretaceous age of Niobrara Chalks. At this location, multiple structural features are visible for analysis and interpretation, including normal faults, veins (opening fracture with mineralization), and joints (unmineralized opening fracture), from which a history of deformation can be constructed. In the middle of the continent, such deformations are uncommon and faults can suggest a potential seismic risk. The faults cut through both the lower and upper chalk units, are filled with calcite slickensides, and are oriented mostly east-west, but with significant variability. All faults were normal faults, which are associated with local extension. Vertical fault offsets varied from centimeters to meters. Two joint sets were mapped in the study area: longitudinal joints striking SE-NW, and cross joints striking SW-NE. A cross cutting relationship suggests that joints are more recent than faults. The veins are predominantly found in the lower part of the exposed stratigraphy, are typically dish/bowl shaped in cross section with sub-horizontal bases, and have a preferred orientation. We conclude that there were at least three distinct periods of deformation each forming the different types of fractures. The different episodes of deformations and orientations may be due to changes in the stress field associated with North American plate tectonics. There is also a possibility that fracturing occurred during sediment burial and due to compaction, de-watering and mineralogical changes. The veins may be due to modern weathering and topography.

ABBIE HARLOW

Undergraduate

Discovering Nebraska: A Pioneer's History of Western Expansion

Major: History

Faculty Advisor: Todd Richardson

The narrative of Isaiah Bryant is a story of a pioneer, a striver, and the story of the Plains. This project focuses on a man's journey westward in the California Gold Rush and his return to the wild Nebraskan prairie. From his parents' farm in Iowa to a life alone in Nebraska, Isaiah Bryant's expedition is imparted through letter correspondence,

journals, personal notes, and various other writing. The goal of this project is to present a personal story of western expansion to understand American growth as more than a movement of populations, but as a movement of people with motives, lives, and hopes. Isaiah's model is not only his presence in western settlement but his ability to articulate his actions and reasoning. An aspect to history that can often be lost within statistics. This project generated a paper interpreting Isaiah Bryant based on his relation to a vital time period in American history, emphasizing the significance of Isaiah as a pioneer, writer, and Nebraskan.

CHRISTOPHER HARRIS

Undergraduate
Effects of Developers' Networks on Software Evolution
Major: Theatre
Faculty Advisors: Sanjukta Bhowmick, Harvey Siy

My research focus is to understand how social interactions between project participants affect project success. Large projects involve many participants working on different parts of the project which make it prone to failures in communication, as recent technical issues with the new healthcare website illustrate. Using data from a large, software project, we studied interactions among software developers and using network analysis techniques examined how that impacted the resultant product. We compared the structure of the software with the network of interactions among the developers, tracking their activities over 10 years. Our findings indicate that only 20% of the developers were actively involved in developing key pieces of the package. Furthermore, even if people were working on the same part of the software, they rarely communicated and finally errors were only resolved after a long-time, generally as part of a major revision. These findings are detrimental for long-term project success. For example, if even a few of the key developers leave the project, it will come to a standstill. Similarly, delayed resolving of bugs will discourage users from utilizing the package and finally poor communication between developers lead to slower evolution and higher maintenance costs. Our principal outcomes are identifying factors in a collaboration that can be used to inform risk management and mitigation strategies. We developed a toolset that can provide similar analysis for other collaborative projects (not necessarily software). The recent results of this project are available at <http://loki.ist.unomaha.edu/~cbharris/index.php>

TYLER HEREK

Undergraduate
Title: Effectiveness of nascent methods in science pedagogy in the undergraduate classroom
Major: Biology
Faculty Advisor: Christine Cutucache
Co-Authors: Lauren Dahlquist, Tomáš Helikar, Christine Cutucache

Currently, a need exists in higher education to adopt more modeling activities into the standard curriculum. These activities are structured toward assisting students in the comprehension of the basic theories and emergent properties occurring in real-time. This study aims to measure the effectiveness of the Cell Collective, a dynamic web-based modeling platform, as a learning tool serving as a supplement both inside and outside of the laboratory. The Cell Collective, a real-time modeling software, was introduced into two different university courses: an undergraduate Microbiology course, and a graduate on-line Immunology course. Students were interviewed for feedback related to use of the Cell Collective and asked to complete a survey at the completion of the course. The student feedback was analyzed and deconstructed into positive, negative, and suggestion elements. Seventy-five percent of students self-reported that the Cell Collective positively contributed to their material comprehension. Therefore, we have ongoing studies investigating the specific ways to provide greater academic benefit to students using the Cell Collective. Moving forward, the student feedback will allow for improvements to future implementations of the Cell Collective. These improvements will grant students a greater chance to utilize the Cell Collective as an effective learning tool.

AMY HESTER

Undergraduate
Structural Analysis of Coxsackievirus B3 by In-line Probing
Major: Biotechnology
Faculty Advisor: William Tappich

Coxsackievirus B3 (CVB3) is a pathogenic *Enterovirus* of the picornavirus family that infects human cells and can lead to myocarditis and pancreatitis. Its positive sense, single-stranded RNA genome consists of 7400 nucleotides

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with four regions: a 5' Untranslated Region (5'UTR), an open reading frame, a 3' Untranslated Region (3'UTR) and a poly-A tail. The folded, three-dimensional structure of the 5'UTR is 742 bases long and contains seven secondary structure domains, including an internal ribosome entry site (IRES) associated with virulence. Because of this, the 5'UTR has been the focus of our research. Single-stranded RNA is able to fold into a variety of conformations, making it vulnerable to spontaneous cleavage under specific conditions. During an "in-line" conformation, a 2' oxygen, a phosphorous center and an adjacent 5' oxygen fold in a way that makes the phosphodiester bond vulnerable to a nucleophilic attack by the 2' oxygen, resulting in cleavage between the phosphorous and the 5' oxygen. In-line probing experiments have been carried out to determine where the sites of cleavage occur. Radiolabeled RNA incubated in a folding buffer are visualized by 12% polyacrylamide gel electrophoresis and phosphorimaging. Previous experiments have determined a theoretical model of the 5'UTR by chemical modification and comparative sequence analysis. In-line probing experiments are being carried out to help authenticate and add detail to the experimental structure. Detailed understanding of the 5'UTR structure is critical for designing antiviral compounds targeting this region of the genome.

BENJAMIN HOCHFELDER

Undergraduate

Neuroendocrine Stress-Modulation as a Function of Predatory and Novel Stimuli in Marmosets (*Callithrix penicillata*)

Major: Neuroscience

Faculty Advisor: Jeffrey French

Recent studies with marmosets have demonstrated that anti-predator mobbing behavior and associated alarm vocalizations, called "tsiks," may act as a mechanism of self-modulating the neuroendocrine stress response to the presence of predators. These previous studies found the counterintuitive result that the stress hormone known as cortisol decreases when marmosets respond to predators. A separate study found that similar decreases in physiological stress levels occurred in marmosets that produced tsik vocalizations when they were merely allowed access to outdoor living spaces. There is a gap in the literature investigating the breadth of the physiological effect of tsik vocalizations using adequate controls. The study funded by FUSE aimed to investigate the potential extent of the neuroendocrine modulation of the stress response as a function of tsik vocalizations produced across a spectrum of controlled stimuli. Each stimulus was presented on a pedestal. The stimuli included: a rearing model snake, a football, the pedestal by itself, and a removed sanitary shoe cover. Behavior in response to the stimuli was recorded and saliva and urine were non-invasively collected to assess hormone levels across a 5 hour period. These samples were then processed using enzyme immunoassay techniques. Our results showed a significant correlation between tsik vocalizations in response to the predatory stimulus compared to controls. The endocrine results are still being analyzed for statistical significance and further work may be required.

JUSTIN HOLES

Undergraduate

Body Mass Index, Body Image, Sexual Function and Sexual Behavior among Young Women

Major: Public Health

Faculty Advisor: Sofia Jawed-Wessel

Research demonstrates that women with low body image perceptions are likely to also experience less healthy sexual functioning. The purpose of this study was to explore the relationships between body size, body image, sexual behaviors and sexual well-being. A cross sectional study was conducted with 210 women aged 19-24 years in the Midwest. Measures included multiple scales to assess exercise patterns, body image perceptions, sexual behaviors, and female sexual function. Multiple regression analysis was used to assess whether BMI or body image was a better predictor of various sexual behaviors. Independent sample t-tests were used to examine differences in body image perceptions, sexual functions, and sexual behaviors based on socio-demographic characteristics. A significant negative correlation was found between sexual function and body image self-consciousness during sexual activity ($-.179, P < .010$). Body dissatisfaction was positively correlated with body self-consciousness ($.678, P < .0001$) and body avoidance ($.604, P < .0001$). Body avoidance was negatively correlated with sexual satisfaction ($-.178, p < .010$). As BMI increased, body avoidance ($.366, P < .0001$), body self-consciousness ($.227, P < .001$), and body dissatisfaction ($.412, P < .001$) also increased. Although women with higher BMI scores were more likely to experience greater body image dissatisfaction, avoidance, and self-

consciousness, they were not more likely to experience difficulties with sexual functioning. Sexual function is related to body image self-consciousness during physical intimacy. These findings suggest women are more likely experience sexual function difficulties if they feel self-conscious about their bodies during sexual activity and not necessarily because they are, or are considered, overweight.

SHAUNA HOLMES

Undergraduate
The Cranach Dress
Major: Theater
Faculty Advisor: Sharon Sobel

Many people have seen the works of Lucas Cranach the Elder and the Younger. Several of their works featuring women from Saxon county, Germany, show them in a dress that is unique to the area: a cartridge pleated skirt with no obvious waistband, a jacket that when fully laced has a wide opening at the front, and a stomacher with a wide band of trim at the top. There are very few published sources about the history and construction of this garment, which seemed to have been very popular among the Saxon nobility during the 16th century and traveled as far south as Nuremberg. Here I have recreated the dress for theatrical use. Because of the demands of the stage, the construction techniques used vary slightly from what was likely actual methods. These differences have been detailed in the research binder, under the 'Conclusions' tab.

SAVANNAH HUNTER

Undergraduate
Work-school-life conflict and college student success and well-being: a review of unanswered questions
Majors: Psychology and Spanish
Faculty Advisor: Lisa Scherer

Student retention is a major problem faced by universities, and of course, the students themselves (Barefoot, 2004). A number of stressors are facing college students today. Many students work part-time or full-time jobs, take a full load of college courses, and take care of their families. On top of that they may lack academic preparedness and face difficult financial issues, all of which can lead them to drop out of college (Barefoot 2004; Daley, 2010). However, studies have shown that students who experience a high level of wellness are more likely to continue with their academic studies, earn a higher grade-point average, and produce better career outcomes (Botha, 2012; Hettler, 1980; Horton, 2009). In addition, Bakker's (2007) Job-Demands Resources model predicts that stress and negative life outcomes will increase as the demands operating on a person increase; however, as number of resources available increase so will their ability to cope with these negative effects of demands on wellness. My poster will review the current research literature in this area and explain my current research hypothesis. The JD-R model was developed for employees in a work context; however, it has never been applied to students who face demands beyond those of just work. I will be adapting the JDR model to assess working, college student perceptions of their total life demands and total life resources on their wellness, intentions to quit school, and academic success.

ELIZABETH H. HUTFLESS

Undergraduate
Septin associating proteins in *Candida albicans*
Major: Biotechnology
Faculty Advisor: Jill Blankenship

Candida albicans is a significant human pathogen as well as part of the natural microbial flora of most humans. Our interests center on the pathogenesis and antifungal drug susceptibility of this organism, and we focus on a family of proteins, the septins, that are involved in this process. Septins play a key role in filamentation, are vital to pathogenesis, and are important to cell wall integrity. Other roles involve cell cycle progression and acting as a protein scaffold at septation sites. This scaffold allows for the binding and recruitment of proteins. The ultimate goal of this project is to identify proteins associated with septins in *C. albicans*. I have designed and built a construct that adds a His6 tag to the essential septin *CDC3*, which is being used in pull-down assays to isolate the native septin complex and associated proteins. I will discuss the construction of this tagged strain and my efforts to develop methods to isolate the septin complex from *C. albicans*. This work has the potential to uncover novel septin interactions with regulatory and signaling elements which will advance our understanding of *C. albicans* as a pathogen.

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AMISSABAH JOHNSON

Undergraduate

Investigation of the Effects of Glycine on the Hygroscopic Properties of Sodium Sulfate Aerosols

Major: Biotechnology

Faculty Advisor: Joshua Darr

Co-Author: Joshua Darr

Atmospheric aerosols are associated with human health, changes that occur in the climate, and contamination of our natural environment. They are considered as a major contributor in physical and chemical processes of the atmosphere causing the climate to change, but their precise role is largely unknown. Deliquescence and efflorescence are two phenomena that influence aerosol's optical and chemical properties. Infrared (IR) spectroscopy is used to identify the deliquescence and efflorescence properties of sodium sulfate, Na_2SO_4 , aerosols mixed internally with the amino acid glycine. Glycine, sodium sulfate particles, and a mixture of both particles were studied at different pHs and various relative humidities. No deliquescence was observed for glycine up to a relative humidity of 75%; however efflorescence was observed and was found to be pH dependent. At pH 3 the efflorescence relative humidity (ERH) was 50-55%, and it decreased to 45-50% and 40-45%, respectively, for pH 6 and 11. The particles consisting of the mixture of Na_2SO_4 and glycine deliquesced and effloresced at 60-65% and 50-60%, respectively.

TANNER JOHNSON

Undergraduate

The Role of Septin CDC3 in Cell Wall Integrity in *Candida albicans*

Major: Biotechnology

Faculty Advisor: Jill Blankenship

Co-Author: Jill Blankenship

Candida albicans is a common commensal yeast found within the majority of the population. It is the most common cause of vaginal yeast infections in women and diaper rash among infants and can cause serious systemic disease in immunocompromised patients, patients with indwelling medical devices, and patients taking broad spectrum antibiotics. There has not been a significant decrease in the mortality rates of these susceptible patients in the last twenty years, while the susceptible population continues to grow. Previous work in the Blankenship lab has demonstrated that septins, highly-conserved GTP-binding proteins found at sites of cell separation, play a significant role in *C. albicans* response to the antifungal drug caspofungin (Blankenship et al 2010). Cdc3, one of the seven septin proteins found in *C. albicans*, serves as an anchor for the other septins and is an essential protein in this organism. My project has involved generating a construct to make a clean deletion of one copy of *CDC3*. The strain that we have created will be used as a starting point in investigations to identify regions of Cdc3 important for antifungal drug susceptibility and pathogenesis.

VERNA F. JOHNSON

Undergraduate

Insight

Major: Book Arts

Faculty Advisor: Bonnie O'Connell

In researching sign language and handmade books, it is evident that both share a means of visual communication requiring the hands in order for the viewer to experience the communication. This project explores the merging of these two modes in a series of handmade books that reinforce their similarities and possibilities, and examines ways that artists' books might be used to more fully relate the Deaf experience. This study of a varied book structures and their corresponding page movements in combination with the icons of sign language allowed unique expressions of Deaf experience.

MARY LOU KANE

Undergraduate

Telling My Story: Adult Adoptees' Accounts of their Adoption Entrance Story and Its Impact on Self-Esteem, Family Communication, Cohesion and Satisfaction

Major: Non-Profit Management

Faculty Advisor: Ana Cruz

The present qualitative study explored the impact adoption entrance narratives have on family functioning and the psychological well-being of the adopted child, specifically self-esteem, family communication, cohesion, and satisfaction. Personal interviews, ranging from 60-90 minutes, with eleven adult adoptees, ranging in age from 24 to 81, illuminated the dynamic influence of the adoption entrance narrative in their lives. Participants recounted the adoption narrative and shared a myriad of varying emotional and psychological experiences ranging from anxiety, anger, disconnection, rejection, isolation, to being grateful. Adoptees reported a need to gather information about their past suggesting the importance of knowing about their biological roots. The findings of this study suggested that the adoption entrance narrative matters because of its implications on the child's well-being and relationship with their adoptive parents. Most important is the open and honest disclosure of information related to the adoptee's birth story and circumstances surrounding their adoption. Without such honesty, communication and connection with the adoptive parents becomes strained and self-esteem is adversely effected.

LEANNA KEITH

Undergraduate

Journey to the East – An Exploration of Chinese Dizi Music through the Western Flute

Major: Music Performance (Flute)

Faculty Advisor: Christine Beard

Through hands on experimentation of sounds from both traditional Chinese Bamboo flutes and the standard western flute (the standard concert orchestral flute), as well as research from written transcriptions and recorded audio, my FUSE project recreated traditional Chinese sounds into western flute practice by transcribing Chinese Music notation into western music notation (the standard music notation of Europe and the Americas). The poster will illustrate this process, and show examples of the outcome.

EVAN KENKEL

Undergraduate

rEd & bluE present: E's Digital Literacy Narrative: Segregated Literacy

Majors: English and German

Faculty Advisor: Maggie Christensen

In the current academic setting, students are often encouraged to understand the term *literacy* according to its original meaning – the ability to read and write. While this definition is correct, it does not address the current usages of this term, nor does it allude to the numerous fields of study associated with it. Today, *literacy* is used to describe a number of semiotic systems (sign systems) that can be used to both consume content (read) as well as produce content (write); popular examples of this are visual literacies – the systems used to relay information in film, comics, etc. – and digital literacy – the ability to produce and consume information within a digital environment. This multimodal presentation utilizes these newer literacies to convey a personal reflection on the modern pedagogical approaches to literacy and their shortcomings – in particular, the lack of opportunity to produce original works that fall outside the average composition framework. By juxtaposing personal experiences with newer literacies, the video is meant to draw the audience's attention to the current stigma towards unique expression in composition while providing an example of how these expanded literacies can be woven into a university-level composition assignment.

SUZANNE KINGERY

Undergraduate

Effects of androgenic compounds in aquatic sediment on endocrine function in fish

Major: Biology

Faculty Advisor: Alan Kolok

Trenbolone (Tb), a commonly used growth promoter in cattle production, begins to metabolize and degrade quickly when released into the environment. The objective of this study was to characterize that degradation, and determine the potency and biological activity of the Tb metabolites on the sentinel fish, the fathead minnow. For

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this experiment, we collected sediment from the Elkhorn River and spiked it with Tb. Tb was rapidly metabolized into trendione, one of its primary metabolites, such that 71% of the Tb was gone by day 4 and 84% by day 7. Female minnows exposed to Tb exhibit reductions in the expression of two genes in their livers; vitellogenin and estrogen receptor alpha, both of which are critical for reproductive development. Fish exposed to only the first four days of the exposure, when Tb was the dominant steroid in the tank, showed altered expression of the genes 10 days later, suggesting that a short term exposure can elicit long term changes in the fish. More importantly, fish exposed during the next 14 days (days 5-18) also showed altered gene expression, despite the fact that much of the Tb had already been converted into Td. Trenbolone is likely to quickly metabolize in the environment, but the metabolism does not render the compound inactive. Tb metabolites are still very potent and can adversely impact the reproduction of aquatic organisms.

BENJAMIN KNUTSON

Undergraduate

A 2D Shape Recognition Package for Applications in Weapon Detection

Major: Mathematics

Faculty Advisor: Renat Sabirianov

Co-Author: Renat Sabirianov

Modern systems for public safety (such as x-ray and full body scanners) would be revolutionized by a computer's ability to automatically recognize the shapes of weapons in images. Thus, given an image of a detected object, we intend to compare its shape to a library of weapons in order to determine whether the detected object is indeed hazardous. We have developed a software package which innovatively recognizes the presence of a weapon in an image. We begin by isolating the imaged detected object from the background. We use a basic image processing subroutine to filter the image pixels into two color categories (black if inside the object, white if outside). We then extract the boundary (or contour) pixels for later analysis. Next, we smooth the resulting contour using a rapid iterative process (called a running average). To compare the detected object's shape to that of a weapon in the library, we find the best overlap of the two objects using a correlation product, aided by a Fast Fourier Transform to increase the speed of computation. We further our comparison analysis by relating various shape equations, outputting a set of parameters indicating differences and similarities in shape. Such parameters include differences in overall area, perimeter, or local curvature of the contour. Finally, library objects are grouped into sub-libraries based on type and shape similarity, and a final decision is made as to indicate whether the detected object is statistically similar enough to be considered a weapon. We report test results of weapon detection for various imaged objects.

JOSHUA KOLESZAR

Undergraduate

'Tag! You're [it]!': A Video Game to Evoke Empathy and Cooperation with Trans People.

Major: Psychology

Faculty Advisor: Russell Nordman

Values conscious design is a framework for creating games articulated by Mary Flanagan and colleagues (2008). Its basic premise is that through reward mechanics (and sometimes story), games inevitably end up valuing certain types of behavior, so as designers, we should decide on the values before making the game. My project is an exploration of this design framework. I chose the values of empathy and cooperation to be both rewarded and evoked in my game. The result is the fostering of a certain type of media relationship (called a parasocial relationship) with a transgender video game character within the larger context of a first-person, stealth based game.

WHITNEY KORGAN

Undergraduate

Reduced Vertical Displacement Reverses Effect of Speed on Energy Expenditure

Major: Neuroscience

Faculty Advisor: Nicholas Stergiou

Human gait is an advanced process with biological and mechanical factors affecting efficiency. One controversial theory of efficiency is the displacement of the body's center of mass (COM). Initially, the six determinants of gait

suggested energy expenditure would be minimized by minimizing the body's COM. Previously, we expanded on studies that disproved this theory with one major novelty. Specifically our experiment introduced a curved treadmill that has an arc shaped walking platform, similar to the inverted path of motion of the COM during walking. Thus, this design countered the arc of the center of mass, reducing vertical displacement of the COM. This made possible a more natural walking motion with reduced vertical movement as opposed to asking subjects to artificially alter their gait. Our previous study however used a self propelled curved treadmill and a motorized flat treadmill. To address this discrepancy, we motorized the curved treadmill, thus eliminating treadmill mechanics as a possible outside variable. Results were similar but did not exactly mirror our previous experimental results. Rather than VO_2 rising at a constant rate for both treadmills, VO_2 rose more on the flat treadmill than the curved. COM, similar to what we previously saw, increased more on the flat treadmill as speed increased than on the curved treadmill. Thus, it appears that as speeds increase, the excessive motion of the COM on the flat treadmill rapidly increases VO_2 . Our results support our previous work in that reduced vertical displacement does not coincide with reduced energy expenditure.

KEVIN KWAK

Undergraduate

An Analysis of The Dodd-Frank Act: Before and After

Major: Accounting

Faculty Advisor: Xiaoyan Cheng

In 2010, the Dodd–Frank Wall Street Reform and Consumer Protection Act was made into law in order to combat problems caused by the 2007 recession. This project seeks to test if the Dodd-Frank Act's reform of federal financial regulation was successful in improving the economic position of businesses across several industries. Through the use of the DirectEdgar database, financial information was compiled on forty-seven randomly selected industries from 2008 to 2009, before the act, and from 2011 to 2012, after the act. Findings were subsequently compared through ratio and statistical analysis.

TERRY LAURSEN

Undergraduate

Local muscle cooling does not affect signals related to mitochondrial development.

Major: Biotechnology

Faculty Advisor: Dustin Slivka

Co-Author: Matt Heesch

Signals within skeletal muscle for the adaptation of mitochondria have been shown to be temperature sensitive. Specifically, these signals have been shown to be enhanced during recovery from exercise in a cold environment. However, the effect of direct cold application to the muscle after exercise is unknown. **PURPOSE:** To determine if direct cold application during recovery from an exercise bout, will impact the muscle signal (gene expression) for mitochondrial development. **METHODS:** Trained male cyclists ($n = 8$, age 25 ± 3 y, height 181 ± 6 cm, weight 79 ± 8 kg, $12.8 \pm 3.6\%$ body fat, VO_2 peak 4.52 ± 0.88 L \cdot min⁻¹) completed a 90-minute interval cycling protocol. The exercise was followed by 4 hours of recovery. During recovery ice was applied to one leg (IL) while the other leg (CL) served as a control. Thigh muscle temperature was measured using a probe placed into the muscle. Muscle biopsies were taken at 4 h post exercise from the front of the thigh of both legs to determine the muscle signal for mitochondrial development in IL relative to CL. **RESULTS:** The IL was colder (27 ± 4 °C) than CL (36 ± 0 °C) throughout recovery ($p < 0.001$). There were no differences in our five muscle signals of interest for mitochondrial development ($p > 0.05$). **CONCLUSION:** When this data is considered with previous research, it appears that the critical stimuli for cold induced mitochondrial development is a change in core body temperature as opposed to a change in local muscle temperature.

COLLIN LEFROIS

Undergraduate

Determining Morphological and Physiological Plasticity in Local Populations of *Glechoma hederacea*. Comparison of "Virescent-Like" Mutant with Occurring Range of Morphologies and Physiologies.

Major: Biology

Faculty Advisor: Mark Schoenbeck

Co-Author: Roxanne Kellar

Glechoma hederacea, is an invasive herbaceous plant used as a model system for ecophysiological research. A somatic mutant termed "virescent-like" expressing distinct phenotypes relative to the wild type -- reduced volatiles,

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reduced starch accumulation, pest resistance, increased size and number of trichomes, and increased leaf lobing -- was identified in a local population. Our objectives were to more thoroughly characterize the mutant, and to establish the amount of morphological and physiological variability occurring in local populations so we could more accurately attribute the impacts of the "virescent-like" mutation. In field plots, the mutant was only able to survive in deep shade, while representative wildtypes proliferated in shade, partial shade, and full sun. Mutant plants retrieved from the field site after exposure to cold and declining temperatures of autumn flowered prolifically, while wildtypes flowered minimally or not at all. No seed production was observed on the mutant, however. Data collected from plants grown in deep shade field plots showed that leaves of the mutant had a markedly increased number of lobes compared to three different wildtypes, a decreased dry mass to fresh mass ratio, and protein content comparable to wildtypes. Comparison of mutant and wildtype chloroplast genomes ("plastomes") revealed 24 substituted sites; consequently ISSR analysis was employed to confirm that these plants were in fact members of the same species. Comparison of mutant and wildtype core metabolic enzyme activities also showed altered levels for some enzymes, such as malate dehydrogenase.

HARRISON LEFROIS

Undergraduate

Martensitic phase transition in NiTi thin-film alloys

Major: Mathematics

Faculty Advisor: Renat Sabirianov

In the present work, we examine the martensitic phase transition of the shape memory alloy (SMA) NiTi. We are interested in whether a homogeneous external magnetic field can be used to affect the phase transition during heating and cooling. This theoretical simulation utilizes a Monte Carlo method written in Python to simulate the interatomic interactions during cooling and heating of the NiTi lattice. Starting from a cubic structure at 300K, the program simulates cooling to 240K and we observe that the phase transition occurs at approximately 250K – 260K. Upon cooling, the NiTi lattice transitions from a cubic to a rhombohedral structure regardless of the presence of the external magnetic field. However, upon heating the sample back to 300K, we see two cases. In the first case, the lattice transitions from rhombohedral to a cubic structure in the presence of the external magnetic field. For the second case, the lattice transitions from rhombohedral to a monoclinic structure without the external magnetic field. We also found that when subjected to this external magnetic field, the phase transition during cooling is not as abrupt, i.e. an external magnetic field softens the typically first order phase transition. Our study suggests that magnetic fields can indeed be used to affect the phase transition of NiTi and this idea may extend to other SMAs as well.

JACOB LINDGREN

Undergraduate

TimeMatch Scheduling System

Major: Computer Science

Faculty Advisor: Ann Fruhling

With my new hiring for the STATPack I was immediately given a project to work on. This project being the TimeMatch website for mentees and mentors to set up times to meet up and make a way for the head of the program to see if the mentors/mentees were working together and meeting up like they should. The main challenge of the project was learning a new programming language called PHP. It is a server-side scripting language used in many webpages such as Facebook. The first thing I did was redesign it to make it more mobile friendly, dynamically resizing and such. This way whatever the user is accessing the website with the interface will look the same. After that I proceeded to clean up most of the database interaction code, bringing it up to date with a newer plugin was my main priority. I added functionality by making it easy to have reports generated for anyone who had the right to request them. The reports include the contact information for the mentee, the last few meetings they were in, and whether those meetings were successful or not. The system will be put into full use this semester by youth under the organization of Ann Hobbes, director of the Juvenile Justice Institute under the School of Criminology and Criminal Justice.

AMY LINGEL

Undergraduate

Testing the Association of SpcU and ExoU with the Type Three Secretion System Loading Platform of *Pseudomonas aeruginosa* via Two Hybrid Analysis

Major: Biotechnology

Faculty Advisor: Donald Rowen

One mechanism used by *Pseudomonas aeruginosa* to promote infection of eukaryotic host organisms is the type three secretion system. The Type III secretion system is also used by other types of gram-negative pathogenic bacteria. The type three secretion system is made up of about 20 different protein subunits. Recently, three proteins, PscK, PscL, and PscQ, were proposed to form a loading platform. We are testing whether homologs of the three proposed loading platform proteins found in *Pseudomonas aeruginosa* form a complex and whether the chaperone protein SpcU and the effector ExoU interact with any of the proposed loading platform proteins. To test their interaction, we are using the yeast two hybrid system. For those experiments, we first cloned each of the genes for the three platform proteins into yeast plasmids. Preliminary results with the constructed plasmids have suggested that PscL and PscQ, and PscL and SpcU, may interact. However, we have encountered some technical problems with the assay that may be preventing the detection of interaction. These results would suggest that PscK is not part of the complex, however, that would need to be confirmed by other methods.

MICHAEL LOGUDA

Undergraduate

Linking Physiology to Population Cycles in Norwegian Voles: Preliminary Data for a New Look at the Charnov-Finerty Hypothesis

Major: Biology

Faculty Advisor: James Wilson

This project measures the levels of stress hormones (corticosterone and testosterone) in unstressed wild rodents. The aim of this project was to gather preliminary data for use in a future NSF grant proposal and validate a potentially new way of trapping to obtain fecal and urine samples from wild rodents. Voles were specifically targeted but any rodent species captured was sampled. The new trapping method used a modified plastic metabolic chamber that had a trap door installed to allow rodent entry into the chamber. Once trapped, the rodent would stand on the wire floor placed in the bottom half of the chamber, which allows urine and feces to fall below and collect in sample tubes. The chamber was placed, with the bottom half buried, in a natural tall grass prairie to allow easy access to the chamber. Along with the modified metabolic chamber, thirty Sherman live-traps were set and fecal samples were taken from them. Levels of the two hormones will be measured in the feces samples using immune-assay kits. We expect differences in hormone levels between rodent species, and because the method of collection does not involve direct handling, we expect stress hormone levels in feces to reflect natural stress levels. Once validated, this methodology can be used to measure innate stress levels in rodent populations experiencing various levels of overcrowding.

MADISON A. MAPES

Undergraduate

The Use of Polyvinyl Alcohol to Inhibit the Hydrate Transformation of the Drug Theophylline

Majors: Banking and Finance

Faculty Advisor: Alan Gift

The solid form of active pharmaceutical ingredients (APIs) in drug tablets have the potential to transform into a hydrate state. These transformations are important to understand in order to prevent unwanted transformations when the anhydrate crystals are in the presence of water. Specific polymer excipients have the ability to inhibit this anhydrate to hydrate transformation. In this study, various properties of polyvinyl alcohol (PVA) were investigated to better understand the factors that inhibit this theophylline transformation. Anhydrous theophylline was added to solutions containing dissolved PVA and the transformation from anhydrate to hydrate theophylline was monitored using in-line Raman spectroscopy by collecting spectra every 30 seconds. A calibration model was used to quantify the extent of the transformation for each of the collected Raman spectra, which was then used to construct transformation profiles. The results showed that the inhibition of theophylline was dependent on chain length and percent hydrolysis of the polymer. In addition, intrinsic dissolution and solubility tests were performed to further examine the mechanism of this inhibition. These results indicate that the presence of PVA had little to no effect on the intrinsic dissolution and solubility of theophylline. This suggests that PVA is inhibiting the transformation of theophylline by affecting the growth of the hydrate phase.

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BANI MEDEGAN FAGLA

Undergraduate

Cloning Fluorogen Activating Protein J10 VL for Protein Localization Studies in *Candida albicans*

Major: Biotechnology

Faculty Advisor: Jill Blankenship

Fluorogen activating proteins (FAPs) are a new class of protein reporters that can generate fluorescence from otherwise non-fluorescent molecules. We are investigating the use of the FAP J10 VL for observation of septin proteins co-localization in the fungal pathogen *Candida albicans*. Because the universal CTG codon for leucine codes for serine in *C. albicans*, the FAP molecule of interest, in which 5 CTG codons have been identified, is affected. The purpose of this project is to make a J10 VL FAP tag that can be used in *C. albicans*. Using site directed mutagenesis and homologous recombination, CTG sites identified will be changed to TTG, a redundant codon for leucine. Gene sequencing will help determine successful mutagenesis and subsequent staining and imaging will help determine the utility of the FAP J10 VL– OTB bipartite fluoromolecule as a fluorescent tool for protein localization.

ANDREW J. NEVILLE

Undergraduate

Protein Expression in Thermophilic and Non-Thermophilic *Synechococcus* with Induced Stress

Major: Biotechnology/Medicinal Chemistry

Faculty Advisor: Richard Lomneth

In recent decades, it became clear that many microorganisms live and reproduce in extreme environments. To understand how specific organisms survive these conditions it is important to understand how and what macromolecules, namely enzymes, enable organisms to withstand the said conditions. This study examined groEL protein amounts in both, thermophilic *synechococcus* sp. Strain ja-2-3b'a(2-13) and non-thermophilic (marine) *synechococcus* sp. Strain pcc 7002. A subset of thermophilic cells exposed to 6% CO₂ over 172 hours showed a 1.6 fold increase in groEL compared to a 2.4 fold increase observed from cells that received no added CO₂ exposure. When assessing groEL levels independently of time and stresses, it was observed that the thermophilic species had 3.3 fold of groEL compared to the marine species. A 1.6 fold of groEL was also observed in marine species deprived of CO₂ relative to the marine cells at normal conditions; similar to the thermophilic species. This data supports the hypotheses that groEL is up-regulated when *synechococcus* spp. are deprived of CO₂ and also supports that thermophilic *synechococcus* have a substantially higher groEL concentration; insisting that the thermophilic species rely on an abundance of groEL, compared to the marine species.

BENADETTE NGAKAM NGAMELUE

Undergraduate

Design, Docking Studies, and Synthesis of Potential KIAA1199 Inhibitors

Major: Biotechnology

Faculty Advisor: Haizhen Zhong

Breast cancer is the second leading cause of cancer related death in women, second only to lung cancer. A protein KIAA1199 has been observed in many types of cancers including breast cancer. Preliminary studies on breast cancer cells have shown that the protein KIAA1199 influences its growth, metastasis, and angiogenesis. Inhibition of KIAA1199 can reduce the spread of breast cancer. The objectives of this project are 1) to study the binding affinities of a compound that has been shown to inhibit KIAA1199 and two proposed compounds using glide dock software; and 2) to synthesize the two proposed compounds that may inhibit the protein. The results from docking studies showed that the active compound and the two proposed compounds bind to the same active site but interact with different amino acids of the protein KIAA1199 resulting in different docking scores. Various solvents and reaction conditions have been applied to the synthesis of the two proposed compounds and the effect of these modifications on reaction yields will be discussed.

NGUYEN THANH NGUYEN

Undergraduate

Reduction and Oxidation Potentials of Genotoxic Estrogen Quinones and Catechols

Majors: Medicinal Chemistry and Mathematics

Faculty Advisor: Douglas Stack

Co-Author: Douglas Stack

Lifelong exposure to estrogen is one the strongest epidemiological links for breast and other human cancers. The oxidative metabolism of estrogen generates reactive compounds capable of reacting with and modifying DNA. DNA modification is an initiating event for tumor formation. One class of reactive metabolites resulting from estrogen metabolism is estrogen quinones (EQ). EQ can bind directly to DNA, cause depurination of DNA bases or cause redox cycling that leads to formation of genotoxic free radicals. In order to gain insight into their possible role as redox cycling metabolites, we measure the reduction potentials of two isomeric EQ, E2-2,3-Q and E2-3,4-Q. The first reduction potential of E2-2,3-Q and E2-3,4-Q was measured at -0.275 and -0.495 V, respectively, versus a Ag/AgCl reference electrode. The second reduction potential of E2-2,3-Q and E2-3,4-Q was measured at -0.930 and -0.935 V, respectively. All reduction potentials became more positive (more easily reduced) at lower pH. In addition to the EQ, an amino quinone of E2-3,4-Q was synthesized and characterized by high field NMR. This amino quinone had much higher reduction potentials, which became less negative in acidic medium.

CHRISTOPHER NIEHUES

Undergraduate

Effectiveness of Antimicrobial Peptide DASamP2 on *Pseudomonas aeruginosa*

Major: Biotechnology

Faculty Advisor: Donald Rowen

As antibiotic resistant pathogens continue to become an increasing threat to public and patient health, there is an increasing need for new treatment options. Antimicrobial peptides (AMPs) are becoming a promising replacement for conventional antibiotics because AMPs are capable of killing a wide variety of bacterial stains, even the widely known and feared MRSA (methicillin resistant *Staphylococcus aureus*). Recently a new peptide (DASamP2), developed by Dr. Wang at UNMC, has shown to be effective against both Gram-positive *Staphylococcus aureus* and Gram-negative *Pseudomonas aeruginosa*. To future characterize this AMP against *P. aeruginosa*, we examined how long it takes to kill *P. aeruginosa* and how quickly the bacteria can develop resistance upon repeated exposure. We observed that it killed in *P. aeruginosa* in less than fifteen minutes at low concentrations, and nearly instantly at higher concentrations. It also took longer to naturally acquire resistance to the AMP in contrast to conventional antibiotic treatments (gentamycin). These results support the idea that DSamp2 is a promising AMP worthy of future study.

CLAIRE O'CONNELL

Undergraduate

Engagement of High School and Middle School Students in Robotics: Solving Space Challenges in the Zero Robotics Competition

Major: Computer Engineering

Faculty Advisor: Raj Dasgupta

Co-Authors: Raj Dasgupta, José Baca

The goal of this project is to engage Omaha middle and high school students into University of Nebraska at Omaha programs through competing in an international robotics tournament. The aim of this project is to build and prepare a team(s) of middle and high school students to compete successfully in the 2014 Zero Robotics challenge. This tournament is a program organized by MIT and NASA and it provides high school and middle school students an opportunity to do real space research. Students compete in virtual programming challenges using the SPHERES (Synchronized Position-Hold Engage Reorient Experimental Satellites) robots that were developed at MIT. The final phase of competition takes place live aboard the International Space Station (ISS) on the real SPHERES robots that are already on board. In the 2013 tournament there were 13 European countries and 29 states from the US participating. Nebraska was not represented by any team. The importance of this endeavor is that it will provide outreach between the University of Nebraska at Omaha's computer science department and area high schools, while also creating interest in math and computer science and keeping our best and brightest students here in Nebraska. We have built a team of students from several Omaha high schools and have begun teaching them the math, physics, and programming skills they will need for the competition. The students have shown a real interest in learning and have already improved in their skills in the robotics space challenges.

UNDERGRADUATE ABSTRACTS

KAYLIN OHLER

Undergraduate

Assessing the Number of UNO Students with Eating Disorders and Their Need for Mental Health Services

Major: Social Work

Faculty Advisor: Jeanette Harder

Eating disorders are an equal opportunity problem that affects at least 24 million people nationwide. Eating disorders are real, complex, and devastating conditions that can have serious consequences for health, productivity, and relationships. Nationwide, 25 percent of college-aged women exhibit eating disorder behaviors such as restricting, bingeing, and purging as a method of weight control (National Eating Disorder Association, 2013). This researcher created a 15 question anonymous online survey using templates from well-known eating disorder treatment facilities. The survey was distributed to UNO students by email and social media sites. Students who completed the survey were then able to forward the survey to other UNO students. There were 447 student responses; in addition, interviews were conducted with the UNO counseling office and student health center. This research project reveals that the UNO campus is comparable to the nation in that 25 percent of college-aged women are either at risk or are engaging in some form of eating disorder behaviors. Data analyses also revealed the lack of awareness and utilization of services for eating disorders on campus. By knowing this information, UNO can begin to reach out to students by increasing the overall awareness of eating disorders on campus and the available student services, and decreasing stigma. Due to limited participation, additional research is needed to further explore the effects of eating disorders on the male student population on college campuses.

MOLLY OHM

Undergraduate

The Effect of Achievement Motivation Orientation on Creative Outcomes

Majors: Psychology and Neuroscience

Faculty Advisor: Roni Reiter-Palmon

Co-Authors: Victoria Kennel, Roni Reiter-Palmon

Achievement motivation is fundamental to how people attend to tasks and is divided into two goal orientations: mastery and performance. This motivation is the foundational force that drives individuals to reach objectives. In addition, when engaging in tasks people are either motivated to successfully achieve task completion (approach motivation) or to avoid task failure (avoidance motivation). Understanding how these motivational goals orientations relate to creative outputs is key because creative individuals become leaders and innovators that drive change for the future, making this understanding important both for our educational system, as well as in the workplace. Creativity is defined as the production of original and high quality products, ideas, or solutions, and is often assessed in two ways: objective evaluations of creative thought and performance, and subjective self-assessments of creativity. For this study, the Elliot and Church (1997) Achievement Goal Items scale was used to measure three achievement goal orientations: mastery, performance-approach, and performance-avoidance. Participants also completed various objective and subjective evaluations of creativity. This study provides insight into the relationship between the types of achievement motivation orientations, self-perceptions of creativity, and creative idea generation tasks at the individual level. Results suggest that individuals who approach tasks with a greater mastery orientation more positively assess their own creative abilities, and generate more creative ideas across a variety of tasks. Additionally, both performance-approach and performance-avoidance goal orientations negatively related to aspects of creativity across a variety of measures.

JOSEPH PACHUNKA

Undergraduate

“Enzyme Kinetics of 4-Hydroxyphenylacetate 1-Hydroxylase”

Major: Biotechnology

Faculty Advisor: John Conrad

Co-Authors: Norah Hilger, Christian Valquier

Flavin monooxygenases (FMOs) are a class of enzymes that use a tightly bound FAD prosthetic group and catalyze the incorporation of oxygen into an organic substrate. Typically bacterial FMOs are found in catabolic pathways breaking down organic substrates into metabolites that can be incorporated into energy pathways. This work

focused on the relatively uncharacterized FMO 4-hydroxyphenylacetate-1-hydroxylase (4HPA1H), an FMO that catalyzes the hydroxylation of 4-hydroxyphenylacetate (4HPA) forming 2,5-dihydroxyphenylacetate (HG or homogentistate). The gene for 4HPA1H from *Delftia acidovorans* was sub-cloned into the pET-14b plasmid, replicated in NEB-5 α Competent *E. Coli* and the pET-14b-4HPA1H plasmid was used to transform BL-21 (DE3) competent *E. Coli* for the purpose of protein expression. Expression of 4HPA1H was induced in BL21s containing pET-14b-4HPA1H and protein was purified from inclusion bodies. Purification procedures have yielded purified and soluble protein.

SARA PATE

Undergraduate
Metabolic Response Of Nebraskan Anurans To A Warming Climate
Major: Biology
Faculty Advisor: James Wilson

The purpose of this study is to provide needed information on the thermal requirements of Nebraska's common amphibians. Change in the thermal regime of ectothermic species that utilize seasonal torpor (hibernation) is of major concern. Increased global temperatures will cause ectothermic species to be exposed to warmer temperatures, altering their metabolic profile. We used common frogs and toads indigenous to Nebraska to measure their metabolic response to ambient temperatures. We hypothesize that the metabolic rates of frogs and toads will increase with increased ambient temperature. Because their metabolic rate is tied to ambient temperature, any increase in ambient temperature, as is being predicted, would lead to increased energy usage during hibernation. Data collected will provide critical information on the response of ectothermic species to climate change. To test our hypothesis, we collected frogs and toads from Omaha, Nebraska and ran each individual in a metabolic chamber (Sable Systems) at various ambient temperatures. The metabolic chamber measures the production of carbon dioxide in the test individual to determine metabolic rate. A regression of metabolic rate and ambient temperature will be generated to calculate the slope of the regression line for each frog and toad species. Comparison of slopes between both species will determine if the rate of metabolic change is different between species. We expect species with a higher slope will be more susceptible to increase temperatures associated with climate change. The analysis and results will be complete February 2014.

MARISSA POE

Undergraduate
Age-Related Changes in Tongue Tissue Morphology Following Lingual Nerve Transection
Major: Neuroscience
Faculty Advisor: Suzanne Sollars

Taste is a chemical sense utilized by many species as a means to evaluate a substance before ingestion. Taste information from a substance is communicated from taste buds to the brain through the chorda tympani nerve. The individual taste buds are located within mushroom-shaped protrusions on the tongue called fungiform papillae. These papillae also send information to the brain, which is somatosensory in nature. The somatosensory information is transmitted along the lingual nerve. The chorda tympani and lingual nerves have no overlap in the papillae or taste buds. Previously, it was observed in rats that severing the chorda tympani nerve early in development causes changes to the papillae, despite the fact that there are no known connections between this specific nerve and the papilla structure. The purpose of this study was to further investigate these nerves and their relationship with the papillae and taste bud structures. In this study, the lingual nerve was severed in rats of differing age groups, then tongue tissue from these animals was collected and sectioned to a thickness of 10 μ m. The tissue was then stained and microscopically analyzed to determine potentially differing taste bud volumes. These volumes were calculated using the program Neurolucida. It was shown that severing the lingual nerve in all age groups affects taste bud volumes, and the severity of these effects differed between animals at different developmental stages. This provides more information about the relationship between the chorda tympani and lingual nerves and suggests the presence of cross-modal communication between them.

JEROME PRUSA

Undergraduate
What is the difference between virulent and avirulent coxsackievirus B3?
Major: Biotechnology
Faculty Advisor: William Tappich

Coxsackievirus B3 (CVB3) is an enterovirus that is implicated in human diseases, most notably myocarditis. Similar to all other enteroviruses, CVB3 has a single stranded RNA genome that is typically broken into four regions. The

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four regions include the 5'untranslated region (5'UTR), the coding region, a 3'untranslated region (3'UTR) and a poly (A) tail. The 5'UTR function has been well studied and accepted as a critical element for CVB3 infection. The 5'UTR's function in viral processes during infection is dependent on its structure. The 5'UTR must be folded into a specific set of structural domains. We have determined the secondary structure of the 5'UTR in both virulent (CVB3/28) and avirulent (CVB3/GA) strains of CVB3 and compared the structures. The virulent and avirulent 5'UTR secondary structures are dissimilar in a region that has previously been proven to be the CVB3 cardiovirulence determinant. This data strongly suggests the 5'UTR structure is a mechanism of CVB3 cardiovirulence.

ANDREW PULFER

Undergraduate

Building and Simulating a Computational Model of HIV Infection in CD4+ T-Cells

Major: Bioinformatics

Faculty Advisor: Tomas Helikar

Intracellular pathways are the protein to protein interactions within cells that control almost all functions that occur. Although at first glance, these pathways may sound simple, they have interconnections and complexities akin to a massive highway system. It seems simple when you are just following one highway, but each path is subtly effected by every other intersection and road in the system, but these effects can be really hard to predict before they happen. This is much like the web of signals that make up a cell and are extremely difficult to understand without aid. The online simulation platform "The Cell Collective" allows the user to enter each individual protein into a model and then insert the interactions that occur between these proteins. After a model is built, the effects of eliminating certain signals can be tested and their effects on the entire system can be observed. In my project, I took a model of a CD4+ T-Cell and added the pathways that are involved in an HIV (Human Immunodeficiency Virus) infection of the cell by reviewing available papers to find each step in the complex infection. After the model was completed, I tested overall effects of certain changes to the pathway that had been confirmed in laboratory studies in my model to verify that it functions as a live cell actually does.

BINA RANJIT

Undergraduate

Localization ADAM proteins expressed by the *mmd* gene in neuronal cells of *Drosophila*.

Major: Biotechnology

Faculty Advisor: Bruce Chase

The ADAM (a disintegrin and metalloprotease domain) proteins are membrane-anchored and secreted glycoproteins able to disrupt integrin-mediated cell-cell interactions. About half of them have active metalloprotease domains that can process and cut-off extracellular portions of transmembrane proteins releasing growth factors, cytokines, and modifying receptors, thereby altering inter- and intracellular signaling processes. While some ADAM proteins are known to play critical roles in key developmental processes (e.g., fertilization, nervous system formation, muscle formation) and cancer, the physiological relevance of other proteins is not known. One approach to understanding the function of such ADAMs is to undertake genetic analyses in model organisms such as *Drosophila* (fruit flies). Analysis of genomic DNA sequence has identified seven genes for ADAM proteins. The *Drosophila* mind-meld gene, an ADAM-protein-coding gene with an unknown function, encodes a set of ADAM proteins similar to human ADAM 23. The *mmd* gene is expressed in the nervous system like the ADAM 23. The transcripts of *mmd* undergo extensive alternative mRNA splicing to produce at least four different protein isoforms. The proteins were visualized using indirect immunofluorescence staining to understand what role the isoforms play in the developing and adult nervous system. Confocal microscopy was used to detect and analyze the pattern of staining.

JESSICA RENZ

Undergraduate

The Temporal Structure of Postural Control Variability during Standing is Affected by Suprathreshold Mechanical Stimulation.

Major: Pre-Physical Therapy

Faculty Advisor: Nick Stergiou

Co-Authors: Jung Hung Chien, Mukul Mukherjee, Nick Stergiou

Variability is inherent in the maintenance of human posture and is reflective of the contribution of different sensory systems as postural sway. Changes in the structure of postural sway variability under different task and sensory

conditions are essential in understanding their role in the organization of human motor output. To address this issue, we used suprathreshold mechanical stimulation (sMVS) to perturb the vestibular system. We hypothesized that the structure of postural sway variability would become predictable when sensory information from other sources became less reliable. Eight healthy young adults (24.7 ± 5 years) were instructed to maintain their balance while standing on the Smart Balance Master (NeuroCom, Clackamas, OR, USA). There were total six sensory challenging conditions: 1) normal, 2) vision-blocked, 3) visual sway-reference, 4) surface sway-reference, 5) vision-blocked, surface sway-reference, and 6) visual and surface sway reference condition. In general, conditions 5 and 6 were used to indirectly detect the participant's ability to use inputs from the vestibular system to maintain balance. The suprathreshold mechanical vestibular stimulation (sMVS) contained two vibrating elements, called tactors (Engineering Acoustics, FL, USA.), were placed on the mastoid process on each side to perturb the vestibular feedback signals. Our results supported the hypothesis that structure of postural sway variability became predictable if sensory information became less reliable. Our study also found that unilateral vestibular stimulation made postural sway to become more rigid than bilateral stimulation. This is probably because postural control is a bilateral coordination task requiring dynamic input from bilateral sources.

CHELSEA ROSE

Undergraduate

Factors Impacting the Duration of Grooming Behaviors on a Marmoset Pair-Bond (*Callithrix jacchus*)

Major: Psychology

Faculty Advisor: Rosemary Strasser

Exposure to stress and boredom in research animals can provoke various behaviors that may become harmful to themselves or cagemates. Baseline behaviors, primarily grooming, were observed in a research laboratory to determine what may be causing hair loss in a female common marmoset that led to some skin irritation on her thigh and tail. After treating the primates with a positive human interaction, stressful situation, and an enrichment treatment, results showed which manipulations changed behaviors in the marmoset pair-bond. The stressful situation was found to significantly increase autogrooming by the female marmoset. Both the enrichment and positive human interaction treatment decreased allogrooming behaviors by the male to the female. This finding may indicate the importance of novel stimuli in the enclosed environment to deter overgrooming. The study contributes to the growing research promoting positive psychological welfare of laboratory animals.

EMILY ROYER

Undergraduate

AIR The Film

Majors: Sociology and Pre-Medical

Faculty Advisor: D. Scott Glasser

Co-Author: Nick Royer

With a combined FUSE award of \$5000 and an additional \$3000 of private fundraising, Nick & Emily Royer led a team of over 40 volunteers in the production of the upcoming feature film "AIR", the story of a SCUBA diver who surfaces to a world with no breathable air, and must fight to get back to her family, and her son, before her tanks run out. The production is an example of how advancements in the film industry are enabling independent filmmakers to produce films that would previously have been impossible. We will be having a round-table discussion in which we will address questions from the audience and discuss our experiences from the project.

NICK ROYER

Undergraduate

AIR The Film

Major: Studio Art

Faculty Advisor: D. Scott Glasser

Co-Author: Emily Royer

With a combined FUSE award of \$5000 and an additional \$3000 of private fundraising, Nick & Emily Royer led a team of over 40 volunteers in the production of the upcoming feature film "AIR", the story of a SCUBA diver who surfaces to a world with no breathable air, and must fight to get back to her family, and her son, before her tanks run out. The production is an example of how advancements in the film industry are enabling independent filmmakers to produce films that would previously have been impossible. We will be having a round-table discussion in which we will address questions from the audience and discuss our experiences from the project.

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CORY RUZICKA

Undergraduate

Cyber Dissidents: Harbingers of Change

Major: Political Science

Faculty Advisor: Jody Neathery-Castro

This piece of research is concerned with gauging the public's cumulative shift in opinion in the wake of the two most notable instances of cyber whistle blowing. Within the research, I display the existence of two dichotomously positioned schools of thought. The first school of thought is a conglomeration of scholars who sympathize with the notion of cyber dissidence and thus, believe that the public should revere dissidents as protectors of civil liberties and the like. The second school of thought is reserved for those who believe that the cyber dissidence is harmful to national security and that dissidents should be regarded as deviants or renegades. The model that is employed for this research shows that with each act of whistle blowing, public support for government agencies wanes while support for the dissidents themselves increases. I utilized public opinion polling data from Pew, Huffington Post and Gallup studies to bolster my assertions.

AMANDA RYAN

Undergraduate

Midwestern Politeness Meets Religious Diversity: How does Omaha shape up?

Major: Religious Studies

Faculty Advisor: Paul Williams

For the Student Research and Creative Activity Fair, I plan to display the research that I have undertaken during my undergraduate career at UNO. My FUSE grant focused on better understanding the religious diversity that is in the Omaha area. My thesis for this project is: Omaha is an increasingly religiously diverse community that experiences a high level of acceptance towards people of different belief systems. Over the course of the last year, I have used Project Interfaith's interactive *Ravel Unravel* video project to analyze how religious diversity is experienced in the Omaha community, with the focus being "how welcoming is Omaha to people of different belief systems?" By using SPSS to analyze the relationship between perceived levels of acceptance and religious identification and comparing those findings to other national surveys and resources, I discovered that Omaha is a particularly welcoming community to most religious and spiritual minorities. Overall, the findings suggest that people that identified as Buddhist, Muslim, and Catholics generally felt more welcomed by the Omaha community. However, people that identified as Atheists did not feel as accepted as the other groups. This research, therefore, shows how we can better understand the community that we live in and create a more vibrant and civically engaged society.

ANN SMITH

Undergraduate

Backbone Probing of CVB3 RNA

Major: Biotechnology

Faculty Advisor: William Tappich

Coxsackievirus B3 (CVB3) is a pathogenic enterovirus of the *Picornaviridae* family that is responsible for myocarditis and pancreatitis in humans. The positive single-stranded RNA genome consists of 7,400 nucleotides and four regions: a 5' untranslated region (5'UTR), an open reading frame (ORF), a 3'UTR, and a poly(A) tail. The 5'UTR contains 742 bases and seven secondary structure domains. Because virulence has been associated with the 5'UTR, understanding the structure of this region is essential. Selective 2'hydroxyl acylation analyzed by primer extension (SHAPE) is a method used to investigate the structure of the CVB3 5'UTR. SHAPE involves modification of the RNA backbone with the use of an electrophile, N-methylisatoic anhydride (NMIA). NMIA reacts with the 2'hydroxyl group of the ribose sugar to produce a 2'-O-adduct. Single-stranded and unconstrained nucleotide positions will react more readily with NMIA than positions that are base-paired and constrained. Quantifying the reactivity with NMIA will help determine regions of the genome that are accessible to modification. SHAPE experiments will allow us to comparatively analyze the three-dimensional structure of virulent and non-virulent strains of CVB3 and will reveal regions that are exposed for functional activities such as protein binding. A better understanding of virulence determinants in the RNA genome could lead to the development of effective antivirals.

ARRIANA ST. ONGE

Undergraduate
Heartland Community Flute Choir 10th Anniversary Album
Major: Music Performance and Technology
Faculty Advisor: Christine Beard

In my project I edited and produced an album for the Heartland Community Flute Choir. I want to present this work from my FUSE project in the format of a poster, and possibly have the use of some technology to show what the tracks looked like when they were first recorded and the difference after being edited. This will require the use of something such as an iPad to show the difference using audio. The album will be printed and released as a product for the Heartland Community Flute Choir.

APOLLO A. STACK

Undergraduate
Generation of Atovaquone-Resistant *Toxoplasma gondii* via Chemical Mutagenesis
Major: Biology
Faculty Advisor: Paul Davis

Toxoplasma gondii is a zoonotic protozoan parasite that is the causative agent of toxoplasmosis, a leading cause of neurological birth defects in the United States and around the world. Furthermore it is closely related to *Plasmodium falciparum*, the parasite that causes malaria. The research conducted was aimed at furthering understanding in drug development for these parasites through the generation of artificial drug-resistance via chemical mutagenesis of *T. gondii* with N-ethyl-N-nitrosourea. Through chemical mutagenesis, an atovaquone-resistant mutant strain of *T. gondii* was created which is now a viable positive control for further application of this technique.

BREANNA THOMPSON

Undergraduate
The Influence of Social Interaction on Steroid Hormones Levels in Women after a Competition
Major: Psychology/Neuroscience
Faculty Advisor: Rosemary Strasser
Co-Authors: Ryan Placzek, Alicia Phillips Buttner

The fight-or-flight response has been the general prototypic response to threats. Both men and women have similar basic neuroendocrine responses to threat yet behaviorally men are more likely to engage in these types of responses more than women. Evolutionarily speaking, women have a greater investment in the care of offspring, which presents limitations in a fight or flight type response. Women are more likely to demonstrate a "tend-and-befriend" response to a stressor; which has been adapted over many generations by natural selection. This idea is supported by the observation that across species females exhibit more social affiliation to threats than males. This study will focus on the effects of social interaction after competition in women and how these interactions might affect testosterone and cortisol levels. The present study looked at 59 mixed-sex dog handlers in a dog agility competition in the Midwest. This environment represents an ideal social setting that includes clear-cut status of winners and losers, high investment in performance, and a large public audience of fellow competitors, spectators and judges. All of these factors influence the consequences of winning and losing more noticeably. Tending behavior will be measured post competition between the handler and the dog. The results will be presented.

SHERIDAN TRENT

Undergraduate
Resilience as a Moderator of Work-School Conflict on Daytime Sleepiness, Satisfaction, and General Well-being
Major: Psychology
Faculty Advisor: Lisa Scherer
Co-Author: Lisa Scherer

Working through college is now the rule rather than the exception. Recent reports indicate that almost 80% of college undergraduates work while enrolled (King, 2006), citing reasons such as tuition, fees, and living expenses. Prior studies have documented the negative effects of work-school conflict, which is most likely to occur when students work in excess of 20 hours per week (McNall & Michel, 2011; Miller, 2008; Gilbert, 2010). These effects include compromised health and well-being, a lower GPA, decreased sleep, and decreased satisfaction with work. Insufficient research has explored factors which may help reduce these harmful effects. In this study, 180 working college students participated in an online survey to help test the primary hypotheses that resilience would buffer the deleterious effects of work-school conflict on sleep, school and job satisfaction, and general well-being. Resilience is

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defined as “tendencies to cope with stress in a highly adaptive manner,” by Wallston and Sinclair (2004) and has been shown to have a protective influence on those dealing with stress. This study examined the direct effect of WSC on four dependent variables including daytime sleepiness, job satisfaction, school satisfaction, and general well-being. This study also investigated whether or not resilience would have a mitigating effect on the level of WSC experienced by students on each outcome variable.

KRYSTEN VANCE

Undergraduate
Modeling HIV Infection of Macrophages
Major: Biotechnology
Faculty Advisor: Tomas Helikar

The goal of this project was to create a large scale, dynamic, model of HIV infecting a macrophage cell using the Cell Collective. The Cell Collective is online software that allows the user to mine knowledge regarding cellular activity and simulate that activity under different conditions *in silico*. A previous network representing macrophages existed on the Cell Collective with which the model for HIV infection was combined. This not only produced the largest macrophage model in existence but it also allowed us to study the downstream effects of an HIV infection on the totality of the cell. The model was then verified using the Cell Collective’s real-time simulator which allowed the user to actively visualize and mutate the model. In addition the dynamic analysis was used to run thousands of different simulations under unique stimuli. The complete model can now be used to identify which proteins have the largest role in an HIV infection, either by means of a piece by piece knockout study or by new software being developed in our laboratory. This information could then be used to create new and innovative treatments.

MARIA VARGAS

Undergraduate
The Impact of the Acculturation Process in Latino’s Nutrition
Major: Public Health
Faculty Advisor: Jason Coleman

Background: Dietary intake is an important determinant of obesity and numerous chronic health conditions and sickness. A healthful diet is an essential component of chronic disease self-management. Researchers have indicated that the healthfulness of the Latino diet deteriorates during the acculturation process. This study examined the impact of acculturation on the diet of a growing Latino population in Omaha, Nebraska. Methods: A survey instrument was created for this study based on information from literature review and from other previously developed instruments. The questions were based on eating preferences, eating frequency, and family meal frequency. Statistical Product and Service Solutions (SPSS) software was used to conduct all statistical analyses, including descriptive statistics, and comparisons. Results: Fifty-two participants completed the survey. All interviewed were females, and most reported being from Mexico. Participant ages ranged from 19-64years. Most reported living in the United States for more than one year. Final statistical analyses are being conducted. Implications: This study examined the impact of acculturation on nutritional habits for Latinos in Omaha, Nebraska. The findings could be used to create nutritional programs to promote traditional Latino food and to help Latinos maintain their healthy diets, which will ultimately result in the reduction of health disparities for Latinos living in the United States.

MAXWELL VIRUS

Undergraduate
The Effects of Capsaicin on Taste Bud Volume in Rats
Majors: Biology and Neuroscience
Faculty Advisor: Suzanne Sollars

Capsaicin is a pain stimulating neurotoxin found in hot peppers that causes a burning sensation when it comes into contact with pain receptors on the tongue. It is commonly thought that as an individual eats spicy foods, their tolerance increases and they can intake spicier foods. An experiment was designed to find out why this tolerance develops. The experiment exposed rats to a capsaicin concentration that was increased every five days to see if a tolerance was formed. Female Sprague-Daley rats (n=3) were started at a concentration of 1.5 ppm at 40 days of

age and the concentration was increase by 1.5 ppm every 5 days. The capsaicin solution included capsaicin dissolved in ethanol and mixed with sucrose. We were also interested in the effects that capsaicin would have on taste buds, so a control group (n=3) was exposed to a solution of sucrose dissolved in distilled water. The experiment was ended after 67 days of solution exposure at a capsaicin concentration of 19.5 ppm. The experimental group formed a tolerance for capsaicin throughout the experiment, as evidenced by increased concentration consumption. Taste bud volumes were measured post-mortem and compared between groups. There was no significant difference between the taste bud volume of rats exposed to the capsaicin solution and the taste bud volume of rats exposed to the sucrose only solution. Capsaicin does appear to alter the taste bud volume. This result suggests that the development of a capsaicin tolerance is unrelated to changes in taste bud volume.

SEAN WEST

Undergraduate

Integration of domain knowledge and gene expression data in the Development of enriched correlation networks

Major: Bioinformatics

Faculty Advisor: Hesham Ali

Co-Author: Hesham Ali

The ability to model intragenic relationships using networks has allowed for the interpretation of considerable amounts of data, taking a key role in realization of systems biology. Practically, the use of gene correlation networks has assisted in the discovery of drugs as well as the illumination of previously unknown genetic relationships. Such networks provide a useful mechanism to model experimental results obtained from gene expression and capture a snapshot of the expression as well as the correlation of the experimental samples. Due to the fact that the noise to signal ratio in most biological databases are non-trivial, standard correlation networks may suffer from relatively high false-positive and false negative rates. Developing biologically-rich network enrichment algorithms can play a significant role in providing a healthy bias in the network and lead to the extraction of meaningful results. In addition, structure-based network filters can be used to reduce the network size and keep significant edges likely associated with strong biological signals. In this project, we propose the use of domain knowledge, not simply as an assessment tool, but as a basic component in building the correlation networks. We implemented a network integration algorithm that uses both gene expression data (experimental knowledge) and gene ontology data (domain knowledge) to build a biologically-rich correlation model. Our main hypothesis is that the integrated networks would reduce the harmful effects of outliers from imperfect data while maintaining the high concentration of network substructures that are likely to reveal novel, biologically-significant relationships. In addition, using the concept of "guilt by association", we analyzed the clusters of the integrated networks and found that there was a significant increase of enrichment scores relative to the original networks. We also show higher concentration of known biological motifs calculated in the enriched networks. Based on the results obtained so far, the effects of outliers have been diminished in the new networks without the loss of the novel relationships.

ALEX I. WIESMAN

Undergraduate

Effects of Rearing Condition on Parent Fitness and Offspring Development

Majors: Psychology and Neuroscience

Faculty Advisor: Rosemary Strasser

Co-Authors: Ashley Bowling, Rosemary Strasser

This study examined the effects of uniparental and biparental rearing conditions on offspring growth and development and parental fitness in zebra finches. A previous study discovered that rearing zebra finches in the biparental condition had an adverse effect on the growth and development of their offspring compared to uniparental conditions, which supported zebra finch development (Royle, Hartley & Parker, 2002). Uniparental conditions positively affected the development of male offspring due to greater maternal investment, and they became more sexually attractive in adulthood compared to males in the biparental conditions. Using zebra finches as our model system, we examined the effects of uniparental rearing, as opposed to the typical biparental rearing, on offspring growth and fitness of the parents. In the offspring, we measured body mass, bone length, and development of secondary sex traits such as beak and cheek patch coloration across development. Fecal samples were also collected for later stress hormone analysis. Between rearing conditions we discovered that uniparental chicks had a significantly larger increase in tarsus growth and uniparental mothers were found to lose the largest amount of weight from baseline, signifying their greater investment in offspring care. In addition to Royle's findings we observed an increased tarsus growth in offspring of the uniparental condition and increased early beak and cheek coloring development. This may signify increased fitness of offspring reared uniparentally, or alternatively an effect on sex hormone levels, which have been shown to affect longitudinal bone growth (Clarke, & Khosla, 2009; Manolagas, Kousteni, & Jilka, 2002).

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KYLIE WOODRUFF

Undergraduate

Understanding Creativity: The Relationship Between Individual Difference Factors and Components of Creativity

Major: Psychology

Faculty Advisor: Roni Reiter-Palmon

Co-Author: Shane McFeely

Creativity is the production of novel and useful ideas in any domain. In order to be considered creative, a product or idea must be different from what has been done before. However, it cannot be different just for the sake of being different. The product or idea must be appropriate to the situation at hand, correct, valuable, or expressive of meaning. Creativity does not represent a unitary psychological attribute, but rather an outcome of a dynamic interplay of certain individual and situational variables (Amabile, 1982). There is an agreement among researchers that these components usually include cognitive ability, cognitive style, motivation, and the environment as sources of stimulation (Dodds, Smith, & Ward, 2002; Moss, 2002). Creative thinking skills are important because they are useful in any domain. The psychological study of creativity is essential to human progress. It is important to study the social variables that can positively or negatively influence creative performance in order to aid the comprehensive description of creative personality, its development, and its manifestation (Amabile, 1982). The purpose of this paper is to examine the elements of creativity (i.e., solution quality and originality) separately and identify differential relationships among intelligence, personality, and creative engagement measures. Solution originality refers to the novelty of an idea or the degree to which people engage in deep exploration of their knowledge. The product must be unusual, statistically infrequent, or completely unique (Amabile, 1982). Solution quality refers to whether or not the product is correct in the context of the specific problem and solves the issue at hand. Individual differences, such as intelligence (Sternberg & O'Hara, 1999) and openness to experience (George & Zhou, 2001), have been positively associated with creative problem solving. This paper will focus on rating the quality and originality of solutions separately. We expect these two components of creativity to have separate relationships with these individual difference measures of intelligence, openness to experience, and how often one engages in creative behaviors.

TIMOTHY D. WOODS

Undergraduate

Neuron Morphology in the NTS of Aged Rat Following Neonatal Chorda Tympani Nerve Cut

Major: Neuroscience

Faculty Advisor: Suzanne Sollars

The chorda tympani nerve (CT) transmits taste signals from the anterior two thirds of the tongue to the nucleus of the solitary tract (NTS). The terminal fields of three taste nerves, which include the CT, as well as the greater superficial petrosal (GSP), and the glossopharyngeal (GL), demonstrate developmentally competitive overlap within the NTS (Sollars, Walker, Thaw, & Hill, 2006; Corson & Hill, 2011). Following neonatal CT nerve cuts (CTX) performed at P5 or P10, studies have examined the morphology of NTS neurons in young (P20) and adult (P55) rats, but have not yet investigated aged (P720+) rats. Golgi staining (FD, Neurotechnologies) combined with methylene blue counterstaining, facilitates visualization of the neurons within the NTS. The present work is examining the NTS of P720+ rats that underwent CTX or sham surgery at both P5 and P10. After NTS neurons are visualized through light microscopy, Neurolucida software (MicroBrightField Inc.) is used to trace and measure dendritic length. These measurements will be contrasted between treatment groups. Results should offer insight into how neurons within the rat NTS restructure in response to dramatic denervation. It is expected that NTS neurons within the experimental group will have comparatively longer dendritic processes in order to receive innervation from the GSP and GL, respectively. If morphological distinctions are not present, this could indicate a swifter expansion of the GL and GSP terminal fields than previously anticipated.

SAMANTHA WORACEK

Undergraduate

Notorious: A Case Study of Marketing and Management Practices in Two Terrorist Organizations

Major: Management

Faculty Advisor: Gina Ligon

Co-Authors: Katy Connealy, Gina Ligon

Terrorism is a complex issue that demands examination from multiple frameworks. By applying empirical research from marketing and management literature to two historical cases of violent extremist organizations, we were able to

understand much more about the “business of terrorism.” While knowing what keeps violent extremist groups going is important, uncovering what led to their downfall is equally, if not more, important. In this study, I used a dataset of historical information previously collected through a grant funded by Department of Homeland Security to add to my own research into the Weathermen Underground and the Japanese Red Army. Using a case study design I applied notoriety (i.e., firm reputation) variables to these violent extremist organizations to determine the similarities and differences in their rise and fall from their height of power. For both organizations, I found that organizational branding was the greatest source of success; however, by creating a highly centralized structure the Japanese Red Army was better able to direct members to a strategic goal. Ultimately, the deterioration of their organizational structures led both groups to collapse. By examining these organizations, I determined that organizational strategies such as creating a unique “brand,” as well as hierarchical structure of operations play significant roles in the overall success of a terrorist organization.

SARAH WROBLESKI

Undergraduate

Outliers: Success in Rural Healthcare

Major: Pre-Nursing

Faculty Advisor: Karen Murch-Shafer

Many Nebraska counties are experiencing a shortage of primary health care providers. It is not unusual for nurse practitioners and physician assistants to provide primary care when a M.D. isn't in the county. The 2009 report from University of Nebraska Medical Center titled "A Critical Match" documented the healthcare professional shortages by specialty and provided recommendations to alleviate it. This research involved the purchase of 2013 data from the Health Professions Tracking Services of primary care nurse practitioners (NP) and physician assistants (PA) in rural Nebraskan counties and compared it to the 2009 findings. The analyses revealed that while the shortage of PA's is narrowing in many counties, the NP shortage remains widespread. By showing the dire need for rural practitioners to undergraduates entering healthcare as a profession they can begin to consider how they can make a difference in rural communities. Beyond the quantitative data illustrating the need, the qualitative portion of this project involved interviewing individuals who practice, research, and contribute to healthcare in rural communities. The most compelling content from the interviews was paired with photos. The resulting posters are the final deliverables of this research and will hang in the UNO anatomy and physiology lab and other venues with the intent of encouraging undergraduates to start thinking about practicing in a rural community early in their education.

HANNAH WYBLE

Undergraduate

“Analysis of CAV1 Signaling in Healthy, Epithelial Cells”

Major: Pre-Medical Studies

Faculty Advisor: Christine Cutucache

Caveolin-1 (CAV1) is the major protein that comprises caveolae, also known as cave-like invaginations, that are found in both the cytoplasm and on the plasma membrane of human cells. It was once thought that CAV1 was involved solely in endocytosis; however, recent research suggests that CAV1 has multiple functions in the cell. Specifically, CAV1 is important for cell-signaling, in which it up- and down-regulates multiple cell processes; including, cell proliferation and invasion. *Methods:* We created an *in silico* model of CAV1 cell signaling in healthy, epithelial cells using primary research findings. We compared our findings with protein analysis software: STRING and BioGrid. *Result:* Using The Cell Collective, a mathematical computer modeling system software, we created an *in silico* model of CAV1 and 26 proteins that directly interact with it in healthy, epithelial cells.

NICHOLAS YOST

Undergraduate

The ability to finely control muscle temperature and the relationship to body fat

Major: Exercise Science

Faculty Advisor: Dustin Slivka

Two popular types of rehabilitation therapy are the application of heat, and the application of cold. **PURPOSE:** The purpose of this study was to determine the effects of a commercially available local heating/cooling device, Thermazone Continuous Thermal Therapy cuff (Innovative Medical Equipment LLC, Cleveland, Ohio), on human skeletal muscle temperature kinetics. We also aimed to identify the extent to which subcutaneous body fat may impact the effectiveness of the device. **METHODS:** The participants' subcutaneous body fat was obtained by obtaining a thigh skinfold measurement on both legs of the participant. For the trial, a Thermazone cuff was placed on each of the subjects' legs, one cooling the muscle and the other heating, after an intra-muscular probe was

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placed 2.5 cm into the belly of the thigh muscle of each leg. Intra-muscular temperatures were recorded before and two hours after cuff application. RESULTS: The leg receiving hot application increased intramuscular temperature from $36.5 \pm 0.4^{\circ}\text{C}$ to $37.6 \pm 0.3^{\circ}\text{C}$ ($p < 0.001$), while the leg receiving cold application decreased intramuscular temperature from $35.0 \pm 1.1^{\circ}\text{C}$ to $29.9 \pm 1.6^{\circ}\text{C}$ ($p < 0.001$). The magnitude of temperature change was not correlated with subcutaneous fat in either hot ($r = -0.158$; $p = 0.462$) or cold ($r = -0.093$; $p = 0.660$). CONCLUSION: The Thermazone thermal therapy cuff was found to be effective at manipulating intramuscular temperature with no relationship to subcutaneous fat when an intramuscular thermistor is placed 2.5 cm from the skin surface into the muscle belly. Supported by UNO, FUSE grant funds.

DYLAN ZANER

Undergraduate

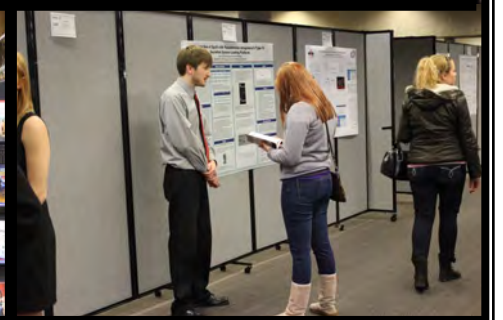
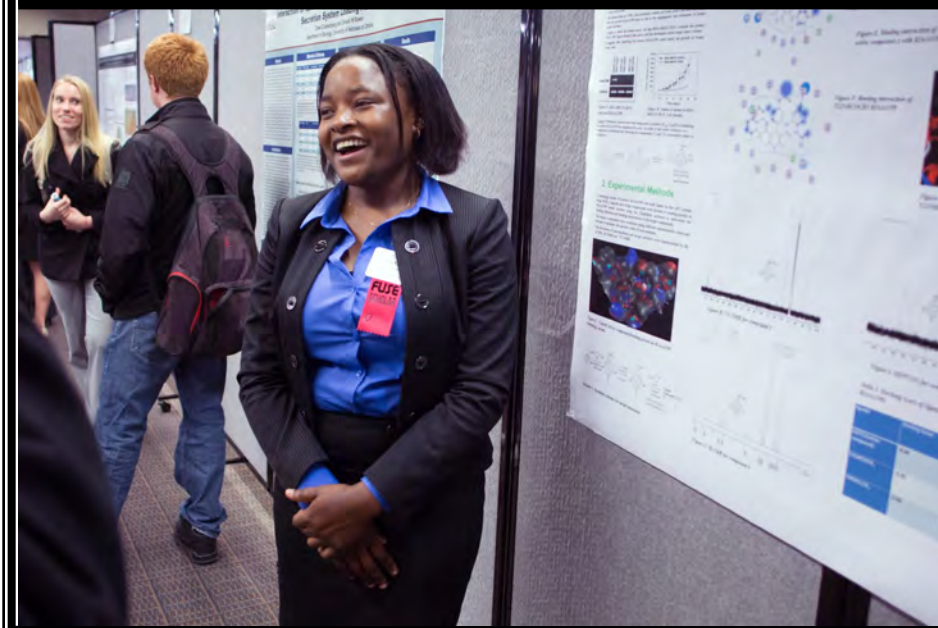
A Regional Examination of the Behaviors and Language of MSM Sex-Seeking Behaviors on Craigslist

Major: Public Health

Faculty Advisor: Jason Coleman

Numerous studies have examined online sex seeking behavior among men who have sex with men. However, most research has focused solely on the transmission of HIV or other sexually transmitted infections. This study identified the cultural differences that emerged within this population based on their geographic location and the norms that existed from these regions. Further, the study identified “how” men talk about these behaviors. Methods: In June 2012, 8,400 ads were collected from Craigslist over 14 days from 20 cities across the United States. Eight cities were selected for analysis based on region and population. The data were reviewed to create a coding scheme of behaviors and linguistic phrases that are displayed the most across all of the ads. Following qualitative analysis, frequencies for each behavior and associated language were calculated and loaded into QSR NVivo for analysis. Results: Regional differences emerged regarding behaviors that were sought on Craigslist ranging from low risk transmission behaviors to higher ones. Regional culture plays into the types of behaviors one asks for online. Further, language used to describe behaviors varied by region. Understanding the variation of behaviors and the language used to talk about those behaviors may be useful to practitioners in the public health field looking to develop and refine culturally appropriate messaging to promote sexual health.





GRADUATE: MASTERS ABSTRACTS

DAKOTA L. AHRENDSEN

Graduate: Masters

Phylogenetic Diversity using next-generation sequencing: Biodiversity assessment of rosids in two grassland prairies of Nebraska

Major: Biology

Faculty Advisor: P. Roxanne Kellar

Co-Authors: Shelly Aust, Amanda Masteller

As the global biodiversity crisis continues, it is imperative that scientists develop new ways to determine how limited conservation resources are distributed. Phylogenetic diversity (PD) measures the evolutionary difference between taxa in a community and can be used as a biodiversity assessment tool. Maximizing PD in a region will maximize the options for future adaptations as ecosystems continue to change. In this study, many species of rosids will be collected from two grassland prairies in Nebraska: The Niobrara Valley Preserve (NVP) and Nine-Mile Prairie (NMP). The total DNA will be extracted from each sample, and next-generation sequencing will be used to estimate robust phylogenies. The phylogenies produced will be used to calculate eight PD metrics that will be compared within and between study sites as well as to species richness and a measure of functional diversity, specific leaf area. The questions that will be investigated are 1) How do various PD metrics characterize biodiversity differently?; 2) How does PD differ between geographic locations?; 3) How is PD related to species richness (SR) and functional diversity (FD)?; and 4) How do PD metrics calculated from a phylogeny estimated using complete genomes differ from one estimated using three to five genes? Results will provide information to conservation planners about the value of using PD as a biodiversity assessment tool.

ROSEMARY ONEKE ARRAH

Graduate: Masters

The impact of reading instruction training for secondary school teachers in the North West Province of Cameroon

Major: Educational Leadership

Faculty Advisor: Elizabeth Leader-Janssen

This study was a pretest-posttest design to examine secondary teachers' perceptions of reading and growth about their knowledge of reading instruction over a seven months period. The researcher facilitated a professional development workshop to the participants in two locations. The focus of the research was on secondary teachers' attitudes and perceptions towards reading, knowledge of reading instruction and assessment, and the effective use of the library for instruction. Teachers (N=39) from six secondary catholic and government schools in the North West Province took the pretest before the workshop and (N=24) teachers completed the posttest seven months later. The survey is being analyzed using descriptive statistics, t-tests, and MANOVA. Data was analyzed and conclusions were drawn. Discussions of the findings will examined the direction of future research and practice in the area of reading instruction in Cameroon.

ELLYN BASS

Graduate: Masters

Attribution Styles and Waking Salivary Cortisol Levels in Adolescents

Major: Developmental Psychology

Faculty Advisor: Jonathan Santo

Co-Authors: Jonathan Santo, Ryan Adams, William Bukowski

According to attribution theory, adolescents are motivated to find a meaningful relationship between causes and effects but may differ in interpretation of this meaning. These attributions reflect adolescents' belief that events are either beyond personal control, indicating an external locus of control, or within personal control, indicating an internal locus of control. Research has demonstrated that an internal locus of control is associated with lower levels of perceived stress (Diehl & Hay, 2010), less physiological arousal as measured by heart rate (Houston, 1972), and lower serotonergic stress responses (Robbins, 2005). In further exploration of this relationship, the current study examined the relationship between attribution styles and the cortisol stress response in a sample of 114 early adolescents ($M_{age} = 10.83$, $SD = .77$; 53.9% male) from a public school in Montreal. Participants completed a measure of attribution style (created based on Dweck, 2002), in which social scenarios, both positive and negative, could be attributed to task difficulty, luck, global ability, a specific trait, or individual effort. Salivary cortisol levels

were measured five times per day for four consecutive days. Adolescents who attributed social scenarios as resulting from their own effort exhibited lower levels of cortisol ($b = -.07, p < .05$) at waking. Other attribution styles were not significantly associated with salivary cortisol. These results suggest that a belief in an internal locus of control, as indicated by attribution of events to an individual's own effort, may reduce daily physiological stress.

MATTHEW BATTEY

Graduate: Masters

Analysis of the Quasigroup Block Cipher

Majors: Computer Science and Information Assurance

Faculty Advisor: Abhishek Parakh

In this research we focus on the analysis of the Quasigroup Block Cipher co-developed by Dr. Parakh and Mr. Battey. Cryptographic routines are continually subjected to attacks from those who wish to gain unauthorized access to protected information. Thus as one cryptographic system is retired, others must be devised to take its place. The Quasigroup Block Cipher (QGBC, which is based on Latin squares i.e. Sudoku) has proven to be statistically sound when evaluated by industry standard tools provided by the National Institute of Standards and Technology. Hence, a second proving of the cryptographic system is necessary. In this research project we subject the QGBC to linear and algebraic analysis to determine its strengths and weaknesses. From our findings we propose alternate solutions to enhance the security of the cryptographic algorithm, and demonstrate possible attacks.

NOELLE LYNN BLOOD

Graduate: Masters

We're Supposed to Believe Fat is a Bad Thing: A Phenomenology of Fat Talk among Feminist College Women

Major: Communication

Faculty Advisor: Shereen Bingham

Fat talk—the conversations women have about their own and others' bodies—is a harmful linguistic ritual with negative impacts on individual self-concept and body image. Through application of critical feminist body rhetoric and linguistic studies, fat talk is conceptualized as an extension of hegemonic power exerting control over women's bodies and language. This study seeks to discover, through hermeneutic phenomenological inquiry, how three feminist college women experience fat talk in their everyday lives, as well as how their individual feminist standpoints inform their interpretations of the behavior. Findings indicate that feminist college women mainly experience fat talk as a linguistic expression of conformity to several intersecting power structures: societal standards, mediated ideals, social obligations, and patriarchal norms. Individual feminist standpoints serve to protect against these hegemonic powers and the negative effects of fat talk, and help maintain a sense of equality for self and others. Illuminating young women's experiences with fat talk from multiple modern feminist standpoints shows little has changed since feminist scholars first explained how social power is imprinted on women's bodies.

BENJAMIN BOHALL

Graduate: Masters

"Mr. Buffett the Teacher" Documentary

Major: Communications

Faculty Advisor: Jeremy Lipschultz

Co-Author: Michael Hilt

This project entailed the editing and co-production of a 30 minute, feature-length documentary to be debuted in May of 2013 at the University of Nebraska-Omaha's Mammel Hall. Warren Buffett began his career as an investor in Omaha also teaching adult education courses at Omaha University for a decade until 1962. Today, Buffett teaches thousands of students visiting with him from across the world. This documentary features recently uncovered historical TV news footage of Buffett in 1962, exclusive interviews with early investors and students, and analyses of Buffett's importance on the global economic stage. Film by Jeremy Harris Lipschultz. Producers Michael Hilt and Ben Bohall. Narrator Mort Crim. Music by Darren Pettit (full credits at end). This documentary aired on NET2 in August of 2013.

GRADUATE: MASTERS ABSTRACTS

HOLLY BUGLEWICZ

Graduate: Masters

A Cross-Generational Analysis of College Students' Perceptions of Leadership Styles, Interactions, and Expectations in Higher Education

Major: Communication Studies

Faculty Advisor: Chin-Chung Chao

For years scholars have been investigating the generational differences that exist among people. One aspect that has been investigated is how a person's generation impacts the workplace. Researchers have explored generational preferences among workers with regards to: work expectations, leadership preferences, and work ethic. While scholars continue to address this topic, another area needs further investigation. Today, various generations can be found in the collegiate classroom. However, research has been inadequate about engaging in the generational difference that exists among students. Specifically, student's generational expectations in regards to preferred professorial leadership style. For this reason, a pilot study was conducted and data was collected from students at a Midwest university. Participants were asked to complete a survey, which was compiled from the LMX and Leadership Style Approach questionnaires (as cited in Northouse, 2013). Findings supported previous literature as it pertains to generational preferences in the workplace. These findings also provide a starting point to understanding the generational expectations found in college students with regards to their preferred professorial leadership style. However, additional investigation is needed in order to understand this topic and report significant findings. Therefore, this study will continue to explore the work started by the pilot study in order to further understand students' generational expectations and preferences for professorial leadership in the classroom.

LIANG CAO

Graduate: Masters

Knowledge coordination crossing firm boundaries in Open Source Communities: An empirical study in open source

Major: Computer Science

Faculty Advisor: Matt Germonprez

Open Source is viewed as a real option for organizational knowledge production risk reduction during research & development activities. However, the Open Source community environment can lead to moral hazards where some participants simply take a "free-ride" and consume resources without contributing back to the community. The risk management methodologies between open source community and participants are not always obvious, and current management practices do not clearly explain the engagement issues beyond individuals. My research proposes a management methodology to address the complexities when organizations engage an open source community, highlighting the knowledge transfer issues involved in such practices. Through an empirical study of open source projects, I investigate knowledge transfer practices in open source project engagement for different participants and understand how these practices are identified and systematically managed. I present the results from two open source projects, involving several organizations, representing three unique types of participation. The analysis explicates the roles that participants play in the engagement with open source communities, and how the roles stratify across different leadership patterns. The paper describes participants' practices used to engage to open source communities, which provides critical insight into understanding the complexities of knowledge transfer and the relationships between methods, process, and individual actions. In addition, the study of work practices in open source software development is also valuable to understand knowledge coordination in the context of large-scale, distributed projects between organizations that cross firm boundaries to explore and exploit knowledge in open communities.

ANA CASTRO

Graduate: Masters

Localization and genetic analysis of *mind-meld* gene in *Drosophila melanogaster*

Major: Biology

Faculty Advisor: Bruce Chase

The ADAM (a disintegrin and metalloprotease domain) proteins comprise a family of membrane-anchored proteins able to disrupt integrin-mediated cell-cell interactions. About half of all known ADAM proteins have active metalloprotease domains that can process and shed ectodomains of membrane-anchored growth factors, cytokines and receptors. In this way, they serve a major role during development (e.g., *kuz* encodes an ADAM protein that serves such a role in *Notch* signaling). The role of ADAMs without metalloprotease function is less well understood.

The *Drosophila mind-meld (mmd)* gene encodes transcripts that are highly expressed in the developing and adult central nervous system and encode proteins with extensive sequence similarity to human ADAM22, ADAM23, and ADAM11. Its transcripts undergo extensive alternative mRNA splicing to produce at least four different protein isoforms: one secreted and three membrane-bound proteins differing in their intracellular cytoplasmic domains. All are likely to lack a functional metalloprotease, as they have a single amino-acid change from a required consensus. To better understand these isoforms' role in the developing and formed nervous system, their expression is being evaluated using immunostaining with antibodies generated against isoform-specific epitopes and RNAi is being used to discover whether they specific isoforms are required for normal nervous system structure or behavior. Knockdown in the retina is associated with defects in the adult pseudopupil. The detailed nature of the underlying morphological defects, and whether they are developmental or reflect neurodegeneration following normal development is under investigation.

SAMANTHA CHESTERS

Graduate: Masters

Sacrifice the Body: Teaching the Value of the Physical in the Composition Classroom

Major: English

Faculty Advisor: Nora Bacon

Work is hard on the body. From the intense injuries of meat packers to the sedentary strain of office workers, all labor takes a toll on the human form. It is this concept that inspired the development of a Composition I unit about "The Body at Work." Using Freirian concepts of the Pedagogy of the Oppressed, this five-week unit was developed with the intention of challenging students to think about the physical effects of the human work life. In this case study, the material was implemented in a Composition I classroom where students were exposed to texts spanning various employment situations. They were then asked to consider the physical effects present in each author's story, including tales of highly strenuous work, sedentary lifestyles, and those making the tradeoff between physical wellness and financial gain. Students were also asked to compose an essay detailing the relationship between able-bodiedness and the American Dream, further connecting the sacrifice of the physical to success. Exit interviews were conducted with the instructor and several students, revealing a heightened engagement with the texts and thoughtful writing that evidenced reflection and internalization of the key concepts of the unit.

KERRIE S. DEVRIES

Graduate: Masters

I Already Belong: Collectivistic College Students' Family Belonging, Institutional Social Belonging, and Intentions to Persist

Major: Social/Personality Psychology

Faculty Advisor: Wayne Harrison

Children of immigrant and refugee populations are increasing in the U.S. and are currently underrepresented at U.S. universities. The purpose of my research is to examine how collectivistic, immigrant-origin students and individualistic, U.S.-origin students may respond differently to university strategies to establish institutional social belonging in order to facilitate institutional persistence. I propose a model that adds an alternate path for collectivistic students to Tinto's Model of College Persistence, bypassing institutional social belonging and capitalizing on existing bonds with family. Collectivistic students' existing bonds with family, which meet their human need for belonging, may facilitate their institutional academic belonging and motivate them to persist in college. In contrast, individualistic students' persistence may be facilitated by new connections at the university, as opposed to maintaining and being supported by existing, extended family connections. This correlational study will test the relationship between collectivistic identity, institutional academic belonging, institutional social belonging, and family of origin belonging. Seventy-five U.S.-origin and 75 immigrant-origin college freshman currently enrolled at the University of Nebraska Omaha will be recruited to complete a 60-item survey. Implications for university recruiting and retention strategies will be discussed.

ALEK DIFFENDAFFER

Graduate: Masters

A Comparison of Joint Torques and Powers during Over Ground versus Treadmill Walking In Patients with Peripheral Arterial Disease

Major: Biomechanics

Faculty Advisor: Sara Myers

Peripheral arterial disease (PAD) is the result of atherosclerotic occlusion of the leg arteries leading to inadequate blood flow to the muscles. This limitation of blood flow then leads to pain during walking. Prior research in our lab

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has identified specific gait abnormalities with respect to this population during overground walking. However, recent advances in instrumented treadmills may benefit researchers by decreasing collection time, decreasing space required, and the ability to see how gait changes over time. Particularly important for individuals PAD and other pathology is that the use of a treadmill will significantly decrease the data collection time and the duration of time spent in pain. The treadmill has been commonly used to simulate overground walking; however research has not fully determined whether there are biomechanical differences when walking on the treadmill versus walking overground. Thus, this research evaluated whether treadmill walking accurately represents overground walking by measuring ground reaction forces, joint torques and joint powers. For this research two groups were collected including: 5 healthy elderly (aged 40 years and older), and 5 patients with PAD. The overground trials consisted of walking over force plates while kinematic and kinetic data was collected at the participant's self-selected speed. Kinematic and kinetic data from treadmill trials were collected after finding the subject's self-selected speed on the treadmill. The healthy subjects walked for 3 minutes on the treadmill and the patients with PAD walked until pain occurred. Differences found between overground and treadmill walking will be discussed for each population. Implications for future research design and methodology when studying pathological populations will be presented.

TAYLOR FLAIRTY GEHRINGER

Graduate: Masters

Alpha Dominance Desire: Development and Exploration

Major: Industrial/Organizational Psychology

Faculty Advisor: Lisa Scherer

Co-Author: Victoria Graeve Cunningham

Alpha dominance desire (ADD) or the degree that a person wants to be perceived as an alpha dominant leader by others, may be used to better understand reluctance to lead for certain groups of people, such as women. Sociocultural factors may affect likelihood to pursue leadership roles, beyond simply having leadership traits and skills. For example, cultural stereotypes about dominance and gendered social roles can result in prejudice against female leaders. Knowledge of these stereotypes and the potential backlash that women could experience when taking on a leadership role may influence their desire to be seen in a dominant leadership role. We developed a scale to measure ADD and established construct validity and scale reliability by examining relationships between ADD and common predictors of leadership such as social dominance at the trait level, narcissism, and need for power. This measure should be a more accurate predictor of leadership because it takes into account those who might monitor their behavior to be in line with sociocultural expectations. ADD also enables researchers to examine potential relationships between leadership skills and reluctance to lead for certain groups of people. Analyses suggest ADD is a better predictor of motivation to lead than other predictors of leadership such as personality dominance, narcissism, and need for power.

JODEE FRIEDLY

Graduate: Masters

Performance Measurement of Violent Extremist Organizations

Major: Industrial and organizational psychology

Faculty Advisor: Gina Ligon

Co-Authors: Gina Ligon, Dan Harris, Mackenzie Harms

Organizational success is frequently measured through various performance metrics, but little is known about how to measure performance of violent extremist organizations (VEOs). In order to gauge threat levels of key VEOs a key performance indicator (KPI) framework was used to create a taxonomy of critical performance factors that lead to success in VEOs. An exploratory factor analysis was conducted on attack-level performance data. A total of 1406 attacks were coded across 40 VEOs. The EFA yielded a two-factor solution. There were six items loading on the first factor that mostly pertained to culturally important constructs, whether for the target culture or the organizational culture of the perpetrating organization, so that first factor was named *Cultural Potency*. Three items loaded on the second factor and pertained to innovative constructs, so the second factor was named *Unique Proficiency*. Applied implications indicate that the most threatening VEOs are those who attack targets that are symbolically important in a variety of different ways, and that these attacks require high levels of expertise to execute.

JESSICA FUJAN-HANSEN

Graduate: Masters

Thermoregulatory and performance differences between treadmill and overground running

Major: Exercise Science

Faculty Advisor: Dustin Slivka

Co-Authors: Matt Heesch, Dustin Slivka

Overground running requires higher energy expenditure than treadmill running at the same velocity due to the cost of overcoming air resistance. To account for this, it is commonly recommended to run on a treadmill at 1% grade to ensure the run is metabolically equivalent. **PURPOSE:** To determine differences in performance and thermoregulation between treadmill and overground running. **METHODS:** Male runners ($n = 10$, age 32 ± 6 y) completed two 10 km time trials in a randomized, counter-balanced order on separate days: one on a treadmill (TM) at 1% grade, and one on a 200 m indoor track (IT). Core temperature, skin temperature, RPE, and heart rate were monitored during the run. **RESULTS:** Participants completed the 10 km time trial faster during TM (40.10 ± 6.06 min) than IT (41.66 ± 5.86 min, $p < 0.001$). Core temperature was higher during IT (38.8 ± 0.4 °C) than TM (38.6 ± 0.5 °C, $p = 0.021$), while skin temperature was lower during IT (32.7 ± 2.9 °C) than TM (34.9 ± 2.4 °C, $p = 0.002$). There were no differences between IT and TM in RPE (15 ± 2 vs. 15 ± 1 , respectively) or HR (174 ± 13 vs. 178 ± 13 , respectively). **CONCLUSION:** Participants are able to complete a 10 km time trial more quickly on a treadmill than a 200 m indoor track despite a similar HR and RPE and a less favorable thermodynamic gradient between the core and skin in TM.

MENGMENG GAI

Graduate: Masters

Real-time Sensor Localization for Three-dimensional Indoor Wireless Sensor Networks

Major: Computer Science

Faculty Advisor: Azad Azadmanesh

Central to many Wireless Sensor Network (WSN) applications is the importance of designing efficient and successful sensor area localization (SAL) algorithms. SAL refers to the process of estimating and computing the physical global or reference positions of the sensor nodes. In spite of many solutions, the majority of SAL algorithms are based on two-dimensional (2D) plane rather than the three-dimensional (3D) scenario useful for real world applications. This study aims to demonstrate the ability of localizing objects equipped with sensors and cameras in WSNs by utilizing the Building Information Modeling (BIM) technique and 3D stereo image measurements. In particular, a novel approach composed of two phases is proposed to realize SAL of dynamic objects within an indoor 3D test space. In the region determination (RD) phase, the physical area in which a dynamic target will be localized is estimated by utilizing a group of sensor nodes preinstalled in the working space. In RD, 3D spatial information (coordinates) will be generated based on the BIM technique to visualize the target space, so that the spatial relationship of existing objects within the test space can be determined. Once the physical area is estimated, sensor node localization (SNL) phase will determine the exact location of the object based on a distance measurement technique using stereo image in the defined specific region.

MAGGIE GOSSARD

Graduate: Masters

Are You Man Enough? Exploring Compensatory masculinization in Homosexual Men

Major: Psychology

Faculty Advisor: Lisa Scherer

Research indicates that sexual prejudice and discrimination is prevalent in our society. The stigma associated with being gay has many negative consequences for the target including depression, isolation, and social withdrawal. Rooted in heterosexual men's perception that a gender role norm violation has taken place on the part of gay men, homosexuality has become a source of ridicule. To preempt the negative consequences of gay stigma, past research has shown that homosexual men engage in compensatory masculinization behaviors such as emphasizing their athletic ability, engaging in the devaluation of women, and endorsing the punishment of effeminate performance in men. The aim of this explorative study was to develop a scale to measure compensatory masculinization in homosexual men, as well as investigate the possible role of compensatory masculinization on dissonance affect. Results of this study indicated that homosexual compensatory masculinization did predict dissonance affect in gay men. Implications for research on masculinity, negotiation of identity, the need to belong, and impression management will be discussed.

GRADUATE: MASTERS ABSTRACTS

ROSE GREEN

Graduate: Masters

Effects of Managerial Support and Rationale on Diversity Training Effectiveness

Major: Industrial/Organizational Psychology

Faculty Advisor: Carey Ryan

Co-Authors: Carey Ryan, Joel Butler, Lauren Weivoda

As a result of the increasingly diverse workforce and its potential for problems and benefits, many organizations have implemented diversity training in the workplace. Despite its widespread use, however, little is known about the factors that influence diversity training effectiveness. We experimentally examined two factors that might influence training effectiveness: managerial support and proactive versus reactive implementation. Managerial support refers to whether an organization's management conveys to employees that the training is important. Although managerial support has been associated with training effectiveness (Rynes & Rosen, 1995), its effects have not been experimentally examined. Proactive versus reactive implementation refers to whether the training is implemented to promote an understanding of diversity or as a response to racism. The effect of management support appears to depend on the reason for training and gender. Management support resulted in *less* effective training when training was implemented proactively. Further among men, management support resulted in *less* effective training. This pattern of results suggests that management support may sometimes backfire—perhaps when participants believe they are viewed as part of the problem.

DAVID GROTHEN

Graduate: Masters

Molecular Detection of Human Pathogens in Water Sources of Peru

Major: Biology

Faculty Advisor: Paul Davis

Water is the world's most essential resource for life, which also holds the potential to cause great harm via microscopic pathogens. Resultant infections have the ability to cause growth deficiencies, mental retardation, mental illness, and are the second most likely cause of death in children under the age of 5 worldwide. This work utilizes modern advances in molecular biology to allow rapid, economic, and highly specific testing for potentially harmful water borne pathogens. As part of UNO's 2013 OLLAS study abroad program to Lima, Peru 22 water samples were collected from the Rimac River or residential locations. These DNA samples were then tested utilizing the developed PCR assays for the harmful organisms *V. cholera*, *Cryptosporidium*, *C. perfringens*, *E. histolytica*, *G. lamblia*, *Leptospira*, and *T. gondii*.

MACKENZIE HARMS

Graduate: Masters

Who is the Other? Organizational Differences in Terrorists

Major: Industrial/Organizational Psychology

Faculty Advisor: Gina Ligon

Co-Authors: Gina Ligon, Daniel Harris, JoDee Friedly

This research investigates the ways in which leaders of ideological organizations use words, imagery, and vision to influence radical and sustainable action among followers in a sample of Violent Extremist Organizations. Using the Charismatic, Ideological, and Pragmatic (CIP) Model of Leadership, power orientation, and ideological differences in terms of defining an audience for their violence, we examined organizational and leader characteristics that influence the sustainability of lethal performance over time. The results of this research suggested that differences in leadership style and power orientation influence organizational sustainability. In addition, ideological differences within an organization interacted with external cultural factors to influence sustainable performance. The results of this research and implications for counterterrorism are discussed.

ELIZABETH HARP

Graduate: Masters

What Underlies the Pursuit of Missing Information in Negotiations?

Major: Psychology, Industrial/Organizational

Faculty Advisor: Lisa Scherer

Negotiations take place every day (Lewicki, Saunders, & Barry, 2006), and failed organizational negotiations can result in such problems as employee strikes and discord in the workplace (Bazerman & Carroll, 1987; Kochan, 1980). One approach to studying negotiations takes an information processing focus and attempts to uncover the decision making biases, or systematic errors, of negotiators (Carroll & Payne, 1991). The identification of these biases allows for negotiator awareness and for the development of strategies to avoid their influence (Bazerman & Neale, 1983). One decision making bias is the pursuit of missing information (Bastardi & Shafir, 1998). The purpose of this project was to further understand how pursuing missing information influences negotiations. When negotiators pursue incidentally missing information related to an issue, compared to those who had the complete information from the beginning, they perceive that issue to be more important and achieve better outcomes for it (Young, Bauman, Chen, & Bastardi, 2012). I attempted to replicate these previous findings as well as investigate whether missing information that is deliberately withheld also influences expected negotiation outcomes. In addition, potential explanations of how missing information influences negotiation outcomes, such as self-perception and psychological reactance, were examined. Data were collected from 165 undergraduates who completed the study for course credit. Participants prepared for a promotion negotiation that involved six issues (e.g., salary, bonus, job location), indicated their negotiation goals, and completed an online questionnaire. Results will be presented as well as implications for researchers and practitioners.

RYAN HASENKAMP

Graduate: Masters

Force Output is More Variable in Patients with Peripheral Arterial Disease

Major: Exercise Science

Faculty Advisor: Sara Myers

Co-Authors: Shane Wurdeman, Jason Johanning, Iraklis Pipinos, Carlee Howe, Sara Myers

Peripheral arterial disease (PAD) is a vascular disease characterized by atherosclerosis in the lower extremity resulting in pain in the legs known as claudication. PAD patients have altered baseline gait including abnormal ankle moment and power [1-6]. An insufficient ability of the plantarflexors to generate force may be a key contributor. PAD patients have reduced muscular strength and power at the ankle, knee and hip, reduced cross-sectional area of muscle, reduced nerve conduction velocity, and a decrease in type II (fast-twitch) muscle fibers [6,7]. While much work has been done investigating muscular strength, little work looks beyond peak maximal muscular strength. Walking however, is not a task requiring maximal effort. Therefore, this study investigated more comprehensive variables of muscular function including average, timing, and variability measures of force profiles. Eight patients with PAD and eight age-matched controls performed isometric plantarflexion using a dynamometer. Two maximal trials of isometric plantarflexion were performed for ten seconds. PAD patients performed testing while in claudication pain. Dependent variables included peak torque, time to peak torque, average torque, and standard deviation of torque during the defined linear region. Significant differences between controls and PAD patients were discovered at peak torque, average torque during the linear region, and standard deviation of torque during the linear region. Patients with PAD were not able to generate as much maximum force during isometric plantarflexion as healthy controls. Furthermore, during the linear region, patients with PAD generated lower and more variable torque.

BRENT HASSENSTAB

Graduate: Masters

Proteolytic Gene Response to Exercise and Temperature

Major: Exercise Science

Faculty Advisor: Dustin Slivka

Co-Authors: Brent Hassenstab, Matt Heesch, Lindsey Williams, Landon Zuehlke, Dustin Slivka

Aging is characterized by a relative maintenance of myogenic activity and increased proteolytic activity resulting in a loss of muscle mass termed sarcopenia. The purpose of this study is to determine the impact of local muscle heating and cooling on proteolytic gene response following resistance exercise. Recreationally resistance trained male participants (25.3 ± 5.0 y, 178.7 ± 6.1 cm, 86.8 ± 12.5 kg, 13.6 ± 6.6 % body fat, 1 RM Leg Press 139.0 ± 18.9 kg, 1 RM Leg Extension 67.2 ± 10.5 kg). The participants completed 4 sets of 8-12 repetitions of leg extension (LE) and leg press (LP) with each leg. Participants accomplished an average of 11 ± 1 reps at $76.6 \pm 4.5\%$ of 1 RM for

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LE and 9 ± 1 reps at $61.1 \pm 6.5\%$ of 1 RM for LP. ThermaZone Continuous Thermal Therapy System was used to heat the upper thigh of one leg and cool the upper thigh of the other leg. A muscle biopsy was taken from each leg pre- and 4 h post-exercise. Gene expression analysis will be done on the proteolytic genes of interest Atrogin 1, MuRF1, and FOXO3A. The mRNA analysis is nearing completion and will be finished for presentation at the research fair. This study will provide critical information for the development of novel temperature optimized exercise strategies that may help combat sarcopenia.

MEGAN HOEFT

Graduate: Masters

Implications of Self-Perceived Body Image on Sports Performance in Elite Female Volleyball Players

Major: Health Education

Faculty Advisor: Sofia Jawed-Wessel

There have been concerns about athletes in “image” sports such as gymnastics, ballet, and swimming. As the idealized female image gets leaner, and sports uniforms become more form fitting there is a need to explore the implications of body image and eating disorders in all female sports. Research has supported the idea that female adolescents’ participation in athletics before college has a positive influence on characteristics associated with a positive self-esteem (Richman, 2000). However, research also shows that rates of disordered eating are highest amongst elite level female athletes (Jorunn 2004, Blackmer 2011). The current project was a cross-sectional, online survey study of self-perceived body image and self-perceived sports performance. To be included in the study, participants had to be Division I, female, volleyball players. Data was collected three times throughout the sports season, once at the beginning of the season, mid-season, and post-season. Descriptive statistics were used to describe athletes’ demographics, body image and performance. Questionnaire items were also assessed for reliability and validity in this sample. Twenty-five surveys were completed from 14 athletes. Participant’s age ranged from 18 to 21 ($X=19.80$; $Md=20$; $SD= 0.76$) and the majority (100%) identified as White. In the sample collected it appeared that the outside, right side, and middle hitters were more critical of their appearance when they felt that their performance was poor.

The defensive specialists, liberos, and setter groups appeared the most confident and consistent in their views of both their skills and appearance.

MICHAEL L. HOUGH

Graduate: Masters

Improving Elderly Gait Using a Structured Auditory Stimulus

Major: Exercise Science

Faculty Advisor: Sara A. Myers

Co-Authors: Sara Myers, Steven Harrison, Shane Wurdeman, Denise McGrath, Nicholas Stergiou

Previous studies on walking show a correlation between fall risk and gait unsteadiness. Specifically, older adults who have a history of falling demonstrate an increased magnitude of stride-to-stride variability compared to older adults with no history of falling. One current rehabilitation method, rhythmic auditory stimulation (RAS), aims to restore variability to healthy levels by having the patient walk in synchrony with a metronome; however, unlike a metronome, healthy gait is not perfectly regular. In healthy young walkers, stride-to-stride variability exhibits a characteristic temporal structure, in which later strides in the series depend on earlier strides. Pathology alters this structure, causing gait to become either unsteady or too regular. This bi-directionality suggests an optimal level of variability associated with healthy gait, and divergence from this optimal value correlates with fall risk. Therefore, we feel that RAS may be improved by replacing the metronome with an auditory stimulus that is variable. Recent work shows that the variability of a pink-noise structured auditory stimulus (SAS) most closely resembles the variability in the stride time series of healthy young individuals, and that the gait variability of older individuals can be affected by walking in synchrony to such a stimulus. The results of this study indicate that the gait variability of healthy older adults can be driven with SAS, to values approaching the optimal values exhibited by healthy younger adults. This supports the feasibility of a rehabilitation technique using such a stimulus.

MEGAN HUERTER

Graduate: Masters

Aiding the Refugees: The Work of Voluntary Agencies and the Realization of the Cuban Refugee Program, 1959-1965

Major: History

Faculty Advisor: Danielle Battisti

In my thesis, to ensure clarity and organization, I will divide the work of a group of voluntary agencies (VOLAGs) into four categories: administration, immediate relief, extended welfare concerns, and resettlement efforts. Each of these sections will show the voluntary agencies as the liaison between the governmental policies and funds and the Cuban refugees. First, VOLAGs' unique administrative structure allowed them to provide aid to Cuban refugees in a way the government could not. This chapter also considers the government's reliance on VOLAGs to quickly come to the aid of Cuban Refugees. By allowing the government to use their existing organizations, the relief to Cuban exiles was not slowed down or clouded as the result of bureaucratic complications. Next, "immediate relief" and "extended welfare concerns" will be discussed in a single chapter on welfare. This section considers VOLAGs direct work with Cuban refugees. This chapter will discuss the specific use of government funds for the exiles' welfare. It will also show the networking and cooperation between VOLAGs in the Miami-Dade. The final section of my thesis will focus on the VOLAGs facilitation of Cuban refugee resettlement. This chapter will navigate the complex nationwide network of VOLAGs involved in resettlement. Without resettlement, the Miami-Dade county area would have not been able to continue supporting the masses of Cubans, and the government would have had to stop the migration of Cuban refugees in an attempt to protect the infrastructure of the area.

KURT HUNGERFORD

Graduate Masters

Dynamic Re-Partitioning for Multi-Robot Coverage

Major: Computer Science

Faculty Advisor: Raj Dasgupta

Co-Authors: Raj Dasgupta, K. R. Guruprasad

We consider the problem of coverage path planning in an initially unknown or partially known environment using multiple robots. Previously, Voronoi partitioning has been proposed as a suitable technique for coverage path planning where the free space in the environment is partitioned into non-overlapping regions called Voronoi cells based on the initial positions of the robots, and one robot is allocated to perform coverage in each region. However, a crucial problem while using such a partitioning scheme in an environment where the location of obstacles is not known a priori is that, while performing coverage, a robot might perceive an obstacle that occludes its access to portions of its Voronoi cell and prevents it from completely covering its allocated region. This would either result in portions of the environment remaining uncovered or requires additional path planning by robots to cover the disconnected regions. To address this problem, we propose a novel algorithm that allows robots to coordinate the coverage of inaccessible portions of their Voronoi cell with robots in neighboring Voronoi cells so that each robot is responsible for covering a set of contiguous connected regions. We have proved analytically that our proposed algorithm guarantees complete, non-overlapping coverage. We have also quantified the performance of our algorithm on e-puck robots within the Webots simulator in different environments with different obstacle geometries and shown that it performs complete, non-overlapping coverage.

CARL JACKSON

Graduate: Masters

Substance Abuse Treatment Outcomes

Major: Social Work

Faculty Advisor: Jeanette Harder

This study analyzes data received from the Omaha Campus for Hope (OCH) Community Support Program. OCH is a treatment center that addresses the problem of substance abuse which has high prevalence at all levels of society. Data shows that 8.5% of the U.S. population were classified as dependent or abusive of certain substances in a recent survey. A review of literature related to this issue and a national survey on its prevalence guide this study on the relationship between treatment methods and service outcomes. The methodology uses a sample of 306 subjects taken from the clients of the OCH Community Support program and the scores from a Self-Sufficiency Matrix (SSM) tool administered to the clients at intake (pretest) and at discharge (posttest). Statistical analysis of the data using paired sample t-tests and *chi-square* analysis indicates that there is a significant improvement in SSM mean scores of the clients from pretest to posttest ($p \leq .000$). A discussion of the findings in this study and the implications of the findings on service provisions in substance abuse treatment facilities will be presented. The report will conclude with recommendations for the program going forward as well as ideas for improving treatment methods throughout the service field.

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ZACH JACOBS

Graduate: Masters

"Something Worth Writing": The Antiochia ad Cragum Archaeological Research Project, Summer 2013

Major: English

Faculty Advisor: Tammie Kennedy

From the heart of the United States to a far-flung ancient pirate coast, from planning and prediction to discovery and documentation, Zach Jacobs has, it seems, experienced something worth writing. This presentation will inform its audience of the summer 2013 Antiochia ad Cragum Archaeological Research Project on the Mediterranean coast of Turkey. It will also walk them through some of the process by which a writing project that was initially to yield an essay based on participation at Antiochia ad Cragum has now become something much larger.

ERIKA JEAN JACOBSON

Graduate: Masters

Threats and Acts of Violence in Protection Orders

Major: Social Work

Faculty Advisor: Kerry Beldin

Coercion, intimidation and threats are considered to be integral to the perpetration of Intimate Partner Violence (IPV), yet there is little academic research on how these control strategies are experienced by victims. One source of information regarding these experiences is a Protection Order application. While there has been extensive research in the area of Intimate Partner Violence (IPV); however, there have been few studies which have examined Protection Orders to gather information about IPV. This study seeks to examine the information provided in Protection Order applications to contribute to the dearth of knowledge about these control strategies and how they may related to other characteristics of abuse experiences through quantitative analysis. This study seeks to fill the gap in the IPV literature by examining 50 Protection Orders from Lancaster County, Nebraska for themes in threats and acts of violence reported by victims on Protection Order applications. Threats and acts of violence were identified based on Evan Stark's Coercive Control Theory which likens IPV to behaviors similar used by terrorists which seek to keep the victim isolated from others and society (Stark, 2009). The themes identified by this analysis can help people who are unfamiliar with this topic to recognize IPV when they come into contact with it, and may help those who interactive professionally with IPV victims to better understand the nature of these victims' experiences.

DESIREE JOHNSON

Graduate: Masters

An Examination of the Effects of Actions Versus Inactions and Perspective-Taking on Post-Decisional Regret in a Workplace Domain

Major: Industrial/Organizational Psychology

Faculty Advisor: Lisa Scherer

Co-Author: Lisa Scherer

This study adds to our knowledge of post-decisional regret in a sample of working adults 30 and older by: (1) determining whether people are more likely to regret actions or inactions in a workplace setting; and (2) improving upon methodological issues plaguing prior research by disentangling hypothetical versus autobiographical effects from perspective-taking on regret experience. The study utilized a 3X2 mixed experimental design, with viewpoint (autobiographical; hypothetical self; hypothetical other) as the between-subjects factor and type of regret (action; inaction) as the within-subjects factor. Data will be presented that address the critical antecedents of the number and intensity of regrets reported.

BRITTANY JUDGE

Graduate: Masters

School-Wide Positive Behavior Support for Individuals with Severe and Profound Disabilities

Major: School Psychology

Faculty Advisor: Brian McKeivitt

Co-Author: Brian McKeivitt

One of the greatest challenges for alternative schools is to develop effective training programs for students with severe and profound developmental disabilities. School wide positive behavior support (SWPBS) has been shown to

decrease problematic behaviors in alternative schools and self-contained settings yet little is known about how effective the practice can be for students with severe and profound disabilities who also exhibit behavior problems. This study exhibited how SWPBS was implemented at an alternative school with students with severe and profound disabilities as well as explored the effects SWPBS had on behavior for students with severe and profound disabilities. In regards to behavior challenges, instances of aggression, seclusion and involuntary classroom removal decreased. In addition, SWPBS was successfully adapted to fit the unique needs of students with severe and profound disabilities through many approaches and resources such as explicit teaching, the Picture Exchange Communication System, and video- based instruction. Implications of these findings and future directions for research are discussed.

JAMIE L. KNEHANS

Graduate: Masters

Comparing the Structure of RNA Genomes from Virulent and Avirulent Strains of Coxsackievirus B3

Major: Biology

Faculty Advisor: William Tappich

Co-Author: William Tappich

The study of a viral structure, replication, and evolution is important for understanding how viruses cause disease. Coxsackievirus (CVB3) is a picornavirus that causes inflammation of the heart and pancreas with a particular pathogenicity in infants. Previous research has shown that the structure of the CVB3 RNA genome is responsible for virulence, with clear differences in structure between the genomes of virulent and avirulent strains of the virus. The CVB3 genome is comprised of a well-organized ssRNA beginning with a 5' untranslated region (5'UTR). This 5'UTR contains an internal ribosome entry site (IRES), which drives translation of viral proteins. This study will determine how structural differences between the virulent and avirulent 5'UTR sequences influence interactions between viral RNA and host proteins. We hypothesize that viral interactions with the host protein, PCBP2, differ in virulent and avirulent 5'UTR sequences. Our lab has previously determined characteristics of PCBP2 interactions with the 5'UTR of a virulent strain (CVB328). We now focus on interactions of PCBP2 with the 5'UTR of an avirulent strain (CVB3GA). This will be done by monitoring PCBP2 affinity using electrophoresis mobility shift assays and PCBP2 influence on RNA structure through chemical probing. Results from this study may lead to new approaches for treating CVB3 infection.

LINDSEY A. KNIGHT

Graduate: Masters

Herbicides in aquatic environments: When the frog prince becomes the frog princess

Major: Biology

Faculty Advisor: Alan Kolok

Co-Author: Brent Dinkel

Herbicides used in row-crop agriculture can enter watersheds through runoff where exposed aquatic organisms may experience endocrine disrupting effects such as altered sexual reproduction and development. Atrazine (ATZ) is one of the most commonly used herbicides in Nebraska and has been suggested to alter male frog sexual development resulting in feminized male frogs. In 2012, male northern leopard frogs (*Rana pipiens*) were exposed to Elkhorn River water during a pulse of herbicide runoff during which atrazine was the primary herbicide detected. Following a 7 day exposure, frogs were feminized as indicated by the significant increase in mRNA expression of the estrogen responsive gene, estrogen receptor-alpha (ER α). The objective of this experiment was to determine if water spiked with atrazine at three concentrations (0.5 μ g/L, 5.0 μ g/L, or 50.0 μ g/L ATZ) would result in gene expression responses in male northern leopard frogs similar to those observed in frogs exposed to Elkhorn River water. Following a 7 day lab exposure, the impact of ATZ was assessed by measuring the mRNA expression of two estrogen responsive genes, vitellogenin (Vtg) and estrogen receptor- α (ER α) in liver tissues. Quantitative real-time PCR revealed that frogs exposed to 50.0 μ g/L ATZ were feminized as indicated by the significant increase in ER α mRNA expression. This response was similar the response observed in male frogs exposed to Elkhorn River water. These results suggest that male northern leopard frogs may be particularly at risk during peak runoff periods in the spring when concentrations of ATZ may reach or exceed 50.0 μ g/L.

KELLY KOEPEL

Graduate: Masters

The Relationship between Social Media and Siting of Omaha Restaurants

Major: Geography

Faculty Advisor: Michael Peterson

Properly used, social media represents a new and dynamic form of advertising. This paper analyzes the relationship

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between social media use and the physical location of Omaha restaurants. A pilot study showed no predictive relationship between overall social media use and physical location. The major study using 495 restaurants examined the restaurants' use of three major social media sites. Correlation analysis of the variables showed essentially no relationship between the use of social media and restaurant location. The findings indicate that restaurants with a poor physical location are not taking advantage of social media to attract customers. Likewise, restaurants with a better physical location are not using social media to attract more customers. The social media landscape may be too immature to show any identifiable spatial patterns.

SAVANNAH KOK

Graduate: Masters

An In-Depth Analysis of High School Student and Teacher Perceptions of PBIS

Major: School Psychology

Faculty Advisor: Brian McKeivitt

Co-Author: Brian McKeivitt

The purpose of this study is to compare student and teacher perceptions of Positive Behavioral Interventions and Supports (PBIS) currently being implemented in a high school setting. In depth interviews were conducted with high school students and teachers in this qualitative study. Four themes were identified reflecting teacher and student perceptions of PBIS: perceptions of strengths and weaknesses in PBIS model, perception of rewards, school and classroom atmosphere and culture, and suggestions for PBIS improvement. Overall, the results suggest PBIS is socially accepted and perceived as a positive and effective program in grades 7-12. Recommendations and topics for future research are discussed.

D. TAYLOR LA SALLE

Graduate: Masters

Physiological and mechanical differences of an electrically assisted bicycle between inactive and active individuals

Major: Exercise Science

Faculty Advisor: Dustin Slivka

The American College of Sports Medicine (ACSM) recommends adults participate in weekly aerobic activity: minimum of 30 minutes moderate intensity exercise 5 days per week or 20 minutes of vigorous activity 3 days per week. The electrically assisted bicycle may help individuals achieve the ACSM's aerobic recommendations and introduce inactive individuals to physical activity. However, individuals with differing fitness levels may require different considerations in order to meet ACSM recommendations. **PURPOSE:** The purpose of this study is to compare the physiological and mechanical differences of inactive and active individuals using a standard bicycle versus an electric bicycle. **METHODS:** Participants (N=24) will take part in 3 trials. They will be separated into two groups based on whether they meet ACSM aerobic fitness recommendations or not: Active Group (n=12) and Inactive Group (n=12). During the first visit participants will perform a VO_2 max test. During the second visit participants will perform two randomized 2 mile cycling trials using 1) a standard bicycle and 2) an electrically assisted bicycle. The third visit will be performed indoors using a crank based power meter and computrainer ergometer to measure the relative power generated by the motor compared to the cyclist. VO_2 and power output will be measured during all cycling trials. **CONCLUSIONS:** This research will allow us to make recommendations for utilizing the electrically assisted bicycle to achieve ACSM aerobic fitness guidelines.

JOSHUA LARSON

Graduate: Masters

Two Drug-Like Compounds Show Limited Effectiveness in Treating Acute Toxoplasmosis in the Mouse Model

Major: Biology

Advisor: Paul Davis

Co-Authors: Lakshmi-Prasad Potluri, Abigail Judge

Toxoplasma gondii is a human parasite that can cause serious health problems, including death, in some individuals. There are currently no FDA approved drugs that are able to completely eliminate toxoplasmosis (*Toxoplasma* infections). Since there are no drugs available that can completely clear toxoplasmosis, it is important to identify compounds that may be able to serve as anti-*Toxoplasma* drugs. Additionally, many compounds that can eliminate toxoplasmosis are effective in treating malaria, a disease that kills more than one million people each year.

Therefore, anti-*Toxoplasma* drug discovery studies have the potential to save the lives of those affected by malaria and toxoplasmosis by identifying new treatments for both diseases. Recently, a small group of drug-like compounds were identified as compounds that may be able to clear toxoplasmosis. Six of these compounds were confirmed microscopically as compounds that inhibit the growth of *T. gondii in vitro* by our group. These six compounds were then evaluated for toxicity and efficacy in clearing toxoplasmosis at the organismal level. Since *Toxoplasma* can infect mice as well as humans, mice were chosen as the animal model for evaluating the therapeutic value of these six compounds. Three compounds demonstrated extreme toxicity in mice. One compound tested showed promise in treating the infection, but results were inconclusive ($p > 0.05$). Two compounds, however, were effective in eliminating adverse effects of *T. gondii* infections ($p < 0.05$).

JOSHUA LARSON

Graduate: Masters

The CAV1 Dependent Gene Expression Profile In Chronic Lymphocytic Leukemia

Major: Biology

Faculty Advisor: Christine Cutucache

Caveolin-1 (*CAV1*), a cell membrane protein, is heterogeneously expressed in different types of cancer. In some types of cancer (i.e. breast cancer and prostate cancer), the protein is present in low amounts. Evidence suggests that this low expression promotes cell cycle progression. Conversely, we reported previously that high expression of *CAV1* in chronic lymphocytic leukemia (CLL) in the lymph node and in the bone marrow correlates to lower survival rates and survival times for cancer patients. To determine the mechanism of action by which *CAV1* expression can predict clinical prognosis in CLL, we used a bioinformatics approach to determine complete gene expression correlative to *CAV1* expression in CLL tumor samples from 17 different patients. As expected, *CAV1* expression was heterogeneous across samples. In fact, *CAV1* expression variation exceeded 2 orders of magnitude among the samples. Genes whose expression correlated to *CAV1* expression were validated via linear regression analysis. The results of these experiments included the identification of 165 genes whose expression correlated to the expression of *CAV1* ($n=17$ $|r| > 0.7$) in CLL cases from lymph node. These genes should be investigated for their role in disease progression in CLL.

ALLISON LAURITSEN

Masters/Graduate

Gender Differences in Citations and Dual Arrests for Domestic Violence Offenders

Major: Social Work

Faculty Advisor: Kerry Beldin

Co-Authors: Kerry Beldin, Henry D'Souza

Increased awareness and prevention efforts have brought the issue of Domestic Violence (DV) into the national spotlight. Police are often the first responders to answer a Domestic Violence or Intimate Partner Violence (IPV) call, but very little research has examined typical law enforcement responses in these situations. This study sought to examine data showing differences in police response to these DV incidents. The jurisdiction studied had state statutes and municipal laws that allowed for law enforcement officers' discretion for arrest based on the specifics of the incident itself (such as imminent threat, an established protection order in place, etc.). A Community Response Team (CRT) established in 1996 began data collection on multiple factors and has worked consistently on increasing the percentage of perpetrators who are placed into custody immediately upon contact with law enforcement. The data for the present study relied on information about all domestic violence incidents to which the local police department responded in a 14 year time span, from 1996 to 2010 in one jurisdiction. This DV incidents dataset was used to investigate the hypothesis that there is a relationship between perpetrator gender and law enforcement responses. Statistically significant differences were found in citation decisions, number of citations given, types of citations given, plea decisions, and dual arrests for male and female domestic violence offenders. These results leave implications for future law enforcement response, policy, and judicial processes when working with domestic violence offenders.

KRISTEN LAZARE

Graduate: Masters

International Criminal Court (ICC) Backslide: The Toll on Domestic Affairs in Cape Town

Major: Political Science

Faculty Advisor: Jonathan Benjamin-Alvarado

In the past decade, we have witnessed a shift in the design, practice, and behavioral attitudes toward war crime tribunals. Challenged by human rights regimes, deference for national sovereignty is marginalized when confronted

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with reinstating the rule of law after intra-state conflicts. Strategic interests of powerful states threaten the impartiality of an unbiased, internationally driven, permanent tribunal. Many obstacles permeate efforts to develop a legitimate war crimes tribunal. Hindrances' include: domestic support and cooperation, disproportionate influence that are accompanied by geopolitical power imbalances, deficient procedural education, comprehensive domestic legislation emphasizing guidelines to support tribunal errands, financial burden, and the civic views of legitimacy. In 2002, the Rome Statute formalized the International Criminal Court (ICC), marking the first treaty-based permanent international criminal court. The ICC has jurisdiction to intervene in investigation and prosecution when states are incapable or unwilling to adjudicate claims of atrocity crimes. Currently, there is insufficient data outlining the domestic impact of the ICC. The perceived data deficiency comes from a lack of traceable measures, as well as the assumed lack of cooperation. Research collected for this project aims to interpret local perception of ICC programs in Cape Town (and neighboring regions). Specifically regarding legislation that educates localities on the role of the ICC and the judicial practices initiated since inception of the ICC.

VANESSA N. LIMING

Graduate: Masters

Avenue Scholars Foundation: The Number of Hours Employed and Attendance in High School

Major: Social Work

Faculty Advisor: Kerry Beldin

The broad social problem being addressed by Avenue Scholars Foundation and this research is at-risk students. At-risk students are those who have more of a challenge to succeed in their education or work and have a higher chance of being absent from classes and even dropping out (Gemici & Rojewski, 2010). Absenteeism is a problem in the Omaha area with 5,000 students absent from classes each day and 1,000 students being reported for truancy (Avenue Scholars Foundation, 2012). This post-test research design, which would be exhibited in a poster presentation, tried to determine if the amount of hours a student was employed had any relationship with the attendance rate of the student; the hypothesis was that there would be a relationship. High school senior attendance data was taken after the Avenue Scholars program and employment hours was taken from a summer survey students filled out. Although Avenue Scholars does seek to influence employment hours, in the summer survey students self-reported their hours, which the program had no control over, thus it was used as the independent variable. Both an ANOVA and a chi-square test were performed to establish if a relationship existed. Both tests produced no statistical significance, yet did not fail to establish important discoveries. Due to the small sample size and the other external factors influencing the results, such as inconsistent attendance data, the findings should not be ignored. Especially when statistical significance was produced when an additional ANOVA test was run, using a spring survey.

XUAN LIU

Graduate: Masters

Improvement of Joint Torques and Powers before and after surgery for patients with peripheral arterial disease.

Major: Biomechanics

Faculty Advisor: Sara Myers

Peripheral arterial disease (PAD) is a manifestation of atherosclerosis of the leg arteries, is highly prevalent in the United States and is associated with increased cardiovascular morbidity and mortality. Surgical revascularization is recommended for patients with moderate to severe occlusions, but no one has tested whether gait improves after surgery. Thus, this study determined the differences in lower extremity joint torques and powers of the before and after surgery. Twenty-four patients with PAD (176.1±5.9 cm, 90.9±18.2 kg; 32 claudicating limbs) performed walking trials at a self-selected speed through a ten-meter pathway while kinematics (60 Hz; 12 camera Motion Analysis Corp., Santa Rosa, CA, USA) and kinetics (600 Hz; Kistler Instruments, Winterthur, Switzerland) were recorded. Subjects completed five trials on each leg before and after the onset of claudication. Testing was performed prior to and three months following surgery. In the pain-free condition, ankle power absorption ($p<0.001$), knee power absorption ($p=0.005$) and hip power generation ($p=0.002$) in early stance were significantly increased after surgery. Peak hip extensor torque ($p=0.009$) and ankle power generation ($p=0.005$) in late stance were significantly increased. In the pain condition, knee extensor torque ($p=0.026$), hip power generation ($p=0.001$), peak ankle dorsiflexor torque ($p=0.023$), ankle power absorption ($p<0.001$) in early stance and peak hip extensor torque ($p<0.001$) in late stance were significantly increased after surgery. The increases in lower extremity torques and powers represent an improvement in patients with PAD following surgery.

AMANDA LUDES

Graduate: Masters

Boolean network modeling of edge-of-chaos in certain biochemical networks

Major: Mathematics

Faculty Advisor: Dora Matache

Biochemical networks like intracellular signaling networks in cancer tumors can be modeled using mathematical Boolean networks (BN) in which the node/cell activity can be simplified to two states, ON or OFF. The networks are comprised of different classes of Boolean functions in various proportions, including canalizing functions of different types or degrees of canalization, or threshold functions in which the activity level of the inputs of a node has to surpass a given threshold in order to activate it. In this project, we use a BN model inspired by a signal transduction network in a generic fibroblast cell to determine the sensitivity of the network to small disturbances. That way we may be able to identify certain types of proteins whose mutations by drug therapy could lead to an ordered network. Biologically, this could mean, for example, stabilizing the growth of cancer cells. We use the model to create computer simulations which allow us to analyze the sensitivity of the network for particular parameter values. We also develop a strategy for investigation of the twenty-six parameters of the current model and perform simulations to investigate a sizable sampling of the numerous parameters of the model and form hypotheses about the data to guide further investigation. This data is compiled into both a large and comprehensive table, and condensed into a more compact summary capturing the most important features of the results. These results allow us to draw conclusions about the impact of the studied parameters on the network dynamics.

ALISANDRU LUNCA

Graduate: Masters

Organizational Culture Incentive Design

Major: Business Administration

Faculty Advisor: Gina Ligon

Co-Author: Gina Ligon

The research study examines the relationship between *Organizational Culture* and perception of incentives. The analysis is based on survey data collected from College of Business Administration students at UNO. The survey has three main parts: 1) identification of the current dominant organizational culture 2) identification preferred organizational culture 3) perception of the most common incentives. The identification of the current organizational culture is made by using the Organizational Culture Assessment Instrument (OCAI), developed by Kim Cameron and Robert Quinn. OCAI identifies the degree, to which an organizational culture falls under a certain type (e.g. Clan 20%, Adhocracy 30%, Market 5%, and Hierarchy 45%). The assessment of the preferred organizational culture was performed using the same research method. The collected data was broken down into four previously mentioned categories, the classification criteria being the current dominant cultural type. Subsequently, for a robust test of the hypotheses, both parametric and nonparametric inferential methods have been used. One of the findings suggested by the results, is that for employees working in an organization characterized as having a market culture, career advancement opportunities are more important and motivating than for employees working in organizations with other types of culture. More results of the research to be presented at the Student Research and Creative Activity Fair.

VINCENT M. MARASCO

Graduate: Masters

Perceived Facilitators and Barriers to Intimate Relationships of Persons Ages 65 and Older

Major: Community Counseling

Faculty Advisor: Jason Coleman

In 2011, the first members of the Baby Boomer generation turned 65 years old. Despite the increasing numbers of this population, little research has been conducted with these individuals, especially concerning interpersonal and intimate relationships. Research shows the association between healthy sexual functioning and good physical and mental health (DeLamater, 2012). This study is significant as there is limited research regarding senior sexuality; especially from the perspectives of the elderly themselves. The purpose of this research study was to examine intimate relationships and sexuality of persons ages 65 and older from the perspectives of the participants themselves. Participants were interviewed and all interviews were audio-recorded. Transcripts were uploaded, verbatim, into NVivo™ software for analysis of emergent themes. Data was coded using open coding, followed by focused coding to identify themes and categories. Participant recruitment was a major challenge and delayed data collection. Thus, data analysis is currently on-going. During the interviews, domains that were discussed included: past and current attitudes regarding sexuality and intimate relationships, barriers to intimate relationships, accessibility to knowledgeable medical and other health service providers regarding sexual health, and facilitators to

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engaging in intimate relationships. Due to the increasing numbers of individuals within this age range, it is important to understand better the sexual functioning and dynamics of intimate relationships. Results from this study provide insight into the sexual health and attitudes, interpersonal relationships, and communication with medical providers and may be used to develop programs to enhance their quality of life.

PAIGE MCARDLE

Graduate: Masters

Reducing Off-Task Behaviors with Reinforcement-Based Procedures

Major: School Psychology

Faculty Advisor: Lisa Kelly-Vance

This presentation describes a combination of reinforcement-based procedures that were used to decrease off-task behaviors in a first-grade male student, Gale (name has been changed). Off-task behaviors included verbal, motor and passive behaviors. First, a token economy was implemented with a Mystery Motivator component. Gale earned tokens and praise for on-task behaviors and after earning six tokens, he colored in one square on the Mystery Motivator board. If the square revealed a star, Gale picked a reward. While Gale's off-task behaviors showed a decreasing trend, he did not receive a high schedule of reinforcement because of infrequent implementation. Next, Gale was taught to self-monitor his behaviors. Gale had an iPod and one ear bud through which he heard a beep at random intervals. Every time he heard the beep, he marked whether he was on task. Each day, Gale had a goal of how many "yeses" he had to earn for a reward. Gale's off-task behaviors continued to decrease, but at the request of his teacher, the token board was implemented again and self-monitoring ceased. Gale's behaviors decreased from baseline, during which he was off task 63% of the time. During the token board/ Mystery Motivator intervention, off-task behavior was reduced as low as 31%, with a session average of 44%. During the self-monitoring intervention, off-task behavior was as low as 14% with a session average of 20.35%.

DANIEL MCCARTY

Graduate: Masters

What's black and white and read all over? Pun comprehension across development

Major: Cognitive Psychology

Faculty Advisor: Michael Cortese

In the proposed study, humor will be analyzed along the course of cognitive development within a Piagetian framework among a sample of younger children as well as among college-age students. This work is an extension and elaboration of the work pioneered by Paul McGhee (1971; 1974; 1976) in which a specific type of humor, namely, puns, is examined within the context of a corresponding cognitive process. Additionally, it is important that this cognitive process is measured as directly as possible rather than relying on just age as an indicator of development. School-aged children will be interviewed to have their reading fluency assessed using the DIBELS ORF test. Subsequently, children will be asked to read several passages containing puns and non-puns. They will be asked to identify puns in the passages and report whether the puns are funny. According to the cognitive congruency principle, children should find pun humor to be funny only if it provides a cognitive challenge during processing. Age of acquisition ratings for puns and reading fluency will be examined as predictors of pun comprehension in school-aged children. It is posited that children with higher reading fluency will be superior in identifying puns. Pun comprehension will in turn be tested with a novelty measure to predict mirthful response to pun humor in both children and college students. Mirthful response is predicted to be a function of novelty, such that pun words that have been learned more recently will trigger more mirthful responses.

JONATHAN MICHELA

Graduate: Masters

Internalized pressure to be in an exclusive relationship

Major: Psychology

Faculty Advisor: Lisa Scherer

Co-Author: Isaac French

Individuals internalize many pressures from their environment. One of these pressures could be the pressure to be in an exclusive, romantic relationship. In this study, we seek to create a valid scale to measure this internalized pressure to be in an exclusive relationship. We define "internalized pressure to be in an exclusive

relationship” (IPER) as an individual’s assimilation of external cues which exert pressure on that individual to be in an exclusive relationship. This could be an important concept for future research because it may provide insight as to when and how individuals utilize certain dating strategies. To determine the validity of our scale, we created a theoretical nomonological net and will administer a survey including nine scales that we hypothesize will be related to the IPER measure. The scales we will administer include: susceptibility to influence (Bearden, 2005), internal locus of control (Gochman, 2005), positive attitudes toward living at home (Glezer, 1984), advantages of marriage (Amato, 1988), disadvantages of marriage (Amato, 1988), advantages of singlehood (Amato, 1988), disadvantages of singlehood (Amato, 1988), dating behavior, and IPER measure. Once the data is collected, we will test all proposed paths within our nomonological net to determine if there is evidence to support the validity and reliability of our IPER measure.

CATHERINE MILLER

Graduate: Masters

Identifying Potential Child Trafficking Cases in the State of Nebraska

Major: Public Administration

Faculty Advisor: Carol Ebdon

This thesis (currently in progress) seeks to identify victims and potential victims of child trafficking in Nebraska through the use of risk indicators such as a history of abuse experienced as a child, removal from their home, and/or homelessness. If potential victims can be identified then a policy recommendation can be formulated to provide services to at risk/victimized children. Using risk indicators identified through literature on sex trafficking, prostitution and commercial sexual exploitation of children, three state databases noted will be examined and cross-checked for information to answer the following two questions: (1) How many children who were seen at Project Harmony in 2006-2008 were later arrested for prostitution? (2) Were other indicators of commercial sexual exploitation present? This presentation will discuss whether trafficking is a true issue in Nebraska, current policy and research, as well as potential solutions. This discussion is pertinent because two studies have indicated that 70 percent of women or girls involved in prostitution entered “the life” before the age of 18 (Hughes, 2007). If true, then the majority of prostitutes were, at least initially, victims of sex trafficking, (Hughes, 2007). Based on this premise, it is highly likely women in Nebraska who were arrested for prostitution as young adults were exploited when they were minors, and thus are victims of trafficking, especially if other risk indicators were present.

ANNESHA MITRA

Graduate: Masters

The Associations between Depression, Alcohol Use, and Academic Performances with Self-Continuity.

Major: Criminal Justice

Faculty Advisor: Jonathan Santo

Co-Author: Jonathan Santo

Rationale: Self-continuity reflects the ways in which people reconcile the physical and psychological changes they undergo into a cohesive self-concept. The strategies used by adolescents to explain the stability of perceptions of self-continuity over time have been associated with indicators of mental health (Chandler et al., 2003). Previous studies show that depression is positively associated with self-discontinuity, alcohol use and poor academic performance. In the proposed replication, we hypothesize that self-discontinuity will be positively associated with depression, alcohol use and poor academic performance. Methods: Data were collected from 309 emerging adults (mean age=21.88 years, 75% female) recruited through SONA (an online source to collect data among psychology students). Measures included the Beck Depression Inventory, the AUDIT alcohol measure, a measure of self-continuity and discontinuity (Santo et. al, 2013) along with self-reported GPA. Results: As expected, alcohol consumption and depression symptoms were positively associated ($r=.32, p<.05$). Males reported significantly more alcohol consumption ($t(99.92)=2.98, p<.05$) yet lower self-discontinuity ($t(302)=3.05, p<.05$). Preliminary analyses revealed that participants who felt that they remained the same person over time (71.5% of the sample) were less likely to report symptoms of depression ($t(118.91)=2.68, p<.05$). However, there were no differences in alcohol consumption or GPA as a function of personal persistence. Discussion: The current study demonstrated that alcohol use was positively correlated to depression. Also, that people who were more self-continuous had fewer issues with depression. Future analyses will use structural equation modeling to further explore the relations between the study variables.

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MARYLEE G. MOULTON

Graduate: Masters

Power Play: The Rhetoric of the NRA after Newtown

Major: Communication

Faculty Advisor: Barbara Pickering

On Friday morning, December 14, 2012, Adam Lanza shot his way through a secured door at Sandy Hook Elementary School in Newtown, Connecticut and killed twenty first-grade students and six teachers. The NRA response to the Newtown shooting, posited that an armed guard could have stopped the gunman and called for armed guards in every school. This response was promoted in two video ads. The first ad, *School Security*, was launched on January 15, 2013, the day before President Obama presented his gun control initiative. The thirty-five second video challenged the use of armed guards for President Obama's daughters when America's children were unguarded at school. The second video expanded on the first video, building the NRA case for armed security at American schools, and derided media elites who objected to the policy. This paper will contend that the ads are illustrative of a vocabulary of power utilized by an organization that occupies a hegemonic position. Moreover, it will examine the use of three ideographs in the videos: <elites>, <white male> and <Stand and Fight> to bolster this hegemonic status and motivate the NRA target community. The analysis will examine whether the National Rifle Association motivated their constituency to derail a national groundswell to act on gun control legislation, and what effect the strategy will have on the power of the NRA to dominate gun rights policy.

MARYLEE G. MOULTON

Graduate: Masters

Investigating Moral Conflict in the Gun Debate: A Phenomenology of Gun Ownership

Major: Communication

Faculty Advisor: Shereen Bingham

This phenomenological research examined meaning attached to gun ownership. The purpose of the research was to provide a voice to gun owners so that the essence of gun ownership is understood. Three white, male, Mid-western gun owners participated in interviews and an analysis was carried out using the phenomenological method of Moustakas (1994). Five themes were identified: (1) gun ownership is a positive experience, (2) gun owners are misunderstood, (3) responsibility is fundamental, (4) gun ownership is influenced by history and politics and (5) views about gun control are complicated and sometimes contradictory. The essence of gun ownership consisted of a strong affirmative image, comfort with traditions and values represented and a strong sense of responsibility. It is hoped that a more complete understanding of the meaning of gun ownership will serve to help resolve the moral conflict surrounding the gun debate.

STEPHANIE MUELLER

Graduate: Masters

Investigating the Construct of Heart-Head Propensity and its Relationship to Empathy in Volunteer Burnout

Major: Industrial/Organizational Psychology

Faculty Advisor: Lisa Scherer

Co-Author: Joseph Allen

The purpose of this study was to begin to understand the causes of burnout among volunteers in non-profit organizations. Nonprofit organizations are highly reliant on volunteers, and volunteer retention is critical to their success. This study explored the relationship between two volunteer dispositions on burnout: volunteer empathy and volunteer heart-head propensity. As predicted, heart-head propensity moderated the effect of empathy on burnout, with heart propensity volunteers experiencing high levels of burnout regardless of empathy. Head propensity volunteers were more likely to experience burnout at lower rather than higher empathy levels.

EMILY NGUYEN

Graduate: Masters

Telling the Story of At-Risk Youth: Utilizing Mixed Methods in Program Evaluation

Majors: Social Work and Public Health

Faculty Advisor: Jeanette Harder

This poster will focus on sharing the methodologies of utilizing mixed methods in evaluating youth's experiences in a program focused on ensuring at-risk youth are career-ready. Data was collected from a satisfaction survey and focus groups with at-risk youth. This poster will highlight the methodologies used to conduct and analyze this research as well as the learning experiences from conducting community-based research. This proposal shows how mixed methods can be used in community-based research, specifically program evaluation. Evaluating client experiences is a crucial part of any program evaluation. Utilizing mixed-methods allows the client's experiences to be shared in both qualitative and quantitative research. It also allows community-based partners to be presented results in a variety of different ways and use that evaluation to communicate with board members, funders and the broader community they serve.

MAGNUM PETERSON

Graduate: Masters

Promoting Prosocial Behavior Using Cooperative Video Games and Peer Models

Major: School Psychology

Faculty Advisor: Lisa Kelly-Vance

Prosocial skills can involve positive social interactions such as appropriately conversing with peers and adults. Studies have indicated that not only nonviolent video games but also a peer model may help increase prosocial behaviors. Because the amount of video game play is so high, video games can potentially be used as a great teaching tool. Four 1st grade students will take part in this study. Students will be placed into two groups with each group containing one student who is socially at risk, and one student who represents a typical, socially developing peer. Participant groups will receive approximately fifteen minutes of intervention time weekly in the form of gameplay sessions. All intervention sessions will be conducted in a room which will contain gameplay stations. All games selected for the Nintendo Wii will consistently place participant pairs on the same team within gameplay, encouraging cooperation to reach a mutual goal (as opposed to competition). Observational data will be collected once a week from participants during recess periods and during gameplay. By pairing those students who are believed to be socially "at-risk" with typically developing peers in prosocial, cooperative video gameplay sessions, this study pursues the advantages of video gameplay to increase prosocial skills. These advantages may include initiating and maintaining group play, sharing, and carrying on appropriate conversations with peers. Pairing nonviolent, cooperative video game play with peer modeling will increase prosocial behavior. Participants will learn how using video games can be used in a learning environment to promote prosocial skills.

JOSH PICKHINKE

Graduate: Masters

Varying the Speed of Perceived Self-Motion Affects Postural Control During Locomotion

Major: Exercise Science

Faculty Advisor: Mukul Mukherjee

Virtual reality environments have been used to show the importance of perception of self-motion in controlling posture and gait. In this study, the authors used a virtual reality environment to investigate whether varying optical flow speed had any effect on postural control during locomotion. Healthy young adult subjects walked under two conditions, with optical flow matching their preferred walking speed, and with a randomly varying optic flow speed compared to their preferred walking speed. Exposure to the varying optic flow increased the variability in their postural control as measured by area of COP when compared with the matched speed condition. If perception of self-motion becomes less predictable, postural control during locomotion becomes more variable and possibly riskier.

ERIC PISCIOTTA

Graduate: Masters

Kinematic Variability and Accelerometers Demonstrate a Lack of Agreement

Major: Biomechanics

Faculty Advisor: Sara Myers

Analysis of human movement variability has provided insights into motor coordination. It has been suggested that an optimal range of variability is preferred in biological systems. Deviations away from optimal have been associated

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with aging and pathology. Current methods for assessing gait variability are limited to a laboratory setting. A portable method for assessing gait variability could be very useful in the clinical setting. An accelerometer is a small portable device that quantifies acceleration in the vertical direction. The purpose of this study is to determine the agreement between gait variability obtained from an accelerometer and through laboratory-based gait analysis. A total of 19 participants (Age:27±4.9yrs, Mass:69.8±23.0kg, Height:165.9±38cm, Speed:2.9±0.4mph) were recruited for this study. Participants walked on a treadmill at a self-selected speed for 10 minutes while 3D kinematic and right hip accelerometer data was collected. The largest Lyapunov Exponent (LyE) was used to quantify structure of variability. LyE was calculated from the ankle, knee, and hip joint flexion/extension time series and from the vertical acceleration time series. A Bland-Altman statistical test was performed to assess the agreement and repeatability of variability between gait and accelerometer measures. The results indicate a lack of agreement between variability measures of gait and accelerometer while walking on a treadmill. This disagreement indicates that caution should be used when translating laboratory-based measures to the clinical setting using mobile devices. Further work is needed to investigate agreement between variability of data obtained from portable devices and through gait analysis collected in the laboratory.

RYAN PLACZEK

Graduate: Masters

The Effects of Testosterone on Decision Making Following a Competition

Major: Neuroscience and Behavior

Faculty Advisor: Rosemary Strasser

Co-Author: Rosemary Strasser

Testosterone (T) has been identified as a hormone that influences aggressive behaviors across many species, including humans (for a review see Archer, 2006). This link between T and aggression has been studied in many situations, including those where social status is in jeopardy. Previous research has pointed to elevated T levels promoting aggressive behaviors aimed at gaining and maintaining social status, possibly via separate processes. The first process is short-term increases in T resulting from exposure to stimuli that signal an opportunity to gain social status. The second process is prolonged elevation of T levels resulting from prior experience in situations where social status was gained. Additionally, a limited amount of evidence has emerged showing that short-term increases in T may be inhibited in individuals concurrently experiencing elevated cortisol levels. The following study was designed to investigate the relationship between cortisol levels, short-term increases in T and aggressive behaviors aimed at gaining vs. maintaining, social status. Adult males were asked to compete on a pen and paper task, report their need for status, and their willingness to compete again after the initial competition. Saliva samples were obtained before and after the competition to measure changes in T and cortisol as a result of competing. These hormone changes were then compared to participants' reports of their willingness to competing again in an attempt to further elucidate the complexities of their relationship.

CHRISTINE QUICK

Graduate: Masters

Influence of Distributive Justice on Volunteer Satisfaction and Intentions to Quit as a Function of the Importance of Outcomes

Major: Industrial/Organizational Psychology

Faculty Advisor: Lisa Scherer

Co-Authors: Lisa Scherer, Joseph Allen

The purpose of this study is to examine whether volunteers' experiences of distributive justice influence their satisfaction and intentions to quit. Previous work has only examined the effects of distributive justice in employee samples, and has found that employees who perceive distributive injustice experience lower job satisfaction (Lind & Tyler, 1988). This issue is of greater importance in volunteer samples because there are no obligations, such as financial responsibilities, that prevent volunteers from quitting. When volunteers experience feelings of dissatisfaction in volunteer work, they are more likely to have a conscious intent to quit volunteering than those who feel satisfied (Vecina, Chacón, Sueiro, & Barrón, 2012). Further, when individuals have intentions to quit they are more likely to follow through with quitting than individuals who do not have such intentions (Azjen, 1991). Results indicated that satisfaction partially mediated the relationship between volunteers' perceptions of distributive justice and their intention to quit. Additionally, consistent with Locke's value theory (1969), the importance that volunteers place on the outcomes distributed in their volunteer organization moderated the relationship between distributive justice and satisfaction such that the relationship between distributive justice and satisfaction was stronger for volunteers who

placed greater importance on outcomes. Exploring the role of distributive justice in improving volunteer satisfaction and retention is not only theoretically important but also offers practical solutions for nonprofit organizations dealing with issues of volunteer turnover.

CAITLIN RAY

Graduate: Masters

'On Your Feet!': Navigating Disability in Theatre-based Teaching Pedagogies

Major: English

Faculty Advisor: Kristen Girten

Instructors engaging in critical and radical teaching pedagogies are concerned with challenging the traditional power structures of the classroom and transforming it into a more inclusive, democratic teaching space. Incorporating theatre activities into the classroom is one method of developing such a space with students (Boal, Rutter). Student-centered classrooms enable marginalized people an opportunity to develop their voice and agency. However, these same methodologies may ironically limit their own potential for inclusiveness, particularly when considering issues of disability (Hillcoat). I argue that most theatre-based teaching methods, such as Theatre of the Oppressed, Open Space Learning and others rooted in theatre, assume a certain level of able-bodiedness in its participants. Currently, theatre activities in the classroom regularly need modification when a student with a disability is present. Such modifications are not always adequately developed. I propose using the tenets of Universal Design in order to allow for inclusiveness in these activities. By doing so, facilitators will be able to develop changes in activities that might have originally privileged able-bodied participants to be more inclusive, without necessitating people on the disability spectrum to self-disclose (Brueggemann, et.al., Dolmage, Knoll). By thinking through issues of accommodations and accessibility in advance, facilitators can ensure that objectives of the original activities are maintained while allowing for the most participants possible.

AMBER REIS

Graduate: Masters

Individualized Social Skills Interventions for Young Adults with Asperger's Syndrome

Major: School Psychology

Faculty Advisor: Brian McKeivitt

As the number of individuals with Asperger's Syndrome (AS) continuing their education in postsecondary settings continues to increase, it is essential to address the needs of these individuals. Young adults with AS can have difficulty navigating the social world during this transition time in their lives. Research on social skills programs for young adults with AS is limited and the purpose of this study is to evaluate the effectiveness of individualized social skills interventions as a method for increasing specific social skills. This study utilized a case study approach with four young adults with AS such that each young adult was given a social skills goal based on their needs. Results found an increase in the targeted social skills when measured by direct observation. How this study contributes to the existing body of literature, practical implications, and concerns with self-perceived social competency are also presented.

ANDREW RIQUIER

Graduate: Masters

An Examination of Microglia Presence Following Chorda Tympani Transection Across Rat Development

Major: Neuroscience/Behavior

Faculty Advisor: Suzanne Sollars

The chorda tympani (CT) nerve transmits taste information from the tongue to the nucleus of the solitary tract (NTS) in the brainstem. Following transection of the CT (CTX) in adult rats (over 40 days of age), structural and functional changes occur but return to control-like status after approximately 45 days (St. John, Markison, & Spector, 1995). However, if the nerve damage occurs to the rats prior to maturation, similar but more drastic changes occur, with the most severe effects occurring when the damage occurs at 5 or 10 days of age, where the damage is permanent (Sollars, 2005). The mechanisms behind these developmentally-dependent changes are unclear. Microglia cells are a classification of non-neuronal cells in the central nervous system that perform a myriad of functions, one of which is to respond to damage and inflammation (Rock et al., 2004). Microglia are known to be present in the NTS of adult mice four days after CTX (Bartel, 2013). The proposed study will examine the microglial presence in the NTS following CTX at 5, 10, 25, or 40 days of age to see if the response trend is comparable to the observed developmentally-dependent functional and structural effects. It is hypothesized that the microglial presence following injury will be greater in the youngest age group and will be less prominent as the experimental age increases. Data obtained from this study could assist in a better understanding of central nervous system plasticity, protection, and peripheral regeneration following injury.

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STEPHANIE SCHEER

Graduate: Masters

A Play Intervention for Native Spanish Speaking Preschool Students

Major: School Psychology

Faculty Advisor: Lisa Kelly-Vance

Co-Authors: Lisa Kelly-Vance, Brigitte Ryalls

Play is considered an important part of child development as it aids in problem solving, social skills, language development and skills associated with school success. Play interventions have been developed to aid those students who may developmentally be lacking play skills. One population that has not been specifically studied is children who speak Spanish as a native language who may face difficulties because many skills are taught to them using a language they may not understand. This study examined the effects of a play intervention done in English on native Spanish speaking children's play skills. The participants included three preschool students one male (3 years 11 months) and two females (5 years 2 months and 5 years 4 months), who speak Spanish as a native language. The intervention occurred twice a week for four weeks and followed a plan, play and review method which incorporated reading a story, teaching new play skills, giving praise and encouragement and reviewing what they had learned. All three children increased in the amount of time they spent in pretend play and the percentage of pretend play acts the completed according to observational data from the PIECES. Two children increased the highest level of play achieved while the third remained at the same level. I will be presenting my research study and its results in a poster format.

R.J. SHUTE

Graduate: Masters

The Effects of Constant vs. Variable Workload Cycling on Performance and Perception

Major: Exercise Science

Faculty Advisor: Dustin Slivka

Co-Authors: Rick Edgerton, Matt Heesch, Dustin Slivka

PURPOSE: To determine whether constant workload (CL) or variable (VL) workload cycling stimulates different physiological and psychological responses. **METHODS:** Recreationally-trained male cyclists ($n=8$, age 32 ± 5.3 y, mass 75.7 ± 10.9 kg, body fat $13.4 \pm 5.6\%$, VO_2 peak 4.6 ± 0.6 L \cdot min $^{-1}$) completed two experimental trials. The VL trial alternated between 3 min at 45% W_{max} and 3 min at 85% W_{max} until completion of the 63 min trial. The CL trial cycled at a constant 65% W_{max} for 63 min. Following each trial, participants completed a self-paced 10 km time trial. Blood lactate was measured at the beginning, 6, 30, and 60 min, and conclusion of the trial. **RESULTS:** There was no difference between VL and CL performance trials (16.97 ± 2.07 min, 16.81 ± 1.47 min, respectively $p = 0.62$), VO_2 (3.62 ± 0.71 , 3.68 ± 0.66 L \cdot min $^{-1}$, respectively, $p = 0.43$), HR (160 ± 12 , 161 ± 12 bpm, respectively, $p = 0.64$), blood lactate (10.4 ± 4.2 , 9.2 ± 5.1 mmol \cdot L $^{-1}$, respectively, $p = 0.52$), RPE (18 ± 2 , 18 ± 2 , respectively, $p = 0.22$), Feeling Scale (9 ± 2 , 9 ± 1 , respectively, $p = 0.63$), or Attentional Focus (2 ± 2 , 2 ± 2 , respectively, $p = 0.32$). **CONCLUSION:** These data indicate that when overall work is held constant, despite different intensity profiles, there is no impact on acute measures of performance, physiology, or perception.

MORGAN STODDARD

Graduate: Masters

Housing for Adults with Disabilities in Nebraska

Majors: Social Work and Social Gerontology

Faculty Advisor: Karen Rolf

Parents or caregivers of children with developmental disabilities have an unspoken burden that many are afraid to talk about. What will happen to their child after their passing? While holding two focus groups, one with English-speaking participants and one with Spanish-speaking participants, many commonalities were discovered amongst the caregivers. Caregivers want to find someone who will provide the same amount of love and care that they provide themselves. Unfortunately, these caregivers are unaware of their resources available to them because of a lack of information. The Latino caregivers have the even harder task of finding resources even though some don't have a Social Security Number and often a language barrier. Latino's rely more on family contacts to care for their loved one post-death than the English-speaking population. Both groups have goals and desires of finding resources that allow their children to work, make an income higher than peace-rate, be monitored without being over-pressured, a social life, and a positive quality of life. Unfortunately, the rural areas of Nebraska are lacking in

residential services as the life expectancy of people with developmental disabilities is increasing. Statewide, Nebraska needs to provide more residential settings for people with developmental disabilities and resources that provide them with a quality of life similar to any other Nebraska resident without disabilities does.

JACK TAYLOR

Graduate: Masters

Oxytocin, Vasopressin, and Interest in Infants in Marmosets (*Callithrix jacchus*)

Major: Psychology

Faculty Advisor: Jeffrey French

Among mammals, parental care is required for the survival of offspring, but in the majority of species, this task is carried out solely by the female. However, some rodent and primate species (including humans) have evolved reproductive strategies that make use of paternal and alloparental care. The neuropeptides oxytocin and vasopressin have been implicated in enhancing the care of young in these and other species, though often in sexually dimorphic ways. Marmosets are a cooperatively breeding non-human primate, and have been used as a model for social bonding. They exhibit high rates of paternal and alloparental care, they respond physiologically and behaviorally to infant stimuli, and they possess a novel gene for oxytocin. The purpose of the current experiment was to examine the roles of oxytocin and vasopressin in the facilitation of parental response to unrelated infants. Nulliparous marmosets were treated with oxytocin, vasopressin, or receptor antagonists, and then exposed to infant and control stimuli. If oxytocin and vasopressin increase parental behavior in marmosets, then individuals treated with either oxytocin or vasopressin will exhibit increased interest in the infant stimuli compared to saline treatment. Furthermore, marmosets treated with receptor antagonists will exhibit decreased interest in the infant stimuli. Also, if vasopressin affects parental behavior in a sex-specific way, then vasopressin agonist or antagonist treatment should have a greater effect on male marmosets than female marmosets.

HEATHER TICE

Graduate: Masters

Critical Issues in Volunteer Management: VPA-UNO's Approach to Assessment and Solutions

Major: Industrial/Organizational Psychology

Faculty Advisors: Lisa Scherer, Joseph Allen

Co-Author: Elizabeth Harp

There is no denying the importance of volunteers. In 2012, 64.5 million volunteers contributed 7.9 billion hours of service, which translates into a monetary value of 175 billion dollars (Corporation for National and Community Service, 2013). Despite the large impact volunteers have, non-profit organizations are struggling to retain their volunteers. Indeed, more than one-third of volunteers who participate in service one year do not do so the next (Eisner, Grimm, Maynard, & Washburn, 2009). The University of Nebraska-Omaha Volunteer Program Assessment (VPA-UNO) has been specifically designed to address the challenges that non-profit organizations are facing. UNO Industrial/Organizational Psychology faculty and students collect data and consult with community agencies to assess the experiences of volunteers in order to ultimately improve volunteer satisfaction, performance and retention. The five VPA branches around the country collaborate to create a VPA Norms Report every year. Organizational data from clients we work with are compiled in order to determine national industry norms. We utilize the VPA Norms Report in order to better inform organizations of how they compare to the average non-profit and to identify their strengths and growth areas. Using the VPA Norms Report, we can also identify the overall strengths and growth areas across the volunteer industry. We will present the top three strengths and growth areas as identified by the VPA Norms Report. In addition, we will provide evidence-based best practices recommended to address the growth areas (VPA-USA, 2012).

RYAN VACANTI

Graduate: Masters

Land Use and Crime: A Partial Replication and Expansion of Stucky and Ottensmann's 2009 Study

Major: Criminology and Criminal Justice

Faculty Advisor: Amy Anderson

This study used elements from both routine activity theory and social disorganization theory to partially replicate and expand Stucky and Ottensmann's (2009) analysis of the effects of land use on violent crime. First, I examined the relationship between land use and violent crime to determine whether land use types that encourage the convergence of motivated offenders and potential victims, in the absence of capable guardians, contributed to block group violent crime rates. Next, I expanded the work of Stucky and Ottensmann (2009) by examining whether

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similar relationships existed between land use and property crime. Finally, I examined whether any relationships between land use and crime were conditioned by the amount of social disadvantage in the block group. I collected AY2000 data from the Omaha Police Department, the Douglas County Assessor, and the United States Census, and aggregated it as necessary to create the block group level measures used in the analyses. Preliminary findings from multivariate analyses and spatial mapping of the residuals suggested that the effects of the type of land use on violent and property crime varied across Omaha, Nebraska, depending on the social characteristics of the area.

MARYLYN VONG

Graduate: Masters

Gender and the Self-Sufficiency Matrix Scores

Major: Social Work

Faculty Advisor: Jeanette Harder

In the United States is that there is an estimation of 20.6 million people who were classified with substance dependence or abuse (U.S Department of Health and Human Services, 2012). Catholic Charities, located in Omaha, Nebraska, is a nonprofit private support provider for clients dealing with addictions. This poster will present the statistical findings of gender and the Self-Sufficiency Matrix scores provided by Catholic Charities. Catholic Charities uses the Arizona Homeless Evaluation project Self-Sufficiency Matrix Tool to measure the progress of participants in 17 categories. The responses range from 1-5 on a 5-point Likert scale with 1 being in crisis and 5 being empowered. Included in this study is a review of journal articles that correlate with the program, and a summary of the statistical findings in various categories including gender. The research design that was used in collecting my data was pretest-posttest. A pretest-posttest design was used because the participants fill out a self-sufficiency matrix tool prior to treatment. After completing treatment, the participants once again fill out a Self-Sufficiency Matrix tool to see how they are doing post-treatment. This study validates that although there is a relationship between gender and the Self-Sufficiency Matrix scores, the findings were found to be not statistically significant. This study was designed to help Catholic Charities evaluate its progress using the Self-Sufficiency Matrix tool. To help Catholic Charities improve behavior among participants, strengths, limitations, and recommendation are provided at the end.

KRISTA WALBURN

Graduate: Masters

Effects of Physical Activity on a Spatial Memory Task and a Stroop Task in Young Adults

Major: Community Counseling

Faculty Advisor: Abby Bjornsen

It has long been known that physical activity has multiple physical benefits and recent research has also examined possible benefits on the human brain. The aim of the proposed study is to observe the effects of physical activity on the performance of young adults on a Stroop task and a task designed to test spatial memory. Participants will complete a Life Stress Inventory, Stroop task, and a spatial memory task. It is predicted that participants will score higher on the Stroop task and be more likely to correctly identify the location of previously studied objects on the spatial memory test if they report a higher number of hours of weekly physical activity. It is also predicted that participants with higher scores on the Life Stress Inventory will score lower on the Stroop task and be less likely to correctly identify the location of previously studied objects on the spatial memory test. Existing research provides evidence that physical activity improves certain cognitive functions in older adults, and it is hypothesized that similar effects will be seen with young adults. Results of the proposed study may provide evidence that physical activity can cognitive functioning in young adults.

STEPHANIE WEDDINGTON

Graduate: Masters

Attention to Similarity: Interactions between the Self and Other

Major: Industrial/Organizational Psychology

Faculty Advisor: Lisa Scherer

Co-Author: Tara Augustin

Building off of previous research, we created the construct Self-Other Attention to Similarity (SOATS) and developed a scale to measure it. SOATS is defined as the tendency to initially focus on similarities between the self and other when meeting a new individual. We wanted to see if this tendency varies among individuals and what other psychological constructs it is related to. Three related constructs were identified: empathy, agreeableness, and

extroversion. We analyzed the correlations among the variables, as well as the reliability of the SOATS scale. It was found that SOATS was correlated with the three related constructs as hypothesized. Implications for these findings are discussed.

SAMANTHA WEISS

Graduate: Masters
Women in Substance Abuse Treatment
Major: Social Work
Faculty Advisor: Jeanette Harder

In 2012, 6.9 percent of United States females 12 years or older reported current illicit drug use ("Results from the 2012 national survey on drug use and health," 2012); this is an increase from 6.6% of women in 2009 ("Women, girls, families, and substance abuse," 2012). When compared to men, women often face additional barriers to accessing treatment. Women in substance abuse treatment are more likely than men to have children, be unemployed, and be more easily influenced by negative partner or friend relationships. Despite these barriers, women who complete treatment are equally or more likely than men to remain abstinent (Green, 2005). This study analyzed pre and posttest data from the Self-Sufficiency Matrix tool for 53 women in the Community Supports Program at Catholic Charities of Omaha. The researcher found a statistically significant and positive relationship between the percent of service goals clients completed and the Self-Sufficiency Matrix change scores; supporting the belief that women who complete treatment have better outcomes than women who do not. The researcher also examined the relationship between a women's Self-Sufficiency Matrix score for levels of childcare and substance abuse at intake and what percent of the treatment goals they completed by discharge. The presentation will include policy and research recommendations including local female specific barriers to treatment completion and possible methods of improving female treatment retention.

LAUREN WEIVODA

Graduate: Masters
The Relationship Between Psychic Distance and Expatriate Adjustment to Host Countries
Major: Industrial/Organizational Psychology
Faculty Advisor: Carey Ryan

Multinational corporations send expatriates all around the world to live and work. Expatriates' adjustment to the host country partially determines their success abroad. A handful of studies have examined the relationship between cultural distance and adjustment; however, the results of these studies have been inconsistent. Some studies suggest that adjustment is greater when the home and host countries are more similar, whereas others suggest that there is no relationship between cultural distance and adjustment at all. It is possible, however, that the relationship between cultural distance and adjustment depends on previous experience or host-national contact. It is also possible that psychic distance, which includes cultural distance and a variety of other factors, predicts adjustment better than cultural distance alone. The main purpose of this study was to determine whether the relationship between psychic distance and adjustment depends on previous experience and contact with host nationals. Eighty-seven American expatriates on assignment in twenty-one countries completed mailed questionnaires assessing previous experience, host-national contact, and adjustment to the foreign culture. Psychic distance was calculated by assessing cultural and geographic distance between the home and host country as well as differences in language, education level, industrial development, political system, and religion. Hypotheses were tested using multiple regression procedures.

HEATHER WILLS

Graduate: Masters
Effect of Proximity to Wind Turbines on Excreted Corticosterone and Testosterone in Lekking Male Greater Prairie Chickens
Major: Biology
Faculty Advisors: L. LaReesa Wolfenbarger, John McCarty
Co-Authors: John McCarty, Jeffrey French, Andrew Birnie, L. LaReesa Wolfenbarger

Human disturbances such as wind farms potentially stimulate stress responses in wildlife. Our objective was to assess stress levels in wildlife in relation to proximity to wind turbines. We hypothesized that if wind farms induce physiological stress in prairie grouse, then levels of the stress response hormone, corticosterone (CORT), would decrease in birds as distance from turbines increased. Hormones in birds can be measured noninvasively by analyzing droppings, eliminating capture stress required for taking blood samples. We analytically and biologically validated and used a radio- and enzymo- immunoassay to measure CORT, as well as testosterone (T), in droppings

of breeding male Greater Prairie Chickens (*Tympanuchus cupido*). We collected droppings at 15 breeding display grounds along a 25 km gradient from an established wind farm in the Nebraska Sandhills. Our analysis indicates that wind turbines do not affect stress levels or T in breeding male Greater Prairie Chickens. Further research is warranted to investigate the physiological impacts of wind farms in other landscapes, reproductive periods, and species. The results of this study provide insight for management and energy-development guidelines to protect species of conservation concern.

PAIGE WINTZ

Graduate: Masters

The Relationship Between Time in Childcare, Play, and Social Interaction of Young Children

Major: School Psychology

Faculty Advisor: Lisa Kelly-Vance

Co-Author: Lisa Kelly-Vance

Childcare attendance is a factor that affects the development of young children’s play and social skills. Research suggests that pretend play and social skills are advanced as a result of childcare, but other research suggests that aggression and behavioral problems increase. The relationship between the amount of time children spend in childcare and their play and social skills was examined at a university’s childcare center, which included children ages 18 to 56 months. The results of this correlational study indicated that children who spent more time in the childcare center (full time, 40 plus hours) demonstrated more advanced pretend play skills than children enrolled part-time (36 hours or less). Results also indicated that children who attended the childcare facility part-time were involved in more peer play than children enrolled full-time.

BRAD WOOSLEY

Graduate: Masters

Simultaneous Motion and Task Planning Using Task Reachability Graphs

Major: Computer Science

Faculty Advisor: Raj Dasgupta

Task and motion planning are two fundamental problems in robotics which are frequently encountered in many applications for robots. Task planning involves finding a sequence in a set of tasks satisfying some set of constraints. Path planning involves finding a path through the environment which is collision free between a start and goal location. Since, in most cases, a task involves going to a point in the environment to perform some operation, task and path planning are closely related. However, these two problems have been normally addressed as two separate research problems. Only recently researchers have considered combining these two topics using a technique called Simultaneous Task and Motion Planning (STAMP). In this research, I propose a new method to solve the STAMP problem using a framework called a task reachability graph (TRG). A novel feature of this approach is that it incorporates a very practical aspect of robotics - uncertainty in the robot’s motion and uncertainty in the environment into the decisions made by the robot to determine the order of performing tasks while traversing the vertices of the TRG. I have validated the proposed algorithm using two Corobot robots performing different numbers of navigation tasks within an indoor environment. I have also compared it with another recent STAMP algorithm called MRTA-RTPP and shown that the TRG-based algorithm performs comparably.



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BRYON APPLEQUIST

Graduate: Doctoral

The Relationship Between a Progressive vs. Single-Stage Treadmill Test For Evaluation of Claudication

Major: Exercise Science/Biomechanics

Faculty Advisor: Sara Myers

Co-Authors: Shane Wurdeman, Sara Myers

Peripheral arterial disease (PAD) is defined by atherosclerotic plaque buildup and subsequent blockages in the arteries of the lower extremities, causing reduced blood flow to the legs during exertion, and leg pain known as claudication. Two different treadmill-walking tests are administered to examine claudication: a single-stage, and a progressive walking test. Previously no attempts have been made to determine a relationship between these two different protocols. The purpose of this study was to determine the relationship between the single-stage test and the progressive test, with the goal of being able to make comparisons between the two tests for clinical purposes. Thirty-one patients with PAD (age: 65.2 ± 6.71 years; height: 175.6 ± 6.1 cm; mass: 87.5 ± 15.6 kg) were recruited and gave consent for this study. Participants initially performed a progressive test at 2.0 miles per hour. The slope grade started at 0% incline and increased 2% every 2 minutes. Subjects walked until the pain forced them to stop. Following rest, participants performed a single-stage test at 1.5 mph, with the slope at a constant grade of 10%. Mechanical work from each test was calculated for all subjects. Pearson product moment correlation between calculated mechanical work for single-stage and progressive tests were determined. Maximum walk time and mechanical work both yielded a significant relationship, but graphical examination led to questions of clinical utility. However, a log transformation of work yielded a significant, strong relationship with a strong linear trend. Less than reliable relationship existed for time and mechanical work, but removal of nonlinearities through log transformation yields strong relationship with strong linear trend.

NICHOLAS ARREOLA

Graduate: Doctoral

Transfer of Facilitation Best Practices: From Experts to Novices

Major: Industrial/Organizational Psychology

Faculty Advisor: Gert-Jan de Vreede

Today's problems are becoming increasingly complex, and therefore rely on a multitude of individuals with diverse backgrounds and expertise in order to be effectively solved. When people work together to achieve a shared goal, such as coming together to solve a particular problem, they are by definition, collaborating. Collaboration creates value that cannot be derived by individual effort. Despite the obvious benefits of collaboration, there is one major downfall: the meeting. A necessary evil, the meeting poses several important threats to productivity. For example, these threats include: miscommunication, digressions, lack of focus, hidden agendas, fear of public speaking, and meeting dominance by one or more group members (White, 2007). Facilitators and technology such as group support systems (GSS) have been used as ways of getting around these issues, but unfortunately they are not always practical due to a lack of facilitation competence in organizations. The purpose of the project was to take a close look at the underpinnings of the collaborative effort and develop a set of tools and recommendations that will make facilitation more accessible in organizations.

JASJIT K BANWAIT

Graduate: Doctoral

Context-based bipartite graph matching- a computational approach to find associations between microRNAs and biological pathways in pancreatic cancer

Major: Information Technology/Bioinformatics

Faculty Advisor: Dhundy Bastola

Co-Author: Dhundy Bastola

Cancer research has generated a valuable body of knowledge about the mutations that play a significant role in cancer proliferation. These mutations have led to gain of function in oncogenes where as detrimental loss of function in tumor suppressor genes. Pancreatic cancer (PC), in particular pancreatic adenocarcinoma (PA), is one of the deadliest forms of cancer, resulting in 38000 deaths in the United States per year. The current 5-year survival rate for patients treated with state-of-the-art therapies is merely 5%. To date, abnormal CA19-9 level is the most reliable diagnostic serum marker. However, it is still not effective in detecting the cancer early enough for available therapy to be effective. This lack of early diagnosis has been recognized as the major cause for the high mortality

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rate observed in pancreatic cancer. More recently, microRNAs have been identified as potential biomarkers in the diagnosis of pancreatic cancer. MicroRNAs (or miRNAs) are short ~21-22 nucleotide long non-coding RNAs that act as regulators of gene expression. Gene expression studies have shown existence of deregulation of miRNA genes during tumor conditions. In this study, we developed a computational approach to identify relationship between miRNAs and biological processes or pathways involved in pancreatic cancer using bipartite graph matching. The long-term goal of our research is to establish a computational framework capable of integrating multiple-relevant knowledgebase (miRNA-mRNA interaction, gene expression, biological process and metabolic pathway data) to identify candidate therapeutic miRNA(s). Successful completion of this goal is expected to increase the specificity of therapeutics and reduce the side effects associated with current methods.

TIM BARNUM

Graduate: Doctoral

Racial Disproportionality in Prison Admissions: A County-by-County Analysis

Major: Criminology and Criminal Justice

Advisor: Pauline Brennan

This paper investigates racial disproportionality in prison admissions on a county-by-county level for the states of Iowa and Missouri. Although these states border one another they differ in significant ways—Missouri shares characteristics with southern states because it practiced slavery whereas Iowa did not, but research shows that Iowa disproportionately imprisons blacks although it has a substantially lower black population than Missouri. We examined whether the racial threat hypothesis explained disparity in new prison admissions while also considering whether differences in political ideology at the county level mattered. Specifically, we looked at the effects of the percentage of individuals in each county who voted Republican in the 2004 presidential election as well as the percentage of whites living in each county on our dependent variable (i.e., black prison counts). We found that net of other variables black prison counts were higher in Iowa than Missouri. There was evidence supporting the racial threat hypothesis in both Iowa and Missouri, but there was no evidence that political ideology effected black prison counts in either state.

OLIVER BONHAM-CARTER

Graduate: Doctoral

Modeling the Effects of Microgravity On Oxidation in Mitochondria: A Protein Damage Assessment Across a Diverse Set of Life Forms

Major: Information Technology/Bioinformatics

Faculty Advisor: Dhundy (Kiran) Bastola

Co-Authors: Jay Pederson, Lotfollah Najjar, Dhundy Bastola

The exposure to stress at the microbiological level may likely cause life-sustaining proteins and tissues to fail. The effects of microgravity from space flights (weightlessness) and muscular disuse (as in the case of bed-rest) are thought to impose hardships on muscular proteins, which can result into atrophy. After an exposure to microgravity, astronauts may lose much muscle strength and mass. Carbonyl derivatives are the result of direct metal-catalysed oxidation that interacts with the carbonylatable amino-acid side chains of arginine (R), lysine (K), threonine (T) and proline (P) residues. Incited by stress, sites containing these amino-acids may attract oxidation and degradation in protein. Mitochondria are small organelles that are responsible for many extremely important “house-keeping” functions related to cellular health. Mitochondria primarily produce the energy for the eukaryote cells using oxidative processes. Since the consequences of oxidative reactions on protein are often dangerous, we hypothesize that these reactions are highly contained in mitochondria to minimize local oxidative damage. In this study, we present the composition of oxidative sites across mitochondrial and non-mitochondrial (enzymatic and non-enzymatic) proteins from a diverse group of organisms. Our major finding is that mitochondrial proteins contain far fewer oxidative sites than the non-mitochondrial variety. We maintain that sites may have been naturally removed in life-sustaining proteins for evolutionary purposes. This study helps to explain protein tolerances to oxidation based on the composition of these sites.

JON CAVANAUGH

Graduate: Doctoral

Pro⁸ variant of oxytocin facilitates fidelity in marmosets

Major: Psychology

Faculty Advisor: Jeffrey French

Behavioral strategies that facilitate the preservation of high-quality social relationships are critical. Central oxytocin (OT) activity modulates these features of socially monogamous relationships in a number of mammalian species, and plays a vital role in the behavioral maintenance of long-term social relationships. Several distinct variants of OT have been identified in New World primates (including marmosets: *Callithrix*; Lee et al., 2011; Ren et al., 2013). The marmoset variant of oxytocin (Pro⁸-OT) is distinctly different than the consensus mammalian variant of oxytocin (Leu⁸-OT), due to a proline substitution at the 8th amino-acid position. The goal of the study was to determine if treatment with Pro⁸-OT, relative to treatments with Leu⁸-OT or an OT antagonist, had modulatory effects on the behavioral maintenance of long-term pair bonds in marmosets. Treatment with Pro⁸-OT, but not Leu⁸-OT, facilitated a behavioral strategy to minimize time spent in close proximity, and diminish the quality of sociosexual interactions, with an opposite-sex stranger. These results suggest that the OT system is responsible for reducing fidelity-threatening behaviors in long-term pair bonds.

JOSELYNE L. CHENANE

Graduate: Doctoral

Racial and Ethnic Differences in the Predictive Validity of the Level of Service Inventory-Revised.

Major: Criminology and Criminal Justice

Faculty Advisors: Pauline Brennan, Benjamin Steiner

Co-Authors: Pauline Brennan, Benjamin Steiner, Jared Ellison

The Level of Service Inventory-Revised (LSI-R) is a risk/needs assessment tool that has been widely-used in correctional settings. Extant research has demonstrated the predictive validity of the LSI-R for individuals under correctional supervision. Yet, few researchers have assessed whether the LSI-R or the various subcomponents of the LSI-R are equally predictive of prison misconduct for white and minority inmates. Using data collected from male inmates confined in prisons in a Midwestern state, we examined the predictive validity of the LSI-R and its 10 subcomponents for white, black, and Hispanic inmates.

B. SHINE CHO

Graduate: Doctoral

Sustainability in Public Budgeting: Old Wine in New Bottles?

Major: Public Administration

Faculty Advisor: John Bartle

Co-Author: John Bartle

Scholars and practitioners in public budgeting frequently use terms such as fiscal sustainability, sustainable budgeting and sustainable procurement. However, it is elusive whether or not they are using those terms coherently. What does sustainability mean in public budgeting? This research aims to investigate the meaning of sustainability used in public budgeting by comparing it to the preexisting values of public budgeting (control, management, planning, honesty, economy, efficiency, and proportion) and the original notion of sustainable development (economic development, environmental protection, and social equity). To do so, this research performs content analysis on the latest budget messages of chief executive officers in principal cities in the U.S. using computer-assisted qualitative data analysis with MAXQDA.

JACQUELYN DAVIS

Graduate: Doctoral

Taste Receptor Cell Counts Following Oral Capsaicin Desensitization

Major: Psychology (Neuroscience & Behavior)

Faculty Advisor: Suzanne Sollars

Behavioral research in humans regarding taste suppression in individuals whom frequently consume capsaicin (the chemical compound that gives chili peppers their characteristic spicy heat) has produced variable results. The exact mechanism behind such potential suppression is unclear, but may be due to an integrated relationship in which the capsaicin-sensitive trigeminal system supports taste structures. In an effort to clarify these findings, the present work focused on whether increased tolerance to capsaicin was accompanied by a reduction in taste receptor cells. To do so, an animal model of chronic capsaicin consumption was created to allow for an in-depth immunohistochemical

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examination of tongue tissue following chronic capsaicin desensitization. When initially exposed to capsaicin, Sprague-Dawley rats reject concentrations above 5ppm. Following an incremental increase in concentration exposure (daily, hour-long exposure, increased by 5ppm every three days) adult animals willingly consume up to 25ppm over the course of two weeks. Two days after treatment cessation animals were sacrificed and tongue tissue was sectioned and stained with immunofluorescent CK-19, which allows for the visualization of taste receptor cells within taste buds. Ongoing investigations aim to quantify differences in taste receptor cells counts between animals treated with a capsaicin or control solution. Capsaicin tolerance achieved without corresponding loss of taste receptor cells would suggest that the behavioral adaptation to spice is independent of the taste system. In contrast, reductions in taste receptor cell counts following exposure would support capsaicin-related taste suppression and provide evidence of the mechanism behind this phenomenon.

GERARD DE LEOZ

Graduate: Doctoral

Infusion of High Performance Teams in Information Technology Project Environments

Major: Information Technology

Faculty Advisor: Stacie Petter

Co-Authors: Abhishek Tripathi, Narjes Tahmasbi, Stacie Petter

Failures in information technology (IT) projects continue to prevail in disconsolate rates despite concerted efforts to improve IT project management standards and practices. A popular benchmark, The Standish Group Chaos Manifesto, reports annually challenged and failed projects hovering around 60 percent. Of the many success factors discovered, research unfolds that project team performance is a key determinant of project success. In the management literature, high performance teams (HPTs)—*those highly reliable self-empowered teams with the right skill sets who employ the right set of principles and attitudes*—are specifically formed to drive business success. For many years now, organizations have been leveraging the benefits of HPTs in their operations such as manufacturing, retail sales, healthcare, and research and development. However, research on HPTs is sparse in the information systems (IS) field. This, therefore, opens auspicious opportunities to leverage the benefits of employing HPTs in IS, particularly within IT project environments. Our research forms part of a compendious theme for addressing high IT project failures. Using the work systems theoretical lens and related studies, we identify key success themes and dimensions necessary to form high performance IT project teams, and reveal evidences which predispose the employment of high performance IT project teams to project success. Our study contributes a foundational concept within the interdisciplinary fields of IS and project management towards the development of a potentially new sub-discipline—*high-performance IT project management*.

AYAN DUTTA

Graduate: Doctoral

An Auction-based Position Selection Algorithm for Efficient Reconfiguration in Modular Robots

Major: Information Technology

Faculty Advisor: Raj Dasgupta

Co-Authors: Jose Baca, Carl Nelson

We consider the problem of reconfiguration in modular self-reconfigurable robots where modules, starting from arbitrary locations, are required to assume appropriate positions so that they can get into a new target configuration. This problem is non-trivial as the desired positions of different modules in the target configuration could conflict with each other resulting in occlusions and failed attempts to achieve the target configuration; modules should also select positions that reduce their energy expenditure for locomotion and communication. To address this problem, we propose an algorithm called the spot allocation (SA) algorithm that uses a utility based model on each module to rank positions, followed by an auction-based technique to allocate positions to modules. We prove analytically that our algorithm is deterministic, complete and optimal (in case of no conflicts between modules). We have also verified the operation of our algorithm in simulation within the Webots simulator and compared the algorithm's performance with other allocation strategies. Our results show that our proposed algorithm is able to successfully reconfigure different numbers of modules to different target configurations and performs better than the compared strategies in terms of run time, utility and violations of energy (battery) constraints.

JARED ELLISON

Graduate: Doctoral

Age Group Differences in the Predictive Validity of the Level of Service Inventory-Revised

Major: Criminal Justice

Faculty Advisor: Pauline Brennan

The Level of Service Inventory-Revised (LSI-R) is a widely used risk assessment tool that has demonstrated predictive validity among incarcerated and community-based offender populations, as well as a number of subpopulations (e.g., non/violent offenders). Few studies have examined the predictive validity of the LSI-R across separate age groups of adult inmates, however. Researchers have uncovered developmental changes in attitudes, life goals, and self-interests that occur during adulthood, which suggests there may also be changes in the relevance of some risk factors for antisocial behavior. Using data collected from male inmates confined in prisons in a Midwestern state, we examined the predictive validity of the LSI-R and its 10 subcomponents for across developmentally defined age groups of adult offenders. We found that the LSI-R predicted the prevalence of misconduct similarly across age groups, but we also uncovered a number of differences in the magnitude of the effects of the LSI-R and its subcomponents on the incidence of misconduct across these groups. Implications for research and correctional administrators are discussed.

BENEDICT FERN

Graduate: Doctoral

Relationship between interpersonal personality traits and organizational benefits

Major: Industrial/Organizational Psychology

Faculty Advisor: Wayne Harrison

We were interested in whether the fairness of an employee policy is dependent on their individual need. We further hypothesized that individuals with an other orientation on the self-other orientation scale would find a policy that they do not personally need as fairer. That is, individuals that have a less self-centered or selfish world view will be more likely to find a policy as fair even if they did not personally gain from the policy. A total of 139 (17 male) students participated in the study. Participants read a vignette indicating whether the benefit that organization was offering was congruent or incongruent with their needs. A correlational analysis indicated that participants in the condition where their needs were congruent with the benefit offered rated the policy as fairer than participants in the incongruent scenario ($r(117) = .21, p = .019$). Further analysis found that the relationship between fairness and self-other orientation was not significant ($r(117) = .12, p = .189$). This relationship was unexpected. Further analysis, found that the expected relationship that self-other orientation would moderate the relationship between policy need and fairness was not supported. The finding that self-other orientation was not related to fairness suggests that individuals that are interested in the welfare of others do not use this orientation when evaluating organizational policies that do not directly benefit them.

ELIZABETH GRAHAM

Graduate: Doctoral

Hyper-connectivity despite pathologically-reduced beta activity in the motor cortex of patients with Parkinson's disease

Major: Psychology

Faculty Advisor: Tony Wilson

Co-Authors: Katherine Becker, Pamela Santamaria, Howard Gendelman, Tony Wilson

Parkinson's disease (PD) is a progressive debilitating neurodegenerative disorder clinically manifested by motor, posture and gait abnormalities. Human neurophysiological studies recording local field potentials within the subthalamic nucleus and scalp-based electroencephalography have shown pathological beta activity throughout the basal ganglia-thalamic-cortical motor network in PD. Notably, suppression of this pathological beta activity by dopamine replacement therapy or deep-brain stimulation has been associated with improved motor function. However, due to the invasive nature of these studies, it remains unknown whether this "pathological beta" is actually stronger than that observed in healthy demographically-matched controls. We used magnetoencephalography (MEG) to investigate neuronal connectivity and oscillatory amplitude in the beta range and lower frequencies during the resting-state in patients with PD and a matched group of patients without neurologic disease. Patients with PD were studied both in the practically-defined drug "OFF" state, and after administration of dopamine replacements. We found that beta oscillatory amplitude was reduced in the bilateral primary motor cortices of un-medicated patients with PD compared with controls. Administration of dopaminergic medications significantly increased beta oscillatory activity, thus having a normalizing effect. Interestingly, we also found significantly stronger beta connectivity between the primary motor cortices in un-medicated patients with PD compared with controls and that medication

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reduced this coupling, which is in agreement with the intra-operative studies. These results are also consistent with the known functionality of the basal ganglia-thalamic-cortical motor circuit, and the likely consequences of beta hyper-synchrony in the subthalamic nucleus of patients with PD.

MATT HEESCH

Graduate: Doctoral

Dose-response of hypoxia on mitochondrial related gene expression

Major: Exercise Science: Exercise Physiology Concentration

Faculty Advisor: Dustin Slivka

Co-Authors: Dustin Slivka, Charles Dumke, John Cuddy, Walter Hailes, Brent Ruby

Mitochondrial function is increased in repeated short term exposure to hypoxia. However, chronic hypoxia exposure has been shown to decrease mitochondrial function. It is unknown if a dose-response relationship between mitochondrial gene expression and magnitude of hypoxia impacts this paradox in mitochondrial function between acute and chronic hypoxic exposure. **PURPOSE:** To determine the mitochondrial related gene response to incremental levels of hypoxia. **METHODS:** Recreationally-trained male cyclists completed a 60-minute ride at 70% of W_{max} at an altitude of 975 m, followed by 6 h of recovery at four different simulated altitudes (0 m, 1667 m, 3333 m, or 5000 m). Blood O_2 saturation was measured via pulse oximetry every hour during the 6 h recovery period. Muscle biopsies were obtained from the *vastus lateralis* pre- and 6 h post-exercise for analysis of mitochondrial related gene expression. **RESULTS:** Blood O_2 saturation decreased with increasing simulated altitude during recovery (0 m: $98 \pm 1\%$; 1667 m: $94 \pm 1\%$; 3333 m: $90 \pm 1\%$; 5000 m: $79 \pm 2\%$; $p < 0.05$). Expression of PGC-1 α , HK, and SOD increased significantly with exercise ($p < 0.05$), but were not different between trials. There was a tendency for expression of HIF-2 α to increase with exercise, although this did not reach statistical significance ($p = 0.089$). **CONCLUSION:** These data demonstrate no dose-response relationship between magnitude of hypoxic exposure and mitochondrial gene expression. Therefore, the paradox of mitochondrial function in response to acute and chronic exposure to hypoxia cannot be explained by the magnitude of hypoxia.

CHUN-KAI HUANG

Graduate: Doctoral

Title: Effects of Visual Perception of Self-Motion on Gait in People with Diabetes

Major: Biomechanics/Physical Therapy

Faculty Advisor: Ka-Chun Siu

Co-Authors: Pariwat Thaisetthawatkul, Vijay Shivaswamy, Ka-Chun Siu

The reliance on visual perception is crucial in diabetes mellitus (DM) population who bear higher probability of suffering from somatosensory deficits that attenuates their sensory input and causes falls. The visual perception of self-motion during locomotion has been shown being adopted to maintain dynamic stability in healthy subjects. The aim of this study was to investigate the effect of self-motion that was perceived by people with DM and age-matched healthy control on gait alteration during locomotion. We recruited three chronic DM and three age-matched healthy controls to walk on a treadmill with their self-selective pace under two different conditions: with and without a virtual corridor that moves toward the subjects. The 3D spatiotemporal gait characteristics were measured using NDI motion capture system. We compared the group effect and the effect of visual perception on gait characteristics (step length, step width, step time) and the variations using two-way ANOVA with repeated measure. As result, DM showed significantly decreased step length compared to healthy; in addition, DM decreased step width more than those in control group under the virtual condition. We conclude that visual perception of self-motion plays a prominent role on gait adjustment/alteration in DM during treadmill walking. Virtual environment could be useful for DM to adopt their walking strategy which is safe to prevent from future incidence of falls.

MICHELLE C. HUFFMAN

Graduate: Doctoral

The Role of CRF-R2 in Alloparental Care in Mongolian Gerbils

Major: Psychology (Neuroscience and Behavior)

Faculty Advisor: Jeff French

Co-Author: Andrew K. Birnie

The hypothalamic-pituitary-adrenal (HPA) axis regulates stress response and has been implicated in several social behaviors, including parental care. Within the HPA axis, the corticotropin-releasing factor receptor 2 (CRF-R2) has previously been shown to be anxiolytic and may mediate the anxiogenic effects of CRF-R1. Reduced anxiety, in turn, has been associated with increased parental behaviors. However, little research exists regarding alloparental care and the HPA axis. We examined the role of CRF-R2 in alloparental care in Mongolian gerbils, a cooperatively breeding species that provide alloparental care to offspring, using two peptides that selectively bind with CRF-R2, Urocortin II (CRF-R2 agonist) and Astressin2B (a CRF-R2 antagonist). On the day of testing, subjects received a single intraperitoneal injection of either a sterile saline or water vehicle, one of three Urocortin II dosages (3 ug/kg, 30 ug/kg, 100 ug/kg), or one of three Astressin2B dosages (3 µg/kg, 30 µg/kg, 100 µg/kg). Adults were exposed to unfamiliar pups in ten minute trials. Direct and indirect caregiving behaviors were recorded, including grooming, huddling, latency to approach, and time in pup cage. Preliminary analyses indicate that Urocortin II and Astressin 2B differentially influence both direct and indirect alloparental behaviors compared with vehicle and these effects appear to be dose-dependent. Additionally, the frequency and duration of alloparental behaviors appears to be influenced by sex and previous experience caring for younger sibling pups compared with animals without such experience. The preliminary analyses indicate that CRF-R2 mediates alloparental care, possibly by influencing anxiety levels towards the pups.

CHRISTIAN L. JANOUSEK

Graduate: Doctoral

Examining differences in local government management among U.S. states: A regional analysis of MPA programs and professionalism

Major: Public Administration

Faculty Advisor: Robert Blair

According to the literature, the differences in the institutionalization of professionalism in local government management observed among the U.S. states may be attributed to various formative factors. Given the prominence of the Master of Public Administration/Affairs (MPA) degree in the local government profession, the purpose of this study is to assess the impact of municipal proximity to a university-based MPA program on the nature and/or occurrence of professional local government management in regional U.S. states. Utilizing an Ordinary Least Squares (OLS) multiple regression analysis, the estimated effect of municipal proximity to a university-based MPA program on local government professionalism was evaluated while holding constant other control variables determined to be associated with professional local government management. In addition, comparative analysis involved categorization and description of the nature and contribution to professionalism in local government management of university-based MPA programs. The region of interest included the seven U.S. states of the West North Central Midwest: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota. The findings suggest that an increase in the distance of a municipality from a university-based MPA program within the state and region is negatively associated with local government professionalism. Despite dissimilarities among the regional MPA degree programs, the results corroborate the proposition that university-based MPA programs may contribute to professional public administration within a geographic sphere of influence. This leads to the conclusion that the accessibility and dispersion of university-based MPA programs within a state may affect the nature and/or occurrence of professional local government management.

MICHAEL JOHNSON

Graduate: Doctoral

White and Black Hat Hackers: Re-evaluating the "Hacker" Community and Ethic

Major: Criminology/Criminal Justice

Faculty Advisor: Samantha Clinkinbeard

The term "hacker" has undergone a transformation over the past two decades. While the term held a positive connotation at inception, the prevalence of hackers in movies, news and other media has resulted in a shift towards notoriety. Yet, hackers claim to belong to a community with a clearly defined ethic. The hacker ethic emphasizes free access to and exchanging of knowledge and information, and resists malicious intrusion or theft or intellectual property. Within the hacker community, those who disregard this hacker ethic are supposedly shunned and labeled

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"black hat hackers." This study seeks to evaluate how the hacker ethic has evolved and the divide between white and black hat hackers blurred. Data was collected through secondary interview analysis of interviews collected from a variety of sources online, and through interviews conducted with current and former self-proclaimed "hackers." The study used a grounded theory approach to examine hacker mentalities and motivations, and how hackers differentiate themselves from their malicious counterparts.

CLAYTON B. JUAREZ

Graduate: Doctoral

Role Expansion and Role Conflict among Employed Arab Israeli Women

Major: Industrial/Organizational Psychology

Faculty Advisor: Wayne Harrison

Co-Authors: Carey Ryan, Randa Abbas, Sherri Pataki

Holding multiple roles is generally considered beneficial for psychological and physical health among women (and men) partly because of greater opportunities for success and meaning in life; however, multiple roles can also result in distress and dissatisfaction, particularly in contexts where a traditional gender-role ideology is strong. We examined perceptions of role expansion and role conflict among Arab women in Israel (N=287; M age = 39 years, SD=8.9)—a group whose entry into employment and professional careers has been relatively recent. Most participants (91%) were married and nearly three-quarters (74%) had from two to four children (89% had at least one child). Participants completed a questionnaire that included measures of the extent to which careers and motherhood facilitated or conflicted with their career, motherhood, and community roles; perceived stress; and general satisfaction. Results indicated that participants perceived greater role expansion than conflict—especially for career (vs. motherhood) roles. Further, career expansion was associated with greater satisfaction, whereas motherhood was generally associated with greater stress. These relationships held when the other types of role facilitation and conflict were controlled.

VICTORIA KENNEL

Graduate: Doctoral

Innovations in Rural Health Care: "CAPTURE"ing the Challenges and Successes of Implementing Interprofessional Fall Risk Reduction Programs in Nebraska's Critical Access Hospitals

Major: Industrial/Organizational Psychology

Faculty Advisor: Roni Reiter-Palmon

Co-Authors: Katherine Jones, Anne Skinner, Dawn Venema, Roni Reiter-Palmon, Regina Nailon

Patient falls are a common, costly, and serious adverse event in all hospitals. Compared to larger urban hospitals, smaller and more rural Critical Access Hospitals (CAHs) tend to serve higher proportions of older adults at risk for falls and have higher fall injury rates. Yet, CAHs lack many of the incentives and resources present in larger hospitals to adequately attend to falls as a patient safety risk. To address this patient safety risk, we partnered with 17 of Nebraska's CAHs to implement an innovative patient safety program called *Collaborative and Proactive Teamwork Used to Reduce (CAPTURE) Falls*. The CAPTURE Falls program moves beyond the traditional paradigm of fall prevention by establishing collaborative interprofessional fall risk reduction teams who coordinate fall prevention processes and assume accountability for the hospital's fall risk reduction program and outcomes. Through the CAPTURE Falls program, CAHs are working to establish a culture of safety and collaborative teamwork, and to utilize action planning and sensemaking to overcome barriers and implement evidence based practices to support fall risk reduction. We will share the challenges and successes faced by CAHs in implementing sustainable patient safety programs and provide a model for addressing the unique challenges in implementing innovations in small rural hospitals.

WENDY LOEWENSTEIN

Graduate: Doctoral

Breaking Down Barriers: The Impact of Access to iPads and Scaffolded Instruction in a Graduate Teacher Education Course

Major: Educational Administration

Faculty Advisor: Rebecca Pasco

Mobile devices are not being utilized to their full potential in P-12 education. In response to this phenomenon, researchers have identified various barriers that prevent educators from creating effective mobile learning

environments, such as resources, attitudes, and beliefs (Ertmer, 1999; Hew & Brush, 2007). How can higher education, teacher education programs help P-12 educators breakdown these barriers to create powerful 21st Century, learner-centered classrooms? This brief paper will describe a survey research study at a Midwestern University that has addressed these mobile learning barriers with graduate teacher education candidates (GTEC).

ROBERT LYTLE

Graduate: Doctoral

Variation in the Content of Sex Offender Registration Laws: The Role of State-Level Context

Major: Criminology/Criminal Justice

Faculty Advisor: Lisa Sample

If sex offender laws are legislative responses to nationwide sex crime panics, as is widely described in the existing literature, one would infer that sex offender laws across states would be passed at similar times. However, recent research has observed significant temporal variation in the creation and revision of sex offender laws across the United States. Using legislative histories of SORCN statutes from several US states, this study explored variation in the timing of the passage of SORCN both across and within states using a thematic content analysis. This information may provide a better understanding of legislative responses to moral panic and criminal justice policy making more generally.

LOUIS J. MARTIN

Graduate: Doctoral

Neonatal Chorda Tympani Transection Reduces NaCl Responses in the Glossopharyngeal Nerve of the Adult Rat

Major: Neuroscience

Faculty Advisor: Suzanne Sollars

Co-Author: Suzanne Sollars

Injury to the peripheral taste system of the rat produces more severe changes to the system if the damage occurs during development. Transecting – or cutting – the chorda tympani (CT) nerve (which relays taste information from the anterior tongue to the brain) leads to several structural, functional, and behavioral differences in the taste system. In adult rats, these changes are short-lived; the CT regenerates in about 45 days, and an almost complete recovery is observed. When CT transection (CTX) occurs in neonatal (or pre-weaning) rats, the CT fails to regenerate and consequently, injury-induced changes are permanent. Interestingly, neonatal, but not adult CTX leads to an abnormal preference for ammonium chloride (NH₄Cl) – a salt that intact rats never prefer. In order to determine if changes in taste nerve functioning could account for this NH₄Cl preference, whole-nerve electrophysiology was performed on another taste nerve - the glossopharyngeal (GL). Rats either received neonatal CTX or a control surgery, and at least 50 days later, GL responses to taste stimuli were recorded. GL activity following NaCl stimulation was lower in rats receiving CTX compared to controls. This result suggests that the way NaCl is detected and converted into a neural code is altered after early injury to the CT. No changes in nerve response to NH₄Cl stimulation were found, indicating that altered GL activity is not responsible for creating a preference for that stimulus. Work is currently underway to determine the mechanism responsible for altering GL functioning after neonatal CTX.

SCOTT MCGRATH

Graduate: Doctoral

How Personal should Personal Genomics be? A study of the direct to consumer market for genetic testing and the need for an honest broker.

Major: Bioinformatics

Faculty Advisor: Kiran Bastola

The consumer market place to allow the public to purchase genetic tests emerged in 2006. Companies, known as Direct-To-Consumer (DTC) genetic testing, marketed their test online, allowing customers to buy genetic tests. Would removing the supervision of medical professionals have an impact on the customer's ability to properly comprehend his or her results? Customers of the DTC company 23andMe were invited to participate in a 27 question online survey. 122 subjects who met inclusion criteria completed the survey. Compared to United States national averages the population sampled was younger (mean age = 34.26), held a higher level of education (38.5% held master's degrees or higher), and earned above the national median income (> \$90,000 per year). Most had purchased their 23andMe test to find out more about medical conditions (53.3%), but very few shared their results with medical professionals (10.7%). In the survey, the customers were asked to interpret the results of two mock test cases, where results were translated into disease probability for an individual compared to the public. When asked to evaluate risk, 72.1% correctly assessed the first case and 77% were correct on the second case. Since there is a

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chance these test results can lead to medical or lifestyle changes, involving an honest broker, or a 3rd party medical professional, would help to reduce cases of poorly interpreted results from DTC companies by their customers.

SCOTT MCGRATH

Graduate: Doctoral
Re-envisioning the STATPack
Major: Bioinformatics
Faculty Advisor: Ann Fruhling

Rural areas in the United States have been increasingly underserved due to a shortage of doctors electing to set up new practices in these areas. STATPack (Secure Telecommunications Application Terminal Package) was built to help address some of the diagnostic limitations in these underserved areas. STATPack enables secure remote communication and diagnosis of microbial infections. The system includes both macroscopic and microscope imaging capabilities, to enable diagnosis of a variety of pathogens. These same limitations of medical access face NASA astronauts. It isn't possible or practical to provide astronauts a full wet lab traditionally used for diagnostics work. In this project we evaluated methods for adapting the STATPack system for use in spaceflight and for diagnostic purposes on extended trips, such as a mission to Mars. A review of the literature was performed to investigate the current state of telemedicine in space. That information was used in building the foundation of our case for two NASA grants, Human Exploration Research Opportunities (HERO) and Experimental Program to Stimulate Competitive Research (EPSCoR). Both grants target the need to address medical issues astronauts may encounter during missions. A plan was developed for methods to miniaturize the STATPack system, explore ways to add wireless components, and adapt its control to a tablet interface.

AARYN MUSTOE

Graduate: Doctoral
Marmosets' response to inequity following manipulation of the oxytocin system
Major: Psychology—Neuroscience and Behavior
Faculty Advisor: Jeffrey French

One of the foremost properties of human cooperation is the egalitarian sharing of resources when, for example, one prefers to share resources in a way that provides neither an advantageous nor a disadvantageous outcome to themselves or others. This preference is known as *inequity aversion*. Recent attention has focused on the extent and context for which nonhuman primates respond to inequitable outcomes. Because primates exhibit diverse social structures and cognitive abilities, studying responses to inequity across many species will help elucidate functions and contexts for which inequity aversion may have evolved. Potential neuroendocrine mechanisms for inequity aversion in nonhuman primates have also yet to be explored. Across mammals, oxytocin is an important neuropeptide in the regulation and monitoring of social affiliation, social cognition, and interpretation of social signals. Consequently, oxytocin emerges as a leading candidate for a central neuroendocrine mechanism underlying cooperative behaviors like inequity aversion. In this study, we examined how oxytocin agonists and antagonists influence food sharing and social behavior in opposite-sex marmoset dyads. Experiments assessed marmoset's social behavior and provisioning of food in equitable and inequitable outcomes to themselves, their long-term partner, or opposite-sex strangers, and by administering oxytocin agonists, antagonists, and controls, we were able to examine whether oxytocin would influence the propensity to share food with others in cases of both equity and inequity. The results suggest that marmosets are not sensitive to inequity aversion in general, but food sharing and social behavior are influenced by social context (partner type and presence) and oxytocin treatment.

CUONG NGUYEN

Graduate: Doctoral
Engaging Online Citizens in Civic Works-A Flow Theory Based Approach
Major: Information Technology
Faculty Advisor: Gert Jan de Vreede
Co-Authors: Onook Oh, Abdulrahman Alothaim, Triparna de Vreede, Gert Jan de Vreede

Online collaborative problem solving (OCPS) refers to the use of social web technologies to garner netizens' collective effort for problem solving and innovation tasks. The model has enabled government agencies to involve citizens in civic works at large scale. However, success of this kind of initiatives depends much on, among other things, user engagement, or the quality of effort online users devote to OCPS activities that contribute directly to

desired outcomes. We argue that an important influence on user engagement in OCPS events is their experience when participating in the events. We further argue that Flow Theory by Csikszentmihalyi and Csikszentmihalyi (1988) provides much insight on how to improve this experience. In addition, we propose to measure the psychological construct "flow" through a novel physiological-psychometric approach. We validate our hypotheses in a lab experiment.

JAY PEDERSON

Graduate: Doctoral
Human Mitochondrial Proteome Differences at the Tissue Level
Major: Bioinformatics
Faculty Advisor: Dhundy Bastola

Mitochondria are organelles in all human cells which provide energy for cellular activities. They are known as the powerhouse of the cell. Dysfunction in mitochondria is linked to neurodegenerative diseases such as Alzheimer's. We do not have perfect knowledge of the workings of mitochondria. The most respected resource of human protein knowledge lists approximately one thousand proteins as being human mitochondrial proteins. The best estimates of the actual number of proteins in human mitochondria are approximately twelve hundred to fifteen hundred. Thus there is a significant gap in knowledge of the proteins. There is evidence that even with the known human mitochondrial proteins, that there is variance at the tissue level. An experiment was conducted in 2003 examining the protein content in twelve healthy human tissues, and publically available results. These results were examined with specific filtering for mitochondrial proteins in the tissues. Preliminary results show that approximately six hundred mitochondrial proteins were found in all tissues. However, another four hundred proteins were found in only subsets of the twelve tissues, and some proteins were found only in specific tissues. Research is being conducted to characterize these tissue-specific differences, and to relate them to the function of the tissues that they are found in. A metabolic pathway analysis of the proteins is also in progress.

ALICIA PHILLIPS BUTTNER

Graduate: Doctoral
Does the human stress response to competitive loss influence dogs' cortisol concentration?
Major: Psychology
Faculty Advisor: Rosemary Strasser
Co-Authors: Ryan Placzek, Breanna Thompson

Hormones play an important role in social behavior. For example, cortisol triggers the mobilization of resources in response to stressors (e.g., being chased by a predator), but also plays a role in stressful or arousing social interactions (e.g., meeting a new individual, participating in a competition). Dogs are extraordinarily perceptive to human social behaviors. Only one study up to this point has taken into account whether humans' hormonal changes are directly correlated with their dogs'. The aim of this study was to further explore the relationship between humans' and dogs' hormonal responses to competition. We assessed whether humans' cortisol responses to competition are reflected in their dogs' responses, and how humans' testosterone levels may have interacted to influence this relationship. We collected data from 59 handler/dog agility teams during dog agility competitions in the Midwest. Saliva samples were taken from the dog and handler before and after a run and were later assayed for cortisol and testosterone levels. Handler-dog interactions following the competition were observed for affiliative and punitive behaviors. Participants were also given questionnaires to complete containing questions pertaining to their dog and competition-related questions. The results of this study will be presented.

DANA L. RADATZ

Graduate: Doctoral
Polyvictimization and internalizing behaviors among adult women.
Major: Criminology and Criminal Justice
Faculty Advisor: Emily Wright

Although current studies on female victimization have focused on the prevalence of several forms of violence, including separate measures of child abuse and intimate partner violence, little research has examined the extent of polyvictimization (e.g., multiple victimizations) among adult women. In this study, we use data from life histories of 424 women to examine the extent to which women are exposed to multiple forms of victimization, including child abuse, intimate partner violence, sexual assault, and traumatic life events. Additionally, we will examine the effects of the separate types of victimization on women's health-related outcomes (e.g., self injury, drug/alcohol use) as well as the effects of the accumulation of various forms of victimization on such outcomes. Lastly, we will examine whether

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the types, prevalence rates, and effects of victimization are significantly different between the subsamples of incarcerated and non-incarcerated women.

TROY RAND

Graduate: Doctoral

The Strength of long-range correlations of postural sway is greater in older fallers than non-fallers.

Major: Exercise Science

Faculty Advisor: Mukul Mukherjee

Falling is a major concern and results from an inability to maintain postural control during daily activities. The ability to maintain the center of pressure (COP) within the base of support during standing is a reflection of postural control. Mediolateral COP has been used to predict falls.¹ However, the temporal structure of mediolateral COP in older fallers compared to non-fallers remains largely unknown. The temporal structure of biological signals has been used to characterize the dynamics of human movement.² It has been suggested that an optimal temporal structure of human movement variability exists that permits the maintenance of a desired movement pattern while still allowing the system the adaptability needed to interact optimally with a dynamic environment. This research used Detrended Fluctuation Analysis (DFA) to measure the long-range correlations in standing posture; DFA α -values provide a measure of the temporal correlations. Three groups were analyzed; young non-fallers ($n = 9$), older non-fallers ($n = 10$), and older fallers ($n = 5$). Participants stood on a force platform while center of pressure was recorded in three conditions, normal standing, absent vision, and faulty vision. The results demonstrated stronger long-range correlations in older fallers ($\alpha = 1.29$) when compared to the older non-fallers ($\alpha = 1.06$; $P = .009$) and young non-fallers ($\alpha = 0.95$; $P < .001$). Stronger long-range correlations demonstrate a more rigid and constrained mediolateral postural sway. This indicates a lowering of the flexibility and adaptability necessary for older fallers to interact with a dynamic environment without falling.

TRISHA RHODES

Graduate: Doctoral

Police Officers and School Settings: Examining the Influence of the School Environment on Officer Roles and Job Satisfaction

Major: Criminology and Criminal Justice

Faculty Advisor: Samantha Clinkinbeard

Despite growing numbers of school police personnel, little research has examined how school environments influence officers assigned to school resource officer (SRO) programs. This study explored officers' perceptions of their roles and job satisfaction. Fifty-two SROs from a statewide Midwestern region were matched to 328 patrol officers at a Midwestern agency. Findings revealed, compared to patrol officers, SROs performed fewer order maintenance tasks, reported lower levels of role conflict, and were more satisfied along one dimension of job satisfaction. Results supported the link between role perceptions and job satisfaction, suggesting officers in a specialized position were protected from sources of role conflict, which poses implications for improving the job performance and wellbeing of officers.

OLIMPIYA SAHA

Graduate: Doctoral

Robot Navigation in Initially Unknown Environments using Manifold Alignment

Major: Computer Science

Faculty Advisor: Raj Dasgupta

Co-Author: Raj Dasgupta

We consider the problem of robot path planning in initially unknown environments using machine learning techniques. Previous research on this topic abstracts the similarity between navigation tasks in terms of a reward received by the robot and prescribes techniques to select the robot's actions based on a policy that is learned through reusing previous policies. However, such techniques are susceptible to the geometry of environment features (e.g., obstacles), and do not 'transfer' well to new, different environments or domains. To address this problem, we propose a new algorithm based on the concept of manifold alignment from text mining. Robots first build a library of significant environment features from a source domain. Then, while navigating in a target domain they dynamically learn a mapping function between features across the two domains and use it to map features perceived

in the target domain back to the source domain, and, probabilistically prescribe a commensurate action from the source domain. In order to verify the proposed technique, we have tested it in different indoor environments constructed in a test arena using a single Corobot robot.

DANIELLE C. SLAKOFF

Graduate: Doctoral

Newsworthiness and the "Missing White Woman Syndrome"

Major: Criminology and Criminal Justice

Faculty Advisor: Pauline Brennan

Co-Authors: Hank Fradella, Ryan Fischer

A scan of online news articles reveals a consistent trend: Missing White women and children are more likely to garner media attention than missing minority women. The glorification of missing White women and children has been dubbed "missing White woman syndrome." This qualitative content analysis of online and traditional print journalism articles examines the differences in how the national media outlets portray missing White women compared to missing minority women. Triangulated analyses validate the existence of the "syndrome" and explore the nuances of ways in which missing girls and women are portrayed in print media. The implications for theory and professional practice in both journalism and criminal justice, as well as those for justice policy, are discussed.

KARYN A. SPORER

Graduate: Doctoral

Mental Health and Violence in the Family: An Integrated Theory

Major: Criminology and Criminal Justice

Faculty Advisor: Pete Simi

Little is known about the unique victimization experience among the parents and siblings of a violent and mentally ill family member. Although victimization research provides substantial insight, most of the familial violence research is in the scope of child abuse and neglect, interpersonal violence, and spousal abuse. Also, the modern theoretical explanations of victimization (e.g., cultural trappings and cultural norms of violence, victim precipitation, and routine activities) do not address the victimization experience within the family, specifically for the siblings and parents of a mentally ill family member. Likewise, the typologies and classification systems used in victimization theory do not address the unique needs of these family members. Drawing upon Tittle's (1995) theory integration techniques and family systems theory, the present study will formulate a theory of family victimization in which the central premise is that the victimization experience is different for victims when the offender is a mentally ill family member. The research is guided by the following questions: What type of social-psychological strategies do individuals develop to cope with a violent and mentally ill relative? More specifically, how do parents and siblings process the experience of victimization?

NARGESS TAHMASBI

Doctoral Student

An Exploratory Analysis of the Evolution of Information Diffusion Pattern in Twitter Networks

Major: Information Technology

Faculty Advisor: Lotfollah Najjar

In this study we use the concept of power law distribution to explore and analyze the network evolution of two real-life social networks formed around two contexts. Power law in simple words is a property of a network which states that only a tiny fraction of individual users are responsible for a majority of content produced in the network. Our social movement network is a Twitter network of users contributing in online social movement in Egypt 2011 uprising. The other dataset is an extreme event network, which is the Twitter network formed around Boston Bombing 2013 incident. The essence of these two networks are different as the former is a long-term event in social/political context, while the latter is an unpredictable short term-event with the purpose of responding to an emergency situation. We explore the network structure and the pattern of information diffusion during time in the two networks. The number of total retweets a user gets from other users is the degree of the node representing the user in the network. For both networks we analyzed the retweet pattern by extracting the Tweet message content and identifying whether it's a retweet post or an original message. Our results show that although both networks follow a power law degree distribution, the distribution is more heavy-tailed with factor of 10 in the Egypt social movement network; and the extreme event network is more distributed. The results will follow a discussion and theory-supported explanations of the results.

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AMY WALZER

Graduate: Doctoral

Playing Favorites: The Effect of Gender on Assigned Goals

Major: Psychology

Faculty Advisor: Carey Ryan

Co-Author: Carey Ryan

Considerable research indicates that setting high, specific goals results in better performance (Locke & Latham, 2002). Although scholars have examined factors that affect the level at which these goals are set, most of this work has examined factors that affect self-set goals (e.g., self-efficacy; Bandura, 2012). Little is known about the factors that affect assigned goals although managers often assign goals to their subordinates in an effort to motivate them. Assigned goals are likely, at least in part, based on the goal setter's expectations for the goal target's ability. These expectations may come from a variety of sources, including the stereotype-based expectations people hold for certain groups. Accordingly, this study examined whether gender-related competence stereotypes affect the goals people set for female versus male targets on a work-related task. Male ($n=321$) and female ($n=264$) participants with sales experience read a scenario about a male or female target in a workplace sales situation and then completed a measure of the target's sales ability and set performance and learning goals for the target. Participants also completed a measure of modern sexism. The results indicated that, as expected, the male target was perceived to be more competent than was the female target. This relationship was not moderated by participant sexism. Additionally, participants assigned higher goals to the male (vs. female) target. This effect was moderated by goal type such that it was stronger for the performance goal than for the learning goal. Implications for gender differences in workplace performance are discussed.

JULIA WARNKE

Graduate: Doctoral

A novel multilayer graph model for building smart assemblers and efficiently extracting information from next generation sequencing reads

Major: Pathology and Microbiology/Bioinformatics

Faculty Advisor: Hesham Ali

Co-Author: Hesham Ali

The rapid advancement of Next Generation Sequencing (NGS) technologies has inspired the development of numerous read assembly and analysis tools. A wide variety of assemblers and read analysis tools rely on an overlap graph as their foundational model. However, a single graph modeling approach can only capture one view of the read overlap relationships in a NGS dataset and most current graph-based assembly and analysis tools model only localized overlap relationships between individual reads. This fine-grained approach may also miss global relationships between subsets of reads in the dataset such as repeats or shared regions between multiple genomes in metagenomics applications. To address these issues, we have developed a graph theoretic modeling approach that is able to capture multiple snapshots of local and global read relationships across a spectrum of granularity. Unlike previous methods that rely on a single graph model, the proposed approach constructs a series of graphs that can model the reads from localized relationships between individual reads to global relationships between subsets of reads within the dataset. Using the multilayer model, we developed data analysis algorithms that integrate various graphs in the spectrum to capture different types of relationships among the input reads and efficiently extract useful information that can be used for recognition and classification purposes. The implementation of this approach in High Performance Computing (HPC) environments will provide a robust graph-modeling platform for domain-specific, flexible assembly tactics resulting in improved assembly and analytics tools that are scalable to the increasing demands of biomedical researchers.

BENJAMIN WIGERT

Graduate: Doctoral

Decision Processes and Creativity

Major: Industrial/Organizational Psychology

Faculty Advisor: Roni Reiter-Palmon

Co-Author: Roni Reiter-Palmon

Previous research examining problem construction and creativity focused narrowly on the divergent thinking sub-process of problem construction. However, convergent thinking undeniably occurs during problem construction and

its influence on creative problem solving has gone largely under-studied. To examine the unique and cumulative effects of divergent and convergent problem construction processes on creative decision making, an experimental study was conducted in which participants were assigned to one of five conditions and asked to creatively solve an ill-defined story problem. The first four conditions were based on a 2 (divergent thinking method A vs. divergent thinking method B) x 2 (convergent thinking vs. no convergent thinking) design, with the fifth condition acting as control condition that asked participants to creatively solve the problem without any mention of problem construction.

Results of the study indicated that after controlling for general intelligence, divergent thinking ability, convergent thinking ability, self-efficacy, and task interest, the type of instructions used to initiate divergent thinking during problem construction did not influence participants' creativity. However, participants instructed to engage in convergent thinking during problem construction generated more creative solutions than those who were not instructed to engage in convergent thinking. Thus, the current study suggests that the method by which problem construction is initiated is less important than ensuring one intentionally converges on the elements of the problem that are most salient to generating a creative solution.

JIE XIONG

Graduate: Doctoral

The Role of Human Capital in Information and Communication Technology Adoption for Development: Evidence from China

Major: Information Technology

Faculty Advisor: Sajda Qureshi

Co-Author: Lotfollah Najjar

Emerging economies, in particular China, are powering growth in Asia. While China is seen to lead growth in the emerging markets of Asia, 98% of its manufacturing and production base is powered by small businesses. These businesses represent the majority of all businesses in emerging countries and the growth of these businesses increases with their successful adoption of Information Technology. This paper uses a well-known model in Information Systems Adoption to analyze ICT usage, the effect ICT usage and human capital in the development of the small businesses in China. The reason this model is used is to find out which variables, if any, hold in the case of small businesses in China. As very little research has been done in the IS literature of ICT adoption in small businesses in China, this paper adds to what is known about the role of human capital in ICT adoption for development in China. This paper makes a contribution to the IS acceptance and global development literature by providing concepts that enable IS researchers to study ICT adoption in China. Based on the UTAUT model, a survey was designed and data was collected from 118 small business in China. In this paper a set of variables from the IS literature have been identified that would enable this research question to be answered: *What factors affect the adoption of ICT by small businesses in China?* This paper makes a contribution to the IS adoption literature by investigating ICT adoption in a unique context: that of small businesses in China. The analysis shows that the higher the investment in ICT, the greater the usage of ICT will lead to greater profit, hence development of small businesses in China. This addresses the gap in the literature requiring research between the relationship between ICT and the development of small businesses and adds to the literature on IT adoption.

XIAODAN YU

Graduate: Doctoral

Understanding the interplay between the adaptive use of IT capabilities and shared mental models in virtual teams

Major: Information Technology

Faculty Advisor: Deepak Khazanchi

Co-Author: Deepak Khazanchi

Virtual teams (VT) consist of people who rely on information technology (IT) capabilities to interact and work from different geographic locations to accomplish explicit team goals. The virtual team has become an important building block in organizations to achieve innovative collaborations. However, virtual teams continue to present many challenges. Developing shared mental models (SMM), which are team members' shared understanding about key elements of the team's environment, is one of the most significant challenges facing virtual teams. Despite the critical importance of IT in virtual teams, no study has empirically examined how virtual teams' adaptive use of IT capabilities will influence the development of SMM in virtual teams. Drawing on theories from shared mental models and technology use research, this study examines the interplay between the adaptive use of IT capabilities (AUITC) and the development of shared mental models in virtual teams by developing a conceptual model. Three research propositions derived from this model are empirically validated using multiple longitudinal case studies within an educational setting. The results suggest that the degree to which virtual teams' shared mental models converge is

affected by the three dimensions of IT capabilities adaptive use: inclusiveness, usage experience, and fit. The findings suggest that managers of virtual teams should 1) encourage teams' inclusive use of IT capabilities, 2) build an open and innovative culture, 3) choose knowledgeable, proactive, and responsible team leaders, 4) introduce technologies to support VTs that are compatible across heterogeneous platforms, and 5) set up clear team expectations about IT capabilities.



POST-DOCTORAL FELLOWS' ABSTRACTS

JOSÉ BACA

Post-Doctoral Fellow

Distributed Coordination Strategy for Locomotion in the ModRED Modular Robot: Mapping the Leader

Major: Computer Science

Faculty Advisor: Raj Dasgupta

Co-Authors: Bradley Woosley, Raj Dasgupta, Ayan Dutta, Carl Nelson

We consider the problem of locomotion in a chain-type modular self-reconfigurable robot (MSR) called ModRED. An important aspect of successful locomotion in MSRs is to be able to autonomously coordinate the movement of each of the modules so that the robot can move in the desired direction and with the desired velocity. We consider the locomotion problem in a distributed setting where multiple MSRs can be within the communication range of each other and modules do not have a priori information about other modules that belong to the same MSR as themselves. Synchronizing the movement of modules in such a distributed setting becomes a challenging problem because of the limited perception and computation resources available on each module. To address these problems, in this paper, we propose a novel algorithm that first uses a combination of infra-red and wireless communication signals to enable each module to autonomously determine the set of modules that belong to the same MSR as itself. The algorithm then uses a distributed leader election strategy to identify the MSR's leader, which thereafter coordinates the motion of the modules in its configuration according to the desired locomotion.

We have verified the performance of our algorithm using an accurately simulated model of the ModRED within the Webots simulator and shown that our algorithm can successfully determine the set of connected modules, elect a leader for each configuration and coordinate the locomotion of MSRs for different numbers of modules.

KAUSHIK DAS

Post-Doctoral Fellow

Multi-robot allocation with Dynamically Arriving Alarms

Major: Computer Science

Faculty Advisor: Prithviraj Dasgupta

We consider the problem of patrolling by a set of autonomous robots that are divided into teams; each team performing coverage within a specific region (cluster) of the environment. Within this setting, we consider a scenario where alarms go off in certain regions indicating a request for allocating additional robots in those regions by reallocating them from regions without alarms, to continue performing the patrolling task efficiently. This robot reallocation problem is non-trivial and is known to be NP-hard. In this work, we propose a stochastic allocation scheme for the robots for patrolling a region based on polynomial stochastic hybrid dynamical equations. We propose two types of controllers - a decision controller that allows the robot to determine the time for which to continue navigating within a cluster and a navigation controller to control the robot's motion while transitioning from one region to another. We will present experimental results that verify the successful operation of the proposed algorithm with simulated and physical robots.



Published November 2014

by the Office of Research and Creative Activity

at the University of Nebraska at Omaha

Graphic Design by Amanda Overgaard

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