7TH ANNUAL

STUDENT

2015

# RESEARCH AND CREATIVE ACTIVITY FAIR

# FINAL PROCEEDINGS

March 6, 2015

University of Nebraska Omaha

UNIVERSITY OF NEBRASKA AT OMAHA

# 7TH ANNUAL STUDENT RESEARCH AND CREATIVE ACTIVITY FAIR

## TABLE OF CONTENTS



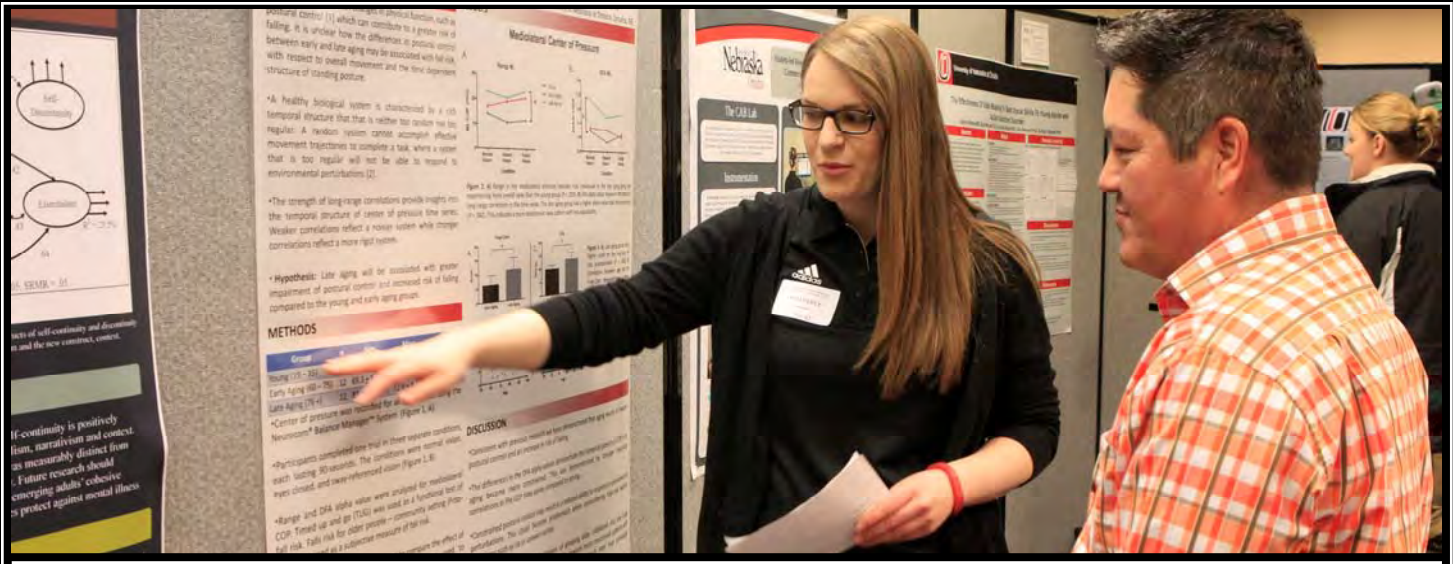
## AT A GLANCE:

- 226 projects
- 91 undergraduate students
- 129 graduate students
- 3 post-doctoral fellows
- participation from all 6 UNO colleges
- 115 faculty advisors

*The Student Research and Creative Activity Fair is administered by the Office of Research and Creative Activity at the University of Nebraska at Omaha and was made possible through the generous support of the Dr. C.C. and Mabel L. Criss Library.*

# SCHEDULE OF EVENTS

| | |
|---|---|
| 9:00am – 10:30am: | Oral Session 1 |
| 9:00am – 10:30am: | Poster Session 1 |
| 10:30am - 11:00am: | Coffee Break |
| 10:45am – 12:00pm: | Oral Session 2 |
| 11:00am – 12:30pm: | Poster Session 2 |
| 11:30am - 1:30 pm: | Lunch at CEC Building |
| 1:00pm – 2:15pm: | Oral Session 3 |
| 2:00pm – 3:30pm: | Poster Session 3 |
| 2:15pm— 2:30pm: | Coffee Break |
| 2:30pm – 4:00pm: | Oral Session 4 |
| 4:00pm: | Display Removal |




# FACULTY MODERATORS

| | |
|---|---|
| Timi Barone — | Sociology & Anthropology |
| Abby Bjornsen — | Counseling |
| Juan Casas — | Psychology & Office of Latino/Latin American Studies |
| Joshua Darr — | Chemistry |
| Raj Dasgupta — | Computer Science |
| Paul H. Davis — | Biology |
| Doug Derrick — | Interdisciplinary Informatics |
| Shari DeVeney — | Special Education |
| Tim Dickson — | Biology |
| Eugenio DiStefano— | Foreign Languages |
| Carol Ebdon — | Public Administration |
| Jeff French — | Psychology |
| Shari Hofschire — | Art & Art History |
| Jeanette Harder — | Social Work |
| Halla Kim — | Philosophy & Religion |
| Gina Ligon — | Marketing & Management |
| Harmon Maher — | Geography & Geology |
| Brian McKevitt — | Psychology |
| Sara A. Myers — | Health, Physical Education and Recreation & Biomechanics |
| Jody Neathery-Castro — | Political Science |
| Mark Pauley — | Interdisciplinary Informatics |
| Roni Reiter-Palmon — | Psychology |
| Marisol U. Rodriguez — | Nebraska Business Development Center |
| Lisa Scherer — | Psychology |
| Jeanne Surface — | Educational Leadership |
| Peter Szto — | Social Work |
| Jenna Yentes — | Health, Physical Education and Recreation & Biomechanics |

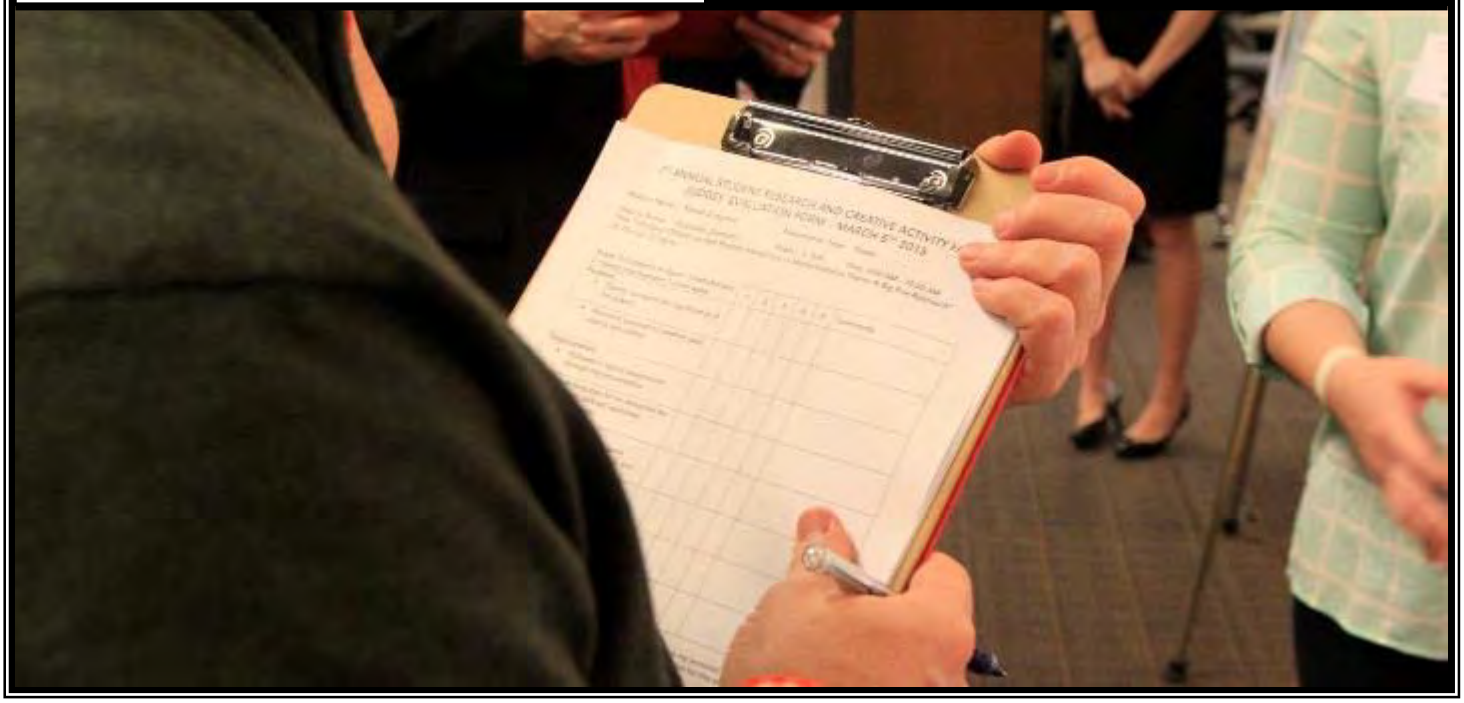
# 2015 COMMUNITY JUDGES

| | |
|---|---|
| Brian Allison — | Children's Hospital Home Healthcare |
| Jon Anderson, MBA, PhD — | Li-Cor Biosciences |
| Ellie Archer — | Community Volunteer |
| Sara Ausdemore — | First Data |
| Mike Bird — | University of Nebraska Foundation |
| Adam J. Case, PhD — | University of Nebraska Medical Center |
| Leandro Castro — | MultiMechanics |
| Barbee Davis — | Davis Consulting |
| Audrey DeFrank — | University of Nebraska at Omaha |
| Anthony Flott — | University of Nebraska at Omaha Alumni Association |
| Nina Graziano — | Habitat for Humanity of Omaha |
| Amy Haase — | RDG Planning and Design |
| Matt Hammons — | University of Nebraska |
| Traci Hancock — | University of Nebraska at Omaha Innovation Accelerator |
| Barbi Hayes — | Hayes Environmental LLC |
| Emilio Herrera — | Inclusive Communities |
| Darin L. Jensen — | Metropolitan Community College |
| Jolene Johnson — | University of Nebraska Medical Center –MMI |
| Melinda Kozel — | Kaneko-UNO Creativity Library |
| Jenny Kucera — | University of Nebraska Medical Center |
| Leslie Kuhnel — | CHI Health Ethics Center |
| Glenn Leatherwood — | Valmont Industries |

The Office of Research and Creative Activity thanks our judges for their time and assistance with the 7th Annual Student Research and Creative Activity Fair! Community representatives donated their time and experience to help evaluate the student presentations.

# 2015 COMMUNITY JUDGES

| | |
|---|---|
| Justin Lieth — | First Data |
| Maria Malnack — | University of Nebraska at Omaha Alumni Association |
| Susie McGuire — | Conservation Fusion |
| Tim McIvor — | Omaha Public Power District |
| Dr. Susie Melliger — | Millard Public Schools |
| Ken Moreano — | Scott Technology Center |
| Turner Morgan — | Habitat for Humanity of Omaha |
| Todd Morris — | PayPal |
| Rachel Olive — | Hunger Free Heartland |
| Paul Olson — | University of Nebraska - Lincoln |
| Andy Rikli — | Papillion-La Vista School District |
| Steven J. Schreiner, PhD — | University of Nebraska Medical Center UNeMed |
| Andy Simpson — | Farnham and Simpson Law |
| Marty Skomal — | Nebraska Arts Council |
| Nicholas Smith — | Boys Town National Research Hospital |
| Bill Snyder — | Peru State College |
| Chris Sommerich — | Humanities Nebraska |
| Mark Spadaro — | Dyna-Tech Aviation Services |
| Lisa St. Clair — | University of Nebraska Medical Center - MMI |
| Patrick C. Swanson, PhD — | Creighton University |
| Michelle Troxclair — | Nebraska Writers Collective |



# 2015 FAIR AWARDEES

## UNDERGRADUATE ORAL PRESENTATIONS

***Best*** **OLAJIDE COOPER**

"Effectiveness of Target Language Acquisition Methodology When used with Spanish Speaking Parents of Deaf Children"
Major: Elementary Education
Faculty Advisor: Julie Delkamiller

***Outstanding*** **CALEB CAVE**

"Detection of Mycoplasma in Human Cell Cultures Using Homology and PCR"
Major: Biology
Faculty Advisor: Paul Davis

***Meritorious*** **KATIE JUAREZ**

"Testing Novelty Synergistic Drug Combinations to Knock-out Toxoplasma gondii in Mice Brains"
Major: Biotechnology
Faculty Advisor: Paul Davis

***Honorable*** **JOSEPH CONRAD**

"Has the 'Everything But Arms' Initiative Led to an Increase in Trade from LDCs into the EU?"
Major: Economics
Faculty Advisor: Catherine Co

## UNDERGRADUATE POSTERS/EXHIBITS

***Best*** **MARJOLYN BROEK-TODD**

"From the Baroque Musical Period (1600-1750) to the Music Faculty of UNO (2015): Music Teachers Passing the Art of Piano Pedagogy Through the Generations"
Major: Music Performance
Faculty Advisor: Barry Ford

***Outstanding*** **BINA RANJIT**

"Spetin regulation in Candida albicans"
Major: Biotechnology
Faculty Advisor: Jill Blankenship

***Meritorious*** **NADIAH WAHBA**

"Short-Term and Cumulative Life Stress in Mature Zebra Finches Based on Rearing Condition: Responses and Influence on Sexually Selected Traits"
Major: Neuroscience
Faculty Advisor: Rose Strasser

***Honorable*** **BRANDON BISCHOFF**

"Manipulations of the style of locomotion affects both the kinesthetic and visual perception of distance traversed"
Major: Exercise Science
Faculty Advisor: Steven Harrison

# 2015 FAIR AWARDEES

## GRADUATE ORAL PRESENTATIONS

***Best*** **ABIGAIL STANGER**
"Investigation of the molecular target of an early lead anti-Toxoplasma compound"
Major: Biology
Faculty Advisor: Paul Davis

***Outstanding*** **LORA FRECKS**
"Citizen Engagement, collaborative Governance, and the Civic Hacking Group Social Movement in the United States"
Major: Public Administration
Faculty Advisor: Yu-Che Chen

***Meritorious*** **JON CAVANAUGH**
"Oxytocin and social buffering in marmosets"
Major: Psychology
Faculty Advisor: Jeff French

***Honorable*** **DANIELLE BAILEY**
"Diffusion of shame: Experiences of sex offender family support networks"
Major: Criminology and Criminal Justice
Faculty Advisor: Lisa Sample


## GRADUATE POSTERS/EXHIBITS

***Best*** **TAYLOR LA SALLE**
"Physiological demands of riding an electric-assist bicycle"
Major: Exercise Science
Faculty Advisor: Dustin Slivka

***Outstanding*** **TAYLOR GEHRINGER**
"Where do I fit in? Gender Differences and Barriers to Interest and Perceived Belonging in Science Careers"
Major: Psychology
Faculty Advisor: Carey Ryan

***Meritorious*** **SARAH GAUGHAN**
"Population Structure and Habitat Use of Macrhybopsis Chubs in the Missouri River"
Major: Biology
Faculty Advisor: Guoqing Lu

***Honorable*** **STACY HARTWIG**
"A Comparison of Four Foam Roller Treatment Protocols on Hamstring Flexibility"
Major: Exercise Science
Faculty Advisor: Kris Berg

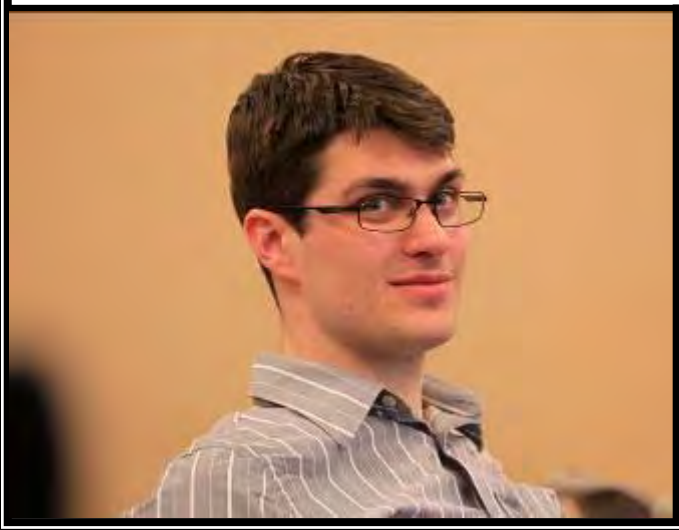
# Undergraduate Abstracts

EBRAHIM ABDULSATTAR
Undergraduate
*Integration Robotics and Bioinformatics in visualizing the process of forming Amino Acids*
Major: Management Information Systems
Faculty Advisor: Jose Baca
Co-Authors: Kiran Bastola, Jose Baca

In my research I have created a more interactive method of learning the formation of Amino acids based on the use of a robotic platform and a mobile application. My research is targeting high school students to make their education more interactive, thus learning faster. This research work focuses on the development and integration of a robotic platform with a mobile application that simulate the process of forming Amino acids. The codon is a sequence of three nucleotides that together form a unit of genetic code in a DNA or RNA molecule. The codons are being transported via the messenger Ribonucleic acid (mRNA). The ribosomal RNA (rRNA) binds with the mRNA which create RNA or tRNA which read the three letter code on mRNA or codon. The sequence of codons on the mRNA determines the sequence of amino acids in the protein, which in turn determines the structure and function of the protein. The robotics platform is a robotic arm that receives data from the mobile app and points the corresponding Amino Acid on a table. The student enters in the mobile app an arrangement of three blocks representing each of the codons. The student continues inserting the codon commands into the mobile app until a secret message is discovered. By repeating the process, the student learns about the formation of Amino acids in a more interactive way. The hand-on factor, along with the use of technology facilitates the learning process.

JONATHAN ACOSTA
Undergraduate
*Do Differences in Rearing Conditions Influence Immune Function in Zebra Finches?*
Major: Biology
Faculty Advisors: Rosemary Strasser, Paul Davis
Co-Author: Rosemary Strasser

Parental care is common among avian species, and tends to exist when the benefits of raising offspring are substantially better than the costs. Sexual conflict is just one costs that can lead to increased stress among biparental species. Corticosterone is the major stress hormone in Zebra Finch. Increased corticosterone levels have been shown to have negative effects on an organism's immune response. Previous studies have shown that differences in growth and development may arise when finches undergo different rearing conditions. We tested to see if different rearing conditions (uniparental vs biparental care) effected immune function in Zebra Finches. We used finches that were previously raised by either two parents or one and also had their corticosterone levels measured; finches raised uniparentally had lower corticosterone levels compared to their counterparts. Using these previously raised finches we hypothesized that the finches raised uniparentally (lower corticosterone levels) would have a more competent immune system compared to the finches raised biparentally (higher corticosterone levels). We tested our hypothesis using microbe-killing assays that contained finch blood and either *E. coli* or *C. albicans.* Two different pathogens were used because they test two different components of the immune system. Immune response findings will be presented at the Student Research and Creative Activity Fair.



# Undergraduate Abstracts

TAYLOR BAILEY
Undergraduate
*Identification of the Targets of the Antimicrobial Peptide DASamP2 by Isolation of Pseudomonas Mutants with Increased Resistance*
Major: Biology
Faculty Advisor: Donald Rowen

The emergence of bacteria that have developed resistance to current antibiotics is an issue of great concern because we may no longer be able to treat some bacterial infections. Antimicrobial peptides (AMP) have shown promise as a source of new antimicrobial agents. Antimicrobial peptides are short proteins with a wide range of antimicrobial activity against bacteria, fungi, and viruses; they can vary from 12-50 amino acids in length. Dr. Guangshun Wang at UNMC has developed a promising new AMP (DASamP2) that is effective against *Psedomonas aeruginosa* as well as many other types of bacterium. To further investigate DASamp2, we are seeking to determine its mechanism of action against bacteria.cells. To do this, we sought to isolate mutants of the bacterium *P. aeruginosa* that show increased resistance to the AMP. These mutants are expected to have a mutation in a gene that encodes a target of the AMP. We made mutants by causing a transposon to jump randomly into the *P. aeruginosa* genome. I helped to screen 1,500 transposon mutant cells for increased resistance. Mutants that showed increase resistance in an initial screen were retested. I ultimately helped to isolate four mutants that showed increased resistance after three rounds of retesting. Determining the location of the transposon in these four mutants should help to identify the mechanism of action of DASamp2.

MAGGIE L. BARTLETT
Undergraduate
*Does a Toxoplasma gondii EP67 conjugated epitope vaccine show efficacy in vivo?*
Major: Biotechnology
Faculty Advisor: Paul Davis

*Toxoplasma gondii* (TG) is an obligate intracellular apicomplexan parasite. 30% of the world's population is affected and it is the leading cause of birth defects in pregnant women and many livestock. Currently, there is no cure for the latent infection which has unknown implications in people. Therefore, it is imperative that a vaccine is generated to prevent bradyzoite cyst formation and blunt the spread of the parasite. To this end, we generated five 15-mer epitopes from TG genes known to be highly immunogenic. These were conjugated to a promising host-derived, molecular adjuvant EP67. Intraperitoneally (IP) immunized mice were observed and subsequently infected with 5,000 ME49 tachyzoites. For the duration of the trial the mice were weighed and monitored for signs of well-being. ELISA and qPCR assays were done to determine if the vaccine had prevented the latent stage infection.

BRANDON BISCHOFF
Undergraduate
*Manipulations of the style of locomotion affects both the kinesthetic and visual perception of distance traversed*
Major: Exercise Science
Faculty Advisor: Steven Harrison

The capacity of humans and animals to successfully navigate the world around them is supported by a process known as path integration. Path integration concerns the use of sensory information during locomotion to perceive distances traveled and angles turned by the body during locomotion. In our research we investigated the contributions of visual and kinesthetic information to perception of the distances traversed as a person are moves through the world. Kinesthetic information concerns the information derived from the movements of the body. Previous research has shown that when kinesthetic information is the primary source of information for path integration (i.e. participants are blindfolded), information about the distance depends upon the way in which the legs are coordinated (e.g. skipping vs. running). Specifically, in distance matching tasks, in which participants traverse a distance in an initial "study phase", and then attempt to travel a matching distance in a "test phase", systematic biases in test phase reports are observed to result from the manipulation gait patterns in the study phase. In our study we investigated the contributions of both visual and kinesthetic information in path integration. We analyzed whether the coordination of the legs would be influenced by the availability of visual information during the task. Although a main effect of vision was observed, the presence or absence of vision did not attenuate the systematic bias resulting from the manipulation of the manner in which the limbs were coordinated. More research is needed to understand this finding.

# Undergraduate Abstracts

NATASHA BISHOP
Undergraduate
*Futurist Immersion and Scholarly Contribution*
Major: Art History
Faculty Advisor: Adrian Duran

My area of focus as an Art History major is Futurism, an early twentieth century Italian cultural movement. The FUSE grant allowed for me to travel to New York City to see the Solomon R Guggenheim Museum's Futurist retrospective, *Italian Futurism 1909 - 1944: Reconstructing the Universe*. I also toured the Center for Italian Modern Art, a new foundation dedicated to the study of Italian modern and contemporary art, to see their inaugural exhibition highlighting the career of Futurist artist, Forunato Depero. At the Metropolitan Museum of Art and Frick libraries, I sought out primary source material pertaining to Futurism, and focused specifically on finding original exhibition catalogues. I met with Jessica Palmieri, the founder of italianfuturism.org, to discuss ways that I could contribute to her website. We concluded that my efforts would be best spent compiling resources for students interested in Futurism and Italian Modernism in general, and also to write an article on a topic of my choosing. Since then, I have been researching grants and fellowships applicable to Italian Modernists, as well as aggregating Futurist literature resources all to be published on the site. Additionally, I am using my research material from New York to write my article. Last semester, I relied heavily on that material to write my senior thesis, which harmonized my two major research interests - classical elements in Futurist artworks and the various intersections of continental philosophy and the Italian avant-garde. This is the direction I intend to take my article for italianfuturism.org.

LOREN BLAKE
Undergraduate
*Will Brown and the 1919 Douglas County Courthouse Lynching*
Major: Black Studies
Faculty Advisor: Jennifer Harbour

The Red Summer of 1919 may very well be the bloodiest season in the history of American lynching and racial rioting. There were an estimated 41 race riots and lynchings that rocked the country from New York to San Francisco. Omaha was at the heart of these melees boasting its third illegal lynching since 1891, and culminating in the murder of Will Brown on September 28th. The callous executions across the United States were validated to various excuses including; stealing pigs, sitting on a porch too long, not using proper pronouns when addressing Whites, and thievery. By far, the most common theme was the exploitation and violation of White women. Omaha was no exception to this rule. On the evening of the 27th, rumors had been floating around town of the Black man being held at the Douglas County courthouse on the charges of rape against a young white woman and the eerie predictions of his eventual fate. There would be justice whether it was rendered by the legal system or the vigilantes noose.

ALBERT BLANCO
Undergraduate
*Generalized Self-Efficacy as a Moderator on Burnout and Outcomes for Working College Students*
Major: Psychology
Faculty Advisor: Lisa Scherer
Co-Author: Lisa Scherer

Burnout is increasingly posing a threat to employed college students (Alarcon, Edwards, & Menke, 2011). Malach-Pines (2005, p. 78-79) defined as "a state of physical, emotional, and mental exhaustion". The risk for burnout is greater among the college student population because an increasing number of college students are employed (Riggert, Boyle, Petrosko, Ash & Rude-Parkins, 2006). Burnout often results in various detrimental academic, occupational, health and psychological outcomes (Yueh-Tzu, 2009); this can include academic disengagement, alcohol consumption, and increased intentions to quit school. The Job Demands-Resources model (Bakker & Demerouti, 2007) can be applied to explain burnout as a consequence of the demands faced by an individual at work and the resources they have to meet these demands; this model was originally developed for application in occupational contexts (Demerouti, Bakker, Nachreiner, & Schaufeli, 2011). My research applies this model to employed college students and expands the scope of demands and resources to those encountered in both occupational and academic settings. My presentation will discuss whether generalized self-efficacy (GSE) acts as a personal resource that mitigates the negative effects of life demands on burnout. Additionally, my presentation will explore how work-school demands faced by employed university students affect their rates of burnout, and consequently their rates of academic disengagement, alcohol consumption, and intentions to quit school.

# Undergraduate Abstracts

LAUREN BOWMAN
Undergraduate
*Improved Prosthetic Gait Following Amputee-Specific Physical Therapy*
Major: Exercise Science
Faculty Advisor: Sara Myers
Co-Authors: Whitney Korgan, Jessica Renz, Shane Wurdeman

Amputees must relearn to walk with a prosthesis. Prosthetic rehabilitation is used to reduce and eliminate irregularities between the prosthetic and sound leg. This may decrease long term exposure to increased work demand on the sound leg. An amputee-specific physical therapy (PT) program provides motor learning to help develop proper gait mechanics. However, PT is not standard for all individuals receiving their first prosthesis due to lack of evidence showing improved gait in result PT. Thus, the purpose of this study was to determine whether amputees receiving PT have better gait mechanics than those who do not. The hypothesis was that those who underwent an amputee-specific PT program would demonstrate more regular gait patterns. Amputees with transtibial (between the knee and ankle) amputations walked overground at a self-selected pace while data was collected. The therapy group had previously undergone 2-3 therapy sessions per week for 3 months. Irregularities were determined through overground gait tests comparing prosthetic and sound legs. Results – 17 of 23 variables tested showed significant differences between the prosthetic and sound leg for the group that did not receive amputee-specific PT. The group that had previously received therapy, only 4 of 23 variables showed significant differences between the prosthetic and sound leg. Discussion – Amputees participating in an amputee-specific PT program after receiving a prosthesis show more symmetrical gait. This results in less work demands of the sound leg which results in a less likely chance of long term complications to the sound leg.

MARJOLYN BROEK-TODD
Undergraduate
*From the Baroque Musical Period (1600-1750) to the Music Faculty of UNO (2015): Music Teachers Passing the Art of Piano Pedagogy Through the Generations*
Major: Music Performance – Keyboard
Faculty Advisor: Barry Ford

As a keyboard performance major and instructor, I have seen how musical education is passed down from one teacher to another throughout the generations. My poster shows this common thread which connects a 425-year lineage of teachers, their famous contemporaries and the development of keyboard instruments from the end of the Renaissance period in 1589 to 2015, which includes my two piano instructors at the University of Nebraska at Omaha. I began this project by researching the teachers of my two piano instructors. Interestingly, after researching six publications, I discovered the musical ancestry of my teachers intersects at Carl Czerny (1791-1857) and can be traced back to 1589. I have added myself to the end of the list, which has become my "musical heritage tree". I am continuing the tradition of training into the next generation of music students and contributing to this amazing legacy. When we see the brilliant musicians and instructors who have preceded us, we should be inspired to continue their legacy of excellence by promoting that same high standard in teaching and musical performance while also seeking to grow through continued education.

JARED BROWN
Undergraduate
*The Role of the Percussionist in the Andean Musical Styles of Chacarera and Zamba*
Major: Music Performance
Faculty Advisor: Melissa Berke
Co-Author: Philip Kolbo

The role of the percussionist while performing the Andean traditional music styles of Chacarera and Zamba has evolved over the past several years. These two styles – the Zamba originating in the early 19th century, Chacarera in the mid-20th century – each utilized a single traditional drum called the *bombo leguero* to provide the rhythmic foundation of the musical ensemble. However, and as is common in popular music, a musical fusion took place as foreign music became readily available in the region. This research will detail this fusion and explain how the role of the percussionist progressed from playing a single *bombo leguero* to playing an array of varied instruments, the result of which is an expansion of techniques and musical possibilities to be explored by a multiple instrumentalist performing these styles today.

# Undergraduate Abstracts

CARISSA BRUGMAN
Undergraduate
*Identification of Septin Regulators in Candida albicans*
Major: Biotechnology
Faculty Advisor: Jill Blankenship

The pathogenic yeast *Candida albicans* is the cause of many fungal infections in humans including yeast infections, diaper rash, thrush, and severe systemic disease in those that are immunodeficient. *C. albicans* can shift from a budding to filamentous form, a transition that is essential to virulence. Antifungal drugs that compromise cell wall or cell membrane integrity are the current means of defense against this infection. However, these drugs have not lowered the fatalities due to *C. albicans.* Septins, a family of conserved proteins, play an important role in filamentation and cell wall integrity. The goal of this study is to identify septin modifying proteins deletions that alter the ability of septins to promote cell wall integrity and/or filamentation, which may provide insight into novel antifungal drug targets. To do this, a plasmid containing a septin gene fragment linked to a GFP tag with a drug-selectable marker was transformed into *C. albicans*. Transformants were selected by growth on agar plates containing noursecthricin which prevents growth of strains that lack the NAT cassette.

AUSTIN BUNDY
Undergraduate
*Scholarly Engagement: A Study on Applied Research to Help Homeless Shelter Volunteers*
Major: Psychology
Faculty Advisor: Lisa Scherer
Co-Author: Joseph Allen

Volunteers are the heart of nonprofit organizations and are particularly critical in assisting homeless people in shelters throughout the U.S. Obstacles to assisting homeless people include insufficient shelters and particularly a shortage of volunteers. This problem is reflective in national trends showing that the U.S. is at an all time low in volunteering making the recruitment and retention of volunteers a priority. This study, which represents an independent service learning research project and the promotion of scholarly engagement, assessed the satisfaction of volunteers working in homeless shelters in the Omaha area. The goal of this study was to determine the strengths and growth areas identified by the volunteer participants in order to provide recommendations for future practice. Volunteer participants consisted of 20 volunteer coordinators from each of the shelters in Omaha and 10 responded to the survey. The survey, which contained measures relating to volunteer satisfaction and well-being, was distributed via email. The results showed that volunteers enjoyed their work and received satisfactory recognition. In contrast, the results indicated that volunteers experienced role ambiguity and levels of intentions to quit. Recommendations were, therefore, developed and discussed in a consultation for this nonprofit in order to prevent volunteers from quitting and to retain them for future work. Furthermore, these findings are integrated with current research of Industrial-Organizational Psychology and the recent literature of volunteering in the U.S.

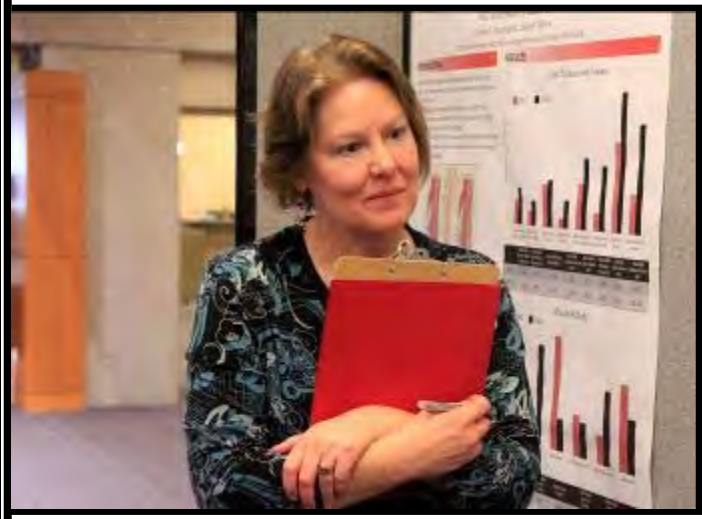
ROBERT CAMPBELL
Undergraduate
*Analyzing Minoan Identity*
Major: History
Faculty Advisor: Jeanne Reames

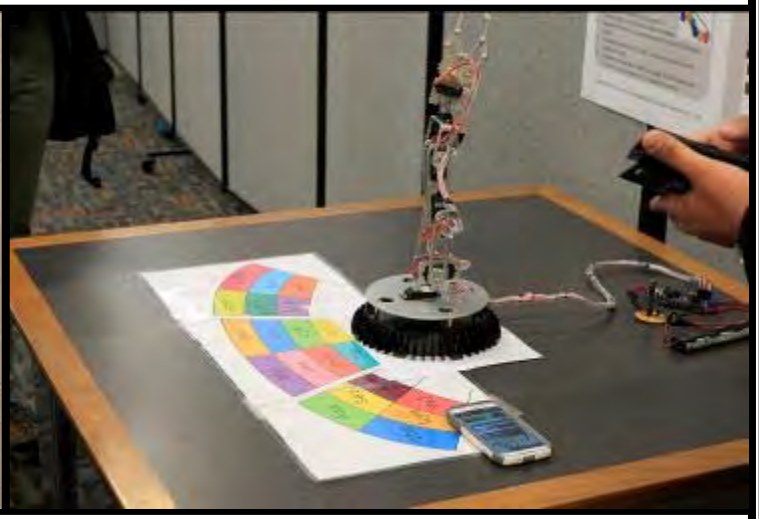
The Minoans are a misunderstood and understudied civilization. The timeframe is murky and scholars are still trying to theorize the cause of their collapse. Between the Early and Late Bronze Age there was an enormous amount of communication but that alone is not enough to establish an accurate portrayal of what took place because there needs to be more tangible evidence like artwork, cylinder seals, and pottery. I intend to undertake appropriate further research to investigate better angles on this topic. In order to determine whether new approaches are viable, it is necessary to first establish a methodology. In my initial research I have focused on cylinder seals, ring impressions and artwork in particular to analyze hybridity of civilizations within the Bronze Age. During these initial enquiries, I noticed that culture was a trade in itself. After the eruption of Thera, the changes became more apparent on Crete. The gods were becoming male instead of female, religious icons being desecrated, and Mycenaean take over leading to possible Minoan migration. Despite the changes in the Eastern Mediterranean the Minoan race held strong. However, the post-Mycenaean Minoans remain unacknowledged in text. The Minoan people were intelligent and greatly influenced the Aegean. My research was conducted to understand the Minoan people and attempt to pursue more factors of their identity. This research not only gave me insight into these people but also into issues that face scholars conducting relevant studies.

# Undergraduate Abstracts

CASEY CANIGLIA
Undergraduate
*Abnormal Breathing Strenghtens Locomotor Respiratory Coupling*
Major: Biomechanics
Faculty Advisor: Jennifer Yentes

Biological rhythms mutually attract to each other. Defined as coupling, locomotor and respiration rhythms in humans have been clearly identified during walking. We, specifically investigated the effect of involuntary abnormal breathing rhythms on the ability to couple the locomotor and respiratory systems to provide additional insight into the instruments behind this coupling. To measure coupling, three tools were utilized: frequency ratio, cross-correlation and cross recurrence quantification analysis (cRQA). Six patients with chronic obstructive pulmonary disease (COPD) and fourteen aged-matched controls were asked to walk on a treadmill for four minutes under a self-selected walking speed and speeds +/- 10% and +/-20% of their self-selected speed. Patients with COPD represent a population that has abnormal breathing patterns. Patients with COPD demonstrated a stricter range of frequency ratios that represented more rigid and less complex coupling. Changes in speed produced changes in in both groups, demonstrating that coupling is altered under different task demands. From a dynamic systems theory point-of-view, preferred performance in certain situations can be along a continuum of very rigid to very random and patients with COPD prefer a 1:1 or 2:1 coupling that is much tighter than their healthy counterparts, based on cRQA results. The findings of the current work should be expanded further in the future to investigate the possibility of using coupling as a rehabilitation tool and using COPD as a platform to understand the pathomechanics of locomotor respiratory coupling.





MEGAN CATLETT
Undergraduate
*The Effect of Structured Rhythmic Auditory Stimuli on the Performance of a Repetitive Hammering Task*
Major: Exercise Science
Faculty Advisor: Steven Harrison
Co-Authors: Steven Harrison, Diderik Eikema, Nicholas Stergiou

The ability to do the same task in multiple different ways makes a person flexible and therefore highly functional. In this sense, variability in how we perform a movement is part of its functionality. As people age, flexibility and therefore functionality decreases. This is reflected in age related changes in the “structure” of the motor variability. Evidence suggests that the structure of movement variability can be manipulated by creating auditory stimuli that have particular fractal variability structures. We are hoping to achieve a better understanding of the basis of motor flexibility from this project by asking participants to coordinate a simple hammering task to a variety of structured metronomes. To study the role of the complexity of the environment we had participants perform hammering motions without a metronome (no metronome condition), to a metronome that has no variability (metronome condition), to a metronome that has unstructured variability (white noise condition), and to a metronome that has fractal variability (pink noise condition). We found that we were able to manipulate the variability structure of participants hammering motions using the different stimuli. In the future if we are able to better understand motor flexibility we will be able to gain insights into the conditions that support adaptable behavior. In addition, if we are able to understand all of these things, it may provide new insight for rehabilitation.

# Undergraduate Abstracts

CALEB CAVE
Undergraduate
*Detection of Mycoplasma in Human Cell Cultures Using Homology and PCR*
Major: Biology
Faculty Advisor: Paul Davis

*Mycoplasma* is a genus of bacteria which commonly infects not only live humans and other organisms but also the cells of laboratory tissue cultures. Due to their impressively small size, this genus of bacteria is difficult to detect in cell cultures using standard microscopy. Additionally, since *Mycoplasma* lacks cell walls, they are impervious to common cell-wall disrupting antibiotics often used to treat human cell cultures. Infection of a biological laboratory's cell cultures with *Mycoplasma* can disrupt or delay research experiments in a variety of ways, including altering enzyme function, causing chromosomal defects, and slowing cell growth rate. These disruptions can eventually cost a research laboratory both valuable time and money. Therefore, an inexpensive, efficient method to detect these detrimental bacteria would be a wise investment for any biological laboratory to adopt. In this study, we applied one such method for easy detection of *Mycoplasma*. First, we used the bioinformatics program Clustal to align the genomes of select species of *Mycoplasma* (those most prone to infect human cell cultures), in order to find homologous genetic sequences among them. Once similar sequences were determined, forward and reverse primers were designed to those sequences to be used in PCR-based detection. Since this method of detection is very specific for strains of *Mycoplasma* known to infect human cells, and since it is carried out using basic materials found in any biology research laboratory, it is aimed to be both comprehensive and cost-effective.

HAN CHEN
Undergraduate
*Investigating Caveolin-1 in Chronic Lymphocytic Leukemia Signal Transduction Pathway*
Major: Biotechnology
Faculty Advisor: Christine Cutucache

Cancer has remained an unforgiving phenomenon whose etiology and corresponding network topology has continuously hindered researchers' efforts to understand it and develop a cure. Commonly referred to as a malignant neoplasm, cancer is the result of uncontrolled cell growth with the ability to progress throughout regions of the body unchecked, negatively influencing essential bodily functions and processes. Signal transduction pathways are what ultimately govern cell growth and response on a molecular level via cell surface receptors and protein phosphorylation. Due to the complexity of cell signaling, we aim to map target pathways involving caveolin1 (CAV1), a cell signaling protein, in the context of chronic lymphocytic leukemia (CLL). CAV1 has a number of intracellular roles and modulates multiple upstream and downstream molecules. To identify key signal transduction pathways in CLL, biological networks are utilized. This approach uses a dynamic systems approach to understand networks and interactions amongst molecules. The major goal of this project includes developing a real-time, dynamic model that illustrates the relationship between CLL and the protein, CAV1.

JOSEPH CONRAD
Undergraduate
*Has the 'Everything But Arms' Initiative Led to an Increase in Trade From LDCs into the EU?*
Major: Economics
Faculty Advisor: Catherine Co

In 2001 the Everything But Arms Initiative was born granting Least Developed Countries (LDCs) a nonreciprocal trade preference with members of the European Union. This preference extended tariff and quota free entry to all products except arms and munitions. It was expected to impact agricultural trade primarily as it eliminated significant barriers to trade for LDCs. Through a political lens this seems to be a major step forward for underdeveloped nations, but economists question its successfulness. Other limitations seem to deter LDCs export growth such as supply constraints and technical barriers. Little work has been done reviewing the program, and this paper aims to use empirical data to determine if any export growth exists. This paper will examine the history of the Everything But Arms, and effects of the program ten years after its origination. Specific interest will be paid to the impact on bananas, sugar, and rice trade along with agriculture as a whole.

# Undergraduate Abstracts

BRITTANY CONROY
Undergraduate
*Design, Assessment, and In Vivo Evaluation of a Computational Model Illustrating the Role of CAV1 in CD4+ T Lymphocytes*
Major: Biology
Faculty Advisor: Christine Cutucache
Co-Authors: Tyler Herek, Timothy Shew, Matthew Latner, Joshua Larson, Laura Allen, Paul Davis, Tomas Helikar, Christine Cutucache

Caveolin-1 (CAV1) is a vital scaffold protein heterogeneously expressed in both healthy and malignant tissue. We focus on the role of CAV1 when overexpressed in T-cell leukemia. Previously, we have shown that CAV1 is involved in cell-to-cell communication, cellular proliferation, and immune synapse formation; however, the molecular mechanisms have not been elucidated. We hypothesize that the role of CAV1 in immune synapse formation contributes to immune regulation during leukemic progression, thereby warranting studies of the role of CAV1 in CD4+ T-cells in relation to antigen-presenting cells. To address this need, we developed a computational model of a CD4+ immune effector T-cell to mimic cellular dynamics and molecular signaling under healthy and immunocompromised conditions (i.e., leukemic conditions). Using the Cell Collective computational modeling software, the CD4+ T-cell model was constructed and simulated under *CAV1*+/+, *CAV1*+/−, and *CAV1*−/− conditions to produce a hypothetical immune response. This model allowed us to predict and examine the heterogeneous effects and mechanisms of CAV1 *in silico*. Experimental results indicate a signature of molecules involved in cellular proliferation, cell survival, and cytoskeletal rearrangement that were highly affected by *CAV1* knock out. With this comprehensive model of a CD4+ T-cell, we then validated *in vivo* protein expression levels. Based on this study, we modeled a CD4+ T-cell, manipulated gene expression in immunocompromised versus competent settings, validated these manipulations in an *in vivo* murine model, and corroborated acute T-cell leukemia gene expression profiles in human beings. Moreover, we can model an immunocompetent versus an immunocompromised microenvironment to better understand how signaling is regulated in patients with leukemia.

OLAJIDE COOPER
Undergraduate
*Effectiveness of Target Language Acquisition Methodology When Used with Spanish Speaking Parents of Deaf Children*
Major: Elementary Education
Faculty Advisor: Julie Delkamiller

The purpose of this research project was to assess the methods included in the first American Sign Language (ASL) curriculum for Spanish Speaking parents and guardians. Until last year, there was no curriculum available for Spanish speaking adults to learn American Sign Language. Spanish speaking parents of children with deafness or hearing impairments were tasked to learn ASL on their own in an unfamiliar language, English. Using second language acquisition methods I designed the aforementioned curriculum to facilitate the acquisition of ASL for this demographic. These lessons were then taught once a week over a nine week period. To determine if this curriculum was successful and if so, what factors lead to its success data was collected on the following parameters: knowledge of ASL prior to the class, level of receptive and productive signing skills in a pre, mid, and posttest, anxiety regarding the class, and hours practiced outside of class. After analyzing these factors, it was concluded that the curriculum was successful. The average score on the pretest consisting of basic vocabulary needed to communicate with a child you are caring for was a 50% level of accuracy. When the same vocabulary was presented at the end of the course as a posttest the average score was 90% level of accuracy. This signifies an 87% increase in accuracy was attained by using this prescribed curriculum. Success was also measured in qualitative data like the satisfaction the parents exhibited when being able to completely express themselves to their children.



# Undergraduate Abstracts

NATHAN CORNELIUS
Undergraduate
*Proof of Concept Implementation of Elliptic Curve Cryptography Using the El-Gamal Algorithms*
Majors: Mathematics and Computer Science
Faculty Advisor: Vyacheslav Rykov

The aim of this project was to create a functional implementation of Elliptic Curve Cryptography (ECC) from the ground up using the El-Gamal encryption algorithm, an asymmetric encryption scheme (an algorithm in which the sender of a message encrypts the message with a different key than the receiver uses to decrypt it). The program was written in Python, a simple and easy to understand programming language. In addition to the message encoding, encryption, and decryption algorithms, the program includes code written to computationally construct a type of finite field called a "group over an elliptic curve," which is a mathematical structure over which we can define group operations such as "addition" and "multiplication". These operations are somewhat analogous to ordinary integer addition and multiplication. The program also contains implementations of several sophisticated mathematical algorithms to facilitate these "group operations". In total the program stands as a demonstration of how a functionally complete ECC implementation using the El-Gamal algorithms can be constructed in a high- level programming language. My work thus serves as a template: written in Python, it can be easily ported and its concepts applied to many other languages. Thus my research has all the necessary computational algorithms, built from basic components available in most languages, to have wide- reaching application.

ISAIAH CRUM
Undergraduate
*Development of RNA Primers and TaqMAN probes for Toxoplasma BAG1 and Ribosomal protein S23*
Major: Neuroscience
Faculty Advisor: Paul Davis

The quantitative analysis of bradyzoite and tachyzoite stages of the obligate, intracellular, parasite Toxoplasma gondii is possible with the use of qPCR. With the primers for Bradyzoite Antigen1(BAG1) and Ribosomal Protein S23 (RPS23), the expression of each gene was tested during both phases of the parasite. These allow us to evaluate the intensity of the bradyzoite stage generated using in vitro and in vivo methods.

JAKE CUNNINGHAM
Undergraduate
*A study exploring volunteer satisfaction within a formal religious institution*
Major: Psychology
Faculty Advisors: Lisa Scherer, Joseph Allen

Volunteers are the backbone of many non-profit organizations, and the knowledge concerning their experiences and how to improve them is somewhat lacking. The National Bureau of Labor Statistics (2014) stated that U.S. volunteering is at one of its lowest rates, and volunteer retention is problematic, with 1 out of every 3 volunteers quitting after one year. Research is needed to address this problem. This study served as an independent service learning research project which examined church-volunteer satisfaction with their experiences. The participants for this study consisted of 46 volunteers from a formal religious institution in the Midwest. The volunteers' duties consisting of devotional leader, set-up crew, and Sunday school teacher within a church environment. The volunteer organization was contacted through a Volunteer Program Assessment at the University of Omaha (VPA-UNO) analyst and sent an online survey consisting of qualitative and quantities questions. Based on survey results, three strengths, three growth areas, and three recommendations were provided to the client. The results showed that volunteers experienced high satisfaction with the nature of their work, their volunteer coordinator, and the recognition they were receiving from the volunteer organization. In contrast, volunteer concerns included dissatisfaction with communication and high levels of role ambiguity and burnout. Recommendations were provided based on industrial/ organizational and empirical literature concerning this population.

# Undergraduate Abstracts

KASEY DAVIS
Undergraduate
*Archaeology in East Jerusalem and International Law*
Major: Religious Studies
Faculty Advisor: Curtis Hutt

Archaeology done in Israel, especially in Jerusalem on the Temple Mount, is enveloped in complex tensions and it is imperative that the artifacts and other material remains are protected in the midst of mounting pressure. This research looks at different case studies in which the *1954 Hague Convention for the Protection of Cultural Property* and its *1st* and *2nd Protocols* have been applied in East Jerusalem. The 1954 *Hague Convention* and its *Protocols* were set in place after WWII to ensure the protection of the material remains of a culture in times of conflict, which is directly applicable to the situation in Israel. In addition to case-studies on the use of international laws regarding the preservation and protection of cultural artifacts, this research also suggests that these laws can create an avenue through which the archaeology of this region can become a source of cooperation and possibly lasting communication between those who are stakeholders in the history of Jerusalem and, more broadly, the world. This is a new perspective on the ever-mounting state of affairs in the Middle East and how international laws have the potential to become a brick in the road to a peaceful solution in the study and presentation of the rich history of Israel. This material will be presented from the work done studying abroad and consulting experts in the field on the application of international law to archaeology.

ALLISON DOMON
Undergraduate
*Sins of Omission*
Major: Biology
Faculty Advisor: Todd Robinson

*Sins of Omission* is a lengthy fiction story that follows three characters from different backgrounds through their adolescence as they encounter different challenges that shape and influence their outlook on the world and the lives they've chosen to lead. Set in the fictitious urban city of North Bend, Tyrese, Keenan, and Annie will come together to discover who they were meant to be, despite their difficult pasts. Written partly in a Creative Writing course taught by Dr. Robinson, the story has been work-shopped by peers, as the story developed and improved.

MITCH DREDLA
Undergraduate
*Volunteers Working in Non-profit Organizations Serving Animal Welfare*
Major: Psychology
Faculty Advisors: Lisa Scherer, Joseph Allen

Volunteers are the lifeblood of non-profit organizations. They are critical to the success and sustainability of non-profits who serve communities. In fact, in 2012 64.5 million volunteers in the United States contributed 175 billion dollars' worth of work (Corporation for National and Community Service, 2013). Alarmingly, volunteering is the lowest it has been in the history of the United States. This problem necessitates research and identifying ways to improve volunteers' experiences and retention rates. This study, which represents an independent research project, examined satisfaction of volunteers working in animal welfare facility in the midwest. The goal of the study was to determine the strengths and growth areas identified by the volunteer participants and to suggest practices for improving volunteer retention. The three strengths identified for this particular organization was the volunteers satisfaction with volunteer coordinator, nature of work they conducted for their duties, and commitment to the organization. Oppositely, areas of concern identified were dissatisfaction with the organization listening to their ideas for improvement (perception of voice), volunteer management practices, and communication within the organization. Recommendations returned to the volunteer coordinator were to provide a monthly newsletter, more thorough and adequate training, and increase lines of upward and downward communication, to volunteers. The chosen recommendations came from applied literature as well as industrial organizational psychology constructs to leverage and improve the volunteer experience.

# Undergraduate Abstracts

ERIC EDENS
Undergraduate
*Like My Terrorist Site? Pin It!*
Major: Computer Science
Faculty Advisor: Bill Mahoney

Violent Extremist Organizations (VEOs) use the Internet to disseminate information and recruit new members. Other "ordinary" Internet users are constantly subjected to targeted advertisements; targeted via the tracking of the user from site to site. Do VEOs utilize the same technology for tracking their "users"? In this paper, we investigate what tracking technologies are used by violent extremist organizations in order to better understand whether these organizations are utilizing similar technology. Longer term this may prove insightful relative to current methods for estimating the technological capabilities of the VEOs.

JULIAN A. EGGER
Undergraduate
*A Bioinformatics System for the Prediction of Genetic Events in Asian Carp Hybridization*
Major: Bioinformatics
Faculty Advisor: Guoqing Lu

The advent of next generation sequencing technology has allowed for greater availability of genomic biological data. With this availability there is a greater need for effective bioinformatics tools for analyzing and deriving knowledge from such genomic data. In this project I developed an integrated bioinformatics system for detecting genomic hybridization events such as homoeologous recombination in genomic and transcriptomic sequences of two Asian carp species and their hybrid counterparts. Introduced to the United States in the early 1970s, silver and bighead carp have become extremely abundant in the Mississippi River Basin (MRB). Known to produce hybrid offspring, they outcompete indigenous species of the MRB and have now become dangerously invasive to the species of the natural system. There is still a critical gap as to why these Asian carp rampantly hybridize in the MRB, yet do not in their native ranges of China. The system I developed detects homoeologous recombination events in the hybrid Asian carp species as well as other species known to undergo hybridization events. The system pipeline, hosted on a web server, is made up of a user input, pairwise alignment function, computational algorithms, a centralized database, and a results output. Using this bioinformatics system, recombination events in hybrid Asian carp were identified, categorized, and analyzed for future study.

DALTON ELLIS
Undergraduate
*Implementing a Matrix Based Key Exchange for Wireless Sensor Networks*
Major: Information Assurance
Faculty Advisor: Abhishek Parakh

We report on a work in progress that aims to develop a secure and efficient method for key exchange in wireless sensor networks. The keys exchanged will then be used for secure communication between sensors. The sensor nodes must maintain battery life for long periods of time while still providing full functionality. One way to extend battery life is to reduce CPU usage of the sensors. The proposed method to reduce CPU usage is to implement a matrix based key exchange algorithm. Currently many sensors use a public key exchange which requires heavy exponentiation. The matrix based key exchange does not require exponentiation and will therefore extend battery life. The project currently is in the pre-deployment stage which involves establishing a symmetric matrix as a product of two other matrices. Once the matrices are established and assigned, simulations will be run to determine CPU usage and be compared to that of a public key exchange. Simulating the key exchange prior to deployment will help in determining the efficiency of the algorithm and will be compared to public key exchange. Deploying sensors containing the algorithm will be the final step in the implementation. If the matrix based key exchange is more energy efficient than a public key exchange, it can be used as an alternative method within wireless sensor networks. Using a more efficient algorithm will save energy spent on CPU capabilities and still provide the essential encryption.

# Undergraduate Abstracts

ALICE FANARI
Undergraduate
*Is My Instructor Misbehaving? College Students Perceptions of Instructor Attire, Tattoos and Piercings*
Major: Communication Studies
Faculty Advisor: Karen Dwyer

The purpose of this study is to further investigate the implications of fashion and physical attire in the college classroom setting. Previous research conducted more than ten years ago showed inconclusive results. This study examined instructor attire (clothing, tattoos, and body piercings) and student perceptions of instructor credibility and teacher misbehavior as related to the learning process. A total of 89 participants were asked to complete an online survey, and evaluate given instructor clothing scenarios based on a 5-point Likert Scale (5= Strongly Agree, and 1=Strongly Disagree). Results showed that student perceptions of credibility were higher when the instructor (male and female) was wearing a professional, casual professional, or casual attire. Some students considered specific instructor attire as disturbing, inappropriate, or unprofessional. When instructors failed to meet student expectations in terms of attire, they were often perceived as uncaring, uninterested in their job or in their students' education (perceived caring was lower). Overall, students' judgments of their instructor were influenced far more by other factors than mere physical appearance –such as how teachers taught, behaved, and managed the classroom, rather than by what they were wearing. In light of these findings, instructors are encouraged to treat the classroom environment as professionally as any other working environment, in order to avoid potential distractions for students. Future research should continue to study the instructor attire in the live classroom context, especially in relation to tattoos and body piercings.

YASMINE FARHAT
Undergraduate
*Effects of Agrichemicals in the Elkhorn River on Endocrine Function of Juvenile Female Fathead Minnows (Pimephales promelas)*
Majors: Biology and Chemistry
Faculty Advisor: Alan Kolok

Several studies conducted in our lab have demonstrated the effects of agrichemicals in the Elkhorn River on adult fathead minnows. However, little is known about the effects of such exposures on fish larvae. Larval exposures present novel opportunities for researchers, as such exposures may result in irreversible effects that are initiated during early development. To investigate how agrichemicals impact juvenile fathead minnows during sexual differentiation, larvae were exposed to agrichemicals at the Elkhorn River Research Station for 7 d. After the exposure, the gene expression of estrogen responsive genes, cyp19a and erα, was quantified. Interestingly, expression of cyp19a, proved to be a useful tool in determining the sex of juvenile fish, as individuals with high levels of the expression can be inferred to be female. Once the male and female fish were separated, we found that female larvae experienced significantly lower expression of these sex related genes when compared to controls. These results represent the first step by which agrichemicals in the Elkhorn River alter the sexual development of juvenile female fathead minnows. Further work must be performed to investigate whether such exposures induce chronic, lifelong negative effects.

KATHERINE FICKLE
Undergraduate
*Nondestructive Testing and Finite Element Analysis for a Collapsed Temple*
Major: Architectural Engineering
Faculty Advisor: Ece Erdogmus

Impact-echo nondestructive testing allows engineers and investigators to identify internal cracks and voids within structural components without invasive drilling. This method is ideal for evaluating historic masonry such as the Temple of Antioch, a collapsed Roman temple under investigation for reconstruction by Dr. Ece Erdogmus (PI, Associate Professor of Architectural Engineering, and research advisor). Despite many advances in nondestructive testing technologies, there still remains a challenge to link these testing and assessment results with numeric strength reduction factors for a structural analysis model. To further the goals of the Temple of Antioch research team, this research involves using ANSYS analysis software for a finite element analysis (FEA) of individual stone blocks with applied static and seismic loads and varying levels of initial damage for the blocks. Issues specific to marble material such as crack propagation are addressed, and this research involves proposed improvements for the current *in situ* damage assessments of marble blocks by linking these FEA and impact-echo findings. This research provides meaningful results to support the Temple of Antioch research team as the temple nears its reconstruction as a heritage site.

# Undergraduate Abstracts

JOHN FLOERKE
Undergraduate
*Comparative Study on Theory Formation during Paradigm Shifts*
Major: Religious Studies
Faculty Advisor: Curtis Hutt

The way in which humans construe theory formation is an exceedingly complex process especially during periods categorized as "paradigm shifts" or "revolutions". Thomas Kuhn shows us an example of such an event in his analysis of the Copernican revolution, to which the Quine / Duhem thesis is applied within this context, demonstrating that theory formation does not occur piecemeal but always in the context of other beliefs. For the purpose of this inquiry a comparative study of theory formation within the individual spheres of religion and natural science is accomplished. I review similarities and differences in these two specific case studies sharing a specific context; the Copernican Revolution. From my analysis it is clear that such persons as Kuhn and Foucault are correct in their interpretation of theory formation, believing that the interconnectedness of each individual sphere becomes an auxiliary hypothesis within the other spheres and forming an underlining foundation. A change in one sphere lends to change in the supporting data which then ripples through the other social institutions as demonstrated in this comparative study.

JORDAN FREEMAN
Undergraduate
*Patients with COPD Walk with a More Periodic Step Width Pattern as Compared to Healthy Controls*
Major: Exercise Science
Faculty Advisor: Jenna Yentes

Patients with chronic obstructive pulmonary disease (COPD) are at increased risk for falls and demonstrate deficits in the medio-lateral direction during standing balance. The purpose of this study is to quantify both amount and temporal structure of spatiotemporal variability while walking at various speeds. Eleven COPD patients and 11 healthy controls walked at their self-selected pace on a treadmill while spatiotemporal parameters were recorded. Both amount (standard deviation (SD)) and coefficient of variation (CV)) and temporal structure of variability were quantified from 238 steps of continuous walking at the five speeds. Step length, step time, and step width time series generated. A main effect of speed for SD and CV of step length and step time was found. No main effect for group was found indicating that patients with COPD are able to adapt the amount of variability as their healthy counterparts. Rather, the only main effect for COPD patients as compared to controls was observed in the temporal structure of variability of step width. Patients with COPD demonstrate alterations in control of the step width variability temporal pattern. Importantly, our results may be of clinical importance since alterations in step width variability are associated with diminished control in the medio-lateral plane of motion and have been implicated as a predecessor to falling and predictive of future falls. This gait abnormality may provide a mechanism for the observed higher incidence of falls in patients COPD as compared to controls.

BENJAMIN GADZINSKI
Undergraduate
*The Impact of Sustained Dialogue on Students' Experiences*
Major: International Studies
Faculty Advisor: Patrick McNamara

This research examines the impact of the Sustained Dialogue (SD) program on the experiences of student participants. Specific attention is paid to changes in the students' social aptitude skills including empathy, assertiveness, and confidence. The SD program emphasizes establishing connections across identity-based barriers such as race, ethnicity, gender and sexual orientation. Changes in these areas are also examined. Our research shows, among the majority of participants, that the SD program has improved social aptitude skills and helped to overcome social identity-based barriers.

# Undergraduate Abstracts

JASMINE GENOVESI
Undergraduate
*Physical Activity Intervention Using Point-of-Decision Prompts*
Major: Exercise Science
Faculty Advisor: John Noble

The study compared the effectiveness of two different point-of-decision posters, negative and positive reinforcement, in predicting an increase of stair use in a shopping center. Observations were recorded for six weeks, consisting of three phases. Phase one was the baseline group, no prompts. In phase two, the positive poster was displayed, which read, "Step it up for a healthy heart". In phase three, the negative poster was displayed, which read, "Don't let your heart down, take the stairs up". The posters were placed where the customers could read the prompts before choosing whether they would take the stairs or escalators up. Over the course of the project, 3,992 customers were observed. There was an increase of stair use, from 13.7% stair use in the control group to an average of 25.5% for both intervention phases. Both men and women increased their stair use, but no significant difference was found between older and younger customers. There was a larger decrease of escalator use when the negative poster was displayed versus the positive poster-baseline 77.7% escalator use to 53.4% use with the negative poster. The number of customers walking up the escalators increased from 8.60% to 15.1% for phase two and 21.9% for phase three. Point-of-decision prompts show to have an effect on increasing physical activity behavior. Both the positive and negative prompts had an effect on stair use; however the negative poster was shown to have a greater effect than the positive poster.

JOEL HACHIYA
Undergraduate
*Thermal Tolerance in Burying Beetles*
Major: Biology
Faculty Advisor: Claudia Rauter

As global temperatures are predicted to increase, so are the occurrences of extreme events like heat waves. On the Great Plains, heat waves have become more common and the last frost generally occurs earlier in spring. These climate changes have an impact on all living organisms, especially ectothermic insects like burying beetles. Exposed to extreme temperatures, burying beetles reduce their metabolic rate to a minimum and enter a coma to protect themselves from these extreme conditions. Once in a coma, the beetles are no longer able to reproduce or search for resources to survive. The purpose of this study was to determine the range of temperatures where two burying beetle species, native to the Great Plains, are active: *Nicrophorus marginatus*, which is found in grasslands and *N. orbicollis* which occurs in forests and grasslands. By exposing beetles from both species to gradually increasing or decreasing temperatures, respectively, I determined the maximum and minimum temperature (Tmax and Tmin), where the beetles stopped moving. For both species Tmin was at about 4.5°C (*N. marginatus* 4.6±0.7°C and *N. orbicollis* 4.2±0.4°C) allowing them to become active at temperatures slightly above freezing thus taking advantage of earlier spring arrival. Tmax was about 40°C with *N. marginatus* having a higher Tmax (40.4±0.4°C) than *N. orbicollis* (39.4±0.5°C). A Tmax of 40°C suggests that both species are physiologically able to survive the current heat waves. Future studies will need to determine the fitness consequences of an extended activity period in combination with increased heat waves.

ABBIE HARLOW
Undergraduate
*A History of the Glacier Creek Preserve*
Major: History
Faculty Advisor: Thomas Bragg

In an ever-growing city, in an ever-encroaching suburb, a natural sanctuary thrives as a refuge to learn, view, and understand our historic Nebraska landscape. The Glacier Creek Preserve, located in northwest Omaha, is an extension of the University of Nebraska at Omaha's campus. Since donated to UNO in 1959 by Arthur and Antoinette Allwine, the original Allwine Prairie Preserve has undergone substantial change including the addition of a research and education facility and doubling in size to what is now referred to as Glacier Creek Preserve. Beginning in the 1970's, a procession of UNO students and faculty have used the preserve to learn about our prairie heritage. Local schools and organizations, including Creighton University and a number of area public schools, have joined UNO in the use of the preserve. The preserve has also served as a location for research projects for UNO and Creighton undergraduate and graduate students, faculty, and classes. While focusing on biological subjects, a diversity of other academic disciplines (e.g. geology, geography, literature, dance, etc.) also have taken advantage of the preserve for different research and educational projects. This project is a complete history of the Glacier Creek Preserve.

# Undergraduate Abstracts

BRIANNA HENDRICKSON
Undergraduate
*Engagement Differences for 2-Year-Olds Identified as Late Talkers*
Major: Speech-Language Pathology
Faculty Advisor: Shari DeVeney
Co-Author: Shari DeVeney

The investigators compared engagement in language-rich activities for 2-year-olds identified as late talkers and their typically developing peers. Participants included 12 2-year-old children ranging in age from 24- to 33-months of age ($M$ = 27 months; $SD$ = 2.906), three were identified as being typically developing, five were identified as having expressive-only language delay, and four were identified as having expressive *and* receptive language delay. From videotaped interactions, child behaviors were coded as unengaged (e.g., uninvolved with any specific people, objects, or symbols), onlooking (e.g., watching researcher or parent activity, but not taking part), person engaged (e.g., involved solely with researcher/parent as social partners), or object engaged (e.g., playing with objects such as toys and/or picture symbols alone) for 15-second increments of all videotaped interactions ($M$ = 378.13 minutes per participant; $SD$ =11.89). Consistent with previous findings for typically developing and expressive-only late talkers, no significant engagement differences were noted across participant groupings; however, a non- significant trend was notable for object-engagement with expressive-receptive late talkers.

AMY HESTER
Undergraduate
*Structural Analysis of CoxsackievirusB3 by In-line Probing*
Major: Biotechnology
Faculty Advisor: William Tapprich

Coxsackievirus B3 (CVB3) is a pathogenic *Enterovirus* of the picornavirus family, with a single-stranded, positive sense RNA genome. Infection can lead to heart disease and pancreatitis. The CVB3 genome consists of 7400 nucleotides 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 CVB3 5'UTR contains 742 bases and seven secondary structure domains. Virulence of CVB3 is found to be associated with domain II. In order to better understand the virus and its pathogenesis, 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 are located. Radiolabeled RNA incubated in an in-line probing folding buffer are visualized by 12% polyacrylamide gel electrophoresis and phosphorimaging. Because highly structured portions of the molecule are less vulnerable to nucleophilic attack, this will also help determine where in the molecule the more structured portions are. Results from in-line probing will enable us to better understand the three-dimensional structure of CVB3, as well as its function.

BENJAMIN HOCHFELDER
Undergraduate
*Investigating Intra-Species Genetic Variation in the Glucocorticoid Receptor Gene of Marmoset Monkeys*
Major: Neuroscience
Faculty Advisor: Jeffrey French
Co-Authors: Dongren Ren, Jeffrey French

Glucocorticoid (GC) receptors have an intimate relationship with the class of steroid hormones that includes cortisol, the well-known "stress-hormone." In humans, minor intra-specific variation in the gene that codes for GC receptors has been shown to have significant effects on a person's ability to cope with psychosocial stress, a person's disposition toward certain types of diabetes and abdominal obesity, and a person's risk for developing major depression. Due to their relatively similar social systems and genetics, marmosets are a promising animal for modeling these gene-behavior and gene-disease interactions. Very little has been done to characterize intra-specific variation of the marmoset GC receptor gene. This project aimed to investigate this gap and to compare the marmoset GC receptor gene to other primates. Due to the functional significance of the first and second exons of this gene in humans, primers were designed based on public reference sequence data to sequence the whole marmoset GC receptor exome. Tissues were extracted and DNA was isolated from ten deceased marmosets from different lineages. These DNA samples were purified, amplified, and were validated by gel electrophoresis prior to sequencing. Following sequencing, samples were aligned and analyzed for quality. Phylogenetic trees were then made to assess similarities between the sequences of these marmosets and other primates. Work is continuing to assess possible functional differences in intra-specific variation between additional marmosets, and this work may eventually be combined with behavioral studies.

# Undergraduate Abstracts

COLLEEN G. HOCHFELDER
Undergraduate
*A Computational Framework to Identify Novel Applications for Existing Drugs*
Major: Biotechnology
Faculty Advisor: Tomas Helikar
Co-Authors: Laura Allen, Tomas Helikar

Dynamical computational models have the potential to predict system's critical components, as well as the wide range of effects by individual perturbations. Herein, the sensitivity and perturbation effects within a large-scale computational model (139 components) of a system of widely expressed signaling pathways have been analyzed. We identified a set of network components as most and least influential on the system when perturbed, as well as components that are most and least sensitive to other perturbations. Several of the identified influential components we found to already serve as drug targets. We used this analysis to define a ranked profile of effects that these drug targets have on the rest of the network. In addition, several other network components were predicted as potential new drug targets as evidenced by their highly influential role in our perturbation analysis. These components include: beta-arrestin-1, TNF receptor-associated factor 1, TNF receptor-associated factor 2, dual specificity mitogen-activated protein kinase kinase 2, and ADP-ribosylation factor GTPase-activating protein 1. Of these proteins, beta-arrestin-1, and dual specificity mitogen-activated protein kinase kinase 2 were also identified as highly sensitive in our perturbation analyses. These sensitive and influential components offer a potential means of influencing large-scale effects in the cell with minimal alteration or stabilization, and are therefore potentially viable drug targets.

MADELINE HOLSCHER
Undergraduate
*Amount of Step Width Variability is Increased in Patients with Peripheral Arterial Disease*
Major: Neuroscience
Faculty Advisor: Sara Myers
Co-Authors: Bryan Arnold, Shane Wurdeman, Jennifer Yentes, Jason Johanning, Iraklis Pipinos, Sara Myers

Introduction: Peripheral Arterial disease (PAD) involves blockages of arteries in the legs and affects up to12 million Americans, most of whom are elderly. These individuals also have increased incidence of falls compared to healthy older without PAD. Abnormally high or low step width variability has also been linked to falls and may play a role into mechanisms of falls in patients with PAD. This study investigates the step width variability in patients with PAD. Methods: Patients with PAD and healthy, age matched controls walked at a self-selected pace in a pain free condition. To calculate step width, medial-lateral distances were taken from the heel strike of the right foot to the heel strike of the left foot and vice versa for 212 steps. Standard deviation, coefficient of variation and sample entropy were calculated and differences between the two groups were measured using independent t-tests. Results: Step width standard deviation was significantly higher for patients with PAD compared with healthy controls ($p=0.006$). No significant differences were found for the coefficient of variation or sample entropy. Discussion: Patients with PAD have significantly higher step width variability compared to healthy controls prior to the onset of walking pain. This increased variability is consistent with increased falls in patients with PAD. Since PAD causes damage to muscle and nerve fibers, such damage could be contributing to increased step width variability. Future research should examine whether this increased step width variability is caused from the neural or muscular damage to determine effective treatment options.

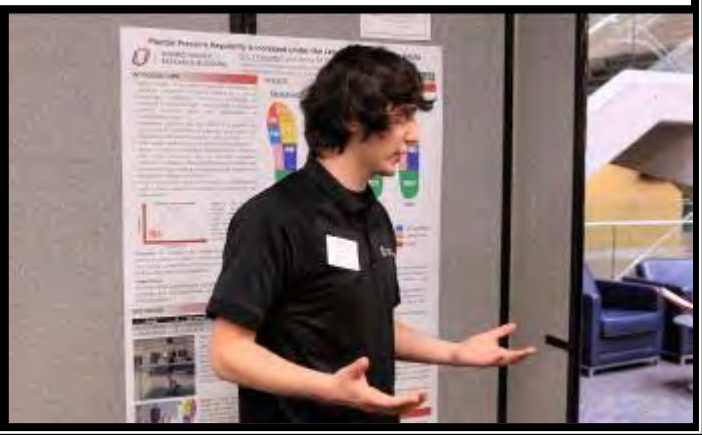
# Undergraduate Abstracts

ALLISON HOOVER
Undergraduate
*Optical Flow with Roll Oscillations Affects Postural Control During Human Locomotion*
Major: Exercise Science
Faculty Advisor: Mukul Mukherjee

Postural control and locomotion rely on input from sensory systems. Virtual reality environments are effective for manipulating visual input. It is known that both frequency and velocity of a tilting visual scene can induce a standing postural response. However, it is unknown whether frequency or amplitude of an oscillating optical flow affects locomotion. We investigated whether medial-lateral (roll) oscillations of different frequency and amplitude combinations embedded within a natural speed-matched anterior- posterior optical flow would affect walking postural control. The dependent variable was the amount of medial-lateral drift exhibited by the C7 vertebrae reflective marker. Healthy young adults walked under ten optic flow conditions. The control condition with no oscillation was compared to nine conditions where amplitude and frequency of oscillation was manipulated. Results showed a significant main effect of frequency. This effect resulted from a reduction in excursion from 0.1 to 0.3 Hz. A significant effect of amplitude was also seen. The excursion increased significantly as the amplitude increased. We also found a significant interaction between frequency and amplitude. This was caused by a much larger increase in excursion from an amplitude of 5° to 10° at a frequency of 0.3 Hz in comparison to the other two frequencies. Therefore, amplitude of an oscillating optical flow affects medial-lateral excursion more than frequency. However, at a particular frequency threshold this effect may be reversed. Therefore, visual control of medial-lateral motion during gait depends on the amplitude and frequency of the visual feedback concurrently, but also depends on a frequency threshold.

DILYS HOUSER
Undergraduate
*Taxonomic classification of an endemic Bermudian fern, using molecular and morphological data*
Major: Biology
Faculty Advisor: P. Roxanne Kellar

*Diplazium* is a genus in the Athyriaceae family of ferns. One specimen of *Diplazium laffanianum* was collected in Bermuda in 1905, and this species is believed to be endemic to Bermuda. Because few individuals remain, it is not very well studied. In this study, I used morphological and molecular methodology to determine the exact taxonomic placement of this species. The government of Bermuda wants to know if *Diplazium laffanianum* (*D. laffanianum*) should remain its own species and if so, what is its phylogenetic placement. *Diplazium* is an immense and diverse genus. In order to properly place this fern into its correct family, phylogenetic and morphological analysis was completed. Nucleotide sequences from six plastid markers (*atpA, atpB, matK, rbcL, rps4-trnS,* and *trnL-F*) were used to construct a phylogenetic tree for *D. laffanianum*. Upon completion of the tree, *D. laffanianum* fell sister to *Diplazium cristatum* which is found in Mexico, the Caribbean, and South America. From review of the phylogenetic tree, I borrowed several herbarium specimens of *D. laffanianum, Diplazium cristatum, Diplazium plantaginifolium*, and *Diplazium bombonasae*. All these species were in the same clade as *D. laffanianum*. With these samples, I investigated 20 different morphological characteristics of *Diplazium* and developed a character matrix which included a wide range of descriptors such as color, size, and other metrics. With this information, I was able to determine that *D. laffanianum* is its own distinct species and it can now be properly protected.



# Undergraduate Abstracts

BRANDON HULSEBUSCH
Undergraduate
*Determination of the Dissimilarity of a Highly Conserved Gene in a Hive of Apis mellifera (The Common Honey Bee)*
Major: Bioinformatics
Faculty Advisor: Karen Murch-Shafer

This purpose of this project is to better understand the dissimilarity of a highly conserved gene between bees living in the same hive. Apis mellifera, the common honey bee, has had a fairly constant population decline since the 1960s, dropping at a rate of about 17%-20% per year, until about 2007. Since then, numbers have been decreasing at alarming rates, leading to a loss of up to 30% yearly, to most drastic cases of 90% of entire colonies. The cause of this collapse is unknown, and is likely caused by a multitude of factors, including parasites, insecticides, habitat degradation, and air pollution. This project will be working with the genetic makeup of the honey bee, whose genome is globally seen as very valuable. The honey bee was set to a high-priority organism for genome sequencing because of its importance in understanding social patterns in nature and its massive impact on human's agriculture. This research is important because this will help us determine how genetically similar or dissimilar female worker bees are, which has many implications, such as the bees' susceptibility to various pathogens, pests, and other environmental stresses. My goal is to better understand how genetic information can be processed and analyzed, and this project provides the chance to produce new ways of thinking in the bioinformatics field, and ideally publish a paper relating to genetic dissimilarity. Because the importance of honey bees is so high, the more information we can gather on them, the better.

SAVANNAH HUNTER
Undergraduate
*An Application of the Work-Demands Resources Model to Understanding Working College Student Outcomes*
Majors: Psychology and Spanish
Faculty Advisor: Lisa Scherer

Bakker's (2007) Job-Demands Resources (JD-R) model predicts that stress and negative life outcomes will increase as the job demands operating on a person increase; however, as the number of resources available increase so will their ability to cope with these negative effects of demands on wellness. The JD-R model was developed for employees in a work context. My research adapted the JD-R model to assess the wellness of working, college students who experience a myriad of demands beyond that of just work. Many students today work part-time or full-time jobs, in addition they take a full load of college courses, care for their families, and desire to socialize with friends. The literature suggests that too many demands on students can lead them to drop out of college (Barefoot 2004; Daley, 2010). My presentation will discuss if resources available to students are able to combat these demands and increase student wellness. Wellness is vital as studies indicate that students who experience a higher 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). My presentation will discuss how working, college student perceptions of their total life demands and total life resources effect their wellness and in turn their intentions to quit school and their academic success.

CHYNNA JEDLICKA
Undergraduate
*Gender Evolution: Observing dynamic gender within China Miéville's Perdido Street Station*
Major: Sociology
Faculty Advisor: Kristen Girten

The relationship between Yagharek, a Grarduda "bird-man" warrior creature, and Isaac Dan der Grimnebulin, an unorthodox research biologist, within China Miéville's *Perdido Street Station* (2000) suggests that gender is an ever evolving social construct which is expressed through social interaction, and is affected by experiences of gendered individuals. China Miéville is a science fiction writer who saturates his work with allegorical illustrations of political, humanist, and social commentaries. I want to emphasize one relationship within *Perdido Street Station* – that of the one between Isaac and Yagharek. While observing their alliance throughout the story, it can be noted that their gender is changing, evolving as the plot thickens and we are swept up into a thrill ride of Science Fiction. With outside research and my own evaluation into this phenomenon presented, I am going to dissect this kinship, between Yagharek and Isaac, while exposing its allegorical connection to current theories of gender identity. I will demonstrate that Yagharek and Isaac's gendered identities are dynamic; they are constantly transforming throughout the course of the novel. These transformations are allegorically suggesting that gender is constructed by the individual and is not an innate characteristic. Based on my own outside research, it is clear that Miéville's depiction of gender, through Yagharek and Isaac, is correct.

# Undergraduate Abstracts

KATIE JUAREZ
Undergraduate
*Testing Novelty Synergistic Drug Combinations to Knock-out Toxoplasma gondii in Mice Brains*
Major: Biotechnology
Faculty Advisor: Paul Davis

*Toxoplasma gondii* is an intracellular obligate parasite that is capable of invading a wide variety of vertebrates. While most infections of *Toxoplasma gondii* remain latent, infections can result in severe effects like behavioral changes, psychiatric disorders, and death. Currently there is no cure for the chronic infection, the bradyzoite form, of *Toxoplasmosis*. Prior to this study, preliminary research was performed in an attempt to develop a novel drug that will kill a chronic *Toxoplasma gondii* infection. Qualitative Polymerase Chain Reaction (qPCR) was performed to quantify remaining cysts in the infected mouse brains. The goal of this experiment is to determine the effectiveness of the novel drugs administered to the test subjects, hopefully leading to an identification of a novel drug combination that successfully eliminates chronic *toxoplasmosis* infection in mice.

ALLI KALINA
Undergraduate
*Strength Profiles Following Supervised Treadmill Exercise Treatment in Peripheral Arterial Disease*
Major: Exercise Science
Faculty Advisor: Sara Myers

Peripheral arterial disease (PAD) is a cardiovascular disease involving atherosclerosis is the lower extremity arteries, which affects almost 12 million people in the U.S. The main symptom is claudication, or pain in the legs caused by walking when the muscles do not receive adequate blood flow and thus oxygen through the blocked leg arteries. Decreases in muscular strength and power generation has been shown in these patients in all three lower extremity joints, of which the ankle is most affected. Treatment involves supervised treadmill exercise, which improves walking distances, but the effect on muscular strength is unknown. Thus, the objective is to investigate muscular strength profiles of the ankle plantarflexors in patients with PAD before and after a supervised treadmill exercise program. Muscular strength tests were performed before and after six months of supervised treadmill exercise, which consisted of intermittent walking for 60 minutes per session, three days per week. Strength was measured by performing two maximal repetitions of isometric plantarflexion using isometric dynamometry (Biodex Medical Systems). Peak torque, time to peak torque, mean, standard deviation, and loading rate were recorded. After exercise treatment, peak torque and average torque improved. Results show that treadmill exercise improves strength, however, it is unknown whether gait deficits associated with PAD persist after treadmill exercise. These findings could lead to development of more effective exercise interventions that could improve gait performance.

KOKOU KANLEY
Undergraduate
*Synthesis of Botulinum Neurotoxin Inhibitors*
Major: Medicinal Chemistry
Faculty Advisor: James Hagen

Botulinum neurotoxins (BoNTs) are one of the most powerful toxins known due to its extreme lethality to humans and other mammals. They act as metalloproteases by blocking nerve function and inhibiting the release of the neurotransmitter Acetylcholine into the synaptic cleft. This project aimed at synthesizing small inhibitor molecules that would reverse the effects of the toxin by either blocking the catalytic zinc in the active site or completely covering it. A series of a three-step reaction was used to manufacture the intended molecule and various organic chemistry methods were used as well. The product of the first step of the reaction was isolated, but the reductive amination reaction used in creating the second product is still ongoing. The third and final nucleophilic addition step is a well-known mechanism. Proton, Carbon and DEPT NMR were used to verify the accuracy of the synthesized compounds.

# Undergraduate Abstracts

SEPEHR KHALILI-TARI
Undergraduate
*Differences in inspiration between offspring of bipolar parents and a control group*
Major: Psychology
Faculty Advisor: Jonathan Santo

Bipolar illness is a mental disorder that involves abnormal shifts in mood, which can negatively affect aspects of individuals' lifestyles and productivity. A major issue regarding bipolar illness is its common avoidance of receiving a diagnosis and treatment. Although direct causes of bipolar illness have not been established, there has been a high prevalence of bipolar individuals sharing the illness with first-degree relatives. Additionally, there has been speculation that there is an association between creative accomplishment and this mental illness, studied mostly among samples of eminent artists, the current study aims to contribute to these findings. The current project builds on a previous study where a group of offspring of bipolar parents was compared to a control group. The current investigation will use the previous dataset to explore differences in perceptions of inspiration applying an item from the PANAS scale. It is expected that offspring of bipolar parents will rate themselves more highly in inspiration. It is also hypothesized that self- reported inspiration and impulsivity will be positively correlated. Implications will also be discussed.

JORDAN KOCH
Undergraduate
*Students, What Are They Thinking? The Influence of Timely Feedback and Utilization of Blackboard on Student Engagement*
Major: Elementary Education
Faculty Advisor: Lisa Scherer

Purpose of Research: Student concerns on the timeliness of feedback and utilization of Blackboard in relation to the student experience drove the research. We, as members of Student Government, wanted to respond to these concerns. With the assistance of Faculty Senate members, trained in survey methodology, we collaboratively developed a campus-wide survey of UNO students. Ultimately, we wanted to evaluate and better understand how to improve the quality of their experience. Information regarding these topics was previously unavailable. Methodology: A total of 1478 students at UNO voluntarily responded to an anonymous online survey created by a six-member team of faculty and student senators. The link to the survey was distributed to the UNO students via email and Blackboard on April 2, 2014, and the survey was closed on May 2, 2014. The survey consisted of 23 closed-ended questions covering the following: demographic information, timeliness of feedback within courses, utilization of Blackboard, the outcomes of student academic satisfaction, engagement, and intentions to quit UNO or college. Results and Discussion: The presentation will cover the results for three major research questions: the relationship between demographic information and outcomes, the relationship between feedback variables and outcomes, and the relationship between Blackboard usage and outcomes. These results will be situated within the scholarly literature on student engagement. Implications and future steps will be identified.

BYRON KORF
Undergraduate
*Quantifying Free and Total Glycerine in Biodiesel*
Major: Medicinal Chemistry
Faculty Advisory: Alan Gift

Biodiesel is a renewable source of fuel that reduces the dependence of fossil fuels. It is manufactured by recycling used fats and oils. Due to its growing popularity, small-scale biodiesel operations are being built to meet the demand. However, strong standards have been put in place to sell biodiesel commercially. Biodiesel needs to be very low in its by-products, free and bound glycerol, to meet those standards. For small-scale producers, the cost of testing for impurities is high. It is our goal in this project, to develop a method to quantify glycerol content that is accurate and cost effective. We have collected data from varying samples on both GC-FID and NIR instruments. We developed a method for quantifying free glycerol, monoglycerides, diglycerides, and triglycerides in the samples using two internal standards: tricaprin and butanetriol. The method proved effective as our results were as expected. The hope is that we can build a calibration curve that will allow us to quantify the free and total glycerol content using the near-infrared instrument with the same effectiveness.

# Undergraduate Abstracts

KAREN KRACL
Undergraduate
*Plaque Assay of EMS exposed Toxoplasma gondii*
Major: Biotechnology
Faculty Advisor: Paul Davis

*Toxoplasma gondii* is a parasite which resides in mammals. Toxoplasmosis has been shown to alter mouse behavior and is suspected to do so in humans. It has been shown to cause slower reaction times and reckless behavior. Finding a drug to eradicate *Toxoplasma gondii* could help decrease the effects of these behavior changes. Our group has identified potential new therapies for *T. gondii*, but the target of this drug is currently unknown. We will use mutagenesis and screening to identify these targets and this work describes the development of methods for generating mutagenized pathogen. To test the efficacy of our mutagenesis, we have used plaque assays. These plaque assays will help us determine whether or not we are successfully mutating *T. gondii* at varying mutagen doses.

JOSIAH KRUTZ
Undergraduate
*A More Secure Means of User Authentication through USB Devices*
Majors: Computer Science and Information Assurance
Faculty Advisor: Kenneth Dick

In 2007-2009, over 5 million computers were stolen in the United States. About 21% of the victims used only a log-in password (the password you type in after initially starting your computer) to secure their computers. As many as 46.5% of those surveyed said they had information worth up to $1 million on their computers. (http://www.mactech.com/2010/08/03/key-findings-8th-annual-2010-bsi-computer-theft-survey) Users often create weak passwords for their computers, which could allow a malicious agent to guess their password, gaining access to their system. My research involves creating a two-factor authentication system for logging in to computers. While various other token-based (e.g. smart card, USB device) authentication solutions exist for logging into websites and operating systems, my research specifically allows users to employ two-factor authentication with a complex key stored on a flash drive combined with a user's PIN, to log into their computers' Windows operating systems. The physical authentication factor comes from letting the user utilize any off- the-shelf USB flash drive as the main key. The knowledge authentication factor comes from the user memorizing a 4-digit or longer PIN code. Together, this creates an easy to use, intuitive, and secure authentication system for a user's personal computer. This system could reach a wide audience by being made available free of charge over the internet. Additionally, this project could be used in further research involving hard drive encryption to provide an even more secure solution.

COLLIN LEFROIS
Undergraduate
*The Impact of a Virescent-like Mutation on Carbon and Nitrogen Metabolism in Glechoma hederacea*
Major: Biology
Faculty Advisor: Mark Schoenbeck
Co-Author: P. 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, reduced starch accumulation, pest resistance, increased size and number of trichomes, and increased leaf lobing – was identified in a local population. Our objectives were 1) to more thoroughly characterize the impacts of the "virescent-like" mutation on carbon and nitrogen metabolism, and 2) to more accurately identify the plastomic loci in which mutations were proposed in previous work. In field plots, the mutant was unable to survive through winter, 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 in the mutant, however. Data collected from malate dehydrogenase assays confirmed that the mutant possessed a greater increase in activity in young leaves compared to mature leaves. Contrary to previous investigations, leaf tissue of *G. hederacea* appeared to insensitive to nitrate reductase induction possibly due to the different growth conditions of the plant (increased pests, different season, and age of plants). A successful attempt to culture *G. hederacea* leaf tissue opened a new avenue to explore using this technique.

# Undergraduate Abstracts

HARRISON LEFROIS
Undergraduate
*Khovanov homology and wrap-arounds: looking for patterns.*
Major: Mathematics
Faculty Advisor: Robert Todd

Knot theory is the study of knots similar to those we encounter in everyday life. Two primary questions in knot theory are when can two knots be considered equivalent and how do we tell if they are. Mathematicians have invented many tools, called knot invariants, to answer these questions. A knot invariant is a property of a given knot that does not change when you manipulate the knot without cutting the strands. Examples of knot invariants are the crossing number, the Alexander polynomial, and the Khovanov homology. In this project, we study the Khovanov homology of a family of knots and propose a general form of the Poincare polynomial.

NICHOLAS LEMPKE
Undergraduate
*Children's looking preference for biological motion may be related to an affinity for mathematical chaos*
Major: Exercise Science
Faculty Advisor: Anastasia Kyvelidou

The purpose of this study was to assess the influence of perceived object motion on concurrent sensorimotor behavior of typically developing children. Synchronous eye movement and standing posture recordings were taken while a moving point-light stimulus was displayed on a monitor in front of the participant. The stimulus moved according to a predefined motion trajectory; Sine, Chaos, and Brown Noise. Cross recurrence quantification analysis was used to assess coupling of gaze and posture to the stimulus, separately, as well to gauge sensorimotor coupling. A significant stimulus effect was found for Gaze percent determinism. Rate of coordination of gaze to stimulus motion was similar in response to Sine and Chaos conditions, but was lesser than each for the Brown Noise condition. Duration of coordination of gaze responded to the structure of stimulus motion and was highest with Chaos. A significant stimulus effect was found for COP percent determinism. Differences were found among each of the conditions, with the greatest rate of coordination in response to the Sine stimulus and the least rate of coordination in response to the Brown Noise stimulus. No main effect of stimulus was found for SensMot, for either percent determinism or maxline. No main effect of age or interactions was found for any outcome for Gaze, COP, or SensMot. These results raise the possibility that children may recognize chaotic motion structures and may have a preference for coordination with them. The lack of SensMot coupling raise questions for the development of perception and production of intentional action.

JACOB LINDGREN
Undergraduate
*"White Powder" – Is it Harmful or Not?*
Major: Computer Science
Faculty Advisor: Ann Fruhling

There are many communicable diseases, but very few that can be considered threats once distance is placed between the vector and potential hosts. Anthrax is a disease that is able to defy that convention. Anthrax in its dormant form can be identified by its light brown powdery look and its gram positive stain color. It is a horrible bacterial disease that is very infectious whether it be through direct inhalation, consummation, or direct contact. Historically Anthrax can be a fatal disease. In order to minimize exposure and intervene quickly, simple and effective methods of identifying such substances are necessary. Being able to identify "white powder" at the origination site, to determine whether or not it poses a threat, would benefit public safety. There are few mobile laboratories that can do "white powder" tests in the field. The purpose of this research project was to research, identify, and test information technology that could "rule out" various bioterrorism powders such as anthrax. The end goal is to add the functionality to the STATPack emergency response system for public health laboratories. This should allow technicians to have the ability to analyze various substances and use various decision support protocols to help identify the type of powder.

# Undergraduate Abstracts

KIMI LUEDERS
Undergraduate
*As Risk of Falls Increase in the Elderly, Standing Postural Control Shows Stronger Long-Range Correlations*
Major: Exercise Science
Faculty Advisor: Mukul Mukherjee

Aging is associated with changes in physical function that leads to increased risk of falling. Within the aged population it's not clear how risks of falls may be associated with postural control. This research investigates postural control in early/late aging and considers magnitude and structure of movement variability. Methods: Three groups participated: young (Y), early (E), and late aging (LA). A force platform recorded center of pressure (COP) in three conditions: normal standing, absent vision, and faulty vision. The COP values were used to calculate range, root mean square, and long-range correlations (using detrended fluctuation analysis; DFA) of postural sway. The EA and LA group also performed the timed up and go (TUG) test and a fall risk questionnaire. A 3x3 mixed model ANOVA compared COP variables and independent samples t-tests compared fall- risk measures. Results: Comparisons between groups revealed differences between the Y and LA groups. The LA group had an increased ML range and ML DFA. When comparing the LA and EA groups for measures of fall risk the LA group demonstrated higher scores on the questionnaire and longer time on the TUG. Conclusions: These results demonstrate an increase ML sway for the LA group. Such sway patterns are very regular with low variability. Postural control is constrained with reduced ability to respond to environmental perturbations. This is demonstrated in increased fall-risks in this group. Therefore, within an aged group there is deterioration of postural control, specifically in terms of flexibility within the temporal patterns of ML sway.

WAYNE MANION
Undergraduate
*Attempted transcriptome assembly of Homalodisca vitripennis*
Major: Bioinformatics
Faculty Advisor: Paul Davis

*Homalodisca vitripennis* is a large herbivorous insect that feeds on a wide variety of plant species in its nymph and adult forms. Targets of H. vitripennis include plants which produce citrus fruits, grapes, almonds and stone fruits. The purpose of this project is to provide an analysis of RNA sequence data provided by the United States Department of Agriculture (USDA) specifically to the Davis Lab at UNO. Due to RNA quality issues, efforts were placed to aggressively filter and assemble the sequencer data. Differences in the quality of results obtained applying these established protocols to this dataset and to a previous data set in this lab are presented here.

MADISON MAPES
Undergraduate
*The use of Polyvinyl Alcohol and Polyacrylic Acid to Inhibit the Hydrate Transformation of the Drug Theophylline*
Major: Finance and Banking
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) and polyacrylic acid (PAA) were investigated to better understand the factors that inhibit this theophylline transformation. Anhydrous theophylline was added to solutions containing dissolved PVA or PAA 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 or PAA had little to no effect on the intrinsic dissolution and solubility of theophylline. This suggests that PVA and PAA are inhibiting the transformation of theophylline by affecting the growth of the hydrate phase.

# Undergraduate Abstracts

RONI MCCLELLEN
Undergraduate
*Spatial occurrence of the herbicide atrazine in the Mississippi River: Can citizen scientists collect the data?*
Major: Biology
Faculty Advisor: Alan Kolok

The use of crowd-sourcing with citizen scientists to collect scientific data is a growing movement, especially in cases where spatial or temporal regions are too large for traditional sample methods. This study, known as *Lil' Miss Atrazine*, used crowdsourcing and citizen scientists to conduct a large-scale water test along the Mississippi River watershed. The testing focused on atrazine, the second most commonly applied herbicide in the United States. These citizen scientists used an easy-to-use commercially available indicator strip to perform the assessment. Atrazine strips are relatively inexpensive and extremely sensitive, discriminating the presence of the herbicide at the EPA's drinking water standard of three parts per billion (ppb). The project used newly acquired contacts and partnerships with various universities and organizations throughout the Mississippi River watershed, from Lake Itasca, Minnesota to New Orleans, Louisiana. Within a 24-hour period, respondents sampled water throughout this watershed returning the data to UNO. Through email, texting, Twitter, Instagram, and postcards, a grand total of 211 useable data points were compiled from seven states throughout the watershed. The data collected came primarily from the state of Illinois. While the results were generally (80%) negative, areas of positive hits were clustered in certain geographical areas, such as St. Louis, Missouri. It would not have been possible to gather these data over such a large geography using conventional techniques.

CLAIRE O'CONNELL
Undergraduate
*Opportunistic Competition and Collaboration in Two-Robot Teams*
Major: Computer Science
Faculty advisor: Prithviraj Dasgupta
Co-Authors: Prithviraj Dasgupta, Jose Baca

In my research I have investigated the problem of autonomous coordination between robots, where each robot has to decide whether to work cooperatively or competitively to accomplish a set of assigned tasks. A task for a robot is abstracted as a location in the robot's environment that must be visited to perform certain operations, such as collecting samples. The robot's objective is to maximize the mass of samples collected while minimizing the amount of fuel spent. Each robot uses a graph theoretic algorithm, called Dijkstra's algorithm, to find the shortest cost path for visiting the task locations. The cost is measured in terms of mass collected and fuel expended. Each robot then examines whether its cost is lower when visiting tasks individually or when collaborating and visiting tasks together. If both robots have lower individual path costs than the collaborative cost, they act individually. Conversely, if the collaborative cost is smaller than either individual cost, they collaborate. In the event of conflict, when one robot's individual cost is smaller than the collaboration cost and the other robot's cost is larger, the concept of maximizing social benefit in a group was used, meaning: the robots decide to act collaboratively only if doing so results in lower combined costs than the combined cost when acting individually. The proposed solution was implemented on the SPHERES robots within the Zero Robotics simulator, which is used for the MIT/NASA Zero Robotics Challenge. The results from simulating different two robot scenarios with different task locations and sample mass, will be demonstrated during the presentation.

# Undergraduate Abstracts

**ELIZABETH OLREE**
Undergraduate
*Stratigraphic Analysis of Synsedimentary Half Grabens in the White River Group of NW South Dakota*
Major: Geology
Faculty Advisor: Harmon Maher

The northern portion of Slim Buttes in NW South Dakota is affected over a 15 by 20 km2 area by significant faulting of assumed nontectonic origin. The cause is not well understood, but gravitational collapse is a possible mechanism. The structure is characterized by rotated half-grabens, with the associated faults connecting in listric geometry to a shallow detachment at the base of the visible layers. The faults occur in Eocene-Oligocene sedimentary rocks, which are overlain by Miocene-aged rocks deposited after faulting ended, constraining the time of deformation to circa 26-27 Ma. The Brule formation, consisting of channel sandstones and loess, is the youngest unit disturbed by faulting. Evidence suggests that some of the faulting occurred as Brule sediments were still being deposited. Typically during synsedimentary faulting, a wedge architecture develops when the space at the top of a rotating half-graben accumulates new sediment. Stratigraphic sections measured within the fault-bounded half-grabens were used to determine the 3-D geometry of the sedimentary units in relation to the faults. Distinctive paleosol horizons within the Brule formation can be correlated between sections and show that sedimentary layers become progressively condensed with increasing distance from faults, consistent with depositional facies changes caused by half-graben rotation. Additionally, playa lake deposits found localized near faults are consistent with lakes forming in areas of lower relief. Such a constraint on fault timing helps to inform models for this enigmatic type of deformation and guide future research in the area.


**MAKENZIE PETERSEN**
Undergraduate
*Project HALON*
Major: Electronics Engineering
Faculty Advisor: James Taylor
Co-Authors: Cody Largent, Dakoda Kilzer, KayLee Taylor, Thaine Rowley

Project HALON (High Altitude Learning Over Nebraska) is a NASA Nebraska Space Grant-sponsored project in which college and high school student teams utilize the Space Systems Engineering Process to design near-space experiments. The overall goal of the UNO ACME Lab Team is to design a high altitude balloon payload that is stable and capable of transmitting real-time imagery from the balloon to mission control. This spring, Project RODEO will be launched by the ACME Lab Team to research and collect data on the movement of the payload and the feasibility of using off-the-shelf Wi-Fi components to send video to the ground station. The payload, a Raspberry Pi computer with four sensors collecting data, is contained in a styrofoam box and attached to a weather balloon that provides lift for the experiment. Two triple-axis accelerometers will be placed on opposite corners of the payload to measure all movement of the payload during flight. Data collected will be used to determine the amount of control authority needed to counter payload motion in future experiments. The other two sensors will measure interior and exterior temperature of the payload to confirm if the equipment was working within operational parameters. To test real-time imagery capability, an off-the-shelf wireless router and webcam will be placed on the bottom of the payload to test the video connectivity and quality. With this research, a stable payload could capture stable images of the solar eclipse over Nebraska in 2017.

# Undergraduate Abstracts

LAUREN PETERSON
Undergraduate
*Generation of Transcriptomes for Denisova and Neanderthal*
Major: Bioinformatics
Faculty Advisor: Mark Pauley

Beginning in 2010, the genomes of two ancestral human species, Neanderthal and Denisova, have been sequenced. These genomes have provided information about genetic diversity and genetic homology, approximate species age, genetic contribution of Neanderthals and Denisovans to modern-day humans, and modern day genetic relationships. While I am continuing to work on my project, I am assisting in the work that the Pauley group is doing in the collaboration with the Guda lab. I will help to validate the results of the BLAST of the human transcriptome against the Neanderthal and Denisova genomes. Next, I will work to write computer software to produce transcriptomes for Denisova and Neanderthal using *sim4cc*. For this, I will use the human transcriptome obtained from the National Center for Biotechnology Information, and the Denisovan and Neanderthal genomes, that have already been obtained by the Pauley group. This data will be provided to the Guda lab for further analysis.

CHRISTA PIER
Undergraduate
*Louis Grell: The Lost Murals*
Majors: Art History/3D Modeling and Animation
Faculty Advisor: Amy Morris

In the city of Toledo, Ohio a historic building known as the Paramount Theater was destroyed in 1965. With the destruction of the theater so too was the artistic murals that decorated its grand lobby ceiling. Designed by Louis Grell, a Chicago artist known for working on the Chicago Theater, the murals highlighted the extravagant surroundings of the lobbies' interior. With only a handful of black and white photographs left and no video or color images to record its splendor I set out to reconstruct the ceiling using modern 3D modeling and animation software. My goal of this project was to create an accurate representation of what the ceiling would have looked like in the past. Using the few remaining photographs and collecting other schematic information from several literary sources I attempted to replicate the ceiling using a 3D modeling program called Maya and the photo editing program Photoshop. With the help of these programs I was able to reconstruct a basic black and white model of the ceilings' layout and artistic motifs in greater detail than what can be viewed in the surviving photographs. While only the ceiling has been reconstructed with this project; the Toledo Paramount Theater is one of many historical buildings in the United States that has, and could continue to benefit from virtual reconstruction.

MARISSA POE
Undergraduate
*Circumvallate papilla and taste bud morphology following lingual nerve transection*
Major: Neuroscience
Faculty Advisor: Suzanne Sollars

The sensory system of taste is important in determining the safety of substances before ingestion. Taste information from the posterior part of the tongue originates from taste buds in the circumvallate papillae area and is transmitted to the brain through the glossopharyngeal nerve. The front two-thirds of the tongue is covered in mushroom-shaped fungiform papillae. The chorda tympani nerve transmits taste information from taste buds in the fungiform papillae to the brain, while the lingual nerve transmits somatosensory (e.g. hot, cold, pain) information from the fungiform papillae tissue to the brain. When the lingual nerve is surgically transected in the rat, the taste buds become smaller, even though there is no synaptic contact between the lingual nerve and taste buds. This effect is most pronounced when the surgery is done in young rats, demonstrating an age-dependent cross-modal interaction. The present study examined the relationship between lingual nerve transection at various ages and its effect on circumvallate taste buds. Rats underwent either a lingual nerve transection or a sham surgery (control) at differing ages, and then tongue tissue was collected at various time points after surgery. The tissue was sectioned on a cryostat, stained, and microscopically analyzed to determine differences in taste bud size. Observed differences would indicate cross-modal communication between the lingual and glossopharyngeal nerves, suggesting that the neural communication network throughout the taste system extends beyond the nerves themselves.

# Undergraduate Abstracts

ANDREW PULFER
Undergraduate
*Dynamic System Analysis of HIV infection in CD4+ T-cells*
Major: Bioinformatics
Faculty Advisor: Tomas Helikar

Cell pathways form a complex web of protein interactions that are almost impossible to understand without some sort of aid. Using The Cell Collective and review of published papers on the topic, I was able to create a large scale detailed model of how HIV infection occurs in a CD4+ T-cell. This model can dynamically simulate the infection and show the effects it has on the cell as a whole. By comparing the results of the model found from in-silico simulations to phenomena that have been reported in other papers, the models accuracy can be validated. After validation the model is now being used to attempt to predict novel relationships between pathways and predict phenomena to be tested in laboratory studies. The second aspect of the project involved developing software in The Cell Collective to allow any user to conduct large scale analysis of entire models. This analysis performs a knockout study for each individual node in the model. The knockout of a single node can produce a rippling effect through the entire model that is quantified to analyze the entire model dynamics This software is able to calculate the sensitivity of certain proteins in the cell's pathways and output a result for the entire model as a whole.

BINA RANJIT
Undergraduate
*Septin regulation in Candida albicans*
Major: Biotechnology
Faculty Advisor: Jill Blankenship

*Candida albicans* is an opportunistic human pathogen that commonly causes oral and genital infections in humans. Hospital acquired infections by *C.albicans* and *C.albicans* biofilms on surfaces of implantable medical devices are of growing concern. Pathogenicity of the organism is dependent on its ability to change between yeast and filamentous form, fixation to epithelial and endothelial cells and synthesis of extracellular proteinases. The septin family of cytoskeletal filament-forming proteins has functions in cellular morphogenesis and cell surface events in eukaryotes. Septins were first identified in the yeast *Saccharomyces cerevisiae* and function at the bud neck by forming a scaffold to recruit other proteins. Septin regulation is still unclear in *C.albicans*. Septin localization using GFP tags in mutant strains would help understand regulation during filamentation or stress using genes known to affect those processes.

BRADEN C. RAPP
Undergraduate
*Validity & Sentiment in Digital Marketing*
Major: Journalism
Faculty Advisor: Jeremy Lipschultz

Marketing relies on a call and response between consumers and marketers. Perhaps today like never before, marketing entities interact with consumers through the aid of social media channels. Through these channels customers provide direct feedback to marketing entities. In this climate, Twitter has emerged as a leader in facilitating these types of consumer-marketer interactions. As such, this research seeks to illuminate how sentiment is measured via interactions between marketers and specific publics as these interactions are played out through social media. The Twitter feeds of two record labels are analyzed based on available research surrounding online sentiment analysis and social media in general. This research concludes with suggestions on how marketers can employ sentiment research into online campaign strategy. Additionally, this research suggests a direction for further development in the realm of sentiment analysis.

# Undergraduate Abstracts

CAMMIE REDFORD
Undergraduate
*Understanding the Special Education Teacher as a General Education Teacher*
Major: Elementary Education
Faculty Advisor: Jessica Hagaman

New special education teachers are leaving the field at rapid rates. The attrition rate of special education teachers sits around 50% - especially within the first 5 years. In other words, roughly 50% of new special education teachers will leave the field within their first few years of teaching. With extensive paperwork, heavy caseloads of students, and other high expectations from general education teachers or administration, special educators are being spread very thin. Studies on special educator "burn-out" have been conducted; however we are still seeking solutions on what can be done to lower this attrition rate. With special educators being needed more than ever because of increasing rates of students needing special education services in our K-12 schools, it is becoming more important to uncover an answer. Through the research I am conducting with Dr. Jessica Hagaman, I have been able to gain more insight as a pre-service general education teacher into the difficulties new special educators are having through focus groups with teachers from various school districts in surrounding areas. By discussing with new special educators and administration, we hope to find the supports we can give pre-service and current special educators to decrease the attrition rate in this profession. As a pre-service teacher this opportunity has given me a new perspective on how a general educator should look at the responsibilities of a special educator. We must collaborate and do our own part in the process, giving so much respect to the work they do.

ALICIA REYES
Undergraduate
*Energy Demands of Reproduction in Burying Beetles*
Major: Psychology
Faculty Advisor: Claudia Rauter

Reproduction is energetically expensive for females. In order to take on these energy demands, reproducing females build up energy reserves before or at the onset of reproduction. These energy reserves are used up to feed and nurture offspring. Burying beetles provide extensive parental care to their offspring and gain substantial mass during egg laying, but lose all the mass again while feeding the offspring with regurgitated food. The goal of this study was to determine whether burying beetles accumulate energy reserves during egg laying in anticipation of the energetically demanding parental care phase. Using photometric methods, I measured glycogen (storage form of carbohydrate), glucose (transport form of carbohydrate in body), and lipid content of burying beetles at four different stages of reproduction: before, during egg laying, during parental care, and at the end of the reproductive event. Whole body lipid content decreased consistently during reproduction. The whole body content of glucose and glycogen was highest during egg laying and parental care and reached pre-reproduction levels at the end of the reproductive event. These results suggest that burying beetles store energy in form of carbohydrates instead of lipids and use the stored energy for the energetically demanding parental care.

NICHOLAS REYNOLDS
Undergraduate
*Information about how another person is moving through the environment is conveyed in the movements of their limbs*
Major: Exercise Science
Faculty Advisor: Steven Harrison
Co-Authors: Steven Harrison, Nick Stergiou

It is possible for us as individuals to know many things about another person just by seeing how that person is moving through the environment. This capacity is used commonly by physical therapists when performing visual assessments as a starting point for any functional evaluation. Research shows that a person has a sense of his or her own individual movement through the world that depends upon the way their legs are coordinated in locomotion. We are interested in finding out if an individual can use this sense, and translate it into being able to assess how another individual is moving throughout an environment. Previous research on visual perception has shown that you can perceive the identity of acquaintances purely based on their walking gait. Although it is known we can visually perceive such properties, little is known about the mechanisms of the visual perception system that make this possible. In this research we investigated the ability to visually perceive another person's movements when those movements are seen as moving stick figures. In this research we found that the ability to perceive another person's movements depended upon the way the seen person's legs were coordinated in locomotion. We found that the pattern of results observed for perceiving other's movements matched those for perceiving one's own movements.

# Undergraduate Abstracts

GRACE RICH
Undergraduate
*Cell Collective: an interactive modeling resource for the scientific community*
Major: Neuroscience
Faculty Advisor: Tom Helikar

The advantages of computational modeling in biomedical research include the ability to analyze and simulate complex biological systems, acting as a predictive agent to generate new hypotheses capable of being tested in the laboratory. Until recently, computational modeling has been limited to those with a background in computational methods. In addition, models are published in a format not easily manipulated or replicated by the majority of the scientific community. In order to expand the usability of computational modeling to a wider audience, researchers need 1)an easily accessible modeling environment and 2) an environment enabling them to create, modify, and edit previously built models. Beginning to address these gaps was the goal of my FUSE project, using software called the Cell Collective. Cell Collective is a computational modeling platform allowing researchers to collaboratively build, analyze, and simulate computational network-models. Through its intuitive user interface, the platform makes computational modeling accessible to laboratory researchers without prior training in mathematics or computer science. Using this platform, I built, annotated, and validated 17 models available to the research community. The models were built with Cell Collective's Bio-Logic Builder, capable of manipulating a network based on biochemical context instead of requiring direct input of complex mathematical functions (which are compiled in background of the software). The models were fully annotated using Cell Collective's Knowledge-Base, a repository containing the citations and evidence supporting every interaction within a model available for review and further expansion by other researchers. Ultimately, the models built for my project provide a sizeable and accessible environment for researchers to expand upon and modify based on their own scientific interests.

CASEY RIESBERG
Undergraduate
*Communication Apprehension in Bilingual College Students: A Variation of Speaking the Same?*
Major: Speech Communications
Faculty Advisor: Barbara Pickering

This paper analyzes Communication Apprehension (CA) in the lives of bilingual college students. High Communication Apprehension (HCA) and Low Communication Apprehension (LCA) are also examined to understand and compare the possible congruencies and differences between these levels of Communication Apprehension with time an individual has spoken a language, the amount of education a student has had within that language, the possibility of being immersed with a language's culture, as well as the possible gender differences between first and second language. Previous research has shown that individuals who have CA are more likely to have it in their second language but those who do not have apprehension in their first language will not have it in their second language. What is missing here is the answer to the question, "How much?" This study hopes to recognize the large potential increase in apprehension in first language to second language, compared with time, education, and gender differences that may also have a role in the eventual CA level an individual possesses. This research analysis suggests that there is an increase in CA from first to second language that is effected by time, education, and gender. For many individuals that increase is almost double the amount of that CA in their first language.

# Undergraduate Abstracts

JOHN RILEY
Undergraduate
*Binding interactions of the Mannose 6-phosphate/Insulin-like growth factor 2 receptor subdomains*
Major: Biotechnology
Faculty Advisor: Jodi Kreiling
Co-Author: Brittney Tweedy

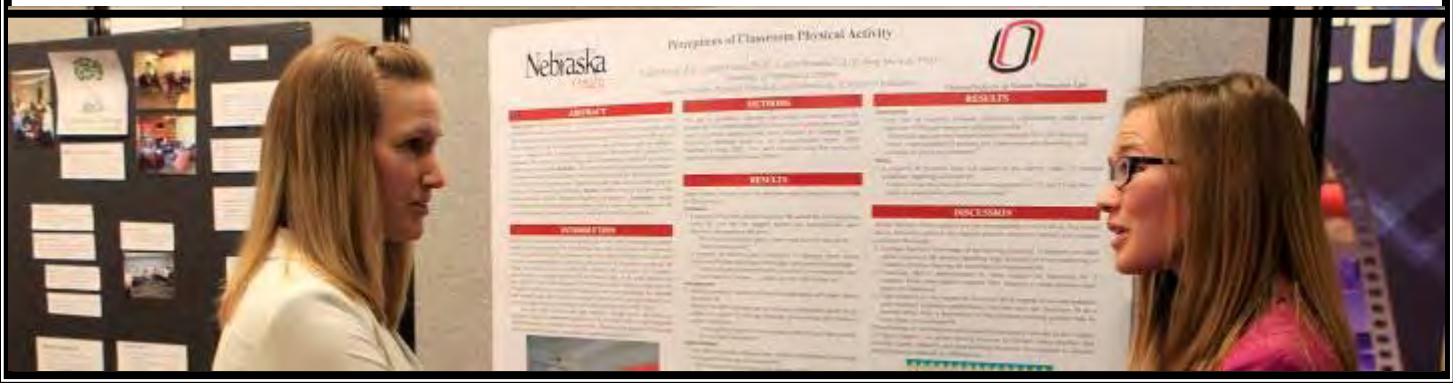
The mannose 6-phosphate/insulin-like growth factor 2 receptor (Man6P/IGF2 receptor) is a mammalian cell membrane receptor involved in the regulation of cellular growth and tumor suppression, making it a necessary component in cancer research studies. The Man6P/IGF2 receptor is composed of several subdomains that are thought to aid in dimerization and proper receptor function. The goal of this research was to determine whether triplet subdomains on each Man6P/IGF2 receptor associate for optimal receptor function, and whether the strength of the interactions between two associating receptors is directly correlated with its molecular-binding abilities. In these studies, we were successful in preparing a MycHis tagged construct of the 7-9 subdomain of the Man6P/IGF2 receptor, confirming protein expression of the construct in cultured mammalian cells, and confirming protein co-expression of 7- 9MycHis with other FLAG-tagged subdomains of the Man6P/IGF2 receptor. It was determined that 7- 9MycHis is capable of forming a dimeric receptor with all of the FLAG-tagged subdomains.

CHELSEA ROSS
Undergraduate
*Effects of 3D video gaming on Visual Spatial awareness*
Major: Elementary Education
Faculty Advisor: Michael Matthews

This study set out to determine if video games had an impact on visual spatial reasoning. This study asked participants to play video games for a short period of time and set out to determine the effects on players in regards to visual spatial ability. The results were ultimately inconclusive due to lack of viable data but provided a second facet to consider, perseverance.

JEAN M. ROWE
Undergraduate
*A Technical Study of Madonna and Child with Saints Catherine and Agnes*
Major: Art History
Faculty Advisor: Amy Morris

This project was first conceived of last spring during my Technical Art History class. I researched a painting called Madonna and Child with Saints Catherine and Agnes currently part of the Joslyn Art Museum's permanent collection. This painting was formerly attributed to Jan Gossart but because of dissimilarities between the figures of this painting and those in his other works it is now said to be in the school of Gossart. In order to research this painting more thoroughly and compare the underdrawings, we used infrared technology to view the paintings underdrawing. This underdrawings will bring behind the scenes look at part of the history of art that few people ever have the privilege to see. Originally underdrawings were only meant to be seen by the artist, people working in their workshops, and the patron who commissioned the work. A technical study was done using Infrared Reflectography(IRR) to view the underdrawings of the Joslyn painting, so that with knowledge of Gossart's underdrawing style we can easily compare it to the style of the underdrawing of the Joslyn painting. This study is very timely, many art historians around the world are using IRR to aid there research into workshop practices by viewing underdrawings. this helps them to see what is original and what is copy and to attribute works to various artists who previously did not get recognition for these works.



# Undergraduate Abstracts

KORI SHEA
Undergraduate
*Taxonomic classification and natural history of a population of endangered Cypripedium orchids in eastern Nebraska*
Major: Environmental Studies
Faculty Advisor: Roxanne Kellar

The lady's slipper orchids are a highly diverse group of taxa, *Cypripedium parviflorum* being one of approximately fifty species currently classified in the genus. However, the taxonomic placement of the *Cypripedium* orchid in eastern Nebraska was unknown, leaving a gap in the phylogeny of orchids. In order to precisely document the orchid population, this study adequately examined the existing species' unique floral characteristics, taxonomy, and natural history by conducting a morphological and molecular comparison of *Cypripedium parviflorum* with that of other species in the *Cypripedium* genus. A detailed investigation of each individual stem's morphological characteristics, including, but not limited to, plant, leaf, and stem size, was completed over a six-week period. Leaf tissue was collected for the extraction of genomic DNA, which was used to sequence and align genes and compare them to closely related species. The analysis of the lady's slipper orchid was complete after closely inspecting various herbarium specimens and estimating a molecular phylogeny, providing a better understanding of the relationships between the species. Morphologically, the Nebraska orchid population resembles *Cypripedium parviflorum var. parviflorum.* Both orchids display 4-5 alternating leaves between 9-19 cm x 2.5-9 cm as well as deep burgundy sepals. However, the molecular comparison reveals the species is a close sister to a clade containing *C. kentuckiense, C. parviflorum,* and *C. parviflorum var. pubescens.* Collectively, my data suggest the *Cypripedium* population in eastern Nebraska should be considered a separate species.

SUSAN TOTH
Undergraduate
*Orally Administered Capsaicin Effects on Rat Taste System Across Development (Behavioral Time Course, Saccharin versus Sucrose)*
Major: Psychology
Faculty Advisor: Suzanne Sollars

Previous investigations in our lab used ethanol as a solvent for capsaicin solutions used for consumption studies, since capsaicin does not dissolve in water alone. Sucrose has been added to the solutions in order to induce consumption. It has been found that rats' capsaicin consumption and tolerance increases over time. However, the caloric value of sucrose is high, possibly confounding the rates of consumption. Capsaicin and ethanol are trigeminal irritants, though sucrose is not. Saccharin is sweet and preferred by rats, but has no caloric value and is a trigeminal irritant. The purpose of the present study was to determine the different consumption behaviors of Sprague-Dawley rats when consuming sucrose/ethanol solutions and solutions with saccharin combined with ethanol. Since both saccharin and ethanol are trigeminal irritants, it was of additional interest to examine their combined effects on consumption behaviors in rats. Twelve Sprague-Dawley rats where videotaped one hour a day for 40 consecutive days during the same time of day. Three received solutions of saccharin, three saccharin and ethanol, three sucrose (control), and three sucrose and ethanol. The total duration of consumption, latency to approach the solution, and consumption rate were recorded from the videos. I hypothesized that the rats would be averse to saccharin and ethanol in the beginning, but would later build a tolerance to the irritants and consume them at a greater rate.

BRITTNEY TWEEDY
Undergraduate
*The Binding Interactions of the Mannose 6-Phosphate/Insulin-Like Growth Factor 2 Receptor Protein*
Major: Biology
Faculty Advisor: Jodi Kreiling

The Man6P/IGFIIR (mannose 6-phosphate/insulin-like growth factor II receptor) is a cell membrane protein involved in cellular growth regulation and tumor suppression. This protein has been found to function optimally as a dimer, where two whole proteins work together to ensure full functionality. Dimerization seems to involve multiple regions of the protein receptor, and no specific dimerization domain has been discovered. In an effort to study the dimerization patterns of the Man6P/IGFIIR, variable tagged domains of the receptor (FLAG (F) or Myc (M)) were constructed and tested for dimerization capability and strength of association. Although the data obtained indicated that association of all triplet domains was possible and that identical triplet domains had the strongest dimerization contacts, those results were unable to be quantified due to heavy chain interference from the antibody used in the binding assays. The goal of this project was to attach a 6x-histidine tag (H) to the end of two triplet receptor constructs, 7-9M and 1-3M, in order to increase their molecular weight for better interpretation of the binding and disruption assays using the triplet receptors and also allow for the use of nickel ion in binding assays instead of an antibody.

# Undergraduate Abstracts

CRISTIAN VALQUIER
Undergraduate
*Kinetic Characterization of 4-Hydroxyphenylacetate 1-Hydroxylase*
Major: Chemistry
Faculty Advisor: John Conrad

Recent and rapid growth in the chemical industry has resulted in larger volumes of waste contaminating soils. Bioremediation is the use bacterial metabolic pathways to break down toxic waste into less toxic carbon compounds. The biodegradation of aromatic compounds, also a prevalent industrial waste byproduct, requires hydroxylation of the stable aromatic ring before it can be opened and further degraded. The purpose of this research was to study the activity of an under characterized enzyme that catalyzes this first step of aromatic degradation, 4- hydroxyphenylacetate 1-hydroxylase (4HPA-1H). To study the enzyme it had to first be expressed and isolated. Various methods were used to express and purify 4HPA-1H. We describe here the expression and purification of 4HPA-1H, quantified by both electrophoresis and activity assays.

NADIAH WAHBA
Undergraduate
*Short-Term and Cumulative Life Stress in Mature Zebra Finches Based on Rearing Condition: Responses and Influence on Sexually Selected Traits*
Major: Neuroscience
Faculty Advisor: Rosemary Strasser

Stress responses, initiated by the hypothalamic-pituitary-adrenal axis (HPA axis), are essential for the survival of all animals when threatened by their environment. However, prolonged secretion of stress hormones can lead to several negative health consequences. Studies looking at individual differences in both short-term and long-term stress responses have suggested that early rearing conditions may contribute to an individual's HPA axis activation, as well as developmental variations early in life. Royal, Hartly, and Parker (2002) found evidence that zebra finch chicks raised bi-parentally initially grew faster than chicks raised uniparentally. Despite these developmental discrepancies, single-mother nests were shown to raise better quality offspring and more physically attractive males. Additionally, previous research has found that chicks raised biparentally had elevated levels of corticosterone (CORT) compared to chicks raised uniparentally. In the present study, we examined whether these hormonal and physical differences continued into adulthood. CORT levels, via fecal assays, were studied in mature zebra finches before, during, and after experiencing a short-term stressor. Additionally, CORT levels were examined in feathers to represent cumulative life stress. Physical variations in male attractiveness were compared by measuring breast and cheek patches. No observable differences in sexually selected traits were found between uniparentally and biparentally raised males; thus suggesting that differences in attractiveness are derived solely from behavioral variations. Results from CORT assays for both short term stressors and overall life stress will be reported.

SARA WHITE
Undergraduate
*Probate Inventories: A Window into the Lives of Free African American Men and Women before the Civil War*
Major: Women's and Gender Studies
Faculty Advisor: Sharon Wood

I created and analyzed a comprehensive database of the probate files of free African Americans who died in St. Louis, Missouri, during the antebellum period (about 1830-1861). I did so by collating the list of individuals in the Freedom Licenses database and the Free Men and Women of Color in St. Louis City Directories (1821-1860) list (created by the St. Louis Public Library) with a database of probate files, also created by the Missouri State Archives. I abstracted a list of African Americans with probate files and matched their identities with Census data.My presentation will be in the form of a poster illustrating my research process. I will show what type of documents I was working with. My poster will also illustrate the setbacks and unforeseen obstacles I encountered.

# Undergraduate Abstracts

KELLY WIECZOREK
Undergraduate
*Irene Adler, the Atypical Criminal*
Major: English
Faculty Advisor: Tanushree Ghosh

From the start of the Victorian era circa 1837, women have contested the roles in which society had placed upon them. Through the medium of paintings, literature, illustrations, and the new technology of photography, women were subjects of opposing ideologies on gender roles as societal representation. To describe the ideal, normative Victorian woman, painters put their subjects in domestic settings. Women were visually seen in the home because painters placed them there. The ideal Victorian woman was defined as a fragile, unitelligent individual. Men took control of discussions involving politics, economy, and law. This became paradoxical since Queen Victoria took control of the throne and all women and men became her subjects. There were exceptions within the category of the "normative woman" that included certain tropes and analyzations of: the English working class, the "fallen" woman in society, and, the later idea, of the "New Woman". Through these tropes and standards, the foreign woman becomes the opposite of the non- threatening English ideal and morals. These stereotypes trickled down into the discussion of female criminals and the traits of their features. In this paper, I will analyze the visual culture of Victorian femininity juxtaposed with foreign female criminal stereotypes; in order argue that Arthur Conan Doyle challenges these concepts through his character Irene Adler.

KATHERINE WITTLER
Undergraduate
*Test-Retest Reliability of Independent Phonological Measures of 2-year-old Speech*
Major: Speech-Language Pathology
Faculty Advisor: Shari DeVeney

Speech-language pathologists (SLPs) rely on formal (i.e., standardized, criterion-based testing) and informal (i.e., observations, clinical judgment, non-standardized) assessment measures. These measures are used for descriptive information critical to evaluating a child's need for intervention. Although the general assumption is that informal measures are reliable, the reality may be much different. This project is an effort to address this problem by examining the test- retest reliability of conversational speech samples taken exactly one week apart from children who are 24-36 months old. The samples will be analyzed using independent phonological measures (i.e., word shape analysis and phonetic inventories). For this project, data was collected and examined regarding the test-retest reliability of informal speech sound measures for typically developing 2-year-old children. Test-retest reliability is the degree to which an analysis is stable over time (i.e., temporal stability). The project will be an extension of the work conducted by Morris (2009). When evaluating the speech samples of typically developing 18- to 22-month old children, Morris found that the test-retest reliability of analyses conducted on two different speech samples collected from the same child one week apart was unstable and did not represent the same number or range of speech sounds produced. This project extended the findings of this research by conducting a replication of the study including children who are two- to eight-months older than the sample used in the Morris study to determine if the findings remain consistent across an additional age range.

ZOE YOHN
Undergraduate
*Freak Fatale: The Nineteenth-Century Freak Show and Carroll's Alice's Adventures in Wonderland*
Major: English
Faculty Advisor: Tanushree Ghosh

This project examines how *Alice in Wonderland* uses images of freak women to actively voice—and ultimately contain—threatening femininity. This project examines several female characters in the novel, taking into account both textual analysis and visual analysis. This essay draws from a variety of primary source material, including various images and advertisements from nineteenth-century freak shows alongside primary source articles about freak show events in the Victorian period. The project compares female characters in Carroll's children's novel to contemporary accounts of freakdom in the nineteenth-century.

# Graduate Abstracts: Masters

BARSA AGARWAL
Graduate: Masters
*Is HealthCare Cost the key Determinant of Life Expectancy?*
Major: Economics
Faculty Advisor: John Dogbey

In the light of rising health care cost in United States questions have been asked about the benefits of expensive health care system. Health care cost accounts for one sixth of U.S GDP and has been growing rapidly. In this paper, I analyze the health care cost vis-à-vis other factors like per capita availability of doctors, pollution, income levels, lifestyle in determining life expectancy. To analyze this I use a cross sectional data of 179 countries for the year 2011. Interestingly, United States despite being the top per capita spender on health care fairs very poorly in life expectancy. In fact U.S. ranks 36th in life expectancy per WHO. When I model life expectancy as a function of the above mentioned factors, what really matters in multivariate regression of life expectancy is the availability of doctors per capita, all other factors, turnout to be insignificant. As expected higher the number of doctors per capita higher the life expectancy. However CO2 emission which is an indicator of pollution should have a negative relation with life expectancy, counter intuitively we find it to be positively related. Industrialization behind the scene is driving both pollution i.e. CO2 and life expectancy.

JASON ANDERSEN
Graduate: Masters
*Effects of the 2011 Missouri River flood on grassland birds at DeSoto and Boyer Chute National Wildlife Refuges*
Major: Biology
Faculty Advisors: L.. LaReesa Wolfenbarger, John McCarty

The Missouri River flood of 2011 has had a profound impact on the habitat at DeSoto and Boyer Chute National Wildlife Refuges by altering the composition and structure of the vegetation that grassland birds use for breeding. Grasslands at the refuges have been heavily impacted by sand and silt deposition caused by receding floodwaters. This new layer of soil has given rise to entirely new communities of herbaceous forbs and cottonwood tree saplings interspersed with mixed grasses. My research investigates how changes in vegetation have affected the bird communities at the refuges by comparing bird abundances measured before and after the flooding in 2011. My three research questions are: how has the vegetation structure and composition changed, how has any change in vegetation affected the populations of birds, and how do any changes in vegetation and bird species abundance affect the overall bird communities at the refuges.

RYAN ANDERSON
Graduate: Masters
*Incentivizing Energy Efficiency in Rental Properties*
Major: Economics
Faculty Advisor: Christopher Decker

I conducted an online survey of 110 landlords to test two popular theories of the underinvestment in energy efficiency among rental property owners. Participants answered questions about their properties and were randomly assigned to read one of four descriptions of a hypothetical incentive program. Each description detailed similar steps to qualify for government aid in installing energy efficiency improvements. One description emphasized the financial benefits of energy efficiency that accrue to property owners even when tenants are solely responsible for paying utilities. A second description detailed how program administrators planned to use local media to promote energy efficient rental properties to prospective tenants. A third description contained both of the special elements outlined above, while a fourth (control) condition contained neither. Participants were then asked how likely they would be to participate in the program at varying levels of financial support. ANOVA reveals no statistically significant effects of the experimental manipulation, however a review of the open-ended responses and other data received offers valuable insight into future research.

# Graduate Abstracts: Masters

SHELLY K. AUST
Graduate: Masters
*Biodiversity assessment in two Nebraska prairies: comparison between phylogenetic, functional, and traditional diversity indices*
Major: Biology
Faculty Advisor: P. Roxanne Kellar
Co-Author: Dakota L. Ahrendsen

To conserve the Earth's biodiversity, conservation of evolutionary diversity is a priority. Phylogenetic Diversity (PD) is gaining acceptance as a biodiversity metric, which measures the evolutionary distance between taxa in a community. PD is often difficult to measure due to time and cost, and previous studies suggest functional diversity (FD) or species richness (*S*) as surrogates. However, studies have found these measurements do not always give the same result and may lead to different estimates of biodiversity and different conservation strategies. My research compared 19 PD metrics with FD and four traditional diversity indices (including *S*) between two prairies in Nebraska. I generated over 65,000 DNA characters from three cellular compartments for over 60 species in the asterid clade of flowering plants. My results revealed that PD metrics varied based on the dataset used to infer the phylogenies (i.e. the quantity of genes included), and it is important to use comparable datasets when comparing PD metrics between sites. Various PD, FD, and traditional diversity indices characterize biodiversity differently and should be chosen depending on the question being investigated. My study provides empirical results that begin to reveal the value of measuring PD when considering sites for conservation, and it highlights the usefulness in using PD in combination with FD and traditional diversity indices when studying community assembly and ecosystem functioning.

ELLIOTT BARBER
Graduate: Masters
*Malevolent Responses to Team Exile*
Major: Psychology
Faculty Advisor: Roni Reiter-Palmon
Co-Author: Kevin Mitchell

Malevolent responses to team exile is the construct that attempts to measure negative responses to dismissal from a team by a leader. Using a nomological net design the construct was tested against a desire for vengeance, collective orientation, and extraversion. It was found that there was a positive relationship between the new construct and vengeance. Potentially explanations are discussed for the relationship between the new construct and vengeance as well as limitations to the findings.

ELLYN BASS
Graduate: Masters
*Contextual Influences on the Relationship between Physical and Relational Aggression and Peer Victimization*
Major: Developmental Psychology
Faculty Advisor: Jonathan Santo
Co-Authors: Jonathan Santo, Luz Lopez, William M. Bukowski

That social norms and contexts shape peer relationships by providing guidelines for behavior and interactions (e.g., Hinde, 1987) is exemplified by the finding that the relationship between peer victimization and physical and relational aggression is influenced by classroom norms of aggression and school gender ratio, likely due to gender-based norms (Boivin et al., 1995; Velasquez et al., 2010). In further exploration of this relationship, the current study examined the moderating effects of classroom norms of aggression and classroom gender ratio on the relationship between peer victimization and physical and relational aggression in a sample of 1,152 (63.9% female) 5th and 6th graders from 39 classes in four schools from Barranquilla, Colombia. Physical aggression, relational aggression, and peer victimization were assessed by unlimited peer nomination using the Revised Class Play checklist (Masten et al., 1985). Analyses were conducted using multilevel modeling to address the non-independence of peer rating data. Both relational and physical aggression predicted peer victimization and, as expected, girls who exhibited relational aggression were less victimized, while girls who exhibited physical aggression were more victimized. The relationship between physical aggression and victimization was stronger in classrooms with a low proportion of girls in which relational aggression was more normative, whereas the relationship between relational aggression and peer victimization was stronger in classrooms with a low proportion of girls in which physical aggression was more normative. These findings further support that the nature of peer relationships is dependent on social norms (classroom norms of aggression) and context (classroom gender ratio).

# Graduate Abstracts: Masters

LACEY BATT
Graduate: Masters
*Girls, Inc. Mentor Physical Activity Interest Survey*
Major: Physical Activity in Health Promotion
Faculty Advisor: Danae Dinkel

Inactivity during childhood places individuals at greater risk of chronic diseases.1 In the United States, only 27% of children meet the daily physical activity (PA) recommendations of 60 minutes of daily PA.2 Females, of all ages, are less likely than males to meet the PA recommendations and are in need of innovative programs to increase PA. One innovative option that has been minimally researched is by encouraging PA in mentoring relationships. Purpose: The purpose of the study was to examine the interest of mentors in participating in PA outings with mentees. Methods: A 15-question survey was developed to explore the interest of mentors of participating in PA with their mentee. Within the survey, sixteen PA opportunities were inquired with an option to propose additional suggestions. The survey was sent to 120 female mentors participating in the Girls, Inc. program. Results: All mentors (n=22) expressed an interest to engage in PA outings. Specifically, 90% were interested in biking, hiking and walking; over 50% were interested in horseback riding, kickball, rock wall climbing, swimming, tennis, and volleyball; and less than 50% were interested in ultimate Frisbee, soccer, basketball, disc golf, flag football, geocaching, and golf. Mentors also expressed a strong desire to engage in PA with other mentor pairs. Conclusion: Some female mentors are interested in engaging in PA with their mentees alongside other mentoring pairs. To further explore the abilities of mentoring relationships to promote PA, PA opportunities are being planned for the Girls, Inc. mentor program. Centers for Disease Control and Prevention. (2012). Overweight and Obesity: Basics About Childhood Obesity. Retrieved from: http://www.cdc.gov/obesity/childhood/basics.html. Centers for Disease Control and Prevention Morbidy and Mortality Weekly Report (2014). Youth Risk Behavior Surveillance-United States, 2013. Surveillance Summaries. 63(4), 28.

ANDREA BRADLEY
Graduate: Masters
*A Tool for Accurate and Informative Behavioral Health Workforce Analysis*
Major: Social Work
Faculty Advisor: Christiana Bratiotis

In recent years, behavioral health workforce analyses have been undertaken in Nebraska and throughout the United States. These efforts had several aims: 1) to correct workforce deficits; 2) strengthen competencies of the existing workforce; 3) make care more accessible; 4) increase retention of behavioral health professionals; and 5) facilitate integration of behavioral health and primary care. Due to a lack of universal terminology, much of the existing literature adopted divergent definitions of behavioral health and had no consensus about professional groups included in the behavioral health workforce. This resulted in unique analyses that hindered comparison between findings, making it nearly impossible to understand the state of behavioral health in this country. Many analysis only included licensed and certified professionals, for ease of tracking and because of their integral role in direct care services. However, supportive staff (behavioral technicians, case managers, peer support, etc.) account for a large portion of the behavioral healthcare workforce; the vast majority of whom are neither licensed nor certified, but nonetheless provide vital services. Through collaborative work with Region 6 Behavioral Health, this student developed a visual tool for use in conducting accurate workforce analysis. The unique model delineates roles and tasks among behavioral health providers and accounts for influences and relationships with peripheral systems. The tool is used to provide a common definition of behavioral health as a reference in assessments and summary reports. This one-of-a-kind model of behavioral health stands to make a significant impact in not only our region and state but throughout the country.

# Graduate Abstracts: Masters

SKYLAR BROOKE
Graduate: Masters
*Validity of Wearable Physical Activity Monitors during Activities of Daily Living*
Major: Physcial Activity and Health Promotion
Faculty Advisor: Jung Min Lee
Co-Authors: Skyler M. Brooke, Hyun-Sung An, Danae M. Dinkel, John M. Noble, Jung-Min Lee

There are a number of PA monitors that have been developed in the last 5 years,but little information about the validity of these monitors exist. PURPOSE: The purpose of this study is to evaluate the validity of wearable activity monitors in SPT and EE under free-living environment. METHODS: Sixteen (27.1±5.4 years) healthy males (n=12) and females (n=4) participated in this study. Total SPT and EE were measured by eight monitors. The monitors were worn for at least 23 hours, and no PA restriction were applied. The SWA and a sleep log were used as a criterion measures. RESULTS: 24 hours of EE (Kcal) (means±SD) were 3123.1±730, 2355.71±528, 2393.86±612, 2240.33±273, 2075.47±87, 2901.5±658, 2926.58 ±576, and 2695.25±600 for VF, JU, PL, BB1, FB, NFB, and MF, respectively. Mean absolute percent errors were calculated (means±SD) 24.4%±8.1, 23.3%±10.7, 15.6%±17.4, 31.8%±87.1, 9.5%±9.6, 5.7%±7.6, and 11.4%±11.2 for the VF, JU, PL, BB1, FB, NFB, and MF, respectively. SPT in minutes (mean±SD) were 464.0±66.4, 401.0±72.9, 460.7±61.4, 457.4±73.8, 504.3±85.5, 439.0±120.8, 443.8±49.2, and 457.8±112.8 for the log, SWA, VF, JU, PL, BB1, FB, and NFB, respectively. MAPE were calculated for SPT (mean±SD) 13.57±9.7%, 0.71±7.6%, 1.41±11.1%, 8.69±28.6%, 5.38±81.9%, 4.38±25.9%, and 1.34±69.8% for the SWA, VF, JU, PL, BB1, FB, and MF, respectively. ANOVA and post- hoc analyses with LSD indicated no significant differences were found with the FB, NFB, and MF in EE estimates. Additional post-hoc analyses with LSD for SPT revealed no significant difference (P>.05) in all monitors except SWA. CONCLUSION: The study indicates that FF, MS, and NFB are most accurate wearable activity monitors when estimating EE and all monitors provide reasonable estimates of sleep period time, except SWA. Word counts: 1,970/2,000 (no space).

MATTHEW BUBAK
Graduate: Masters
*The effect of the muscle biopsy procedure on blood flow and tissue oxygenation*
Major: Exercise Science
Faculty Advisor: Dustin Slivka
Co-Authors: Lindsey Williams, Dustin Slivka

The percutaneous skeletal muscle biopsy has been shown to disrupt glycogenesis, possibly due changes in blood flow and thus nutrient delivery. PURPOSE: To determine the effects of the percutaneous skeletal muscle biopsy procedure on blood flow and tissue oxygen saturation. METHODS: Twelve recreationally active males (age: 25 ± 5 years; height: 178 ± 6 cm; weight: 86.8 ± 12.5 kg; body fat: 13.6 ± 6.6%) rested for 30 minutes before blood flow measurements were obtained from the common femoral artery of each leg using an ultrasound system (Terason t3000, Burlington, MA). This measurement was approximately 2-3 cm proximal to the artery's bifurcation. Tissue oxygenation was collected from a skin surface site over the *vastus lateralis*, using near infrared spectroscopy (Inspectra StO2 Monitor; Hutchinson, MN). Following the initial measurement, a biopsy of the *vastus lateralis* was conducted followed by additional blood flow and tissue oxygenation measures. RESULTS: There was no effect of biopsy on femoral artery diameter (pre, 8.35 ± 0.45; post, 8.19 ± 0.42 mm; p = 0 .412), blood velocity (pre, 6.48 ± 0.66; post, 6.10 ± 0.66 cm · sec-1; p = 0.507), or flow volume (pre, 377 ± 62; post, 350 ± 64 ml · min-1; p = 0.415). Tissue oxygen saturation decreased from pre to post biopsy (pre, 69 ± 8 %: post, 61 ± 7 %; p = 0.0185). CONCLUSION: These data indicate that the skeletal muscle biopsy procedure does not impact blood flow, but does have an impact on tissue oxygen saturation.

# Graduate Abstracts: Masters

GIOVANNI CONSOLINO
Graduate: Masters
*Leadership and Intercultural Competence: A Narrative of Transformational Leadership in the 21st Century*
Major: Communication
Faculty Advisor: Chin-Chung Chao

The purpose of this qualitative study was to explore how leaders use transformational leadership and intercultural competence in a corporate environment and in the classroom. Although a vast amount of scholarship exists on transformational leadership, previous studies have been predominantly quantitative in nature. Likewise, recent communication studies have utilized intercultural competence to better comprehend how crucial it is for leaders to effectively communicate with followers from different cultural backgrounds. Hence, this study employed a narrative approach to offer a new perspective of transformational leadership in the 21st century. By using interviews to collect data among three leaders, findings were categorized into three main themes: Leadership Means Communicating Clarity and Knowledge, Understanding and Encouraging Followers, and Empathy and Intercultural Competence. These themes generated consequent subthemes, which offered an in-depth understanding about leaders' experiences. Finally, the implications of this study reveal the necessity to broaden the scope of transformational leadership to new research areas and possibilities.

WILLIAM DENTON
Graduate: Masters
*Reliability and Validity of a Locomotor-Respiratory Measurement Device*
Major: Biomechanics
Faculty Advisor: Jenna Yentes

The purpose of this experiment was to test the reliability and validity of two sensors simultaneously measuring locomotion and respiratory patterns. A wireless accelerometer was used to measure locomotion patterns and a capacitance sensor was used to measure respiratory patterns on one male human subject. All IRB # protocols were followed. The device containing the two sensors was tested against a commercially available 3-dimensional motion capture system. The position of the lateral malleolus was used as a comparison for the accelerometer since the two were mounted close together. The distance between two other markers placed on the C7 (back of the neck) and manubrium (middle of the sternum) to use as a comparison with the capacitive breathing sensor. Means and standard deviations of the stride times calculated from the motion capture system and accelerometer were compared and determined to be valid, but the accelerometer was not as reliable. This is likely for two reasons: the sampling rate of the accelerometer was lower than the 3-dimensional motion capture and the accelerometer was not tightly attached to the ankle, which introduced noise into the desired signal. Breath times and number of breaths were calculated from both the capacitance sensor and 3-dimensional marker data. The capacitance sensor was determined to be had the same number of breaths and similar breath times when compared to the 3-dimensional motion capture data. Thus, the breathing sensor was determined to have similar validity and reliability as the method used to measure breathing with the motion capture system.

PRAVEEN KUMAR DIGUMURTHI
Graduate: Masters
*Cyber Caliphate and Technology*
Major: Management Information Systems
Faculty Advisor: Gina Ligon

ISIS previously called as Al-Qaeda in Iraq stands for Islamic State of Iraq and Syria. ISIS and Al-Qaeda got separated from each other on February 2014 and now, each have been trying to compete in order to gain influence on other Islamist extremist groups (Beauchamp, 2014). ISIS is mainly controlled by Abu Bakr Al Baghdadi who is also known as Abu Dua (Graphics, 2014). And, if what certain experts believe is true, ISIS could overtake Al-Qaeda as the most dominant group across the globe. ISIS and Al-Qaeda always shared same goal and that is to establish a caliphate. ISIS has proved to be remarkably adept at using technology and does most of its propaganda including recruitment campaign over social media (Frizell, 2014). Another surprising aspect is that, they wish to establish "digital caliphate" and therefore a cyber-dimension in any scenario could be expected (Lyngaas, 2014). The goal of the present effort is to share research our team has conducted on the cyber capabilities of the violent extremist group ISIS. We have profiled the pathways they use to recruit members, spread ideology, and communicate with funders, and we plan to share the overall diversity of platforms (e.g., number of different types of cyber-based technology) as well as the sophistication of the group in terms of internet use. This project was funded by the National Consortium of the Study of Terrorism and Responses to Terrorism (START).

# Graduate Abstracts: Masters

NICHOLAS DINAN
Graduate: Masters
*Validity of Optical Blood Flow Heart Rate Monitors*
Major: Exercise Science
Faculty Advisors: Jung-Min Lee, Dustin Slivka, Danae M. Dinkel
Co-Authors: Hyunsung An, Matthew Bubak, Youngduk Kim

PURPOSE: Validate the Schoche (SC) (RhythmTM), Basis B1 Band (BB) (BASIS Science, Inc.), and Mio Alpha (MA) (Physical Enterprises, Inc.) wireless heart rate monitors. METHODS: Fifteen college students (males, n=11, age=27±5yrs; females, n=4, age=27±6yrs) participated. All participants simultaneously wore the SC on left forearm, the BB on the right wrist, the MA on the left wrist, and Polar HR strap on their chest. Participants' resting heart rate was measured twice prior to exercise. The exercise protocol consisted of one 30-minute bout of continuous walking and running in which the treadmill speed increased every 5-minutes. The treadmill started at 2 mph and completed at 6 mph, followed by 3 minutes of cool down. HR was recorded every minute from each monitor including the Polar HR monitor as a criterion measure. RESULTS: Average HRs (means ± SD) for Polar HR, SC, MA, and BB were 113±32, 110±34, 117±32, and 111±27. A strong pearson's correlation coefficient was observed with the SC (r=.88) and the MA (r =.75), but a weak correlation coefficient was found with the BB (r =.41), p>0.01. Corresponding absolute error rates were 6.0±12.5%, 11.7±24.2%, and 18.2±21.3%. ANOVA and post hoc analyses with Bonferroni revealed non-significant differences between the SC, MA, and BB ($p > 0.05$) compared to the Polar HR. CONCLUSION: The results demonstrate that the wireless wrist-oriented heart rate monitors provide an accurate measurement of HR during exercise. However, further research is needed to validate these monitors with a larger sample in different environments.

TRISH FINKS
Graduate: Masters
*Convergent and Criterion Related Validity of the Behavioral and Emotional Rating Scale-Second Edition as Translated into Lithuanian*
Major: Special Education
Faculty Advisor: Phillip Nordness
Co-Author: Phillip Nordness

In a strength-based approach to assessment, practitioners measure a range of behavioral and emotional skills, competencies, and characteristics that contribute to a child's potential for success in school, peer, and family relationships (Epstein 2004). Internationally there has been increased recognition of the value of strength-based assessment in educational and mental health service delivery. For instance in Lithuania, the Ministry of Education and Science approved a policy entitled, The Concept of Assessment of Pupils' Achievement and Progress (approved by the Minister of Education and Science in 2004-02-25, the Law No 256), which was developed to outline strategies for assessment and to identify key elements in the assessment process. Among the key elements of this policy was that assessments should encourage student motivation by emphasizing strengths and achievement rather than failure. One of the most widely used strength-based assessment instruments in the United States is the Behavioral and Emotional Rating Scale-2 (BERS-2; Epstein 2004). The purpose of this study was to translate the Teacher version of the BERS-2 into Lithuanian and determine its validity for use in Lithuania. To this end, we examined the convergent validity of the Lithuanian BERS-2 with the Lithuanian Strengths and Difficulties Questionnaire. In addition, we examined the criterion related validity of the BERS-2. The results demonstrated moderate to high correlations, which suggests that the BERS-2 as translated into Lithuanian may be appropriate for teachers to use as a strength-based rating scale in Lithuania.

# Graduate Abstracts: Masters

KYLE FRANCIS
Graduate: Masters
*Critical Infrastructure Partnership and Cultural Study*
Major: Business Administration
Faculty Advisor: Gina Ligon
Co-Authors: Gina Ligon, Erin Pleggenkuhle Miles, Douglas Derrick, John Crowe

The Homeland Security environment is challenging from an organizational perspective. With multiple organizations, levels, perspectives and missions resulting in imperfect networks & linkages of information and communications systems. In an attempt to develop sustainable collaborative efforts Executive Order 13636/Presidential Policy Directive-21 outlined tasking to evaluate and improve United States Critical Infrastructure. Key research activities associated with the Critical Infrastructure Partnership and Culture Study are (1) collect and review current inter-organizational collaborative models, (2) conduct fieldwork with government and industry partners, and (3) review proposed model with focus groups of practitioners. Phase 1 involved a literature review which resulted in a list of over 50 selected articles for analysis. Components of the literature review that depicted best practices & procedures within public-private partnerships as well as key challenges to the collaborative process were summarized and implemented into a Notional Collaborative Framework. Phase 2 consists of interviewing key individuals to evaluate & review the Notional Collaborative Framework and provide recommendations & real world scenarios. The questions will be aimed at gathering data on what partnerships currently exist in their organization and why, what type of controls are in place over the collaborative efforts, what are the best practices in executing these collaborative efforts, and what key challenges exist in these collaborations. These recommendations will be implemented into the project to adjust for field conditions the collaborative process is currently experiencing. Phase 3 (February-April) of the project will involve presenting a revised Notional Collaborative Framework and best practices/key challenges to SME's for review.

MENGMENG GAI
Graduate: Masters
*A Hybrid Approach to Indoor Sensor Area Localization and Coverage*
Major: Computer Science
Faculty Advisor: Azad Azadmanesh

This study presents a hybrid approach to indoor object detection and tracking. The test area is partitioned into regions that are covered by sensors placed on the ceilings. The approximate location of an object is determined by these sensors using RSSI. The region determination is then followed by localizing the exact location of the object using Building Information Modeling (BIM) and the 3D stereo image measurements. To determine the coverage ratio of a region for better placement of sensors, the 3D space is partitioned into 2D planes whose coverage points are determined by a newly developed software product called LOCOPac. The package is not only able to simulate the 2D coverage under various distribution algorithms and parameters such as sensor failures and energy efficiency, it also assists in the visualization of an object roaming in different regions of the test space. Other than indoor localization, some simulation results of sensor distribution algorithms that are more suitable for outdoor applications will also be presented. Based on the experimental and simulation results, the proposed approach to indoor localization and LOCOPac has the potential to be used for real world applications.

RACHEL GARDNER
Graduate: Masters
*The Afghan Taliban: A Predictive Analysis*
Major: Political Science
Faculty Advisor: Gina Ligon

This poster will profile the Afghan Taliban on two different levels: first in its height of power prior to September 11, 2001 and second as a resurging group post 9/11 seeking to take advantage of U.S. withdrawal from Afghanistan. Additionally this poster will profile the Afghan Taliban's elusive leader, Mullah Omar. The University of Maryland's START (Study of Terrorism and Responses to Terrorism) Program lists the Taliban as the number one most lethal organization in the world. However, the United States' government does not list the Afghan Taliban as a "terrorist" organization on its FTO list. Could the lure of peace talks give the Afghan Taliban more time to transition from a regional to global Islamist movement along with ISIS? This poster will conclude with potential policy outcomes for the U.S. government and predictive analysis for the sustainability and lethality of the Afghan Taliban.

# Graduate Abstracts: Masters

SARAH GAUGHAN
Graduate: Masters
*Population Structure and Habitat Use of Macrhybopsis Chubs in the Missouri River*
Major: Biology
Faculty Advisors: Guoqing Lu, Richard Stasiak
Co-Authors: Jun Wang, Richard Stasiak, Kirk Steffensen, Guoqing Lu

Little is known about the population structure and habitat use of *Macrhybopsis* chubs in the Missouri River Basin (MRB). Chubs are characteristic of large Great Plains Rivers and serve as important indicators for the health of ecosystems. Environmental parameters and gut contents have been investigated to evaluate the use of habitats. Future work will focus on analyzing genomic sequences to study the population genetic structure for the shoal chub, *Macrhybopsis hyostoma*.

TAYLOR GEHRINGER
Graduate: Masters
*Where do I fit in? Gender Differences and Barriers to Interest and Perceived Belonging in Science Careers*
Major: Psychology
Faculty Advisor: Carey Ryan
Co-Authors: Isaac French, Clayton Juarez, Carey Ryan

Women and men exhibit similar ability (Ceci et al., 2009) and preparedness for science fields going into college (Morgan et al., 2013), indicating that the gender gap in science fields is more likely due to other factors, for example, differences in interest (Diekman & Steinberg, 2013; Eccles, 2011), biased treatment (Moss-Racusin et al., 2012), and potentially differences in perceived fit and belonging. We recruited 121 undergraduates to examine gender, person-thing orientation, belonging, and career aspirations to math/natural science (MNS) and social science (SS) fields. Results revealed no gender differences in perceived ability or in person orientations, but men (vs. women) had stronger thing orientations. Overall, person orientation and belonging in SS courses were associated with SS career aspirations, whereas thing orientation and belonging in MNS courses were associated with MNS career aspirations. However, the latter effects depended on gender; thing orientation predicted greater interest in MNS only among women. Additionally, this interaction between gender and thing orientation further depended upon feelings of belonging in MNS courses. Among women, thing orientation predicted stronger MNS career aspirations only if they perceived themselves as belonging. Among men, this relationship did not depend on belonging. Although traits, such as thing orientation, may make careers in MNS more appealing to women (and men), a lack of belonging may be especially likely to deter even those women who are thing- oriented.

# Graduate Abstracts: Masters

TAYLOR GEHRINGER
Graduate: Masters
*Examining the STEM Pipeline: The Role of Organizational Socialization in STEM Career Persistence*
Major: Psychology
Faculty Advisor: Carey S. Ryan

Women earn over half of bachelor's degrees and make up half of the workforce in the U.S.; however, they remain underrepresented in science, technology, engineering, and math (STEM) careers. Research focused on identifying ways to increase the number of women in STEM careers has largely focused on ways to get more women to enter the "pipeline." However, the pipeline logic fails to explain the substantial attrition of STEM-educated workers, especially women, during the two years after their graduation from college. Individual difference explanations for this gendered attrition are less applicable because graduates have already established their interest, ability, and commitment to STEM fields. I propose that STEM workplace environmental factors may partially account for the dropout of recent graduates, and the higher attrition of women, in particular. Specifically, I will examine whether STEM women and men differ in perceptions of their organizational socialization experiences, that is, in knowledge about their roles and perceived integration into the organization. I expect that these socialization experiences will predict STEM graduates' intentions to persist in their occupations and in their STEM work fields more generally. Further, I hypothesize that the relationships between organizational socialization experiences and intentions to persist will be stronger for women than for men, underscoring the importance of environmental (vs. individual difference) factors that may affect persistence.

VICTORIA GRAEVE-CUNNINGHAM
Graduate: Masters
*Sustaining and Retaining a Healthy Volunteer Population Major: Industrial/Organizational Psychology*
Major: Psychology
Faculty Advisor: Lisa Scherer
Co-Authors: Lisa Scherer, Joseph Allen

With the unstable economy leading to an increase in demand for support services and a decrease in budgets, nonprofits depend on volunteers now more than ever (DeVita, 2012). Despite need, in 2012, volunteer attrition across the United States averaged 34 percent (Corporation for National and Community Service, 2013). The primary purpose of this study is to better understand volunteer retention efforts by investigating factors that affect burnout in volunteers using the job demands-resources model as a supporting theoretical framework (Bakker & Demerouti, 2007). Evidence suggests organizational constraints (e.g., poor equipment or environment and lack of support) and lack of resources are sources of burnout (Schaufeli & Bakker, 2004; Halbesleben & Buckley, 2004; Lee & Ashforth, 1996), which leads to intentions to quit in volunteers (Jourdain & Chênevert, 2010; Bakker, Demerouti & Verbeke, 2004). Because job satisfaction, or one's positive attitude about their job, is negatively correlated with burnout (Bacharach, Bamberger & Conley, 1991) and organizational constraints are related with job dissatisfaction (Spector et al, 1988; Jex & Gudanowski, 1992), we propose job satisfaction is a resource that can reduce organizational constraints and mitigate the negative psychological costs associated with job demands (Figure 1). Results demonstrated a significant conditional indirect relationship between satisfaction and burnout at each level of importance of organizational constraints (Table 1, Figure 2). That is, volunteers who experienced high constraints were less burned out when they were satisfied with the nature of their work. However, as predicted, those who were unsatisfied with their work experience more burno.

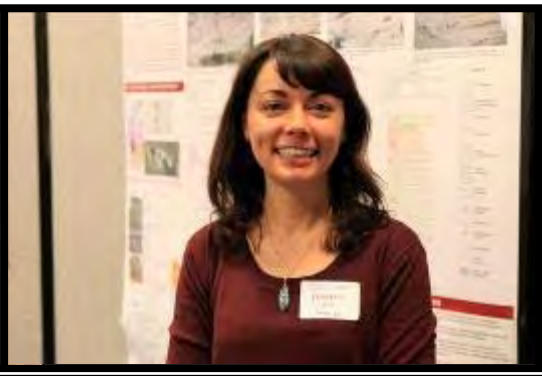
# Graduate Abstracts: Masters

HEATHER HANNAFORD
Graduate: Masters
*"Spies" of the Domestic Sphere: Female Engagement with Empiricism in Evelina and The Female Spectator*
Major: English
Faculty Advisor: Kristin Girten

In *The Female Spectator*, Eliza Haywood explains the significance of the role of the "spy," writing: "and this I look upon to be a more effectual way of penetrating into the Mysteries of the Alcove, the Cabinet, or Field, than if I had the Power of Invisibility." In this passage, I argue that Haywood sets up an opposition between the spy and the "modest witness" (as defined by Shapin and Schaeffer) by insisting that spying offers a better vantage point than a distant and "invisible" observer can ever hope to achieve. The "spy" is, therefore, a role that not only privileges female ways of knowing, but also demonstrates a method of female engagement with empiricism. I argue that viewing the novel, *Evelina,* by Fanny Burney, through the lens of the work done on Haywood's *Female Spectator* offers a new way to approach the role of curiosity, empiricism, and the domestic sphere in eighteenth-century women's writing. My presentation will demonstrate that Evelina, like Haywood's Female Spectator, is a "spy" of the social sphere and that her role allows her to examine and understand her position in the domestic sphere, and also disrupt the public/private dynamic, which offers an alternative way of knowing as opposed to the male "modest witness." Building on the work of L. Lynette Eckersly and Kristin Girten, I will show how women in the eighteenth century were beginning to situate themselves as curious observers within society in opposition to the traditional male observer's stance, characterized by the "modest witness." Thus, the work of both Haywood and Burney challenges us to look for new ways to understand the relation of women to empiricism in the eighteenth century.

CHRISTINE HARRIS
Graduate: Masters
*The Effectiveness Of I-Pad Technology To Enhance Reading Fluency*
Major: School Psychology
Faculty Advisor: Brian McKevitt
Co-Author: Brian McKevitt

Previous studies suggest that the use of these technological devices improve performance in a variety of academic areas, including reading fluency. However, little research has been conducted on the effectiveness of I-Pads as intervention tools for reading fluency when compared to traditional reading fluency interventions. In the present study, three second grade students who were not meeting standard requirements for their grade level in reading fluency were recruited to examine whether the use of the I- Pad repeated reading intervention increased reading fluency at a rate beyond improvement rates when given regular reading instructions as well as when given a traditional repeated reading intervention. Using a multiple baseline design, each student was first given regular instructions to establish baseline reading fluency rates, and, at staggered times throughout the twelve-week study, were then exposed to the traditional repeated reading intervention for three weeks. Finally, each student was given the I-Pad repeated reading intervention for the remainder of the study. Results indicated that, although the rate of improvement in reading fluency increased for all students from baseline to the traditional repeated reading intervention, the rate of improvement in reading fluency was even greater when using the I-Pad repeated reading intervention for two of the three students than when given the traditional intervention. These results provide evidence that the use of an I-pad repeated reading intervention is not only effective, but may be more effective than a traditional repeated reading intervention.


# Graduate Abstracts: Masters

STACY HARTWIG
Graduate: Masters
*A Comparison of Four Foam Roller Treatment Protocols on Hamstring Flexibility*
Major: Exercise Science
Faculty Advisor: Kris Berg
Co-Authors: Melanie McGrath, Neal Grandgenett

The hamstring muscle group is commonly tight in the general population for a multitude of reasons including prolonged sitting, overuse or injury. A therapeutic tool known as a foam roller is used by allied health professionals to decrease hamstring muscle tightness. However, current research does not specify the most beneficial technique, duration of treatment, or type of foam roller to be used to achieve the greatest increases in muscle flexibility. Therefore, this factorial design study compared two types of foam rollers (PVC and RumbleRoller) and two different treatment durations (30 and 90 seconds) on hamstring flexibility in twelve participants with limited hamstring flexibility. After an instructional session with each participant, a total of five experimental protocols were performed in a randomized order:1) 30 second PVC, 2) 90 second PVC, 3) 30 second RumbleRoller, 4) 90 second RumbleRoller, and 5) Control (no protocol). Protocols were separated by at least 72 hours to decrease possible crossover effect. Pre- and post-experimental protocol flexibility measurements were taken by a blinded investigator to assess the effect of the foam rollers and treatment durations. Additionally, a visual analog scale was used to assess the level of discomfort perceived by the subject during each protocol. Data will be analyzed using repeated-measures ANOVA with post- hoc testing of significant results. This study will aid allied health professionals in the selection and prescription of modalities to increase hamstring flexibility, which may aid in the prevention of injury and enhancement of athletic performance.

MICHAEL L. HOUGH
Graduate: Masters
*Improving Elderly Gait Using a Structured Auditory Stimulus*
Major: Exercise Science
Faculty Advisor: Sara A. Myers
Co-Authors: Sara A. Myers, Nicholas Stergiou

Variability in human movement is not random error, but the product of a deterministic dynamical system, which must be able to reliably reproduce movements while retaining the flexibility to adapt to changing conditions in its environment. Previous studies have shown that young, healthy individuals exhibit gait variability with a fractal temporal structure, that this structure is diminished in older individuals, and that this structure can be controlled in both young and older populations by means of an auditory synchronization task. This leads us to an innovative approach to gait rehabilitation – using a fractal structured auditory stimulus to restore variability to an optimal state. In the first phase of this study, we demonstrated that the fractal structure of gait variability of an older population is altered to more closely resemble younger gait when walking in synchrony to a fractal auditory stimulus. This finding supported the feasibility of a rehabilitation program utilizing this stimulus. In this second phase, we are examining the training and retention effects of a minimal exercise program for healthy older adults. This program consists of nine 30-minute walking sessions conducted over three weeks. Analysis of the fractal structure of pilot data does not show a significant training effect or a reliable trend in retention of the training. These results suggest that the observed acute effects may be "cosmetic" in nature and not reflective of changes in the underlying motor system. Further analysis, and comparison to a sex- and age-matched control group, is required to resolve these questions.

WHITLEY JELINEK
Graduate: Masters
*Using Facebook to Support Graduate Students and Alumni*
Major: Psychology
Faculty Advisor: Lisa Kelly-Vance
Co-Author: Megan Norton

Since gaining initial popularity among college students several years ago, social media websites have become more common in education and graduate programs due to several positive outcomes. Graduate students and faculty will learn the uses and positive outcomes of social media pages for professional and graduate schools, alumni, and graduate faculty, and how Facebook is currently being used in one School Psychology graduate program.

# Graduate Abstracts: Masters

HYNJAE JEON
Graduate: Masters
*Ankle Degenerative Joint Disease in a 23 year old male basketball player*
Major: Athletic Training
Faculty Advisor: Adam Rosen
Co-Author: Nicola M. McGrath

Background: A third-year transfer Division I basketball player (23 years old, height=200.7cm, mass=104.3kg) complained of pain in his left ankle mortise of the talocrural joint after a strength and conditioning workout in August 2014. A radiograph revealed osteophytes anteriorly, calcification posteriorly, possible loose body and os trigonum. A magnetic resonance image (MRI) of the ankle revealed tearing of the anterior talofibular ligament, a small rounded ossicle as well as osteophyte formation in the subtalar joint signifying the early stages of degenerative joint disease of the ankle. Differential Diagnosis: Anterior tibiofibular ligament tear, osteochondral lesion of the talus, avulsion fracture, os trigonum syndrome, loose bodies, chronic ankle instability Treatment: Patient first received treatments including therapeutic ultrasound, joint mobilization and ice massages. Patient also received Graston® soft tissue mobilization on the Achilles tendon to relieve stiffness. As the symptoms persisted and progressed, the physician ordered a 40mg injection of Depo-Medrol (methylprednisolone acetate) with 3cc Marcaine (bupivacaine hydrochloride) in his anteromedial ankle twice and prescribed a nonsteroidal anti-inflammatory drug (Naprosyn). Uniqueness: The uniqueness of this case extends from the young age of the patient experiencing osteoarthritis. Conclusion: The ankle is one of the most frequently injured joints. Accordingly, clinicians should be concerned of degenerative joint disease of the ankle in those young athletes with history of frequent ankle sprain.

BRYAN JOHNSON
Graduate: Masters
*Galerkin Methods for Stochastic Differential Equations*
Major: Mathematics
Faculty Advisor: Mahboub Baccouch

A stochastic differential equation is a differential equation which contains at least one stochastic term. Physical systems traditionally modelled by deterministic differential equations can be more accurately described by including random effects. Closed form solutions to stochastic differential equations often do not exist, and are typically complicated when they do. In most cases, computer-driven numerical methods must be used to find approximate solutions. Existing numerical methods become complicated when rapid convergence to the solution is desired. The development of accurate, efficient, and stable numerical methods is an active field of research in mathematics. In this talk, we will propose a new continuous and discontinuous Galerkin finite element methods that exhibit rapid convergence with minimal increase in complexity. Several numerical simulations will be presented to validate the proposed schemes.

ABIGAIL JUDGE
Graduate: Masters
*Investigation of the molecular target of an early lead anti-Toxoplasma compound*
Major: Biology
Faculty Advisor: Paul Davis

*Toxoplasma gondii* is an extremely common parasite of both animals and humans, infecting an estimated up to 40% of the United States human population, but as much as 50% to 80% of the population in much of South America and continental Europe. In a healthy adult, infection with *T. gondii* generally results in minimal or no clinical symptoms due to immune system suppression of the motile form of the parasite. Shortly after infection, however, the parasite forms cysts to protect itself from the immune system, which permits future reactivation in the event of immune system depression. *T. gondii* infection has been identified as a leading cause of severe illness amongst immune compromised individuals and pregnant women. Given these global health concerns, effective methods for treatment and control of *T. gondii* are critical. The goal of this study is to investigate the mechanism of action of the novel drug against *Toxoplasma gondii* infection. We have utilized mutagenesis coupled with genomic sequencing techniques to help identify the gene targeted by KG7 to restrict *T. gondii* growth. Such information will be beneficial not only for the clinical use of this drug in treating patients worldwide for *T. gondii* infection, but will also progress our understanding of the parasite for future studies.

# Graduate Abstracts: Masters

ALYSSA KEILL
Graduate: Masters
*Validity of Wearable Activity Monitors for Estimation of Resting Energy Expenditure in Adults*
Major: Physical Activity in Health Promotion
Faculty Advisor: Jung-Min Lee
Co-Authors: Danae M. Dinkel, Jung-Min Lee

PURPOSE: The purpose of this study was to evaluate the validity of the Fitbit Flex (FF) and SenseWear Mini Armband (SWA) in REE estimates in adults. METHODS: Sixty healthy (26.4±5.7 yrs) males (n=30) and females (n=30) volunteered to participate in the study. The REE measurement was performed in the morning (i.e., 6:00-9:00am) after a 10-hour fast, following previously published guidelines. Estimates of REE from the FF and SWA monitors were obtained from the corresponding software and website. These REE estimates were compared to REE measured from open-circuit indirect calorimetry (IC) and estimated using the Institute of Medicine (IOM) and World Health Organization (WHO) prediction equations. RESULTS: Analyses of covariance (ANCOVA) showed no significant effects of gender for any of the comparisons with REE from IC; therefore, males and females were combined for all analyses. REE (kcals/day) from FF, SWA, IOM, and WHO were (means±SD): 1554.3±249.3,1587.1±247.7, 1528.0±213.0, and 1559.0±232.0, respectively. Mean absolute percentage errors were: 10.85±8.8%, 9.53±8.2%, 9.31±8.4%, and 10.8±8.7% for the FF, SWA, IOM, and WHO, respectively. Pearson correlation coefficients for the FF, SWA, IOM, and WHO in relation to IC were 0.635, 0.640, 0.657, and 0.683, respectively. No significant differences (p-values $< 0.05$) were observed between the measured REE, FF, SWA, IOM, and WHO in REE estimates. CONCLUSION: The estimates of REE from the FF, SWA, IOM, and WHO equation were similar to measured REE. The relatively high accuracy of the FF and SWA in estimating REE suggests that they have great potential to be utilized in intervention and surveillance studies aimed at precisely estimating total daily energy expenditure.

ABBIE KRETZ
Graduate: Masters
*Wage Theft in Nebraska*
Major: Sociology
Faculty Advisor: Lourdes Gouveia

The term "wage theft" first appeared in academic literature in 2006. However, it is only a contemporary iteration of the exploitation of workers, which Karl Marx described in *Das Kapital.* The existence of wage theft today is the result of profound transformations in the U.S. economy since the 1970s. In contemporary terms, wage theft is defined as the non-payment of wages to employees or sub-contractors by employers or contractors for work completed. Drawing from 25 surveys and 15 interviews with Latino immigrant workers, this study is a first attempt to examine and document the occurrence of wage theft in Nebraska. Survey results briefly describe the prevalence of wage theft, how workers are not paid, in what industries, and how these lost wages affect them financially. From the interviews, it is possible to identify three recurring themes. First, Latino workers describe an arduous, time-consuming, and often time-sensitive process they go through to get their unpaid wages. This process, in turn, causes financial hardship, but also social and emotional stress that negatively affects the victim, family members and other personal relationships. Lastly, the workers describe the need for greater protections and increased oversight on companies that do not pay; they felt that these employers believed themselves to be above the law and had no need to pay them. The project contributions are to provide scholars with a contemporary theoretical framework from which to further investigate wage theft. In addition, it can inform policy making in an area where worker protections are minimal.

# Graduate Abstracts: Masters

RYAN KRYSL
Graduate: Masters
*"The impact of exposure intervals to 17β-trenbolone as its metabolite profile in the sediment and water column changes."*
Major: Biology
Faculty Advisor: Alan Kolok

Throughout the United States, bodies of water are contaminated with a variety of endocrine disrupting compounds that enter through surface runoff or groundwater absorption. Such compounds include pesticides, industrial wastes, and veterinary pharmaceuticals. One such veterinary pharmaceutical that commonly occurs is 17 -trenbolone, a growth-promoting hormone in the cattle industry. Considering the biological activity of 17β-trenbolone, it is important to understand the fate and transport of this compound in the environment. 17β-trenbolone is a synthetic androgen, and it, along with its metabolites readily absorb to sediment. Our lab has done several exposures in which the importance of sediment in causing endocrine disruption was been demonstrated. The objective of the present study was to determine the impact of exposure intervals to 17β-trenbolone as its metabolite profile in the sediment and water column changes. Sediment was spiked with 17β-trenbolone and groups of fathead minnows (*Pimephales promelas*) were exposed to it for 5 or 10 days. Fish exposed for the first 5 days (d 0-5) after sediment spiking experienced molecular defeminization, while those exposed to for the next 5 days (d 5-10) and those exposed for 10 days (d 0-10) after spiking did not. The results suggest a very rapid loss of the compound from the system, a result that is not consistent with our previous data. Subtle differences in experimental protocol with respect to spiking of the sediment are likely causing significant differences in the degree to which the chemical is adhering to the sediment particles.

D. TAYLOR LA SALLE
Graduate: Masters
*Physiological demands of riding an electric-assist bicycle*
Major: Exercise Science
Faculty Advisor: Dustin Slivka
Co-Authors: Matt Heesch, R.J. Shute, Nick Dinan, Matt Bubak, Terry Laursen

The American College of Sports Medicine (ACSM) recommends adults participate in weekly aerobic activity. The electrically assisted bicycle may help individuals achieve the ACSM's aerobic recommendations and introduce inactive individuals to physical activity. PURPOSE: To compare the physiological requirements of riding a bicycle with electric-assist versus no assist. METHODS: Participants (n=14, 23.2 ± 0.7 y, 174 ± 2 cm, 77.8 ± 4.0 kg, 20.8 ± 2.0 %body fat, 3.2 ± 0.3 L/min) completed two randomized cycling trials using 1) electric assist and 2) no assist. Cycling trials were over a 3.5 km course with varying terrain. RESULTS: Time to completion was faster in the electric-assist (12.5 ± 0.3 min) than the no assist (13.8 ± 0.3 min, p=0.01). Rating of Perceived Exertion (RPE) was lower in the electric-assist (12.0 ± 0.4,) than the no assist (14.8 ± 0.5, p<0.001). There was no difference in VO2 between electric-assist (2.3 ± 0.1 L/min) and no assist (2.5 ± 0.1 L/min, p=0.45). There was no difference in power output when comparing electric-assist (115 ± 11 Watts) to no assist (128 ± 11 Watts, p=0.38). There was no difference in heart rate between electric-assist (147 ± 5 bpm) and no assist (149 ± 5 bpm, p=0.77). CONCLUSIONS: The electric-assist bicycle was faster and perceived to be easier compared to the no assist. However, oxygen utilization, power output and heart rate were no different. Both the electric-assist and no assist exercise bouts met criteria for vigorous exercise according to ACSM guidelines.

# Graduate Abstracts: Masters

TERRY LAURSEN
Graduate: Masters
*Local skeletal muscle heating and cooling impacts PGC-1β, but not PGC-1α expression after resistance exercise*
Major: Exercise Science
Faculty Advisor: Dustin Slivka
Co-Authors: Matthew Heesch, Brent Hassenstab, Dustin Slivka

PGC-1α expression is increased after endurance exercise. Following exercise and recovery in a cold environment PGC-1α will increase further but is inhibited in a hot environment. PGC-1β is thought to play a role in glucose and lipid metabolism and also in thermoregulation. Little is known about the effect of local muscle temperature following resistance exercise on PGC-1α and PGC-1β. PURPOSE: To determine the impact of local muscle heating and cooling on PGC-1α and PGC-1β following resistance exercise. METHODS: Recreationally resistance-trained male participants (n = 12, 25 ± 5 y, 179 ± 6 cm, 86.8 ± 12.5 kg, 13.6 ± 6.6% body fat) completed 4 sets of 8-12 repetitions of unilateral leg press (11 ± 1 repetitions, 76.6% 1-RM) and leg extension (9 ± 1 repetitions, 61.1% 1-RM) while one leg was heated and one leg was cooled using a thermal therapy system (ThermaZone, Cleveland OH). Muscle biopsies were obtained from the *vastus lateralis* of each leg pre- and 4 h post-exercise for gene expression analysis. RESULTS: PGC-1α increased due to exercise (p = 0.001) in both the hot (4.36 ± 1.94 fold) and cold (4.03 ± 2.76 fold) conditions. Expression of PGC-1β was not significantly different with exercise (p = 0.469), but was higher in the hot trial (1.47 ± 0.79 fold) than the cold trial (-0.35 ± 0.11 fold; p = 0.009). CONCLUSIONS: These data indicate that expression of PGC-1β is impacted by local muscle temperature during exercise and recovery while PGC-1α mRNA is not.

CHRISTINA LEE
Graduate: Masters
*Analysis of spectral resolution effects for mapping invasive tamarisk across aerial and satellite imagery*
Major: Geography
Faculty Advisor: James Hayes

Invasive tamarisk shrubs pose a considerable threat to ecosystems of the American West, where they out-compete native riparian vegetation, by thriving in drought, being resilient to fire, increasing soil salinity, and reproducing quickly and profusely. This research examines the utility of freely available 30 meter resolution Landsat 8 imagery in monitoring and mapping the spread of tamarisk, by comparing supervised classifications of tamarisk percent cover in Landsat 8 imagery against high resolution aerial imagery, referencing field gathered tamarisk spectral signatures. Field data were acquired in Owens Valley, CA, where management efforts against tamarisk spread are ongoing.

CLARE MAAKESTAD
Graduate: Masters
*Capital and the Ecological Crisis of the Twenty-First Century: Capitalism's Impact on Nature in Marx's Theory and Today*
Major: Sociology
Faculty Advisor: Thomas Sanchez

Activities of modern society appear to be leading to ecological crisis, which may threaten the sustainability of humanity and society. The aim of this poster is to use Marx and Engels' theories to show how capitalism influences a plethora of environmental problems that we face in the 21st century. Those problems include pollution, climate change, biodiversity loss, deforestation, and toxification of the environment, among others. The poster shows how capitalism and its offspring—industrialization, globalization and alienation—have exacerbated those hazardous effects on the biosphere. The reasons for this are manifold: First, capitalism has a drive for infinite growth of production, which leads to pollution and exhaustion of vital resources. Second, by moving goods around the world, globalization exacerbates problems of depletion of nutrients, declining soil quality and pollution of the environment. Finally, due to alienation, society places less value on maintaining the health of the earth. After engaging with this poster presentation, audiences will understand the link between the type of society and economy that we live in and the environmental degradation that is increasingly threatening the sustainability of ecosystems and potentially humanity worldwide.

# Graduate Abstracts: Masters

MEG MARQUARDT
Graduate: Masters
*Weird Science: Investigating the Shift in Science Engagement in late 1800s America*
Major: English
Faculty Advisor: Tammie M. Kennedy

According a1988 study, only 10% of American adults "had sufficient understanding of basic scientific ideas to be able to read the Tuesday Science section of *The New York Times*" (Swanbrow). However, American scientific literacy has seen gains in recent decades. A similar study conducted in 2011 saw a jump to 28% comprehension. With science literacy gaining, it is important to understand how the American public interacts with science – and how that interaction changes over time. As part of a larger project, tracing the rise and fall of American scientific literacy, this research is situated over 100 years ago. Using critical discourse and rhetorical analysis techniques, the project focuses on how scientific literacy was constructed in *Scientific American* from 1860-1890, locating shifts in science production and consumption by the general public. This research points a core change happening at that time: the rise of the university in late 1800s America. With universities came the rapid specialization of science. Within the pages of *Scientific American*, there is a distinct shift in how the articles are presented. Not only are they focused on university scientists rather than inventors in homes, there is a tonal shift as well. There are fewer invitations for the reader to be an active participant. Instead, the reader becomes a passive recipient of knowledge. In these early issues of *Scientific American*, one can see the start of the general public's separation from science and the start of the decline in scientific literacy in America.

DEREK MCBRIDE
Graduate: Master's
*A Model for Energy and Well-Being; Implications for Human Performance*
Major: Physical Activity and Health Promotion
Faculty Advisor: Danae Dinkel

The human experience is one full of stimulus, perception, thought, and feeling. Every person has a unique experience that they are constantly working to sort and understand. It has been noted by leaders in self-improvement that in order to make changes to our lives, we must first begin with changes on the inside. To make these internal changes, it is helpful to have a model to anchor and sort our experience. This helps us to more deeply understand the interaction of the "parts" of our human system. This model seeks to explain the system as one of interacting energy, providing a framework through which to anchor and understand the human experience. From this model of interacting energy, one can more easily identify blockages in energy flow and work to correct them. As all parts are intimately interconnected, removing blockages from or increasing energy of any part of the system may streamline flow through the rest of this "system of human experience". This leads to implications for overall well-being. As well-being increases and one is more apt to tackle life, this leads to implications for human performance in all areas of one's life experience.

SWAPNA MEDICHETTI
Graduate: Masters
*Identification of Mechanism of Action of DASamP2 against Pseudomonas aeruginosa by Isolation of Mutants.*
Major: Biology
Faculty Advisor: Donald Rowen
Co-Author: Guangshun Wang

Human bacterial pathogens are evolving resistance to antibiotics currently used for therapy. There is a need to develop new strategies to combat resistant microbes such as S*taphylococcus aureus* and *Pseudomonas aeruginosa* which exhibit multi-drug resistance. Antimicrobial peptides are diverse groups of molecules that possess antimicrobial properties (AMPs) that are being studied for use as antibiotics. They are naturally produced by animals as a defense mechanism against microorganisms. The mechanism of action of antimicrobial peptides is not well known. Most are thought to disrupt cell membranes, but some may inhibit the activity of a cytosolic biosynthetic enzyme. Recently a new antimicrobial peptide (DASamp2) designed by Dr. Wang (University of Nebraska Medical Center) was observed to be effective against both *S. aureus* and *P. aeruginosa* and thereby holds promise as a potential new antibiotic. The goal of our project is to determine the mechanism of action and target of the DASamp2 by isolating mutants of *P. aeruginosa* with altered sensitivity to the DASamp2 peptide. We are performing transposon mutagenesis of the *P. aerugionosa* strain PAO1 and screening for increased and decreased resistance to DASamp2. So far, we have screened 3600 mutants for increased resistance and isolated ten resistant mutants. We have begun to identify the genes mutated in the mutants isolated by using inverse PCR. Characterization of the genes mutated will help in elucidating the target and mechanism action of the DASamp2 peptide.

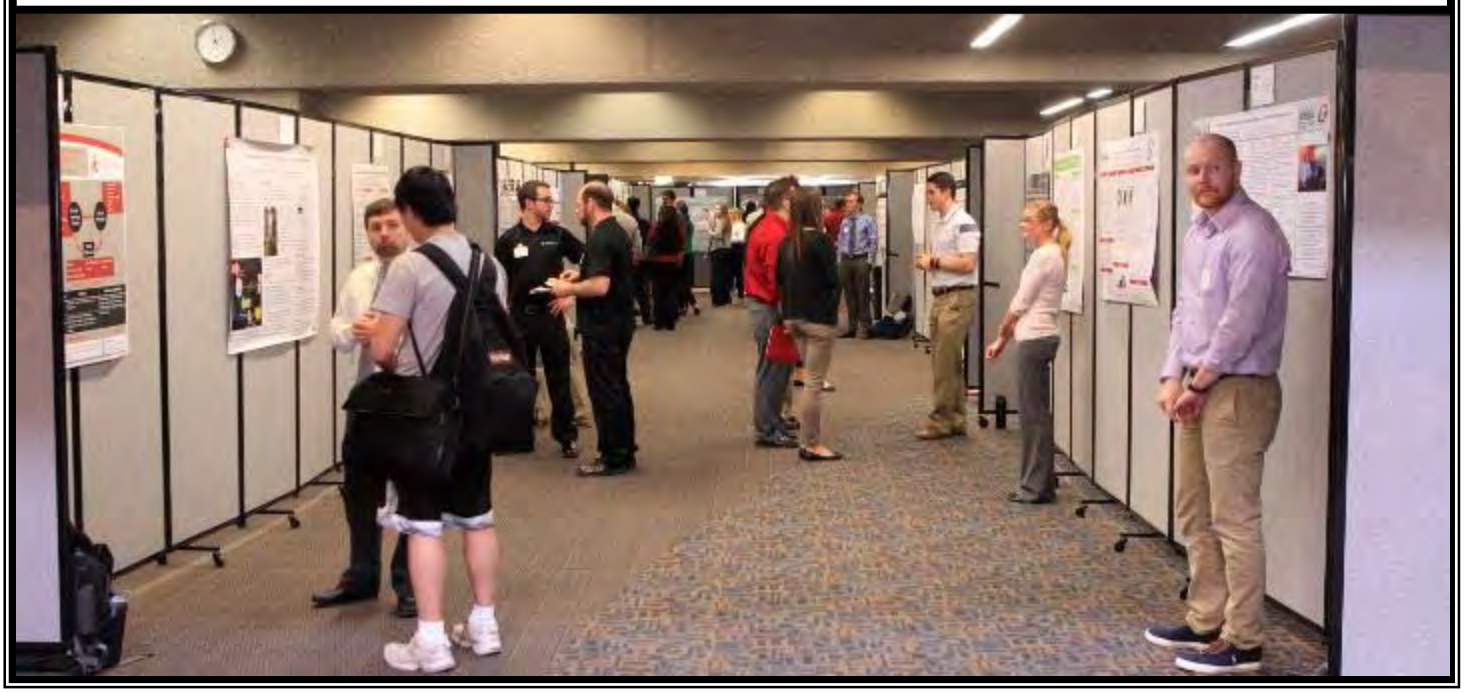
# Graduate Abstracts: Masters

PATRICK MENG-FRECKER
Graduate: Masters
*Feasibility of Uploading Consciousness*
Major: Mathematics
Faculty Advisor: Jenna Yentes

Is it feasible to upload one's consciousness to a computer? If so, what advances in technology will be required to accomplish this feat? Would it be ethical to do if it was possible? From the research I have done, I do believe it is feasible. The brain is incredibly complex but the amount that it has been researched, modeled and simulated has increased exponentially in recent years. To create a copy of a human brain in an artificial substrate will require large amounts of storage, faster processing speed, increased resolution in scanning technologies and the ability to replicate the mysterious subjectivity of consciousness. By analyzing Moore's law as it applies to computer processors, the price of hard drive space and the spatial and temporal resolution of scanning devices, it appears these requirements may be met before the century is half over. Additionally, recent discoveries regarding the nature of consciousness may allow for the "hard problem" to be solved by incorporating the profound implications of quantum mechanics.

TESSA MILLER
Graduate: Masters
*School-Wide Positive Behavior Support in an Alternative School Setting*
Major: School Psychology
Faculty Advisor: Brian McKevitt
Co-Author: Brian McKevitt

School-wide positive behavior support (SWPBS) is an empirically based prevention and intervention program framework utilized in schools to support appropriate behaviors and to create and promote a positive environment. This case study analyses student behavior pre- and post- implementation of SWPBS in an alternative education (AE) setting for students with behavior disorders. The objective of a well-implemented SWPBS program in a school is to provide necessary behavioral supports for all students to be successful academically and socially. This descriptive case study examined if there is a correlational effect of SWPBS on decreasing aggression and teacher consequences while increasing appropriate behaviors. Visual analysis was used to determine trends of student behaviors. In addition to the information obtained by student behavior data, the School-Wide Evaluation Tool (SET) was utilized to determine the integrity of the implementation of SWPBS. In 2011, SWPBS was implemented in the AE school setting. Data was obtained from the previous school year as a baseline and for the following two school years. The student data indicated a decreasing trend post implementation in the use of safety seat as teacher punishment. Consistent trends were not seen with the other behaviors or teacher consequences. Further research is recommended to examine other factors that may have affected the data.



# Graduate Abstracts: Masters

KEVIN S MITCHELL
Graduate: Masters
*The Impact of Tolerance for Ambiguity on Creativity*
Major: Psychology
Faculty Advisor: Roni Reiter-Palmon
Co-Author: Mackenzie Harms

Individuals are often faced with ambiguous situations that require generation of creative solutions. Cognitive models examine processes in generating creative solutions, and research has shown problem construction is important to subsequent creativity. Problem construction is the process of restating the problem to provide direction for subsequent processes. Individual differences also influence creative solution generation. Because ill-defined situations have multiple outcomes and unclear details, individuals must possess some level of tolerance for ambiguity to produce creative solutions. This tolerance for ambiguity allows individuals to navigate concepts and domains they may not fully understand to generate creative solutions. An ideal level of tolerance for ambiguity may exist for individuals to generate a more creative solution. 237 students were recruited from a Midwestern university to complete the study. Participants were randomly assigned to actively engage or not engage in problem construction. Those in the problem construction group were asked to generate problem restatements before moving to the information search task. Those who were not instructed to engage in problem construction proceeded straight to the information search task. All participants completed an information search task before proceeding to solution generation. The results indicated a curvilinear relationship between tolerance for ambiguity and solution creativity controlling for problem construction task completion. Individuals with moderate tolerance for ambiguity produced more creative solutions than individuals with either low or high tolerance for ambiguity regardless if they completed the problem construction task. These results indicate there is an ideal amount of tolerance for ambiguity for creative solution generation.

ANNESHA MITRA
Graduate: Masters
*Aspect of the relationship context as an additional strategy of self-continuity: The roles of family and peers in emerging adults*
Major: Criminal Justice
Faculty Advisor: Jonathan Santo
Co-Author: Jonathan Santo

Introduction: The approaches used by people to explain the stability of perceptions of self-continuity over time have been associated with indicators of mental health. However, the various strategies used during emerging adulthood have yet to be fully explored. Essentialism reflects how certain characteristics remaining the same serves as a strategy for self-continuity whereas narrativism uses the connectivity of the parts of the self-identity that are likely to change over time. The aim of the current project was to identify whether aspects of the relationship context are measurably distinct from other established strategies of self-continuity. Method: Data were collected from 309 emerging adults (75% female; mean age = 21.88 years, SD=4.84) from Omaha, Nebraska. Self-continuity strategies were assessed by asking participants how much they agreed with various statements that either reflected essentialism or narrativism and as a function of the context. Results: Structural equation model building began by first creating latent constructs of self-continuity and discontinuity. Next, we added latent factors for strategies of self-continuity, narrativism, essentialism and that of the context, regressing them on self-continuity. Not surprisingly, self-continuity was positively associated with narrativism, essentialism and context and was a good fit to the data. Conclusions: The results support the notion that self-continuity is positively associated with strategies of essentialism, narrativism and context. Moreover, the relationship context was measurably distinct from the other strategies of self-continuity. Future research should explore how these strategies bolster emerging adults' cohesive sense of self and how these strategies protect against mental illness and substance abuse.

# Graduate Abstracts: Masters

ZACH MOTZ
Graduate: Masters
*Perception of Complex Movement in Typically Developing Children and Children With Autism Spectrum Disorder*
Major: Exercise Science-Biomechanics
Faculty Advisor: Anastasia Kyvelidou
Co-Authors: Joshua Haworth, Anastasia Kyvelidou, Wayne Fisher, Nicholas Stergiou

Typically developing children prefer to watch locomotion coherent with their own mode of locomotion. The development of motor behavior relies, in part, on being able to incorporate the lessons learned from viewing others' attempts at similar motor performance. By watching others, we are able to vastly multiply our own experience and knowledge of successful movement strategies. We suggest that the specific aversion to the complex temporo-spatial aspects of others' movements is related directly to the perception of chaotic motion of the observed individual. Thus, the purpose of the current project was to assess gaze and postural behavior of young children, with and without autism in response to visual stimuli of different temporal complexity. Eight children participated; four have been diagnosed with autism (ASD). Participants attended single collection, which contained measures of eye movements and standing posture (COP) while viewing a point-light stimulus. Motion of the stimulus differed across three conditions, by scaling temporal complexity in terms of approximate entropy; a sine wave, chaos, and brown noise. While not directly supporting our proposed hypothesis, the results do highlight differing responsiveness to motion structure between children with and without ASD The present data suggests that the gaze and postural sway of children with ASD differs from those without. These differences are noticeable in the complexity of temporal variations of each behavior, in response to a stimulus of specific complexity.

MARYLEE G. MOULTON
Graduate: Masters
*Press Accountability Guideposts for Digital Media*
Major: Communication
Faculty Advisor: Hugh Reilly

A free press is an integral part of the fabric of the United States. Guaranteed by the First Amendment, freedom of the press expanded to encompass not only the printed form familiar to the founders of the nation, but to the technological advances that enlarged the scope of the press. Recognizing that accountability was a significant issue, mainstream press organizations developed accountability strategies to address complaints. As the press migrates to digital platforms, disrupting traditional media, and non-traditional sources proliferate, accountability is thrown into turmoil. In order to address this crisis, an examination of historical press accountability strategies for traditional media may provide approaches to bolster digital medial accuracy. This paper reviews historical press freedom and its impact on accountability strategies, public views of accountability, the history and effectiveness of ombudspersons and press councils, and several other strategies used in traditional media to encourage accountability. A brief overview of the state of digital media accountability will then be discussed. Finally, ideas for future research will be considered.

MEGAN NORTON
Graduate: Masters
*Play Assessment and Intervention Systems: A Comparative Review*
Major: School Psychology
Faculty Advisor: Lisa Kelly-Vance
Co-Author: Whitley Jelinek

Are you looking for ways to assess child development that leads directly to instructional practices and interventions in the classroom? This poster will describe, analyze, and compare three play assessment and intervention systems. Recent studies will be reviewed to give insight into the reliability and validity of these systems. Learn to describe, critique, and advocate for play assessment and intervention systems in an RTI framework.

# Graduate Abstracts: Masters

ELIZABETH NYE
Graduate: Masters
*"9 Parts of Desire": Shadows of Ourselves in the Women of Iraq*
Major: Theatre
Faculty Advisor: Cindy Melby Phaneuf

*9 Parts of Desire* by Heather Raffo was produced with support by a GRACA grant and the UNO Theatre Department as part of the UNO Theatre Festival in the fall semester of 2014. This play uses a series of monologues to examine the effects of war on nine Iraqi women. The characters never meet or interact, but their interconnectedness is palpable. They are echoes or shadows of each other. Taken together, they form a compelling portrait of the Iraqi woman who is more similar to the Western woman than might at first appear. These women are driven by the same deep desires that inspire women everywhere: the search for love, acceptance, respect, safety, and passion. This production was intended to help destroy preconceived notions about Iraqi women based on media appearances and Western bias, as well as to inspire discussion and encourage the crossing of cultural boundaries.

SERGIO OROZCO
Graduate: Masters
*Power Usage by Instructors: Does Behavioral Alteration Messages (BAMs) used in an E-learning Environment Differ from those used in a Face-to-face Classroom?*
Major: Communication
Faculty Advisor: Karen Dwyer

The usage of technology has changed the way in which we live, learn and adapt to new ideas. This paper focuses on the power bases, and identifying which are the most common Behavioral Alteration Messages (BAMs) used by instructors in an online class. Many universities are offering online classes, and it is likely instructors use behavioral techniques to control their classroom. Little research has been conducted utilizing Behavioral Alteration Techniques (BATs) and resulting Behavioral Alteration Messages (BAMs) in an e-learning context. Legitimate and Expert Power is the most common Power Bases in the Classroom. The research questions for this study included: What Behavioral Alternation Messages (BAMs) are used by instructors in an e-learning environment? What bases of Power is used more frequently in an online learning environment? Is there a difference between Male and Female college teachers and their usage of BAMs? This study found: This findings support the research of McCroskey, Kearney and Plax (1985), students are more likely to learn on a cognitive level when teachers influence attempts are positive and prosocial, and less likely to learn when teachers influence communication is negative and antisocial. The usage of Legitimate and Expert Power are used more frequently in the classroom, but students prefer Reward Power when instructors communicate to their students in an e-learning environment.

AMANDA L. OVERGAARD
Graduate: Masters
*Mama Knows Best: Breastfeeding Knowledge and Duration in a Social Network*
Major: Sociology and Anthropology
Faculty Advisor: Timi Barone

Breastfeeding in the U.S. lies at the intersection of popular, folk and professional knowledge, as mothers are exposed to a variety of "experts". This study examines how breastfeeding knowledge moves through a mother's social network and its perceived effect on duration. In-depth interviews and social network mapping tracks how knowledge is created and shared through social networks of current or recently breastfeeding women. Although women are exposed to a variety of sources of information, popular knowledge provided by those closest to them in their networks has the strongest effect on success and duration. Breastfeeding success is who - and what - you know.

# Graduate Abstracts: Masters

JASMINE PERDUE
Graduate: Masters
*The Effectiveness of Video Modeling to Teach Social Skills To Young Adults with Autism Spectrum Disorder*
Major: Psychology
Faculty Advisor: Brian McKevitt
Co-Authors: Brian McKevitt, Lisa Kelly-Vance, Troy Romero, Mitzi Ritzman

We know from Bandura's Social Learning Theory that individuals learn through "modeling" the desired behavior of the individual. This presentation describes the results of a research study that examined the use of video modeling to teach three different social skill behaviors to young adults with ASD and looks at the differences between video modeling instruction and general lecture format instruction. Participants will gain an increased knowledge on effective instructional strategies for individuals with ASD.

JESSICA C. PERRIGAN
Graduate: Masters
*Decreasing Agricultural-Sector Employment and its Effect on Fertility Rates in Mexico*
Major: Economics
Faculty Advisor: John Dogbey

Employment in agricultural plays an increasingly smaller role in the Mexican economy as its economy develops. Drawing on data from the World Bank and the Instituto Nacional de Estadística y Geografía, this paper studies the effect that the decreasing percentage of women working in agricultural has on the total fertility rate. Using time-series data and ordinary least squares regression while controlling for growth in per capita GDP, education, and contraceptive prevalence shows a direct relationship between women's employment in agriculture and total fertility. As developing countries in Latin America assess demographic changes, understanding the determinants of fertility choices is integral so that governmental policies can best allocate education and family planning resources.

JOSH PICKHINKE
Graduate: Masters
*The complexity of postural control variability while walking on an unstable support surface*
Major: Exercise Science
Faculty Advisor: Mukul Mukherjee
Co-Authors: Diderik-Jan Eikema, Mukul Mukherjee

The maintenance of balance during locomotion requires control of anteroposterior and mediolateral postural sway. Walking on the unstable support surface requires learning the dynamics of the support surface and counteracting this to maintain stability. The complexity of displacement along each axis can provide information on control processes involved in this type of behavior. In this study, 8 healthy individuals performed a locomotor task while exposed to different types of mediolateral support surface perturbations. The perturbation conditions were presented in order: stable 1, adaptation 1 (surface roll: $\pm$ 5°), stable 2, adaptation 2. All participants were exposed to the conditions in this order. Postural sway was quantified as the anteroposterior and mediolateral displacement of the pelvis. The complexity of displacement along the two movement axes was analyzed using sample entropy; a measure of variability. Statistical analyses consisted of a one-way RM ANOVA per movement axis. The analyses revealed overall higher complexity along the anteroposterior axis, indicated by larger sample entropy values. In response to the random and sinusoidal platform motion conditions, control of the pelvis became more complex. This is significantly different from locomotion on the stable support surface in the baseline and catch trials. Along the anteroposterior axis on the other hand, no significant effect of condition was observed. The results indicate learning to maintain balance while walking on an unstable support surface requires a change in complexity. Complexity of postural control increases only along the perturbation axis, suggesting the system can learn to control for perturbations along selected axes.

# Graduate Abstracts: Masters

MITHRA PIROOZ
Graduate: Masters
*Gender typicality and popularity: Relationships among felt pressure, intergroup biases, and contentment*
Major: Developmental Psychology
Faculty Advisor: Jonathan Santo
Co-Authors: Jonathan Bruce Santo, William M. Bukowski

Felt pressure to behave in gender-typical ways, intergroup gender biases, the degree of gender contentment, and how gender-typical children consider themselves may all play a role in the relationship between peers' assessment of behavior and popularity. Egan and Perry (2001) developed scales to measure these variables, and showed that they are associated with adjustment among children. The present study examined how these variables are related to peer nominations of gender typicality and popularity. Data were collected from 181 children (47.50% female) in grades five and six (mean age = 10.67, S.D. = .55) in Montreal, Quebec, Canada. The current findings illustrate the various means by which gender roles are associated with whether a child is perceived as typical and/or atypical for their gender by peers and how those are tied to popularity. Sex differences are also explored.

MITHRA PIROOZ
Graduate: Masters
*Self-Construal as a Partial Mediator in the Relationship Between General Self-Worth and Competence*
Major: Psychology
Faculty Advisor: Jonathan Santo
Co-Authors: Jonathan Bruce Santo, Felicia Meyer, William M. Bukowski

Three models of partial mediation were proposed and analyzed to examine self-construal as a partial mediator. A sample of 431 early adolescents completed a survey to measure cognitive competence, physical competence, social competence, general self-worth, and self-construal. It was expected that self-construal would partially mediate the relationship in which general self-worth is predicted by a subscale of competence (i.e., cognitive, physical, or social). The relationships between general self-worth and each competence, the relationships between self-construal and each competence, and the relationship between general self-worth and self-construal were all expected to be positive. Findings supported the hypotheses, such that self-construal did partially mediate the relationships proposed. The relationships specified were, as expected, found to be positive.

ERIC J. PISCIOTTA
Graduate: Masters
*Plantar Pressure Regularity is Increased under the Lateral Forefoot in the Elderly*
Major: Exercise Science
Faculty Advisor: Jenna Yentes

The primary goal of this research was to identify alterations in plantar pressure distributions due to aging. Specifically, to quantify the regularity of peak pressure patterns under distinct anatomical regions of the foot during consecutive stance cycles in order to determine if aging leads to alterations in the regularity of peak plantar pressures. It was hypothesized that elderly subjects would distribute loads to the lateral aspect of the foot, localizing towards weaker metatarsal structures and that elderly would display a greater regularity of peak pressures. Five healthy young (25.2y±3.1) and five healthy elderly (77.6y±7.8) subjects participated in this study. A clinical foot evaluation was conducted in order to screen for foot deformities. Subjects were fitted to a control shoe with a pair of pressure insoles (PedarX, Novel Electronics) and asked to walk on a treadmill at their preferred speed for 10 minutes. Data was analyzed by dividing the insole pressures into seven anatomical regions. The peak pressure in each region for 300 consecutive steps was determined and sample entropy was utilized to quantify the regularity of peak pressures for the right foot. An independent t-test was used to compare the regional sample entropy between age groups. The sample entropy of the right lateral metatarsal region was significantly ($p=0.027$) reduced (more regular) in comparison to the young controls. These preliminary results suggest repetitive loading of high pressures under the lateral forefoot in elderly. This may have further implications for elderly persons with foot pain, diabetic ulcers, or at risk for falls.

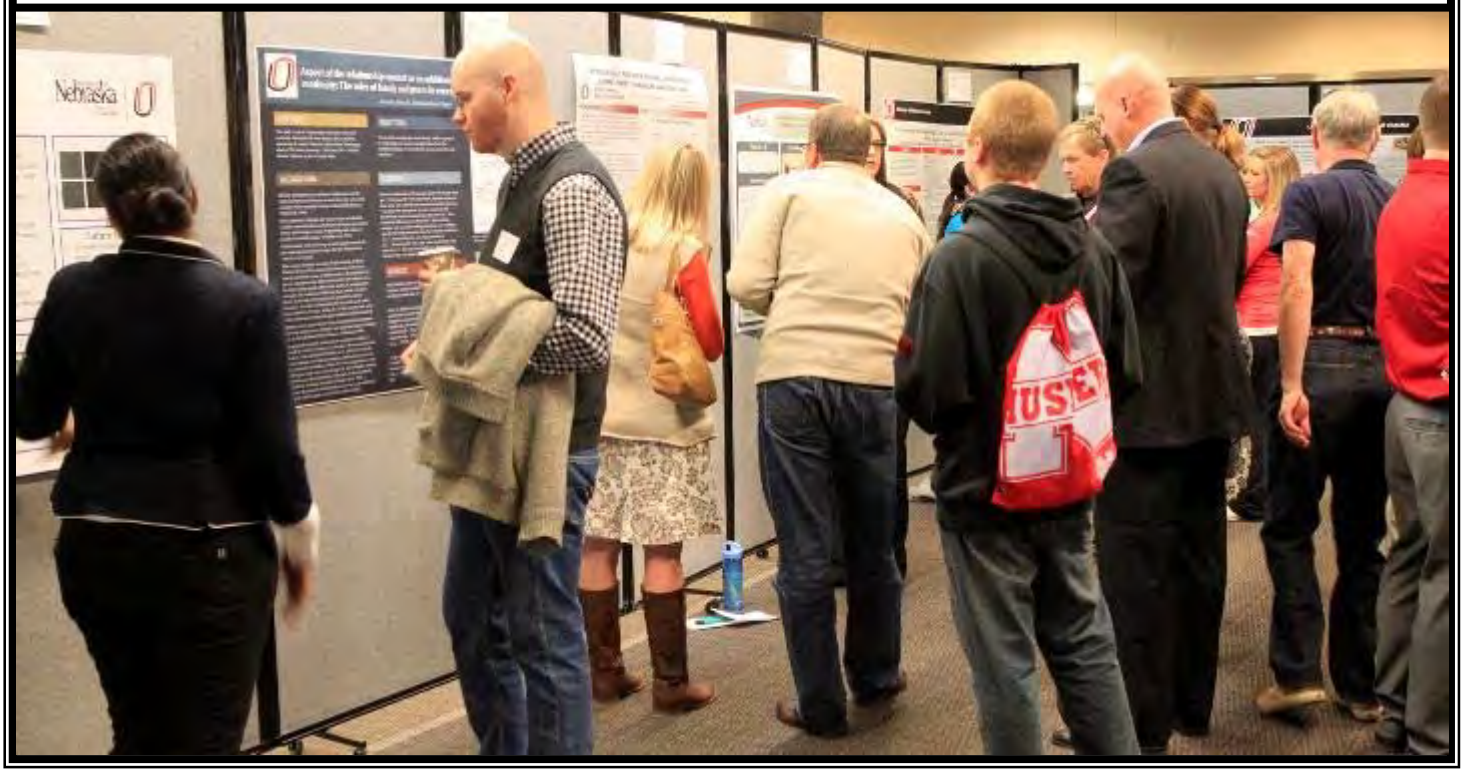
# Graduate Abstracts: Masters

**ANDREW PRINE**
Graduate: Masters
*Increasing Compliance Using Operant Motivations and Direct Skills Instruction*
Major: Psychology
Faculty Advisor: Lisa Kelly-Vance

A 4-year old boy in a midwestern preschool classroom was referred for assessment and intervention by his classroom teacher for noncompliant behaviors, particularly he insisted on refusing to transition from free play to large group activity. A functional behavior assessment was conducted and resulted in indirect methods of data collection yielding one potential function of problem behavior (escape from task demand) and direct observation resulting in a different function (social positive attention). Following a baseline assessment of noncompliant behavior, the two hypotheses were tested sequentially by means of treatments matched to function. Results indicated that the student responded more favorably to the treatment targeting escape as a maintaining variable for problem behavior.

JULIA RAWNSLEY
Graduate: Masters
*Student-led research studies in the CBA Koraleski Commerce and Applied Behavior Lab*
Major: Business Administration
Faculty Advisors: Erin Pleggenkuhle-Miles, Gina Ligon, Doug Derrick, Leif Lundmark
Co-Author: Michael Townsend

As part of a research initiative in the College of Business Administration (CBA), undergraduate and graduate students alike have a new resource available to help advance research on topics such as collaboration, decision-making, leadership, problem solving, and marketing. My co-author and I have both submitted student grants for research we will conduct in the Koraleski Commerce and Behavior Laboratory, and we plan to run a grouping of experiments to capture neurophysiological correlates of human decision-making. The lab was founded in 2014 to provide a physical space and research participant pool for CBA faculty and students to conduct research studies. The lab's specialized instrumentation measures galvanic skin response (GSR), electroencephalography (EEG), eye movement across a computer screen, and aggregate emotion by means of facial expression. We will utilize the lab's specialized instrumentation (specifically eye-tracking and GSR) as well as its participant pool to research sustainability practices and entrepreneurial search patterns. Our poster would benefit the research fair as a chance to showcase the kind of applied CBA research that is conducted using varied neurophysiological instruments.



# Graduate Abstracts: Masters

CAITLIN RAY
Graduate: Masters
*'Calming These Nerves': The Politics of Gender and Disability in Fibromyalgia Rhetoric*
Major: English
Faculty Advisor: Tammie Kennedy

In this presentation, which is a portion of my thesis project, I examine the public's perception of fibromyalgia through a *New York Times* article published in January 2008. Fibromyalgia is a "contested illness"—one that is often depicted in the public consciousness as a psychosomatic illness or as something simply "made up" by the patient. In January 2008, however, Lyrica was given FDA approval for the treatment of fibromyalgia, and a national conversation began that gave the syndrome greater awareness. However, while fibromyalgia had a chance to become legitimized through these conversations, an article in the *New York Times* by Alex Berenson called "Drug Approved. Is Disease Real?" actually worked to further marginalize fibromyalgia as a feminized, psychosomatic illness. I argue that this article is representative of what medical rhetorician Judy Segal terms as "kairology," or the "study of historical moments as rhetorical opportunities" (23). In January of 2008, conversations surrounding Fibromyalgia might have gone a variety of ways, and certainly the patient community was hopeful that the dialogue would be positive and give them validation and hope. However, as my analysis shows, this did not happen. The media coverage, led by this *New York Times* article, reaffirmed the narrative that the syndrome is not "real" (Berenson). Through cluster criticism, I isolate recurring words and phrases in the article that ultimately reinforce the author's view of fibromyalgia. Then, I used ideological analysis to examine how this article and the author's point of view shape subsequent narratives of the syndrome.

ANDREW RIQUIER
Graduate: Masters
*Microglia Levels in Response to Chorda Tympani Transection in Developing Rats*
Major: Psychology
Faculty Advisor: Suzanne Sollars

The chorda tympani nerve (CT) is one of the nerves responsible for relaying taste information from the oral cavity to the nucleus of the solitary tract (NTS) in the brainstem. Following transection of the CT (CTX), the resulting peripheral and central effects range from severe and permanent (in young rats) to mild and transient (in adult rats). The mechanisms driving these developmentally-dependent effects are unclear. A possible contributor is microglia, a primary component of the central immune response. Prior to the current study, no research has examined the microglia response to CTX in young rats and compared it to the response in adults. The current ongoing study utilizes immunohistochemistry to quantify the microglia response following CTX to determine if that response varies over the course of development. Rats aged 5, 10, 25, and 50 days are receiving unilateral CTX, and NTS microglia levels are evaluated four days later. As previous research indicates that microglia levels are typically higher in healthy younger mammals, it is hypothesized that the microglia response to CTX will be greater in the younger age conditions in comparison to the older animals. If this is the case, it will provide insight into a potential mechanism for the more severe central effects of CTX. Upon completion of this study, future research will be needed to elucidate the precise function of microglia in the developing taste system's response to injury.

# Graduate Abstracts: Masters

STEPHANIE SANDS
Graduate: Masters
*Psychological Safety and Team Information Exchange in Virtual Leadership Development*
Major: Psychology
Faculty Advisor: Roni Reiter-Palmon

This study investigated a virtual leadership development program that used case-based learning. Specifically, this study evaluated the hypothesis that perceptions of team psychological safety positively relates to team information exchange, which in turn predicts learning. Emerging leaders were recruited across rural Nebraska and diverse groups of three or four people were created. Participants met six times over the course of eight months to discuss cases focusing on five leadership skills: problem construction, conceptual combination, idea evaluation, meeting effectiveness, and feedback delivery. Learning was assessed at the individual level using a pre- post test design such that pre-test scores were entered first as the covariate, and post-test scores were used as the dependent variable. Regression analyses revealed a significant positive relationship between psychological safety and team information exchange. However, both psychological safety and team information exchange had negative relationships with the post- scores. This suggests that although feeling more psychologically safe led to more exchange of information, these factors did not contribute to learning. A potential explanation for this is that the information exchanged was not related to the task or program materials. This study helps to fill the gaps in leadership development, and group dynamics research and also contributes to the growing field of virtual learning by exploring how an important emergent team state, psychological safety, affects the exchange of information, and ultimately the success of learning and developing key leadership skills.

MOLLY SCHIEBER
Graduate: Masters
*Gait Biomechanics Are Not Improved Following Supervised Treadmill Exercise in Patients with Peripheral Arterial Disease*
Major: Health, Physical Education and Recreation
Faculty Advisor: Sara Myers
Co-Authors: Bryon C. Applequist, Shane R. Wurdeman, Iraklis I. Pipinos, Jason M. Johanning, Sara A. Myers

Peripheral arterial disease (PAD) is a vascular disease that affects approximately 12 million Americans. PAD is characterized by intermittent claudication which occurs because atherosclerotic blockages restrict blood flow to the lower extremities1. Consequently, persons with PAD feel pain and discomfort with activity and often succumb to a sedentary lifestyle3. Currently, conservative treatment for patients with PAD involves supervised treadmill walking exercise (STW). After STW, patients with PAD have been shown to improve their maximum walking distance, however, little is known about the mechanistic changes that occur2. Therefore, the purpose of this study was to determine the effectiveness of STW on walking distance, gait biomechanics, and lower extremity strength in patients with PAD. Fifteen patients (66.0$\pm$1.9years; 175$\pm$2.24cm; 89.2$\pm$5.0kg) underwent gait evaluation before and after participating in a 12-week STW intervention. Evaluations involved the Gardner Treadmill Test and five walking trials per limb where a minute of rest was given between each trial. Absolute walking distance, lower extremity strength, ankle, knee, and hip torque and power were analyzed pre and post-STW with dependent t-tests. Absolute walking distance significantly increased (101.5m to 268.8m) post-STW ($p=.02$). However, there were no significant differences between pre and post-STW for joint torques, powers, or lower extremity strength. Lack of improvements in gait biomechanics suggests that STW addresses a cardiovascular mechanism in PAD, possibly only helping improve walking economy and/or pain tolerance. Additionally, muscular myopathy present in patients with PAD is likely unchanged post-STW.

# Graduate Abstracts: Masters

JENNIFER A. SEDIVY
Graduate: Masters
*Program Evaluation as a Tool to Improve Permanency Outcomes*
Major: Social Work
Faculty Advisor: Jeanette Harder

Statistics for Nebraska's Eastern Service Area (Douglas and Sarpy counties) indicate that more than 250 (11%) children and youth in care aged out of the child welfare system without achieving permanency through reunification or adoption between January 2012 and June 2013 (Nebraska Families Collaborative, 2014). Children and youth aging out of care are at risk for a number of adverse outcomes. Achieving permanency protects against these outcomes by providing children and youth with a strong and stable support system (Perry, 2006). In turn, efforts to guide youth down a path toward permanency are critical to the current and future well-being of youth in care. Addressing barriers to and improving permanency outcomes for the hardest-to-place children in Nebraska's Eastern Service Area are objectives of the Nebraska Adoption Project. This project seeks to meet these objectives through the successful integration of the Family Finding Model and the 3-5-7 Model© into the Eastern Service Area's child welfare system. The current study aims to improve permanency outcomes for children and youth by evaluating and comparing outcomes of the integrated approach to those of treatment as usual (Wendy's Wonderful Kids) in Nebraska's Eastern Service Area.


R.J. SHUTE
Graduate: Masters
*Human Gene Response to Exercise in a Cold Environment*
Major: Exercise Science
Faculty Advisor: Dustin Slivka
Co-Authors: Matt Heesch, Taylor LaSalle, Matt Bubak, Terry Laursen, Nick Dinan, Dustin Slivka

Purpose: To determine mitochondrial related gene expression response to exercise in a cold compared to room temperature environment. Methods: Recreationally trained males (n=9, age: 25±4 y, height: 179±5 cm, weight: 76.2±8.0 kg, %BF: 13.4±3.3%, VO2peak: 4.39±0.82 L/min) completed two trials consisting of cycling in a cold (C) or thermo-neutral (N) environment (7.2±0.2, 20.1±0.2 ºC, respectively) for one hour at 60% of Wmax followed by room 3 hours of room temperature recovery. Muscle biopsies were taken from the *vastus lateralis* pre-exercise and three hours post-exercise for gene expression analysis. Heart rate (HR) and expired gasses were also measured throughout the trials. Results: Exercise V02 was lower in C than N (2.68±0.8, 2.81±5.2 L/min, respectively, p=0.017). HR was similar during exercise and recovery between C and N (Exercise: 150±9 and 150±9 bpm, respectively, p=0.920; Recovery: 75±14 and 74±10 bpm, respectively, p=0.522). Environmental temperature (p=0.238) and V02 (p=0.924) were not different during recovery. PGC-1α and VEGF increased with exercise (p=0.001, p=0.001, respectively) but not between trials (p=0.134 and p=0.975, respectively). ERRα was lower in C than N (p=0.033). There was a trend in MEF2A and NRF2 being lower in C than N (p=0.086, p=0.055) but not with exercise (p=0.786, p=0.256). NRF1 and TFAM did not change between trials (p=0.981, p=0.854, respectively). Conclusion: These results indicate that when exercise is performed in a cold environment, select mRNA associated with mitochondrial biogenesis are altered.

# Graduate Abstracts: Masters

PHILIP SIMMONS
Graduate: Masters
*Management Support, Employee Cynicism, and Diversity Training Effectiveness*
Major: Psychology
Faculty Advisor: Carey Ryan
Co-Authors: Madison Cerizo, Abigail M. Folberg, Carey S. Ryan

Emphasizing the importance of diversity training is generally believed to result in less discrimination and employees with more positive attitudes. However, few studies have experimentally investigated the effects of management support or examined the role of employee attitudes towards management, specifically, whether cynicism towards management affects diversity training effectiveness. In the present study, we experimentally manipulated high versus low management support for diversity training and proactive (i.e., to promote an appreciation of differences) versus reactive (i.e., in response to complaints of racism) rationale for training implementation. We also assessed cynicism towards management. White participants ($N$=186) recruited via MTurk completed a cynicism measure (e.g., I don't usually take management seriously when they decide to do something new) and read a vignette in which management support and training rationale were manipulated. They then completed online diversity training emphasizing multiculturalism followed by measures of multiculturalism and colorblindness. Greater endorsement of multiculturalism than colorblindness indicated greater training effectiveness. The analyses revealed that a) participants endorsed multiculturalism more than colorblindness; b) training was somewhat *less* effective when supported by management; c) when the training was implemented proactively, greater management support resulted in lower training effectiveness, whereas when training was implemented reactively, greater management support resulted in greater training effectiveness; and d) training was less effective among participants who were more cynical of management, particularly when management had been described as supporting the training. In sum, management support may undermine diversity training effectiveness when training is implemented proactively and among individuals who are cynical of management.

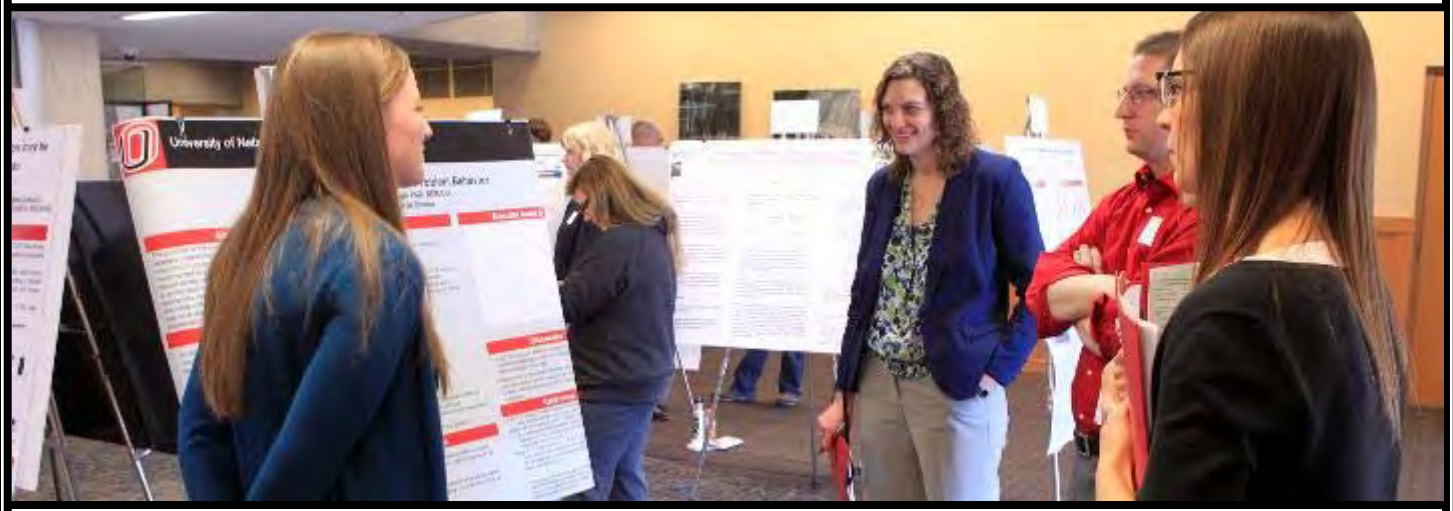
RAJALAKSHMI SIVANANDHAM
Graduate: Masters
*GENETIC ANALYSIS OF PARKINSONISM/DEMENTIA AND MULTIPLE SCLEROSIS*
Major: Biology
Faculty Advisor: Bruce Chase

Parkinson's disease is a neurodegenerative disorder resulting in balance instability, tremor, and slowness of movement. It affects about two percent of individuals over the age of 50 throughout the world. My project's goal is to identify genetic factors that contribute to this disease. A large kindred (MEN-1) has been identified segregates Parkinsonism and dementia as a genetic trait. Whole genome sequencing has been used to show that these phenotypes are not caused by any of the known genes associated with Parkinsonism or dementia, and has identified variants in candidate genes that could contribute to the disease phenotypes seen in this kindred. I plan to undertake a linkage analysis to identify the chromosomal regions harboring genes for these disease traits. This will provide evidence to guide the choice of which genetic variants in the MEN-1 Kindred should be pursued in future analyses. This could involve the development of assays to evaluate the frequency of novel variants in disease and non-disease cohorts as well as functional studies in cell-culture and animal models.

# Graduate Abstracts: Masters

KAILEY SNYDER
Graduate: Masters
*Perceptions of Classroom Physical Activity Breaks*
Major: Physical Activity in Health Promotion
Faculty Advisor: Danae Dinkel

Background: Few children meet the physical activity recommendations. One new and innovative way schools have tried to increase children's physical activity is through classroom physical activity breaks. Studies have found that classroom physical activity breaks not only increase physical activity but also increase children's time on-task as well as academic scores. However little is known about teachers' perceptions of brain breaks. Purpose: The purpose of the study is to determine teacher's perception of brain breaks. Methods: Two school districts in a metropolitan Midwest City were recruited to participate. Twelve teachers from each district took part in a semi-structured interview over the phone (n=26). Semi-structured interview questions were developed based on the socio-ecological model. Data were analyzed using the process of immersion/crystallization. Results: Factors from all five levels of the socio-ecological model impacted teachers' perceptions. At the individual level, teachers chose to implement brain breaks primarily because of cognitive rationales (n=24) (i.e., to improve focus). At the interpersonal level half of teachers noted little to no collaboration with other faculty in regard to brain breaks. At the organization level, most teachers believed their district would be supportive of brain breaks (n=23). At the community level, less than half believed it would be helpful to have resources and programming come from community partners (n=9). Finally, at the policy level, teachers were unaware of any guidelines or policies associated with brain breaks (n=18). Conclusion: Results provide preliminary evidence that teachers have a positive view of classroom physical activity breaks.



KRISTEN SNYDER
Graduate: Masters
*The Effects of Human Emotions on Dogs' Social Cognitive Performance and Hormone Levels*
Major: Psychology
Faculty Advisor: Rosemary Strasser

Research suggests that dogs experience emotional contagion (i.e., synchronization of their emotional state) with humans (Custance & Mayer, 2012), an ability which seems to aid in dogs' social cognitive skills directed towards humans. However, it is still unclear whether dogs can use human facial cues associated with emotional states as a cue that might subsequently influence their behavior and physiology. The current study examines whether shelter dogs respond to manipulated human facial cues associated with certain emotions to alter their behavior on a commonly used social-cognitive task (object choice task) and whether these facial emotional cues will influence the dog's hormonal state. Findings from a pilot study showed that behaviorally dogs' responses vary when given different facial expression cues (e.g., happy, sad, neutral, or disgust), $F(3, 208) = 8.22$, $p < .001$, such that dogs performed worse when given a facial expression associated with sad or disgust. We are also currently collecting saliva samples to measure cortisol following trials that consist of one of the aforementioned facial cues. Additional findings will be presented and it is expected that there will be an increase in cortisol post- testing, especially in the disgust condition compared to the happy or neutral condition. If we find a significant increase in cortisol, it will suggest that dogs not only understand human emotions but that it influences their hormonal states.

# Graduate Abstracts: Masters

ZANE STARKS
Graduate: Masters
*Changes in Gait due to Ankle Plantar Flexor Muscle Fatigue*
Major: Exercise Science
Faculty Advisor: Jenna Yentes

In this case study, a protocol was created in attempt to examine gait characteristics before and after fatigue on the plantar flexor muscles. The lone participant was a healthy 25 year-old female. Kinematics were recorded using a 12 camera motion analysis system (MAC, Santa Rosa, CA) and kinetics were recorded using AMTI force plates (AMTI, Watertown, MA). Two separate conditions were completed within this test. The first condition established a baseline for walking and served as a control to compare within the experiment. The participant then completed a fatigue protocol, which consisted of standing calf raises on a wooden 2x4 for 90 seconds at approximately 0.8 Hz. Immediately following the fatigue protocol, the participant returned to the original starting point and the post-fatigue walking trial was completed. An approximately one to two degree increase in range of motion was discovered pre- to post- fatigue protocol in the ankle and hip, while a six degree decrease was seen in the knee. Pre-test ankle moments decreased 17%, while peak knee and hip moments increased 38% and 28% respectively. In the same way, peak power both produced and absorbed at the ankle decreased 7% and 6%, while knee (41%, 48%) and hip (17%, 140%) increased. Since peak propulsion power is reduced within the ankle plantar flexors due to fatigue or weakness, more power must be produced across the more proximal joints to compensate. This provides an example of how gait can change in order to generate similar powers when distal muscle weakness occurs.

JULIA TEMME
Graduate: Masters
*The Effects of Mand Training on Problem Behavior*
Major: School Psychology
Faculty Advisor: Brian McKevitt
Co-Author: Ashley Lugo

The purpose of this study was to demonstrate the relationship between independent mands emitted by a child and the frequency of problem behaviors that occur. Mand training was implemented to serve as a functional replacement for high-pitched screams (problem behavior) the child exhibited within a clinical setting. Results indicate that when given an appropriate replacement behavior, challenging behavior can decrease without alternative consequential strategies. This approach may be helpful when efforts are made to address problematic behavior in the classroom.

SETH THOMPSON
Graduate: Masters
*Quantitative Trend Analysis of the Impact of Religion on Attitudes about the Environment versus the Economy with Qualitative Support*
Major: Sociology
Faculty Advisor: Dan Hawkins

Using the 1972-2012 GSS dataset I selected persisting relevant variables with elements of both environmental and economic concern. Along with these, I selected variables that measured reported confidence in certain institutions involving authority from religion, and efficacy from television. Supplemental variables were selected based on relevancy and frequency over the 40- year time-span. Paired with these methods, I used qualitative analysis to examine sermons with salient environmental and/or economic content. The purpose of this study if threefold: examining whether there is a relationship between religious affiliation and attitudes about the environment and economy, how such a relationship has changed over time, and whether messages from religious elites can shed light on changes in these attitudes.

# Graduate Abstracts: Masters

ADAM THURLEY
Graduate: Masters
*The Role of Poor Sleep Quality in Producing Incivility at Work Among Working College Students*
Major: Psychology
Faculty Advisor: Lisa Scherer

Soaring tuition costs are leading a record number of college students to work an ever increasing number of hours while also attempting to meet the demands of a fulltime course load, which facilitates feelings of work-school conflict. Though relationships between work-school conflict and other attitudinal variables, such as job satisfaction, have been explored, a more insidious effect of work-school conflict, the creation of uncivil student-employees, remains unexamined. This study builds on prior work-school conflict research to determine its effect on sleep quality and incivility. We examined working college students to determine whether sleep quality would mediate the effect of work-school conflict on their tendency to behave uncivilly at work. Results indicated that sleep quality was negatively influenced by high work- school conflict and led to higher reports of workplace incivility. Implications for researchers, employers, and college personnel are discussed.

SHERIDAN TRENT
Graduate: Masters
*Putting out fires! Exploring Occupational Dispute Competence in the Workplace*
Major: Industrial-Organizational Psychology
Faculty Advisor: Lisa Scherer
Co-Authors: Khanh Lai, Lisa Scherer

Growing diversity in the workforce leading to an increasing number of disputes make hiring individuals who can work well with others and neutralize conflicts a priority. Although many organizations utilize a grievance or alternative dispute resolution system, the high costs associated with workplace conflict remain a prevalent problem. Occupational dispute competence, or an individual's proficiency in deescalating and neutralizing disputes between and among others in the workplace, may help to address this need. The purpose of this exploratory study was to create and validate a scale to measure occupational dispute competence by examining relationships between occupational dispute competence and other traits associated with an individual's ability to understand, interpret, and act upon emotions, such as emotional intelligence, workplace friendships, cognitive ability, and mindfulness. Results indicated that occupational dispute competence was related to emotional intelligence, cognitive ability, and the awareness dimension of mindfulness. Although occupational dispute competence was not a better predictor of workplace friendships than emotional intelligence alone, the absence of argumentation does not necessarily denote an abundance of friendly relationships at work. Thus, future studies should focus on occupational dispute competence as a predictor of outcomes more directly associated with a lack of conflict.

JESSICA VANVUREN
Graduate: Masters
*Social and Emotional Intelligence: A Survey of High School and College Youth*
Major: Social Work
Faculty Advisor: Jeanette Harder

This presentation will describe the findings from a large survey of 339 high school and first-year college students who were members of the local Avenue Scholars Foundation, an organization dedicated to assisting at-risk youth find careers through education and supportive relationships. The sample of youth completed the Emotional Quotient Inventory (EQI). The EQI is a tool used to measure social and emotional intelligence. The tool is divided into five subscales which include intrapersonal, interpersonal, adaptability, stress management, and positive impression categories. A total EQI score was also computed based upon the subscales. Youth from several local public high schools and one community college took the survey in the fall of 2013. The results were compared to the test's predetermined norms. Most scores were within the standardized norms, but the presentation will examine areas where the youth fell below norms and possible reasons why this may have occurred. The data was analyzed in multiple ways by examining certain trends based upon gender, education level, and race. In conclusion, the presentation will touch on why this survey is particularly important for the Avenue Scholars program. The results of the survey also provide insight on how to prepare the future workforce in adjusting to a successful career and how future employers can aid in this process of transition, particularly for youth in poverty.

# Graduate Abstracts: Masters

KRISTIN VANWYNGAARDEN
Graduate: Masters
*Phonological profiles of 2-year-olds with expressive-only and expressive and receptive language delay*
Major: Speech Language Pathology
Faculty Advisor: Shari DeVeney

Late talkers compromise 10-15% of young children. They gain new words more slowly and begin combining words into phrases later than their typically developing peers. This language delay is associated with negative effects on reading and social skill development. Identification of predictive factors for continued language delay, including sound production skills, is important so that appropriate speech-language intervention can be directed. The purpose of this descriptive study is to investigate the phonetic inventories and percent of accurate consonant sound usage among late-talking toddlers. It is hypothesized that children with expressive and receptive language delays will have smaller phonetic inventories and lower percent consonants correct than toddlers with expressive-only language delay.

STEPHANIE WEDDINGTON
Graduate: Masters
*Having Good Colleagues Decreases Detrimental Effects of Volunteer Emotional Labor*
Major: Industrial-Organizational Psychology
Faculty Advisor: Lisa Scherer
Co-Author: Joseph Allen

Volunteers are vital to the success of non-profit organizations; however, the national volunteer rate has decreased over the past decade. It is essential for organizations to retain their current volunteers. Research has shown that burned-out volunteers are likely to consider quitting (Allen & Mueller, 2013). We examined the role of emotional labor on burnout, finding that the presence of negative organizational display rules related to greater surface acting and burnout; however, the opposite effect was found for positive display rules. Further, being satisfied with one's colleagues mitigated the negative effects of surface acting on burnout.

NICHOLAS WERTZBERGER
Graduate: Masters
*"Distributed Decision Making with Rapidly Evolving Information using a Multi-agent System"*
Major: Computer Science
Faculty Advisor: Prithviraj Dasgupta

We consider the problem of distributed decision making by a group of people, in the presence of rapidly evolving information, to determine the outcome of an undecided future event within a prescribed time window. Such decision making in the presence of rapidly arriving data are encountered in disasters, combat or battlefield scenarios, political or sports events, and even for group decisions around meeting project deadlines or fitness goals. Existing computational models of distributed decision making use multi- agent systems to model the interaction between people. Unfortunately, these opinion formation models are created under the assumption that no new information shows up over time. We hypothesize that a results-based update mechanism can effectively allow agents to adapt dynamically to new data as agents around them update their internal models based on this new data. To verify our hypothesis, we apply modern concepts in psychology with techniques in statistics, decision making under uncertainty, and multi-agent opinion formation to motivate a person to achieve a selected task.

# Graduate Abstracts: Masters

CASEY WIENS
Graduate: Masters
*A comparison of gait parameters between patients with peripheral arterial disease and patients with chronic obstructive pulmonary disease*
Major: Exercise Science
Faculty Advisor: Jenna Yentes

Peripheral arterial disease (PAD) and chronic obstructive pulmonary disease (COPD) are both characterized by dysfunctions that result in limited oxygen reaching the musculature. However, the dysfunctional characteristics are different between the two diseases. The purpose of the study was to compare the gait alterations in individuals with PAD with those individuals with COPD. It was hypothesized that both PAD and COPD patients would express differences in gait compared to healthy individuals and that COPD patients would have similar gait alterations as PAD patients. Three groups of subjects were included: 1) 25 healthy elderly control subjects; 2) 25 patients with PAD; 3) 16 patients with COPD. Participants were instructed to walk along a 10-meter walkway at their self- selected pace. Peak ground reaction forces and lower extremity ankle, knee, and hip joint muscular moments and powers in the sagittal plane of motion were measured. A one-way ANOVA was used to analyze differences between group and ground reaction forces and joint moments and powers, with a significance level set a p = 0.05. No significant differences were observed between COPD and healthy controls. Significant differences in gait mechanics occurred between PAD patients and healthy controls, as well as between PAD patients and COPD patients. These results indicate that despite both presentations of problems with oxygen delivery to tissues, the different disease mechanisms associated with PAD and COPD do not have similar biomechanical alterations under baseline conditions.

HOLLY WILSON
Graduate: Masters
*In Search of Nebraska's Orphan Trains*
Major: English
Faculty Advisor: John T. Price

Between 1854 and 1929, an estimated 250,000 orphaned, abandoned, and neglected children were relocated from eastern cities to new homes across rural America (Herman). One in 25 Americans are now thought to be descendants of orphan train riders (George). This history, often cited as the beginning of American foster care, remained hidden from public awareness until rider networking emerged during the late 1970s. The Orphan Train Movement (OTM) has morphed into a growing heritage industry, even as survivors pass away and first-person narratives are replaced by secondhand re-telling or fictional accounts. Much of what is known about Nebraska's orphan train history has been gathered by those with family or friend orphan train ties, told within an uncritically subjective perspective. While the collection of those fading voices was important, significant gaps and contradictory details still dominate the state's collective record. During extensive archival research at the National Orphan Train Complex in Concordia, Kansas, I located a handwritten list maintained by Anna Laura Hill, placement agent for the Children's Aid Society. Hill maintained this record for the duration of her agent travel from 1903 to 1926, beginning with her first "party" to Blair, Nebraska, and followed by 156 Midwestern stops during her career. Her precise cursive writing lists 26 orphan train arrivals within 22 Nebraska counties. When evaluated alongside other stored NOTC documents, Hill's list both corroborates and expands Nebraska's historical evidence. In contrast to the scattered dates recovered from rider memory, Hill's concrete itinerary provides an important macro framework.

# Graduate Abstracts: Masters

SCOTT WISSING
Graduate: Masters
*Assessing Reliability of a Questionnaire that will Assess Teacher Education Students' Preparedness to Implement Physical Activity into the Classroom*
Major: Health Promotion in Physical Activity
Faculty Advisor: Danae Dinkel

Research suggests that physical activity (PA) can be very beneficial in both the physical and mental development of a child. With physical education not being offered on a daily basis in most schools, it is critical that other forms of PA are offered. Classroom-based PA has been shown to be a viable option for increasing PA in children. In order to ensure teachers are prepared to implement PA, not only must teacher education programs be teaching these strategies but there must be a tool available to evaluate PA knowledge. The purpose of this study was to assess the reliability of a questionnaire that assesses teacher education students' preparedness to implement PA into the classroom. A new questionnaire that tested teacher education students' readiness to implement PA into their teaching was evaluated for reliability in15 male and female students from the University of Nebraska at Omaha. After the questionnaire was created, face validity and test re-test reliability was assessed. Face validity was assessed by 3 college professors from UNO and 4 secondary education teachers. Two day reliability for the questionnaire was found to be strong in 9 questions, moderately strong in 3, and weak in1. There was an indirect relationship between amount of multiple choice options and reliability. Our findings are a small stepping stone towards establishing a reliable questionnaire to test PA readiness in teacher education students. More studies are needed to validate these findings.

BRAD WOOSLEY
Graduate: Masters
*Efficient Simultaneous Motion and Task Planning Using Task Reachability Graphs*
Major: Computer Science
Faculty Advisor: Prithviraj Dasgupta
Co-Author: Prithviraj Dasgupta

We consider the problem where robots are provided with a set of task locations to visit in an environment of known size, but the length of the path between a pair of task locations is initially known only coarsely by the robots. The objective of the robots is to find the order of tasks that reduces the path length (or, energy expended) to visit the task locations in such a scenario. To solve this problem, we propose an abstraction called a task reachability graph (TRG) that integrates the task ordering with the path planning by the robots. The TRG is updated dynamically based on inter-task path costs calculated using a sampling-based path planner, and, a Hidden Markov Model (HMM)-based technique that calculates the belief in the current path costs based on the environment perceived by the robot's sensors. We then describe a Markov Decision Process (MDP)-based algorithm that can be used by each robot in a distributed manner to reason about the path lengths between tasks using the currently available path information, and select the paths that reduce the overall path length to visit the task locations. We have evaluated our algorithm on simulated Corobot robots within different environments while varying the number of task locations, obstacle geometries and number of robots. Our results show that the TRG-based approach performs up to 40% better in terms of distances traveled, 77% fewer replans, 76% less planning and locomotion times, as compared to a greedy, nearest-task-first selection algorithm.

# Graduate Abstracts: Doctoral

STEPHANIE ALBERS
Graduate: Doctoral
*A Mediational Model of Relational Victimization and Depression in Bulimia*
Major: Psychology
Faculty Advisor: Juan F. Casas
Co-Author: Juan F. Casas

A recent examination of disordered eating in college revealed students with eating disorders increased from 18.5% in 1995 to 30.5% in 2008 in both male and female students (White, Reynolds-Malear, & Cordero, 2011). Peer victimization (particularly relational victimization) has been positively associated with increases in disordered eating. Though a relationship is noted to exist between relational victimization and disordered eating, this relationship may be due in part to a third variable, depression. While it is noted that relational victimization does occur at college (Dahlen, Czar, Prather, and Dyess, 2013), recalled experiences of relational victimization may be considered particularly significant (Rosen, Underwood, Gentsch, Rahdar, Wharton, 2012). Risk factors for bulimia may differ for boys and girls. Therefore, the current study focused on the potential mediating role of depression between high school relational victimization and bulimia (controlling for college relational victimization and gender). College student participants completed retrospective and concurrent measures of relational victimization as well as assessments of current symptoms of bulimia and depression. Preliminary hierarchical regression analyses provided evidence for a potential partial mediation, however, follow-up bootstrapping supported a fully mediated model. That is, high school relational victimization had significant effect on bulimia, such that as high school relational victimization increased, bulimia also increased (controlling for gender and college relational victimization). Practical implications for eating disorder prevention programs are discussed.

HYUN-SUNG AN
Graduate: Doctoral
*Validity of the iHealth-BP7 and Withings-BP800 self-measurement blood pressure monitors*
Major: Exercise Science
Faculty Advisor: Jung-Min Lee
Co-Authors: Matthew P. Bubak, Danae M. Dinkel, Dustin R. Slivka, Jung-Min Lee

Blood pressure (BP) control among treated people with hypertension remains poor. Home BP monitoring devices have led to their widespread adoption, and are now consistently utilized for the evaluation and management of hypertension. Classifying individual's risk associated with BP should be monitored using accurate measurement devices. PURPOSE: The purpose of this study is to validate the iHealth-BP7 and Withings-BP800 monitors according to the European Society of Hypertension (ESH) International Protocol revision 2010. METHODS: Data from 11 participants (31.6 $\pm$ 2.2 years) were initially examined according to the ESH International Protocol for the validation of BP measuring devices. Participants were asked to sit and relax for 10-15 mins with legs uncrossed, and back supported prior to the test. In all participants, sequential left arm measurements were performed by two trained observers using a mercury sphygmomanometer and one supervisor using the device. Collected data were screened according to the ESH protocol RESULTS: The mean differences between the monitor and sphygmomanometer readings were -0.55$\pm$3.75 (SBP) and 0.54$\pm$3.62 (DBP) for iHealth-BP7 and 3.18$\pm$4.37 (SBP) and -0.35$\pm$5.42 (DBP) for Withings-BP800. The iHealth-BP7 monitor passed all of the modified requirements, however the Withings-BP800 did not meet the last phase of the modified protocol. CONCLUSION: The iHealth-BP7 monitor is recommended as a valid home BP monitoring device, however the Withings-BP800 fails to meet the ESH criteria in this study potentially due to the small sample size. Since the ESH protocol requires 33 subjects, further study with additional participants is warranted to determine validation of both devices.

# Graduate Abstracts: Doctoral

BRYON APPLEQUIST
Graduate: Doctoral
*A comparison of baseline lower extremity muscle function differences in patients with PAD and healthy controls*
Major: Exercise Science
Faculty Advisor: Sara A. Myers
Co-Author: Sara A. Myers

Peripheral arterial disease (PAD) is a disease that results from blockages in the lower extremity arteries and hinders blood flow to the legs. Functional limitations caused by PAD include a sedentary lifestyle, higher cardiovascular morbidity and mortality, and reduced quality of life. Current research evaluating PAD muscular strength and function measure isometric strength, or the amount of torque generated by a joint in a fixed position. This is not representative of function through the full joint angle of motion or of muscular strength used during daily activities such as walking. Evaluating muscular strength and power the entire range of motion allows for further understanding of the muscular capacity. Electromyography (EMG) measures electrical activity within the muscle and is another way to quantify function of the muscles during physical activity. EMG will allow further understanding of how muscle damage documented in patients with PAD affects muscle function. One patient with PAD and six control subjects performed ankle plantar and dorsi flexion and hip extension and flexion on an isokinetic dynamometer while instrumented with EMG electrodes. Movements were performed at a constant speed of 120deg/s. Overall the patient with PAD had decreased torque and power measures for both hip and ankle joints compared to controls. Interestingly, muscle activity was decreased for the gastrocnemius but was increased for the soleus muscle for the patient with PAD. The reorganization of muscle function of the plantar flexors may be indicative of the muscle myopathy present in patients with PAD.

ANDREW ARNOLD
Graduate: Doctoral
*The contribution of the knee to the amount of gait variability*
Major: Exercise Science
Faculty Advisor: Jennifer Yentes

The aim of this study was to enhance understanding of human walking and provide insight into dysfunction. My hypothesis was that there would be a greater amount of step length, step width and step time variability, when walking with locked out knees, compared to freely moving knees. Participants walked on a declined treadmill at two declined (negative) slopes with conditions of freely moving knees and locked out knees. For the locked knees condition both knees were locked in full extension using a knee brace on each leg. Participants walked on the declined treadmill for 5 minutes for each condition. Kinematics were recorded for each participant who walked at their preferred walking speed. Data was collected using reflective markers and a motion capture system. The variability of step length, step width and step time was calculated using standard deviation. When going from freely moving knees to locked out knees there was a general trend of an increase in the gait variability for all the variables at both slopes except for the step width variability at the lower slope. This strongly supported the hypothesis that the overall gait variability would increase when moving from a freely moving knee to a locked out knee.

DANIELLE J.S. BAILEY
Graduate: Doctoral
*Diffusion of shame: Experiences of sex offender family support networks*
Major: Criminology and Criminal Justice
Faculty Advisor: Lisa Sample

Although much descriptive information has been learned about the consequences sex offenders' family members experience when their loved ones have been placed on the registry, little is known about how these consequences affect family members' abilities to provide the informal support sex offenders need to desist from offending. This paper uses strain theory as a guiding framework to understand how effects from sex offender legislation affect family member relationships with their offender loved ones and other support networks in their lives. The sample consists of thirty-six family members, including sex offender spouses, significant others, parents, and adult children. The results of this study can be used to help develop services directed at sex offenders and their family members with the goal of enhancing the social support of sex offenders within the community.

# Graduate Abstracts: Doctoral

JASJIT BANWAIT
Graduate: Doctoral
*A Computational Framework to Identify Therapeutic MicroRNAs - A contemporary approach in treating pancreatic cancer*
Major: Bioinformatics
Faculty Advisor: Dhundy Bastola

Cancer research has generated valuable body of knowledge about the mutations that play significant role in cell proliferation. These mutations have led to gain of function in oncogenes whereas 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%. The most reliable diagnostic serum marker are 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 rate observed in pancreatic cancer. More recently, microRNAs (or miRNAs) have been identified as potential therapeutic agents in the treatment of patients with pancreatic cancer. MicroRNAs are short ~21-22 nucleotide long non-coding RNAs that act as regulators of expression of mRNA. In this study, we developed a computational approach to identify relationship between miRNAs and the mRNA for various biological processes or pathways involved in pancreatic cancer. The long-term goal of our research is to establish a computational framework for 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 project is expected to increase the specificity of therapeutics and reduce the side effects associated with current therapies.

ABHISHEK BHATI
Graduate: Doctoral
*Feeding the Poor: The Portrayal of Destitute Children in the Fundraising Campaigns of NGOs in India*
Major: Public Administration
Faculty Advisor: Angela Eikenberry
Co-Author: Angela Eikenberry

The study presented in this paper brings in the unheard voices of children regarding their own portrayal by nongovernmental organizations (NGOs) working in India. It addresses the questions: How do children feel about their portrayal in the images of the funding campaign? What do photographers or managers/directors affiliated with NGOs view their portrayal of destitute children? The study draws on data from four focus groups conducted with 24 children between the ages of 8-15 years as well as with photographers and campaign managers from four charities working in different parts of India. Findings suggest children liked to be portrayed in a 'good light' by NGOs, telling the whole story about their lives but that also generates awareness about hardships such as child labor and child marriage. NGOs face a challenge in representing beneficiaries in fundraising campaigns between portraying them in a good light while also portraying them holistically.

OLIVER BONHAM-CARTER
Graduate: Doctoral
*Post-translational modification bias and organism complexity*
Major: Bioinformatics
Faculty Advisor: Dhundy Bastola
Co-Author: Ishwor Thapa

A protein post-translational modification (PTM) is a cellular mechanism that enables certain proteins to perform specialized tasks in a cell. There are many different types of natural PTM and they preferentially affect one amino acid over other in a protein. In our work, we are particularly interested in the protein response to various types of stress conditions in cells. It is our hypothesis that environmental stresses influence PTM-bias and may suggest a preference for PTM activity across the proteins of a given organism. To test this hypothesis, we analyzed the protein content from phylogenetically distinct organisms for the presence of PTM, its type and the amino acid target of this PTM. Our result suggests, PTM bias exists and it is unique to each organism. Across the mitochondrial and non-mitochondrial proteins of 11 organisms, the result indicates a strong bias, which is pronounced with the increasing complexity of organization of the living organism. Our work suggests that PTM bias and diversification may likely have been directed by an organism's environmental stress conditions.

# Graduate Abstracts: Doctoral

ALICIA PHILLIPS-BUTTNER
Graduate: Doctoral
*Behavioral, social, and hormonal outcomes of dogs rescued from canine commercial breeding establishments*
Major: Psychology
Faculty Advisor: Rosemary Strasser
Co-Author: Rosemary Strasser

Across species, early life experiences play an imperative role in shaping physiological, behavioral, and psychological processes. Past research has suggested that dogs reared and maintained in adverse and socially deprived environments, like commercial breeding establishments (CBEs, aka puppy mills), demonstrate multiple behavioral and psychological abnormalities, but observational studies have yet to be conducted. We explored differences in the behavior and cortisol levels of dogs rescued from CBEs during social interactions with humans. Twenty dogs (8 CBE, 12 other backgrounds) currently residing at Hearts United for Animals sanctuary were observed while interacting with an unfamiliar researcher and then tested on a food-based pointing task. Salivary cortisol levels were assessed at three time points. Initial analyses revealed that CBE dogs showed lower levels of human-directed social behavior, including a longer latency to initiate contact ($p$=.04) and look at the researcher ($p$=.03), and exhibited more fear- related behavior, including spending more time in a crouched position ($p$=.02) and less time in locomotion ($p$=.03). CBE dogs were less likely accept food from the researcher ($p$=.02), so their ability to follow social cues to locate hidden food items could not be assessed. Differences in cortisol levels will be discussed, though nearly half of the CBE dogs did not produce enough saliva to assay, perhaps due to heightened stress (i.e., sympathetic suppression of digestive functions). These findings shed light on the deleterious effects of adverse living conditions on dogs' social, behavioral, and physiological wellbeing, and elucidate the difficulties they face in forming positive social relationships with humans.

JON CAVANAUGH
Graduate: Doctoral
*Oxytocin and social buffering in marmosets*
Major: Psychology
Faculty Advisor: Jeffrey A. French

Social disruption, isolation, and neglect are a major source of stress and can negatively impact hypothalamic-pituitary-adrenal (HPA) axis functioning in socially monogamous primates; while social support has stress-reducing effects through HPA-axis modulation (Cohen & Wills, 1985). Oxytocin (OXT) plays a critical role in the facilitation of social bonding (Young & Wang, 2004) and may attenuate the bio- behavioral stress response (Smith & Wang, 2012). The goal of the present study was to determine if OXT plays a regulatory role in the social buffering of HPA-axis activity during stress in well-established marmoset (*Callithrix jacchus*) pairs. Male and female marmosets (n=10) experienced a standardized psychosocial stressor with and without their pair-mate under neuropeptide treatment (Pro8-OXT, Leu8- OXT, OXT antagonist, and saline). Male, but not female, marmosets treated with an OXT antagonist had significantly higher HPA-axis reactivity [$F$(3,12)=6.88,$p$=0.006] and total cortisol exposure across the stressor period, relative to vehicle [$F$(3,12)=9.59,$p$=0.002]. Whereas female, but not male, marmosets that experienced a stressor with their pair-mate had significantly lower HPA-axis reactivity [$F$(1,4)=7.07,$p$=0.05] and total cortisol exposure across the stressor period than females without their pair-mate [$F$(1,4)=13.87,$p$=0.02]. These results suggest that endogenous OXT attenuates the stressor- induced rise in cortisol levels in male marmosets, while the presence of a pair-mate buffers HPA-axis activity in females. Thus, the OXT system and social context differentially influence how the HPA-axis responds to stress in male-female marmoset pairs.

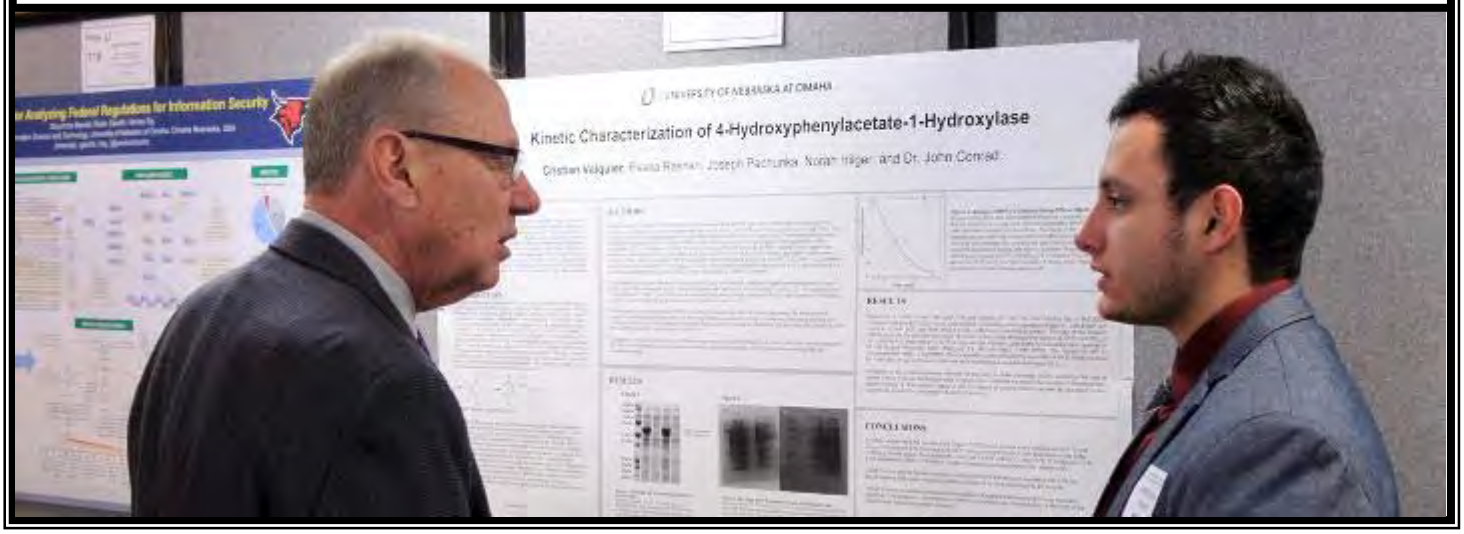
# Graduate Abstracts: Doctoral

CAN CHEN
Graduate: Doctoral
*Disentangling the Myth of the Fragile Foundations: The Effects of Public Infrastructure Finance on State Infrastructure Quality*
Major: Public Administration
Faculty Advisor: John Bartle

The 2013 Report Card for America's Infrastructure continues to give the nation's critical infrastructure an overall poor grade of D+ (American Society of Civil Engineering, 2013). Although there have been many government and media reports discussing the aging and decaying American public infrastructure systems, very few studies have empirically examined the relationship between public infrastructure finance and public infrastructure quality. Drawing from public service production theory, this research builds a public highway infrastructure production model, and then comprehensively and systematically investigates the effects of state highway infrastructure finance on state infrastructure quality and the overall highway infrastructure performance. The research develops core indicators for measuring state highway performance including road quality, bridge conditions, road congestion, and traffic fatalities. A composite infrastructure performance index is constructed to measure the overall performance of state highway systems. This study uses a long panel data set consisting of 48 US states from 1995 to 2009. Panel fixed effect estimation is employed. This research contributes to the fields of capital budgeting and infrastructure finance in three key ways: to expand the theoretical understanding of the determinants of public infrastructure performance, to explore how infrastructure finance and investment practices matter for public infrastructure performance, and to offer practical policy suggestions for improving American public infrastructure performance and condition.

JACQUELYN DAVIS
Graduate: Doctoral
*Characterization of Innate Immune Response in the Neonatal Rat Tongue Following Peripheral Nerve Injury*
Major: Psychology
Faculty Advisor: Suzanne Sollars
Co-Author: Suzanne Sollars

There are well established differences in the way the taste system of rats is affected by peripheral nerve damage, depending on the age at which injury occurs. Following nerve loss, young animals undergo more severe changes than adults and these changes are permanent when injury occurs prior to taste system maturation. It is not yet understood why these developmentally -dependent variations in damage and recovery occur, however, differences in immune response have been suggested as a possible explanation. Neutrophils, a type of white blood cell, make up the first response of the immune system in reaction to injury or infection and can be quantified through the use of immunohistochemistry (IHC) staining procedures. In the present study, the chorda tympani taste nerve was cut (CTX) in young or adult rats, and the neutrophil response in the tongue was assessed at 12, 24 or 48 hours after injury. Following tissue collection, tongues were frozen, sectioned and then stained using IHC procedures. Immunohistochemistry is a lengthy process which often requires a high degree of refinement and the present investigation is ongoing. It is expected that the neutrophil response will be substantially higher in young animals and that the increase in inflammation caused by elevated neutrophil presence contributes to both the larger changes in morphology and the lack of nerve regeneration seen in young animals following CTX. Results differing from these expectations would suggest investigation into other aspects of immune response (such as the later adaptive response) may be needed.



# Graduate Abstracts: Doctoral

GERARD DE LEOZ
Graduate: Doctoral
*High Performance IT Project Teams: A Comparative Study for Traditional and Agile Methodologies*
Major: Information Technology
Faculty Advisor: Stacie Petter

In the software development world, *agile* methodologies offer an approach where piecewise functionalities of the whole system are developed incrementally through a series of rapid mini-development iterations. In contrast, *traditional* methodologies follow a sequential, phase-by-phase approach, which heavily relies upon lengthy yet careful planning prior to the actual development of the entire system. Because agile and traditional methodologies have their respective strengths and weaknesses, many organizations adopt a hybrid version of the methodologies that fit the organizations' characteristics. The differences among the adopted methodologies, therefore, suggest the need to explore common and differentiating characteristics of IT project teams who deliver successful IT projects. Thus, we posed the following questions: (1) based on the adopted methodologies, what are the common and differentiating factors that influence IT project teams to delivery successful projects; and (2) how do those success factors interplay towards the creation of high performance IT project teams? This study employs a qualitative research design, particularly, a case study approach, to capture rich experiences and unfold insights, patterns and themes about the practices of successful IT project teams who employed combined agile and traditional methodologies. Data were gathered from IT project managers from multiple organizations and were eventually compared. Our study develops a process model that highlights the following IT project team characteristics: (a) composed of self-motivated members, (b) has good working relationships among members, (c) mindfully adheres to processes and timelines, (d) attentively meets customer requirements, and (e) conscientiously values stakeholder involvement. These characteristics parallel many of the success dimensions necessary for creating high performance IT project teams.

GERARD DE LEOZ
Graduate: Doctoral
*To Share or Not to Share: Measuring Knowledge Sharing Motivations in a Crowdsourcing Environment*
Major: Information Technology
Faculty Advisor: Lisa Scherer
Co-Authors: Abdulrahman Alothaim, Lisa Scherer

Crowdsourcing has been an emergent social concept which highlights the participative culture and collective intelligence of the crowd towards accomplishing a task. Initiated via an open call from a sponsor, either a person or an organization, crowdsourcing tasks are increasingly being employed because of the benefits that crowdsourcing could bring—which include savings on time and internal resources, as well as wider and more flexible reach to potential human laborers. Because of the newness of the phenomenon, research communities have gained increasing interests to better understand crowdsourcing and to contribute to the sparse crowdsourcing literature. In addition, because engaging the community is a crucial factor for the success of crowdsourcing, measuring the determinants that motivate crowds to participate and share their knowledge is a top priority for crowdsourcing organizations. The objective of this study, therefore, is to develop a new measurement scale for a proposed construct of interest: "motivation to share knowledge in a crowdsourcing environment." We examined this construct by investigating the interrelationship among related constructs present within the study's nomological network. Specifically, we applied correlation and regression analyses techniques to test ten hypothesized relationships using data gathered from Amazon Mechanical Turk—a popular example of an online marketplace for crowdsourcing on-demand tasks that is capable of reaching out to a global work force. Our results indicate strong support for the validity and reliability of the proposed construct.

# Graduate Abstracts: Doctoral

AYAN DUTTA
Graduate: Doctoral
*A Graph Isomorphism-based Distributed Algorithm for Modular Robot configuration Formation*
Major: Computer Science
Faculty Advisor: Prithviraj Dasgupta

We consider the problem of configuration formation in modular robot systems where a set of modules that are initially in arbitrary configurations and located at arbitrary locations are required to assume appropriate positions so that they can get into a new user-specified target configuration. We propose a novel algorithm based on graph isomorphism, where the modules select locations or spots in the target configuration using a utility based framework that reduces the time and energy required by the modules to assume the target configuration. We have shown analytically that our proposed algorithm is deterministic, and using it, a set of modules can converge to the desired configuration in finite time. Experimental simulations of our algorithm with different number of modules in different initial configurations and located initially at different locations, show that planning time of our algorithm is nominal (275 ms. for 100 modules) and total distance traveled by the modules to occupy their respective selected spots, increases linearly with number of modules. We have also compared our algorithm against the Bertsekas' auction algorithm. Results show that our proposed algorithm outperforms the auction algorithm.

LORA FRECKS
Graduate: Doctoral
*Citizen Participation, Collaborative Governance and the Civic Hacking Group Social Movement in the United States*
Major: Public Administration
Faculty Advisor: Yu-Che Chen

The purpose of this research is to increase our understanding of civic hacking within the US. Civic hacking consists of self-organized groups of citizens voluntarily creating new digital interfaces for government data or service information. Examples include clearstreets.org and answers.oaklandnet.com. A congruence of developments in various technologies and government policies made these groups possible in the early 2010s. In 2012, nonprofit Code for America began absorbing these citizen groups under its new Brigade division. However, not all civic hacking groups are Code for America Brigades. Little is known about civic hacking because it is a young, diffuse and nebulous citizen driven social movement. The individual groups represent a new and potentially disruptive type of citizen driven and action oriented organization within their local collaborative governance networks. This research represents the first comprehensive database of civic hacking groups in the US including their characteristics and activities. Preliminary findings include several key points. First, civic hacking groups are significantly more likely to both arise and be successful in Democrat leaning areas. Second, the most active civic hacking groups are not located in recognized IT business cluster areas. Third, even with the help of Code for America, a low percentage of civic hacking groups are successfully transitioning from social movements to formal social movement organizations. Fourth, civic hacking represents a new form of citizen participation.

ALEXANDER FUCHSBERGER
Graduate: Doctoral
*Big Data: How Correlation Networks can be used to predict and analyze Safety Problems*
Major: Information Technology
Faculty Advisor: Hesham Ali

Collecting extensive amounts of data from a variety of sources like sensors, scans or web services is no longer a technological issue. How to extract useful information is the step which most current research focuses on. This research takes another step forward and tries to find useful information out of large datasets, which the researcher might not even be aware of. Directly linked to the industry, this project intends to build up a correlation network out of data, related to the national bridges throughout Nebraska and potentially the entire USA. With the help of Graph theory and cluster analysis we want to find patterns to predict potential safety issues based on issues with similar bridges. This could help determining and prioritizing where to inspect the condition of bridges. This will save costs, increase the safety of the national railroad and road network and potentially save human lives. During regular inspections much data is collected which is used as an initial data source to find patterns helping to predict future problems and safety issues. Statics, traffic, bridge type, weather and bridge age are some examples of affecting variables. The data model is flexible enough to extend it at a later point with e.g. real-time sensor data. Ideally the final outcome will be an information systems which constantly reacts to data inputs in a supportive way. Visualizing the relevant information with the help of graphs, tables, filters and maps mark some of the features.

# Graduate Abstracts: Doctoral

JESSICA FUJAN-HANSEN
Graduate: Doctoral
*Neurovascular Changes Characterize Split-belt Adaptation in Chronic Stroke Survivors: Preliminary Results*
Major: Health, Physical Education and Recreation
Faculty Advisor: Mukul Mukherjee
Co-Author: Troy Rand

Previous studies implicate localized cortical regions in locomotor function recovery in stroke survivors, however, little is known about the mechanisms which underlie locomotor adaptation recovery. Locomotor adaptation in stroke survivors is mired due to weak bilateral coordination during gait. In this ongoing study, bilateral incoordination in gait is targeted with a split-belt paradigm while cortical neurovascular changes during the adaptation are recorded with Functional Near Infrared Spectroscopy (fNIRS). Chronic stroke survivors walked on a split-belt treadmill while wearing an fNIRS device. Participants walked in baseline, splitbelt, and catch conditions. A continuous wave fNIRS system utilized two different wavelengths (~695 and ~830 nm) sampling at 10 Hz measured cortical activity. Task-related cortical activity was computed based on the amount of oxygenated (OxyHb) hemoglobin during the locomotor adaptation task. Our paradigm yielded 24 channels on each side of the head. Baseline levels of OxyHb were calculated for 30 seconds prior to starting each trial with the subjects standing quietly. The difference from baseline was calculated during the first and last 30 seconds of each trial to determine initial and adaptation changes. Preliminary results from the study demonstrate the following for the primary motor and associated cortices: 1) higher levels of OxyHb on the non-affected side, 2) Increased OxyHb during initial adaptation, 3) early to late split-belt adaptation was characterized by a reduction in OxyHb and 4) Increase in OxyHb during catch trial. Characteristic neurovascular changes are demonstrated in stroke survivors during locomotor adaptation which enhances our mechanistic understanding of adaptive changes post-stroke.

SUSANNAH GO
Graduate: Doctoral
*Clustering Retinal Images of Age-Related Macular Degeneration*
Major: Information Technology
Faculty Advisor: Parvathi Chundi

Age-Related Macular Degeneration (AMD) is a condition most heavily affecting the elderly in which patients suffer retinal damage, and consequently have impaired vision. In this study, 14 optical coherence tomography (OCT) images from retinas of patients suffering from (AMD) are pre-processed and then clustered using the *k*-means clustering method. The clusters are subsequently evaluated using a similarity metric based on the percentage of diseased retina. This work has practical implications for efficient analysis of retinal health of AMD patients. Future work includes exploring different clustering methods, and evaluating clusters by a physician.

JORDAN GRUBAUGH
Graduate: Doctoral
*Three-month-old infants do not show preference for social images*
Major: Health, Physical Activity, and Performance
Faculty Advisor: Anastasia Kyvelidou
Co-Authors: Nicholas Lempke, Benjamin Senderling, Anastasia Kyvelidou, Venkata Naga Pradeep Ambati

The increasing occurrence of autism spectrum disorders (ASD) creates a crucial need for clinicians to identify ASD-related deficits as early as possible. Currently, the typical age of diagnosis for ASD is around three years old. However, signs of atypical behavior have been documented retrospectively by parents as occurring earlier. Gaze behavior has been suggested as a useful indicator of developmental disruption in children with ASD. A method called the preference looking paradigm has been utilized successfully in toddlers as young as 14 months for identifying ASD, but it has not been tested in infants. Therefore, the purpose of this study was to investigate gaze behavior in typically-developing infants at three months old before using this paradigm in infants at risk for ASD. Identifying early preferential looking differences in typically-developing infants may allow for an increased understanding of the underlying visual processes, the development of an early detection paradigm for autism, and the advancement of knowledge to develop treatment for autism. Five typically developing infants were examined at three months old. Each infant was shown a preferential looking paradigm with dynamic social images on one side and dynamic geometric images on the other side. Results indicated that none of the five infants displayed a preference for either social or geometric images. Instead, each participant focused between the two images. This is the first study to report that when 3-month-old infants are presented with dynamic social and geometric images they do not show a preference between the two.

# Graduate Abstracts: Doctoral

MACKENZIE HARMS
Graduate: Doctoral
*Information Seeking: The Role of Information Search in Creative Problem-Solving*
Major: Psychology
Faculty Advisor: Roni Reiter-Palmon

As technology such as tablets and smart phones become the norm, and information becomes more easily available, it is important to understand differences in how people search for information to solve a problem in an effective and creative manner. While exhausting all possible information related to a problem would be impractical, searching for too little or irrelevant information may hinder performance. In this research, we developed a computer program that tracked information seeking behavior during a complex, problem-solving task. We also asked participants to restate the problem prior to beginning the search task, in order to separate cognitive processes known to underlie creativity. The results suggested that the ways in which people frame problems influence information search, which in turn influences creativity. The implications of this study and directions for future research are discussed.

DANIEL HARRIS
Graduate: Doctoral
*Solving Puzzles and Problems*
Major: Psychology
Faculty Advisor: Roni Reiter-Palmon
Co-Author: Roni Reiter-Palmon

The primary research question for this study was whether malevolent creativity (MC), which is a harmful form of creativity, would be influenced by different kinds of words that individuals are exposed to. These words were presented in the form of jumbled word puzzles, with the words being aggressive in nature, pro-social in nature, or neutral. After completing word puzzles, participants then responded to one of three creativity tasks (i.e., an aggressive problem, a pro-social problem, or generating uses for a brick). Although the type of word puzzle that participants were exposed to did not influence their MC, the creativity task type did influence MC, as well as benevolent creativity, unoriginal malevolence, and unoriginal benevolence. These results suggest that MC (and related forms of problem solving) may not be easily primed within individuals using word puzzles, and that such priming may require stronger stimuli such as stories, pictures, and videos. The effect of task type adds evidence to the notion that the harmfulness and benevolence of creative ideas can be influenced by the kinds of tasks people respond to.

MATT HEESCH
Graduate: Doctoral
*Human skeletal muscle mRNA response to exercise in a hot environment*
Major: Exercise Science
Faculty Advisor: Dustin Slivka
Co-Authors: Robert Shute, Matt Bubak, Terry Laursen, Nick Dinan, Taylor La Salle, Dustin Slivka

Mitochondrial adaptation is important for both maintaining optimal health as well as improving athletic
The purpose of this investigation was to determine the effects of exercise in a hot environment on mitochondrial biogenesis-related gene expression in human skeletal muscle. Recreationally-active males (n = 9, 25 ± 4 y, 179 ± 4 cm, 76.2 ± 8.0 kg, VO2 peak 4.39 ± 0.82 L · min-1, 13.4 ± 3.3% body fat) completed two experimental trials in which they cycled for 1 h at 60% of Wmax in an environmental temperature of either 20° C (N) or 33° C (H). Muscle biopsies were obtained from the *vastus lateralis* pre- and 3 h post-exercise for determination of gene expression. Relative oxygen consumption was higher during exercise in H (69.8 ± 4.7%) than N (64.5 ± 5.7%; $p = 0.004$), as was HR (H: 163 ± 9 bpm, N: 151 ± 9 bpm; $p < 0.001$). There was a tendency for expression of PGC-1α to be lower following H than N ($p = 0.083$). Expression of ERRα ($p = 0.009$), GABPA ($p = 0.010$), MEF2A ($p = 0.080$), NRF-1 ($p = 0.004$), and VEGF ($p = 0.004$) was blunted following exercise in H as compared to N. Expression of PPARG, SIRT-1, and TFAM was unaffected by temperature or exercise ($p = 0.305$, $p = 0.103$, $p = 0.410$, respectively). These data demonstrate that exercise in a hot environment blunts expression of several genes related to mitochondrial biogenesis.

# Graduate Abstracts: Doctoral

CHUN-KAI HUANG
Graduate: Doctoral
*A Conceptual Model for Gait Maintenance in Patients with Diabetes*
Major: Biomechanics/Physical Therapy
Faculty Advisor: Ka-Chun Siu
Co-Author: Ka-Chun Siu

Sensory systems including visual perception, somatosensory and vestibular sensation are well integrated in healthy people during walking. However, people who suffer from sensory deficits due to diabetic peripheral neuropathy (DPN) bear the risk of instability and the incidence of fall. Therefore, we proposed a conceptual model that depicts how patients with diabetes would utilize their sensory systems to maintain a stable gait. This model contextualized: 1) Patients with DPN would adjust their foot placement by the central nervous system where the sensory feedback mainly received from visual and vestibular perception; 2) Patients with DPN would primarily rely on visual system to maintain their balance during walking. Literature has reported that visual perception as an important factor modulates walking. Therefore, a preliminary study was conducted to demonstrate how the visual perception impacts on gait maintenance among healthy adults, patients with diabetes mellitus (DM) and DPN. Two healthy adults, three patients DM, and one patient with DPN were recruited. All participants were instructed to walk on a treadmill with a moving virtual corridor presented ahead. The spatiotemporal gait characteristics and the measurement of gait variability (i.e. coefficient of variation, CV) were analyzed and compared between the conditions with or without the virtual environment. The perceived visual information (the presence of moving virtual corridor) significantly impacted gait by increasing the CV of stride length ($p$= 0.02) in DM patients, and this phenomenon was shown substantially in the DPN patient. More participants were warranted to confirm the results and to distinguish the group differences.

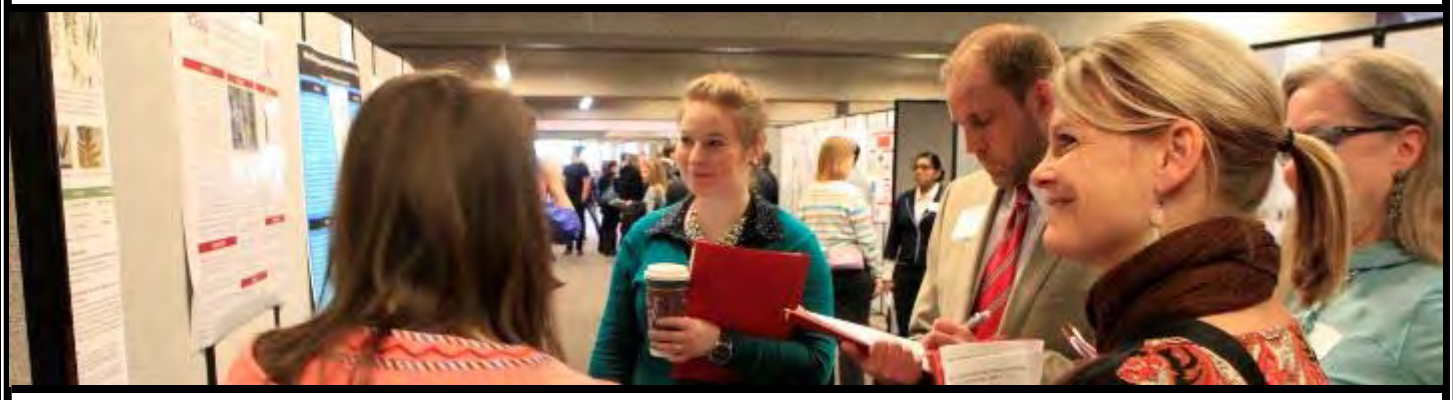
CLAYTON JUAREZ
Graduate: Doctoral
*Pac-Man and Paradoxical Motivation: A Re-examination of the Effects of Regulatory Focus and Feedback Type on Motivation*
Major: Psychology
Faculty Advisors: Carey S. Ryan, Wayne Harrison
Co-Authors: Kami Tsai, Joshua Koleszar

Previous studies examining whether failure or success motivates individuals to work harder have shown mixed results. Some work (e.g., Van-Dijk & Kluger, 2004) suggests that these mixed results may be at least partly due to individual differences in regulatory focus. People may primarily focus on either achieving positive outcomes (promotion focus) or on preventing negative outcomes (prevention focus), depending on trait-based tendencies and present mental states (Higgins, 1997). In this study, using alternative methodology, we attempted to replicate Van-Dijk and Kluger's (2004) findings that negative (versus positive) feedback under prevention focus and positive (versus negative) feedback under promotion focus increase motivation. Participants consisted of 74 undergraduate psychology students (76% female; 76% White). Participants first completed trait regulatory focus measures and played one of two modified versions of the Pac-Man video game intended to manipulate state regulatory focus. Participants then completed a manipulation check and underwent a second manipulation in which they reported their willingness to invest effort in a hypothetical class project after receiving either positive or negative feedback about their progress on the project. Controlling for trait regulatory focus, the Pac-Man game successfully manipulated state regulatory focus as expected. However, contrary to our expectations, participants who played the promotion focus version of Pac-Man reported greater willingness to invest effort following negative versus positive feedback, whereas participants who played the prevention focus version of Pac-Man reported equivalent effort intentions regardless of type of feedback. We discuss the implications of these findings and the potential utility of our new methodology.

# Graduate Abstracts: Doctoral

JENNY KENT
Graduate: Doctoral
*Amputee Step Activity is Correlated to Stride-to-Stride Fluctuations at the Ankle*
Major: Exercise Science
Faculty Advisors: Nicholas Stergiou, Shane Wurdeman
Co-Authors: Jessica Renz, Whitney Korgan, Sara Myers, Nicholas Stergiou, Shane Wurdeman

The skilled performance of a complex movement, such as walking, is associated with an optimum level of variability that provides flexibility given an ever-changing environment [1]. Amputees reveal significantly increased stride-to-stride fluctuations during walking [2] indicative of a greater disorganisation of movement. Although such presentation is linked with pathology, it may also be related to decreased activity in this population. The purpose of this study was to determine the relationship between an amputee's activity level and stride-to-stride fluctuations. Twenty-two transtibial amputees (51.9±10.8yrs, 1.77±0.80m, 100.9±19.3kg) consented to participate. Average daily step count (DSC) was computed over a 3 week period via a step activity monitor (Actigraph, Pensacola, FL, USA) attached to the prosthesis. Following this period, each subject walked on the treadmill at their self-selected speed while kinematics were recorded (60 Hz; 12- camera Motion Analysis Corp., Santa Rosa, CA, USA). Stride-to-stride fluctuations for the sound and prosthetic ankle motion were calculated with the largest Lyapunov exponent (LyE). Relationships between DSC and ankle LyE were tested through a Pearson correlation (α=0.05). A significant negative, moderate relationship with DSC was shown with the sound ankle LyE (r=- 0.569, p=0.006), however not with the prosthetic ankle LyE (r=-0.091, p=0.687). This significant negative correlation at the sound ankle demonstrates that decreased stride-to-stride fluctuations are associated with increased activity levels, however further work is necessary to resolve the type of relationship present. It remains unclear whether the disorganization promotes decreased activity or whether less active individuals do not gain sufficient motor learning experience to achieve a skilled movement.Stergiou et al. (2006) *Journal of Neurologic Physical Therapy*. 30(3):120-129. Wurdeman et al. (2013) *Annals of Biomedical Engineering*. 41(4):806-813.



JOCELYN SCHOCK KING
Graduate: Doctoral
*Adult Novel Word Lexicalization*
Major: Psychology
Faculty Advisor: Michael Cortese
Co-Author: Michael Cortese

Recent research has had success identifying when novel words become integrated into the adult lexicon via the use of the prime lexicality effect (Qiao & Forster, 2013). Two primary steps in novel word lexicalization have been identified. During the first step, lexical configuration, one becomes familiar with the orthographic form of a word, its spelling, pronunciation, meaning and usage. Only after this has been completed can the cognitive representation of the word begin to interact with representations of other words in the lexicon and begin to become fully integrated into the semantic network (Leach & Samuels, 2007). So, as a person is learning a new word, it should begin by behaving in a non-word like fashion (i.e. show large length effects) then slowly begin to behave in a more "word like" fashion as it is lexicalized. The current project examined the length effect in naming as words became lexicalized. Participant studied obscure English words over four sessions. The length effect in naming was diminished as the study words were integrated into the vocabulary of participants, suggesting that the length effect is indeed caused by interactions between the cognitive representations of words. This result is consistent with the DRC model of visual word recognition, while PDP models have difficulty accounting for this effect. The prime lexicality effect however, was not evident in any session.

# Graduate Abstracts: Doctoral

DAVID KOCSIS
Graduate: Doctoral
*A Theory of Ethical Concerns and Considerations in Crowdsourcing*
Major: Information Technology
Faculty Advisor: Gert-Jan de Vreede

In the early days of the Internet, companies provided content, while users were only able to consume the content. With the emergence of Web 2.0, users became capable of generating content on the web. User- generated content enables crowdsourcing, which has changed how individuals, groups, or organizations complete tasks and solve problems; this is changing how some companies and industries do business. The introduction of new systems such as crowdsourcing raises new ethical, social, and political issues. Previous studies have highlighted ethical challenges that organizations or individuals face in crowdsourcing. This research explores these challenges by developing a taxonomy to classify ethical concerns and considerations in crowdsourcing. When a phenomenon is largely unknown, such as ethical issues in crowdsourcing, a taxonomy provides a theory for analyzing the concepts and relationships among concepts. Using research on transparency in organizations and Value Sensitive Design, the following principles deserve consideration: accountability, attribution, autonomy, informed consent, privacy, trust, and welfare. To understand each principle in the context of crowdsourcing, I classify the principles in relation to previous ethical dilemmas, business models that crowdsourcing organizations use, and stakeholders each principle affects. This taxonomy provides three important outcomes. First, a crowdsourcing organization can identify the business model they will employ to understand ethical values that may occur, types of dilemmas, and stakeholders they may affect. Second, organizations facing a particular dilemma can understand what ethical principles are involved. Third, researchers can expand on the taxonomy to gain in-depth understanding of the models, dilemmas, principles, and stakeholders.

XUAN LIU
Graduate: Doctoral
*Improvements in joint torques and powers before and after surgery for patients with peripheral arterial disease.*
Major: Exercise Science
Faculty Advisor: Sara Myers
Co-Author: Shane Wurdeman

Peripheral arterial disease (PAD) or atherosclerosis of the leg arteries, is associated with increased cardiovascular morbidity and mortality. Intermittent claudication (IC) is the most common symptom of PAD and defined as walking-induced leg muscle pain relieved by rest. Surgical revascularization is recommended for patients with moderate to severe occlusions. This study determined the differences in lower extremity joint torques and powers of the before and after surgery. 24 patients with PAD were recruited from the Omaha Veterans' Affairs Medical Center. The subjects performed walking trials at a self-selected speed through a ten-meter pathway while kinematics and kinetics 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. Patients with PAD have reduced muscular contributions of the ankle, knee, and hip during the stance phase both before and after the onset of IC compared with healthy controls (Wurdeman et al., 2012). Following revascularization, patients in the pain-free condition have significantly increased ankle power absorption ($p<0.001$), and hip power generation ($p=0.002$) in early stance and ankle power generation ($p=0.007$) in late stance. During the pain condition, peak ankle dorsiflexion torque ($p=0.023$), and ankle power absorption ($p<0.001$) in early stance, and ankle power generation ($p=0.005$) in late stance were significantly increased after surgery. Thus, increases in lower extremity torques and powers represent an improvement following surgical revascularization, reinforcing this treatment method, aimed at restoring hemodynamics and improving function in these patients.

# Graduate Abstracts: Doctoral

SAYONNHA MANDAL
Graduate: Doctoral
*A Framework for Analyzing Federal Regulations for Information Security*
Major: Information Assurance
Faculty Advisors: Robin Gandhi, Harvey Siy
Co-Authors: Robin Gandhi, Harvey Siy

This research examines regulatory compliance in information systems from a software assurance perspective. Today information systems are software intensive. They are thus prone to software weaknesses, which are exploited by various attacks on the systems. However, when stakeholders are incorporating new systems, they usually tailor security controls based on system needs, thereby, software security concerns receive very less attention than it deserves. In our research, we extend NOMOS, a framework for modeling roles, norms and situations, and evaluate its applicability to information security regulations. We present a case study with the Federal Information Security Management Act (FISMA) of 2002. FISMA statements with high variability space for categorizing information and information systems across multiple documents are examined to explore the utility and limits of the NOMOS framework. Finally, we introduce mechanisms to determine applicability of FISMA and related standards to tailored constraints on software components in a larger information system.

LOUIS MARTIN
Graduate: Doctoral
*A Low-Sodium Diet Alters Glossopharyngeal Nerve Taste Responses in Adult Rats While Nerve Injury Has No Effect*
Major: Neuroscience & Behavior
Faculty Advisor: Suzanne Sollars
Co-Author: Suzanne Sollars

Damage to the taste system at an early age produces much larger structural, behavioral, and functional changes than damage after maturation. We have previously found that when the chorda tympani nerve (CT; the nerve that sends information from the anterior tongue to the brain) is cut (CTX), the way the glossopharyngeal nerve (GL; the nerve that sends taste input from the posterior tongue) responds to sodium salts is altered. This effect appears to occur only if CTX happens during early development. Several studies suggest that immune responses following injurycan affect how taste nerves respond to sodium salts, and that diets low in sodium suppress normal immune function following CTX. To determine whether differential immune system responses to injury are responsible for the changse in GL function that occur after CTX in developing, but not adult rats, electrophysiological responses were recorded in adult rats two weeks after being placed on a low-sodium diet and given either CTX or a control surgery. GL responses to taste solutions were not different between the CTX and control surgery groups. This result suggests that changes in GL function after early CTX are not related to a suppressed immune system response to injury compared to adults. Suprisingly, GL responses to sweet, bitter, and sour solutions appear larger for rats given the low sodium diet compared to rats fed a control diet in a previous study from our lab. These preliminary results indicate that differences in dietary intake can alter the messages the brain receives about food.

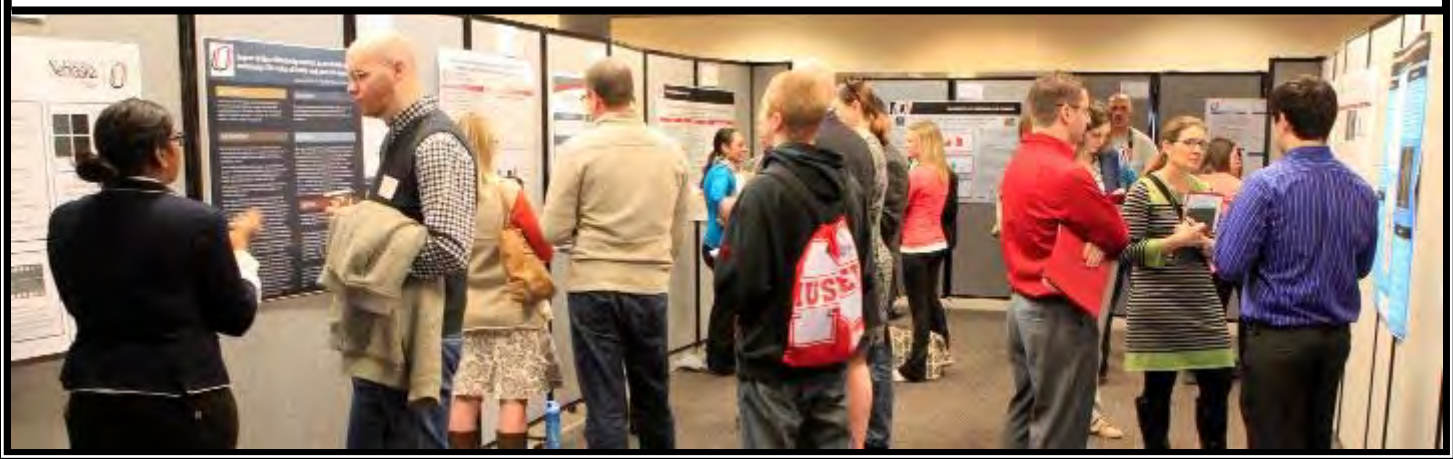
# Graduate Abstracts: Doctoral

SCOTT MCGRATH
Graduate: Doctoral
*Workflow analysis of the Juvenile Diversion Case Management System (JDCMS) in Nebraska*
Major: Health Informatics
Faculty Advisor: Ann Fruhling

In Nebraska, the Juvenile Diversion Case Management System (JDCMS) was designed to link multiple government and non-government agencies that serve youth. The Web-enabled JDCMS enhances data collection, data sharing and accountability by establishing interagency information-sharing programs. Juvenile and criminal justice systems are thus able make better informed decisions. Data is gathered at the county level, through the County Attorney and the Juvenile Diversion Program, a recidivism program. However, only 75% of Nebraska counties are using JDCMS, and only a few are using it to its full potential. The goal of this project was to determine what factors impede JDCMS usage, and generate recommendations to remove them. There were three primary tools to evaluate JDCMS user's opinions and usage of the system: a survey, tool log analysis, and interviews. The survey was based off the Task Technology Fit theory and designed to investigate if JDCMS closely matches the actions user are required to perform or not. JDCMS's data logs were reviewed for pattern and trend analysis to understand the tool's usage. Interviews were conducted in five separate offices to further probe user opinions and to observer their workflow. Results from this study found two principal barriers to usage: confusion about the JDCMS advanced features, and a dependency on paper records over electronic records. Secondary barriers were identified as shortages in staffing and equipment. Recommendations designed to help address these issue were submitted to the Juvenile Diversion program manager and JDCMS's developers for possible implementation.

AARYN MUSTOE
Graduate: Doctoral
*Exploring the Presence of the Catechol-O-Methyltransferase (COMT) Polymorphism in Marmosets and its Potential Influence on Prosocial Behavior*
Major: Psychology
Faculty Advisor: Jeffrey French

The Catechol-O-Methyltransferase gene (*COMT)* is an important gene involved in the enzymatic breakdown of the neurotransmitter dopamine. In humans, there is a functional single-nucleotide polymorphism (SNP) (rs4680) where a Valine (GTG) is substituted for a Methionine (ATG) resulting in lower *COMT* enzyme activity in the catabolism of dopamine. This leads to increased biologically-available dopamine in brain synapses. However, no information is currently available as to whether this functional *COMT* SNP is present in the Platyrrhini parvorder or more specifically the Cebidae family including marmosets and tamarins. Using nested polymerase-chain-reaction (PCR) we amplified extracted DNA from four species of marmosets (*Callithrix* sp.) and one species of tamarin (*Leontopithecus rosalia*), sequenced the DNA for the presence of the rs4680 SNP, and aligned the sequence data to reference primates. We found no evidence of the rs4680 SNP in marmosets and tamarins, which likely indicates very low or absent allelic variation in the rs4680 SNP. We did find the presence of a novel SNP located in AA position 369 in the *COMT* gene. This nucleotide substitution from T to C leads to a synonymous protein product likely suggesting no functional impact. The allelic frequency of this SNP in the sampled population is TT = 14.3%, TC = 17.9%, and CC = 67.9%. More sampling of Platyrrhini (New-World monkeys) and other mammals is required, but these data, as they currently stand, suggest the rs4680 mutation likely occurred after the emergence of Catarrhini (Old-World monkeys, Great Apes, human lineages) which occurred approximately 20-38 million years ago.



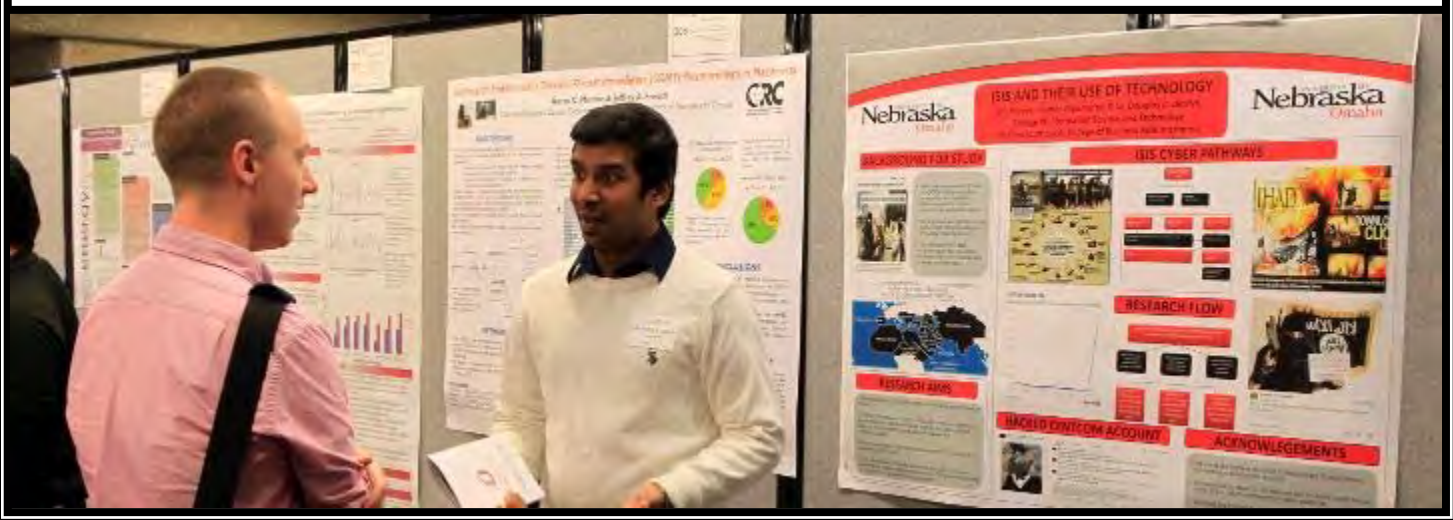
# Graduate Abstracts: Doctoral

JI HYUNG PARK
Graduate: Doctoral
*The Effect of Form of Government and Citizen Participation on Local Fiscal Health*
Major: Public Administration
Faculty Advisor: Carol Ebdon

Fiscal health has recently received increasing attention because of the Great Recession and bankruptcy cases such as the City of Detroit. However, there is no research which systematically explains the determinants of fiscal health with political structure and citizen participation. While form of government and citizen participation are important topics in the public administration literature, they have not been interlinked with government performance. This study aims at better understanding how form of government is associated with municipal fiscal health, taking into consideration the influence of citizen participation. To examine the research questions, this study uses State of the Profession 2012 survey data from the International City/County Management Association (ICMA), paired with data from the 2008- 2012 American Community Survey 5 Year Estimates (ACS) and 2011 Comprehensive Annual Financial Reports (CAFR). Drawing on political insulation theory, this study hypothesizes that the council-manager form with greater commitment to citizen participation is likely to have lower fiscal health. The result shows that citizen participation combined with form of government has mixed effects on fiscal health. Through the results, it should be noted that municipalities can effectively manage fiscal health by recognizing the effect of citizen participation pressure as well as form of government. Furthermore, the implications of the results allow municipalities to adopt elaborate measurements in managing fiscal health and, also, provide a new theoretical concept to public administration. The contribution of this study is a bridge to connect citizen participation with the association between form of government and fiscal health.

JAY PEDERSEN
Graduate: Doctoral
*Analysis of Biologic Relationships with Graph Databases*
Major: Bioinformatocs
Faculty Advisors: Dhundy Bastola, Hesham Ali

Biologic data and medical data are replete with examples of inter-related pieces of information. Proteins interact with other proteins, proteins are involved in metabolic relationships, genes are involved in disease relationships; genes have relationships with function and structure; genes have expression level relationships with tissues which helps to explain tissue level differences. Medical terminology is encoded in ontologies where the relationship of a clinical diagnosis is made to all of the factors which define the diagnosis. The common thread is that relationships are established and documented. One method of analysis of relationships is the creation of networks which represent these relationships. A computational representation of relationships can be created in a graph databases which store nodes and their relationships. The rich library of existing Graph Theory algorithms can be applied to networks to extract information from them. Several projects were undertaken in the previous year in the UNO Bioinformatics lab relating to gene expression analysis, metabolic network analysis and representing a clinical ontology of 300,000 terms in a network. The analysis of the network of metabolic reactions used by organisms found to reside in the microbiome of the mouth was undertaken. A possible connection between the disease gingivitis and the metabolic networks of organisms in the mouth was found and published. Ongoing research continues examining the microbiome of the GI tract which will be compared to that of the mouth.



# Graduate Abstracts: Doctoral

CHRISTINE QUICK
Graduate: Doctoral
*Accommodating Employees Experiencing Work-Life Conflict: An Examination of Supervisors' Decision Making Processes*
Major: Psychology
Faculty Advisor: Lisa Scherer
Co-Author: Lisa Scherer

Supervisors play a critical role in helping employees balance work and family demands, yet only a handful of studies have emphasized the importance of supervisors and their decision making discretion in addressing the many unpredictable life events giving rise to work-family conflict (Clark, 2002; Wells, 2011). In effort to bridge this gap in research, we investigated how supervisors process employee requests for accommodations. Using a mixed-method approach, we also examined whether supervisor assumptions and thought processes influence their choice. Supervisors reviewed a hypothetical problem in which they were asked to grant time off to one of three employees. Following their decision, we asked them to provide rationale for how they arrived at their decision. We also explored whether supervisor gender influenced their decision making, particularly as it related to accommodating a male versus a female parent as much research suggests important gender differences in leadership styles and values (e.g., Frame, Roberto, Schwab, & Harris, 2010; Snipes, Oswald, & Caudill, 1998). Results showed that the decisions of some supervisors were primarily driven by criteria such as perceptions of subordinate deservingness and sympathy toward their non-work needs. Additionally, analyses demonstrated that both supervisor gender and employee gender influenced judgments of who was chosen for accommodation, indicating evidence of a gendered perspective regarding the roles of mothers versus fathers.

TROY RAND
Graduate: Doctoral
*Perception of Self-Motion using a Virtual Reality Environment Enhances Gait Adaptation in Chronic Stroke Survivors*
Major: Motor Development and Control
Faculty Advisor: Mukul Mukherjee

Introduction: Perception of self-motion through VR provides a unique avenue to improve gait adaptation in chronic stroke survivors. Stroke subjects exhibit asymmetrical gait patterns may benefit from training the lower limbs to walk under different task constraints for each leg. In this study, gait asymmetry was targeted with a split-belt paradigm, and perception of self-motion was provided with a Virtual Reality (VR) environment. The VR environment was hypothesized to enhance the split-belt adaptation by removing conflict between the static visual input (as in normal treadmill walking) and the dynamic proprioceptive input. Methods: Healthy young, healthy older adults and chronic stroke survivors walked on a split-belt treadmill in either a VR or a non-VR environment while being exposed to different belt speeds for each leg. The VR stimuli consisted of walking in an infinitely long virtual corridor. Spatiotemporal measures as correlates of adaptation were compared between groups (young, old, stroke) and conditions (VR and non-VR). Results: The participants in the VR condition demonstrated an increase in stride length compared to the non-VR condition for both healthy young ($P = .019$) and healthy elderly ($P = .014$). Preliminary results from the stroke group showed a trend towards a more stable coordination pattern that was reached quicker in the VR group than the non-VR group. Conclusion: Results show that the perception of self-motion provided through VR may lead to faster and more enhanced adaptive capabilities. Such enhancement of adaptive capabilities during gait has important implications for pathological populations such as stroke survivors.

TRISHA RHODES
Graduate: Doctoral
*School Resource Officer and Patrol Officer Perceptions of Roles and Job Satisfaction*
Major: Criminology and Criminal Justice
Faculty Advisor: Samantha Clinkinbeard

Despite growing research on police in schools, there is relatively little known about how the school environment influences officers. School resource officer (SRO) programs increase the range of traditional roles and include activities that may conflict with law enforcement roles, such as mentoring, advising, and teaching. Officers who experience ambiguous or conflicting role expectations may be less satisfied with their work. Officer job satisfaction may also be influenced by individual characteristics, such as locus of control. Importantly, job satisfaction is linked with work performance, and SROs' work affects the lives of youth, parents, and school staff. The present study examined the influence of the school environment on officers' perceptions of their roles, locus of control, and job satisfaction. A sample of 307 patrol officers was matched and compared to a sample of 182 SROs within a Midwestern region. Officer perceptions were compared between patrol officers and SROs. Additionally, predictors of job satisfaction were explored for both patrol officers and SROs. Findings indicated areas for future research as well as implications for the recruitment and training of officers assigned to schools.

# Graduate Abstracts: Doctoral

OLIMPIYA SAHA
Graduate: Doctoral
*Towards Fast and Reliable Robot Navigation in Unknown and Unstructured Environments using Transfer Learning*
Major: Information Technology
Faculty Advisor: Prithviraj Dasgupta
Co-author: Prithviraj Dasgupta

In my presentation I will present my research study which investigates artificial intelligence techniques based on the concept of machine learning to improve existing navigation methods for autonomous robots resulting in fast, energy-aware and resilient locomotion in uncertain and unstructured environments. Our main solution approach is to provide a robot with data comprising key navigation maneuvers that are collected from robots' locomotion in previous albeit different environments. The problem facing the robot is to identify which maneuvers are keys to successful navigation in its current environment and how to adapt these maneuvers from previous environments to the current one. We plan to explore a technique called transfer learning to address this problem. Our proposed approach is based on the insight that although different robot- environments (e.g., rooms in an office space) might be disparate from each other, there are certain common geometric patterns that persist across the different environments. We hypothesize that a robot's navigation performance can be improved if such geometric patterns in its current environment could be matched to similar patterns recorded by it from its past environments, and the corresponding retrieved actions could be reused, after appropriate adaptation to the current scenario. Our solution technique will combine the concept of transfer learning along with a point cloud matching algorithm Iterative Closest Point (ICP) and a random sampling based motion planner Rapidly Exploring Random Trees (RRT). The techniques that we develop will be verified on a simulated as well as a physical wheeled robot called Coroware Corobot.

DANIELLE SLAKOFF
Graduate: Doctoral
*The Picture Tells the Story: Photographic Depictions of Female Offenders in Front-Page Newspaper Stories*
Major: Criminology and Criminal Justice
Faculty Advisor: Pauline Brennan
Co-Author: Pauline Brennan

Most examinations of media portrayals of crime and offenders focus on the textual narratives of crime stories, and these studies generally suggest that racial and ethnic minorities are inclined to be described as dangerous, crime prone, drug-involved, and otherwise socially-troubled. But, one may question the findings from such research after one considers that most people do not read news stories in their entirety. Rather, most consumers look only at photographs, captions, and headlines; most stop short of reading an actual crime story. Considering this, we examined front page news stories about female offenders and focused on whether the photographs, captions, and headlines that accompanied these stories were negative, neutral, or positive. We found that these three elements, alone and in tandem, were more likely to be negative for minority women than for white women; a higher percentage of the stories about minority women included a negative photograph, a negative caption, and an unfavorable headline. Our findings are consistent with notions underlying the cultivation of implicit racial and ethnic bias in our society and may help to explain the disproportionate overrepresentation of minority women in the criminal justice system.

KARYN A. SPORER
Graduate: Doctoral
*Communication patterns among family members of aggressive children with mental illness*
Major: Criminology and Criminal Justice
Faculty Advisor: Pete Simi

There is a lack of research on how the family as a whole adjusts to stressors associated with both mental illness and violence. Existing research tends to focus more on the individual-level outcomes of these stressors and relatively less attention has been devoted to family-level outcomes. Specifically, little is known about issues associated with coping strategies and communication patterns among family members of aggressive individuals with mental illness. Relying on intensive life history interviews with a sample of family members of aggressive persons with mental illness, this study examines how a family system adapts to or changes when there is an aggressive child or sibling with mental illness. In this paper I focus on communication patterns among family members after a violent episode in which the perpetrator was a sibling or child with mental illness.

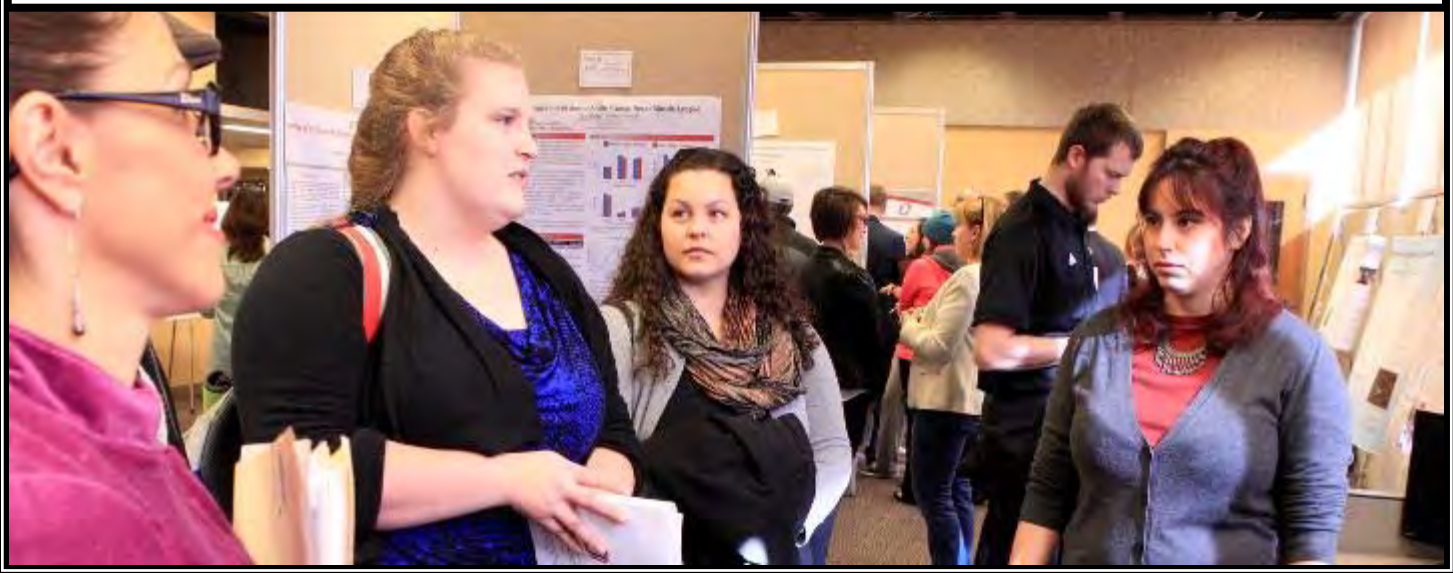
# Graduate Abstracts: Doctoral

**SAEED TABAR**
Graduate: Doctoral
*Quality of Service in Vehicular Ad hoc Networks*
Major: Information Technology
Faculty Advisor: Lotfollah Najjar

Vehicular Ad-hoc Networks (VANET) has attracted a great deal of attention during the last decade. This type of wireless network is predicted to play a key role in future automotive innovation. VANET as a foundation for Intelligent Transportation System (ITS) promises many improvements in terms of safety, resource efficiency - including traffic efficiency and congestion avoidance - and driver and passenger assistance services. Among these three main categories, safety applications are the most important, because they deal with the lives of large numbers of people who drive every day. Safety applications are classified as real-time applications; they must act with high level of confidence and within a certain period of time - otherwise their deployment doesn't make sense. Consequently, Quality of Service (QoS) provisioning must be taken into account. Various methods of improving QoS in the different layers of VANET, such as physical and Medium Access Control (MAC) have been proposed so far. However, in this project the main focus will be the network layer. Two important routing protocols, Ad- hoc On-demand Distance Vector (AODV) and Destination-Sequenced Distance Vector (DSDV) are compared regarding their QoS parameters including delay, packet loss, and overhead in simulation scenarios.

**JACK TAYLOR**
Graduate: Doctoral
*Sex Steroids, Neuropeptides, and Parental Behavior in Mongolian Gerbils*
Major: Psychology
Faculty Advisor: Jeff French

The willingness to respond to and care for offspring is dependent on a complex interaction between influences, and hormones can affect behavior via brain development, activation of existing systems, or a combination of both. Increases in parental behavior are often associated with or caused by concurrent decreases in testosterone, or increases in oxytocin(OT) and arginine vasopressin(AVP). Testosterone is necessary both during early development and at the onset of parenthood for neuropeptide receptor organization in the brain. Less is known though, about how neuropeptide levels during develop affect androgen receptor organization. The purpose of the current study was to determine whether levels of neuropeptides early in life influence androgen receptor development and subsequently, sensitivity to androgen mediated changes in spontaneous parental care. Specifically, we expected that if neuropeptide levels during early life affect androgen receptor development, then gerbils treated with OT or AVP receptor agonists will be more sensitive to androgen manipulations when expressing androgen-mediated behavior, spontaneous parental care. In contrast, we also expect the gerbils treated with neuropeptide receptor antagonists will be less sensitive to androgen manipulations when expressing androgen- mediated behavior. Gerbils were treated on the day of birth with OT, AVP, an OT receptor antagonist (OTA), an AVP receptor antagonist (AVPA), or saline. In adulthood, gerbils were treated with testosterone, an anti-androgen, or vehicle, and then exposed to a young pup. Preliminary results suggest that gerbils treated with neuropeptide agonists were more sensitive to androgen manipulations than gerbils treated with antagonists. Full data and final analyses are in preparation.



# Graduate Abstracts: Doctoral

ABHISHEK TRIPATHI
Graduate: Doctoral
*Myth or Reality? Crowdsourcing as a Complex Problem Solving Model: Evidence from Software Developed by the Crowd and Experts*
Major: Information Technology
Faculty Advisor: Deepak Khazanchi

A relatively new trend for organizations is to utilize the wisdom and labor of large number of diverse people to solve problems with the help of web mediated technologies, popularly known as "Crowdsourcing". Crowdsourcing is a problem solving model. However, the crowdsourcing literature shows that there are two competing streams of research which focus on the legitimacy of the crowd's/customer's complex problem solving abilities. One stream suggests that collective wisdom may be only useful for the simple problem, and may be difficult to use for complex problems such as software development. The other stream argues that crowds/customers of product and services know about their requirements and are able to contribute towards the development of a product and can solve complex problem. However, this assumption has yet to be tested. The broad goal of this research is to increase our understanding of the crowdsourcing and complex problem solving. This research examine the question - Is crowdsourced software developed to solve complex problems of the same or better quality than developed by experts? Adopting the experimental study approach, this study uses a two-phase process to investigate the research questions. The first phase uses the development of a software by the crowd and experts for a complex task. The second phase uses the quality and user experience as a proxy to compare the success of software developed by crowds and experts. This study contributes to knowledge and practice in several ways. First, this study aims to test whether crowdsourcing is a complex solving model, and the crowdsourced solution is as successful as expert solutions. Second, this study presents a user experience model, which can be used as a tool to assess the quality of crowdsourced solutions by crowdsourcing organizations.

KAMI TSAI
Graduate: Doctoral
*The Roles of Organizational Justice and Cynicism in Employee Affective Commitment to Change*
Major: Psychology
Faculty Advisor: Wayne Harrison

The turbulent business environment of the twenty-first century demands that organizations be able to successfully implement changes at a rapid pace in order to remain competitive (Bronson, 1991; Tetenbaum, 1998). Organizational research highlights the importance of employees seeing value in a change, termed affective commitment to change, due to its connection with employee behavioral support for the change (Herscovitch & Meyer, 2002; Machin, Fogarty, & Bannon, 2009; Meyer, Srinivas, Lal, & Topolnytsky, 2007; Shin, Taylor, & Seo, 2012). The present survey study examined factors that may influence employee affective commitment to change, and subsequently, employee behavioral support for change. Five hundred full-time workers who had experienced an organizational change completed a survey on-line. Study hypotheses were then tested using structural equation modeling. As expected, affective commitment to change was positively associated with behavioral support for change. Also as expected, the results suggested that degree of employee participation and effective communication during a change may influence employee affective commitment to change by improving employee perceptions of procedural fairness. However, contrary to expectations, the results suggested that adequate change justification by the organization may directly influence employee affective commitment to change. Lastly, the results indicated that organizational cynicism may influence employee affective commitment to change by influencing employee perceptions of procedural fairness. The implications of these results for organizations will be discussed.

# Graduate Abstracts: Doctoral

VLADIMIR UFIMTSEV
Graduate: Doctoral
*Identifying Important Vertices in Large Real World Networks*
Major: Information Technology
Faculty Advisor: Sanjukta Bhowmick

Centrality measures on networks can provide vital information such as the location of hubs in the network, which entities are critical for information flow, and which vertices are the most centrally located within the network. Generally, vertices that have the *highest* value (rank) for a specific centrality measure are the ones that are most important in the context of that measure. Using a technique known as *group testing* we show that it is possible to identify the highest ranked vertices for closeness and betweenness centrality in a significantly faster time than using the standard method of calculating all of the centrality values and sorting them to identify the highest. Furthermore, we apply a recursive method to remove the highest vertices identified at each step in order to find the next highest vertices thus identifying a larger number of top ranked vertices than if we were to use group testing only once. We also show how we can filter out unimportant vertices using group testing. A new algorithm for computing the betweenness centrality of a specific vertex (instead of all of the vertices, as is done by the Brandes algorithm) is also presented and implemented in the group testing technique. Experimental results on various real-world as well as synthetic networks are presented to show the effectiveness of our methods.

JULIA WARNKE
Graduate: Doctoral
*Focus: A Graph Mining and Assembly Platform for the Discovery and Extraction of Biological Features in Next Generation Sequencing Reads*
Major: Bioinformatics
Faculty Advisor: Hesham Ali

Next Generation Sequencing (NGS) has recently emerged as the main technology behind the majority of Bioinformatics and Biomedical research projects. Although the assembly of the reads produced by NGS remains a difficult task, it is the process of extracting useful knowledge from these relatively short sequences that is quickly becoming one of the most exciting and challenging problems in Bioinformatics. Most current assemblers rely on the assembly graph as the foundational model for representing NGS reads. However, the assembly graph is primarily used to organize NGS data for assembly purposes, even though as a structural model it could be used as the basis of an expanded model to capture genomic structural features intrinsic to the input dataset. In this research, we propose a new innovative graph approach that not only assembles NGS reads but is also capable of mining valuable biological knowledge in the process. We demonstrate that we can uncover a wealth of biologically relevant information from our model's structural features including ambiguous graph nodes, which have previously been considered stumbling blocks for many NGS tools. In addition, we explore graph characteristics that lead to the discovery of biologically relevant features in NGS datasets including rRNA sequences. We also investigate how the assembly graph under the proposed approach can be used to analyze comparative genomics data. The ability to directly extract information from the NGS reads and structural features of their assembly graphs will provide a powerful method of analyzing genomic data and lead to new biological discoveries.

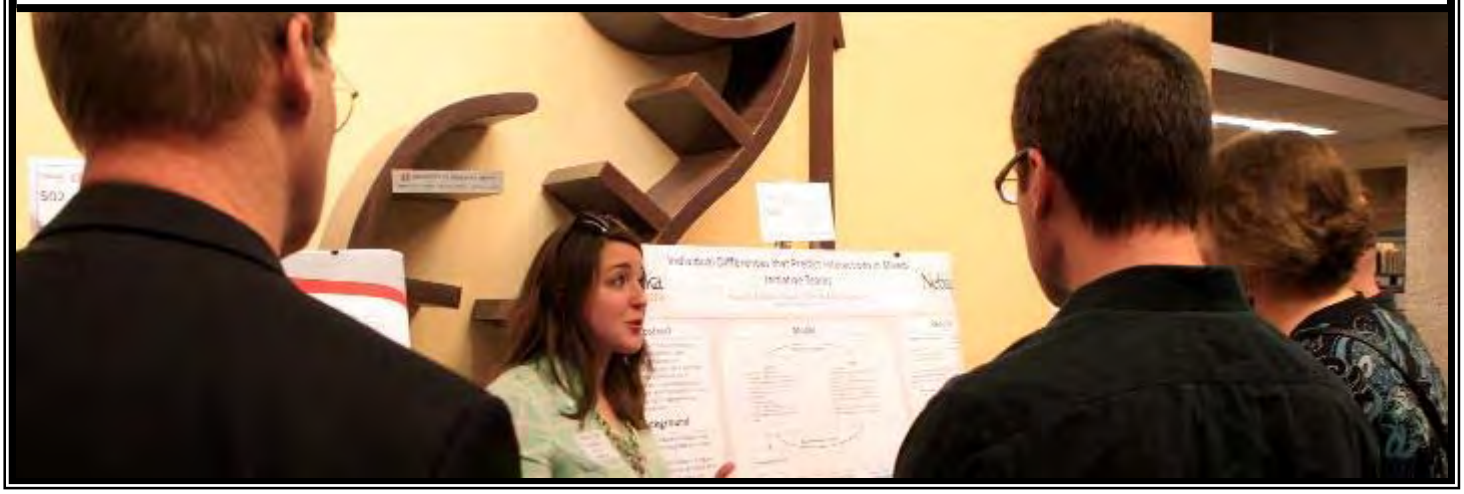
# Graduate Abstracts: Doctoral

SEAN WEST
Graduate: Doctoral
*Characterization of Type II Diabetes through biomedical data fusion*
Major: Bioinformatics
Faculty Advisor: Hesham Ali

Recent advancements in biomedical engineering has resulted in an impressive collection of biomedical instruments. This, in turn, has led to the ability to generate incredible amount of "big" biomedical data with huge volume and high levels of heterogeneity and veracity. The lack of advanced data integrating and analytics tools has been limiting our ability to take full-advantage of the massive amount of raw data currently available. This shortcomings is particularly exemplified by the naïve integration procedures implemented in protein-protein interaction (PPI) networks. Traditionally, PPI networks are created from a single source, usually literature mining. We propose a data fusion approach to integrate multiple sources through data fusion techniques. Our proposed approach is based on the need for an in-depth understanding of the data sources and inter-relationship between the biological elements abstained from each source, in addition to increasing the specificity in which the PPI networks are constructed. Toward that goal, we compare the knowledge overlap and enrichment between protein-protein databases, microarray data, and gene-ontology relationships. In analyzing the results, the most prominent theme discovered was the exclusivity that each source contributed, even among the various PPI databases. We then implemented a data fusion algorithm which incorporates the inherent domain knowledge within each source. The obtained results show that the networks obtained from the proposed algorithm carry more biological significant knowledge and have higher signal to noise ratios.

JIE XIONG
Graduate: Doctoral
*Information and Communications Technology Development for Native American Small Businesses with a Community Emphasis*
Major: Information Technology
Faculty Advisor: Sajda Qureshi
Co-Author: Teresa Lamsam

Information and Communication Technologies (ICTs) have often been touted as a means of enabling people to make their way out of poverty. Despite the high access and use of ICTs in the United States, high unemployment and poverty rates among Native Americans and African Americans continues to rise while deepening existing income inequalities. However, it is still unclear how these technologies are being used by African American and Native American entrepreneurs in the United States. Through a framing analysis of Native American and African American owned micro-entrepreneurs, this paper investigates the use of ICTs in six micro- enterprises that would enable this research question to be answered: What aspects of the digital divide are preventing micro-enterprises from sustaining themselves? Based on the data, the characteristics of ICTs, the access to ICTs, and personal inequalities could impact the direct effects of information provision and infrastructure development. We further conclude that the direct effects could lead to the economic development and empowerment. Findings reveal strong community and infrastructure frames in Native American micro-enterprises and their use of IT products and services for business and economic development. The African American micro-enterprises studied showed low levels of trust affecting their use of ICTs in their businesses. This addresses the gap in the literature requiring research between the relationship between ICTs and the development of Native American owned small businesses and adds to the literature on IT adoption.



# Graduate Abstracts: Doctoral

IK-HYUN YOUN
Graduate: Doctoral
*A New Correlation Network Approach for Modeling Mobility Parameters and Predicting Health Hazards*
Major: Computer Science
Faculty Advisor: Hesham Ali
Co-Author: Abhilash Patlolla

Studying various aspects of mobility has been receiving significant attention of many research groups over the last two decades. The general relationship between mobility levels of humans and general health and clinical implications has been loosely established in several studies. However, not as much has been established on how mobility parameters can be used to develop mobility patterns to predict potential health hazards. With the recent explosion of devices that measure number of steps, number of active minutes etc. attention continued to be heavily biased in favor of data collection tools. In order to take full advantage of such devices, focus need to be placed on data integration and analysis. In this work, we focus on how to utilize the collected data in building a robust model based on correlation models to extract useful information from the raw mobility data. Correlation analysis allow us to model how mobility patterns of individuals in certain groups are associated with each other, and establish embedded associations and similarities among the mobility pattern of the group members. We introduce a correlation network approach as the basic modeling tool for representing various mobility parameters and predicting potential health problems. The proposed approach aims at identifying patterns or features associated with changes in health levels that can lead to medical intervention at the early stages of an emerging health hazard as part of a risk management plan. We illustrate the effectiveness of the proposed approach using a practical case study to link mobility with fatigue.

BIANCA M. ZONGRONE
Graduate: Doctoral
*Individual Differences that Predict Interactions in Mixed-Initiative Teams: A Big Five Approach*
Major: Psychology
Faculty Advisor: Doug Derrick
Co-Authors: Doug Derrick, Gina Ligon

Humans and machines are collaborating in new ways and organizations are increasingly leveraging mixed-initiative teams to enable better, faster, and more effective decisions. We examine the effect that an individual's personality has on his or her willingness to: (1) seek assistance from and/or (2) accept the recommendations of an automated teammate. We use a game of pure strategy with a perfectly accurate decision-assisting automated agent to examine how personality predicts these interactions. Forty-nine participants played 3 rounds of a decision game called "Pirate Island". Each participant made 27 total decisions (9 decisions per round over 3 rounds) and had the option to solicit assistance from an automated agent for each decision. Participants were not told that the agent was 100% accurate only that it could help them. Using multi-level modeling, we found that people low on extroversion and high on agreeableness were more likely to solicit recommendations from an agent. However, only those high on agreeableness actually accepted the recommendations. We also found that over time, the willingness of users to engage with the agent increased over time. This study bifurcates the behavioral outcomes of soliciting versus accepting instruction from a machine in a mixed-initiative team. This has implications for the type of outcome needed in a mixed initiative team; in some cases, merely asking for more options might improve performance, regardless of whether a user takes a specific option suggested by an automated teammate. This research will lead toward a tighter integration of human and machine intelligence.

# Post Doctoral Fellow Abstracts

VENKATA NAGA PRADEEP AMBATI
Post-Doctoral Fellow
*Preliminary Analysis of Modulation of Event-Related Desynchronization in Robot-Assisted Hand Performance: Effect of Augmented Visual Feedback and Force Adaptation*
Major: Exercise Science
Faculty Advisor: Mukul Mukherjee

Robot-assisted therapy is an emerging technique that is applied to patients with stroke via the generation of forces to facilitate motor skill learning. In addition, augmented visual feedback has been utilized for learning reaching movements in dynamic environments. Though evidence supports the benefit of forces and augmented visual feedback, underlying neural correlates are not fully known. The purpose of this study was to examine how brain activities are affected when healthy young adults learn reaching movements in dynamic environments with augmented visual feedback. Fourteen healthy adults were randomly assigned to either a control or an experimental group. They all performed reaching movements with their right dominant hand using the Inmotion2 robotic system. Control group subjects received actual feedback of the movement, while experimental group subjects received augmented visual feedback during the adaptation phase of the experiment. The θ, α-mu, and β event - related desynchronization (ERD%) at C3 were analyzed during movement across the three phases: baseline (no force), adaptation (velocity-dependent force), and washout (no force). The results revealed that θ, α-mu, and β ERD% were increased from baseline to adaptation and then decreased when force field was removed (washout) in both groups. With augmented visual feedback, α-mu, and β ERD% were smaller, but θ ERD% was larger than controls across all phases. These results indicate that utilization of augmented visual feedback may help to reduce cognitive processing, as α-mu and β ERD% were smaller.

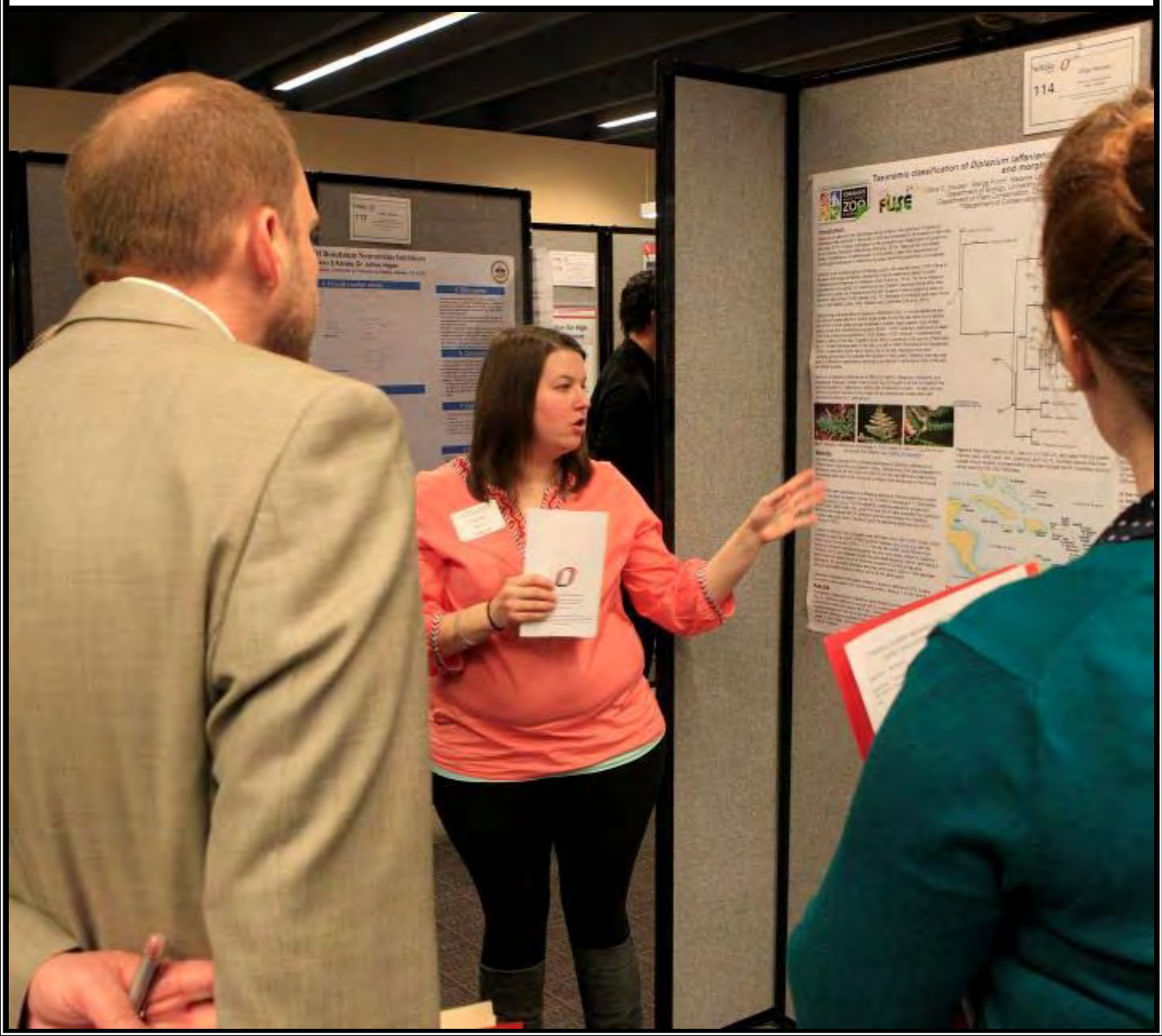
DIDERIK-JAN EIKEMA
Post-Doctoral Fellow
*Locomotor adaptation to support surface perturbations is characterized by environmental decoupling*
Major: Exercise Science
Faculty Advisor: Mukul Mukherjee

Human locomotor adaptation requires control processes driven by sensory feedback to maintain dynamic stability in response to environmental perturbations. Effective postural adaptation is characterized by a decoupling of the environmental perturbation and movements of the trunk. Maladaptive adaptation in conditions of inaccurate sensory input may lead to postural instability. In this study we investigated locomotor adaptation to a continuously rolling treadmill. While walking on the treadmill, 20 participants performed a locomotor adaptation, consisting of baseline, adaptation (sinusoidal roll: ± 5°), catch, retention and transfer trials. Learning was quantified as a decoupling of mediolateral treadmill and trunk roll, computed as the cross-correlation function (XCF) between treadmill and trunk motion. Analysis revealed a trend of decoupling over consecutive trials. Decoupling is primarily observed in the learning phase, indicated by a systematic reduction in XCF in treadmill – trunk ($p<0.01$) coupling. The learnt sinusoidal roll dynamics transfer to a randomized rolling treadmill ($p<0.05$). As learning environmental dynamics occurs, over time a stable decoupled state is achieved and maintained. Significant transfer of decoupling behaviour to the random perturbation, suggests sensory reorganization as the driving phenomenon. Increased reliance on visual information to encode physical orientation, as opposed to lower-limb proprioceptive signals allows supra-pelvic body segments to be controlled using sensory feedback from more stable sources in the environment. Over time this allows for the minimization of mechanical environmental influences.

# Post Doctoral Fellow Abstracts

STEVEN J HARRISON
Post-Doctoral Fellow
*The effect of structured auditory stimulation on movement human movement variability and associated cortical involvement*
Major: Psychology
Faculty Advisor: Nicholas Stergiou
Co-Authors: Michael L. Hough, Nicholas Stergiou

Movement variability in many rhythmic behaviors often exhibits characteristic temporal structures. In gait and tapping, stride to stride, and beat to beat variations are marked by long-term correlations in time. Motivated by evidence suggesting that changes in the temporal structure of movement variability often accompanies pathology, we explore the possibility manipulating the temporal structure of movement using variants of structured auditory stimuli to which participants in our experiments intentionally coordinated. Stimuli comprised of a rhythmic metronomic beat with varying temporal noise structures (e.g. white, pink, brown) were investigated in both tapping and locomotion tasks. Our results show that the stimuli were effective at changing the variability structure of the observed movement patterns. We also report an accompanying analyses of cortical involvement measured through functional near-infrared spectroscopy.



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