



4th Annual

Student Research and Creative Activity Fair

Final Proceedings

February 10, 2012

UNIVERSITY OF
Nebraska
Omaha



UNIVERSITY OF NEBRASKA AT OMAHA
4TH ANNUAL STUDENT RESEARCH AND
CREATIVE ACTIVITY FAIR

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AT A
GLANCE:

- 149 projects
- 107 undergraduate students
- 88 graduate students
- Participation from all 6 UNO colleges, as well as UNL's College of Engineering

The Student Research and Creative Activity Fair is administered by the Office of Research and Creative Activity at UNO and was made possible through the generous support of the Office of Sponsored Programs and Research and the Office of Academic and Student Affairs.



SCHEDULE OF EVENTS

8:00 AM - 9:00 AM	Check in for Fair Participants; Continental Breakfast	Ballroom
9:00 AM - 11:30 AM	Poster Presentations/Exhibits Undergraduate Oral Presentations/ Performances Graduate Oral Presentations/Performances	Ballroom Chancellor's Room Nebraska Room, Aksarben Room
11:30 AM - 12:45 PM	Lunch Provided for All Student Participants, Faculty Advisors, and Judges	Ballroom
1:00 PM - 4:30 PM	Poster Presentations/Exhibits Undergraduate Oral Presentations/ Performances Graduate Oral Presentations/Performances	Ballroom Chancellor's Room, Aksarben Room Nebraska Room
4:30 PM - 5:00 PM	Reception and Viewing of Posters	Ballroom
4:30 PM - 5:30 PM	Judges' Forum	Chancellor's Room
4:45 PM	Presentation by Adam Smith, UNO Alum	Nebraska Room
5:45 PM	Awards Ceremony and Closing Reception	Nebraska Room, Ballroom

FAIR STEERING COMMITTEE

Christine Beard, Music
Sanjukta Bhowmick, Computer Science
Frank Bramlett, English
Paul Davis, Biology
Griff Elder, Mathematics
Jeanette Harder, Social Work
Lisa Scherer, Psychology
Rosemary Strasser, Psychology
Ryan Tefft, Undergraduate Geology Student
Neal Topp, Teacher Education
Jenna Yentes, Graduate Health, Physical Education and
Recreation Student

Ex-officio

Scott Snyder, Associate Vice Chancellor
Wendi Jensen, Coordinator
Catie Miller, Graduate Assistant

FACULTY MODERATORS

Frank Bramlett, English
Catherine Co, Economics
Paul Davis, Biology
Griff Elder, Mathematics
Scott Glasser, Theater
Jeanette Harder, Social Work
Sara Myers, HPER
Dana Richter-Egger, Chemistry and MSLC
Karen Rolf, Social Work
Mark Schoenbeck, Biology

2012 FAIR JUDGES

Community representatives donated their time and expertise to help evaluate the student presentations. Our gratitude to:

Rhonda Ahrens	Physicians Mutual
John Buckley	Omaha Public Power District
John Falconer	University of Nebraska at Kearney
Marian Fey	Omaha Public Schools Board of Education
Julie Griffin	ConAgra Foods
Matt Hammons	University of Nebraska
Brian Henkel	Papio-Missouri River Natural Resources District
Barbara Jessing	Heartland Family Service
Jim Kueffner	
Tim McIvor	Omaha Public Power District
Todd Morris	PayPal
Tom Nimps	Oriental Trading Company
Danny Pate	CenturyLink
Wendy Patterson	The Salvation Army
John Prouty	
John Rogers	
George Royce	Mutual of Omaha
Marty Skomal	Nebraska Arts Council
Bill Snyder	Peru State College
Lisa St.Clair	University of Nebraska Medical Center
Paula Turpen	University of Nebraska Medical Center

2012 FAIR AWARDEES

UNDERGRADUATE ORAL PRESENTATIONS/PERFORMANCES

Best **NATALIE MCCLELLAN**
Cultural Adaptation through Foodways: South Sudanese in the Omaha Area
Major: Sociology-Unclassified
Faculty advisor: Timi Barone

Runner-up **MATTHEW CHRISTENSON**

(tie) Nebraska's farmland amphibian springs from river bank to GenBank
Major: Biotechnology
Faculty advisor: Paul Davis
Co-Author(s): Paul H. Davis, Alan S. Kolok, Andrew J. Trease, Steven V. Ready, and Lindsey Knight

Runner-up **BENJAMIN KNUTSON**

(tie) Relation of Shape Equations (ROSE) Analysis
Major: Physics
Faculty advisor: Renat Sabirianov

UNDERGRADUATE POSTERS/EXHIBITS

Best **JAY NEWSTROM**

(tie) Improving the Accuracy of Measuring Microscopic Organisms Using Information Technology
Major: Innovatn&Entepreneurship
Faculty advisor: Ann Fruhling
Co-Author(s): Greg Hoff and Ann Fruhling

Best **CHRISTOPHER SAUTTER**

(tie) Fracture Orientation Analysis: The Central US
Major: Geology
Faculty advisor: Harmon Maher

Runner-up **JOSEPH BORO**

(tie) Mineralogical Analysis of pottery shards from the Tall al-Umayri Region, Jordan
Major: Geology
Faculty advisor: Robert Shuster

Runner-up **DANIELLE SUPONCHICK**

(tie) The Effects of Treadmill and Overground Running on Attentional Focus and Performance

2012 FAIR AWARDEES

GRADUATE ORAL PRESENTATIONS/PERFORMANCES

Best **KATHRYN DEMPSEY**

Discovering Mechanisms of Aging and Disease using Heterogeneous Integrated Network Models
Major: Bioinformatics
Faculty advisor: Hesham Ali
Co-Author(s): Hesham Ali

Runner-up **DANIEL HARRIS**

(tie) The Relationship between Emotional Intelligence and Malevolent Creativity in Response to Different Tasks
Major: Industrial-Organizational Psyc
Faculty advisor: Roni Reiter-Palmon
Co-Author(s): Roni Reiter-Palmon

Runner-up **ALICIA PHILLIPS BUTTNER**

(tie) The effect of stress on social cognitive performance in shelter dogs
Major: Psych-Unclassified
Faculty advisor: Rosemary Strasser
Co-Author(s): Rosemary Strasser

GRADUATE POSTERS/EXHIBITS

Best **SCOTT WISSING**

Association of staff behaviors and afterschool program features to physical activity: Findings from Movin' Afterschool
Major: Hlth Phys Ed & Rec-Unclassified
Faculty advisor: Jennifer Huberty

Runner-up **SAMANTHA BAYER**

(tie) The Impact of Reading Interventions with Sudanese Children
Major: School Psychology-Unclassified
Faculty advisor: Lisa Kelly-Vance
Co-Author(s): Madeleine Moody and Kristin Moody

Runner-up **SAMUEL WILKINS**

(tie) The Relationship Between Sport Specialization in Baseball and Glenohumeral Internal and External Rotation Range of Motion and Functional Movement Screen Scores
Major: Physical Ed-Exercise Science
Faculty advisor: Melanie McGrath
Co-Author(s): Melanie McGrath, Kris Berg, Jeffrey French, and Kody Moffatt

ABSTRACTS

UNDERGRADUATE

ANKIT AGRAWAL

Undergraduate

Pediatric Visceral Solid Organ Transplant: Is it Possible to Measure Hemoglobin Levels Without Drawing Labs?

Major: Biotechnology

Faculty advisor: Myrna C. Newland

The procedure of visceral solid organ transplantation carries a variety of intraoperative risks to the patient, none of which are more evident than the wide fluctuations in intravascular volume status and subsequent wide swings in hemoglobin. These swings are even more pronounced in the pediatric population due to their small size and total blood volume. Defining the volume of blood loss during organ transplantation is subjective and dependent on a close ongoing discussion between the surgeon and the anesthesiologist. Blood loss during this procedure is also erratic, with periods of significant blood loss occurring during explantation of the diseased organs(s) and implantation of fresh organs.

During liver, liver-pancreas-small bowel, and isolated small bowel transplantation, patients often suffer large volume loss and expansion, wide fluctuations in red cell volume, and dilutional coagulopathy. This difficulty is especially true during and after reperfusion of the transplanted organs. Therein lies the challenge: aggressive transfusion of blood products and isotonic fluids can lead to fluid overload, tissue and pulmonary edema, and inadequate perfusion, but failure to maintain intravascular volume can lead to hypotension and inadequate perfusion. In addition, significant anemia and polycythemia can lead to incipient tissue ischemia and dilutional coagulopathy can produce continued bleeding from incision sites.

To assess if continuous monitoring of hemoglobin (Hgb) and Plethysmograph Variability Index (PVI) using the Masimo Rainbow SET – Radical 7 is superior to current procedures used to determine intravascular volume depletion, anemia and prevent polycythemia during pediatric visceral solid organ transplantation.

ANKIT AGRAWAL

Undergraduate

Nasotracheal intubation in a Difficult Airway using the Storz C-MAC laryngoscope, Boedeker Bougie Endotracheal Introducer, and Boedeker curved forceps

Major: Biotechnology

Faculty advisor: Myrna C. Newland

Introduction: A difficult airway is traditionally addressed through either awake or asleep fiberoptic nasotracheal intubation (FNI). However, even this gold standard can result in failure. These failures can be attributed to several conditions, such as induction of general anesthesia causing the airway tissues to collapse upon themselves. The patient's airway may be edematous from traumatic injury or other pathology preventing use of the fiberscope. ***We will present a new method utilizing the Storz C-MAC VL, Boedeker Bougie (BB) Endotracheal Introducer, and Boedeker forceps for nasotracheal intubation in a Laerdal Difficult Airway (LDA) manikin.***

Methods & Results: In this demonstration, the soft, pliable portion of the bougie was inserted into the right nare and used as a stent for nasal intubation then directed through the trachea using indirect monitoring. Advancement of the bougie into the trachea was facilitated by an orally inserted Boedeker Forceps. These forceps have a novel curvature which facilitates their use while performing videolaryngos-

copy. A 7.0 mm endotracheal tube was then placed over the exposed end of the bougie and railroaded through the nose and into the trachea under indirect visualization by the Storz C-MAC monitor.

Conclusion: This article was intended to describe a modified procedure for nasotracheal intubation although the researchers feel that this method was anecdotally easier to perform than FNI for several reasons.

JACOB ANDERSON

Undergraduate

Terrestrial Vertebrate Trackways of the Early Jurassic Nugget Formation at Dinosaur National Monument

Major: Geology

Faculty advisor: George Engelmann

Co-Author(s): Keegan M. Melstrom
and Joanna M. Panosky

A track site in the Lower Jurassic Nugget Formation within Dinosaur National Monument, Utah, preserves numerous tracks and trackways. The large site located near Cub Creek within Dinosaur National Monument is approximately 70 meters by 20 meters of track-bearing surface. The tracks are preserved on sands beneath the massive eolian dune sands of the Nugget Formation. Tracks are preserved on two different layers separated by about 10cm. There are an estimated 300 tracks at this locality, with a track density of about 3 or 4 tracks per square on average. The size of the tracks ranges from approximately 10 to 25 cm wide. Most of the tracks are poorly preserved and probable undertracks, but there are many well preserved tracks in which pushup rims and toe impressions are evident and manus and pes can be distinguished. Some trackways can be distinguished in the field. Well preserved tracks and trackways can be identified as cheirothere tracks. The tracks and trackways do not appear to have a common orientation, indicating that the track makers were walking in different directions.

Another track site located north of the Carnegie quarry within Dinosaur National Monument is in approximately the same stratigraphic position as the Cub Creek site. Track density is much lower at this site and several trackways are easily distinguished, including a well preserved cheirothere trackway which extends for 14 meters.

Analysis of maps of the site near Cub Creek should make it possible to recognize additional and longer trackways at that site and determine the orientation of trackways. And, together with the long cheirothere trackway mapped at the other site, will provide information about the stride length and gait of the cheirothere track maker.

BRYAN ARNOLD

Undergraduate

Non-linear measures are sensitive to the severity of Cerebral Palsy for sitting postural control

Major: Neuroscience

Faculty advisor: Srikant Vallabhajosula

The development of sitting posture is essential yet commonly delayed in children with Cerebral Palsy (CP). Small changes in postural control during infancy are difficult to quantify using observational measures commonly used in clinical settings. The present study focused on identifying measures of variability that are sensitive for assessment of sitting posture among children with CP. Ten children with moderate CP and fifteen with severe CP were assessed across three months starting when they were just developing the ability to sit. Sitting postural sway was recorded using force platform. A 2 (severity: severe vs. moderate) x 4 (sessions: first onset of prop sitting vs. 1, 2, and 3 months later) repeated measures ANOVA was performed on non-linear measures derived from the center of pressure data. Lyapunov Exponent (LyE) was sensitive to the severity levels of children with CP. Children with severe CP exhibited less flexible patterns in their temporal structure of sitting posture sway, as indicated by lower values of LyE, in both medio-lateral ($p = 0.042$) and antero-posterior ($p = 0.046$) directions. We also found a significant interaction for LyE in the antero-posterior direction ($p = 0.013$). LyE in antero-posterior stayed relatively constant and lower in the group of severe CP than that of moderate CP.

ABSTRACTS

These results suggest that variability measures like LyE, are sensitive to measure the development of sitting posture in infants with CP. Such findings could serve as an indicator of progress when various interventions to benefit sitting posture among infants with CP are compared.

ISMAEL BARAJAS

Undergraduate

Plasticity in the Developing Taste System (GOLGI)

Major: Neuroscience

Faculty advisor: Suzanne Sollars

Sensory systems are crucial for obtaining information from our external environment. The majority of sensory systems have been studied in great depths, however, the taste system is the least studied of them all. Much of the research in the taste system has focused primarily on normal, adult or developing anatomy and physiology. Experimental manipulation of nerves in the taste system is key to analyzing basic changes in anatomy after neural injury. The chorda tympani (CT) nerve has been shown to provide crucial support that aids in the maintenance of taste buds. Ten rats serve as subjects: five received surgical transection of the CT at ten days of age and five received a sham control surgery. Processing of brain tissue is done in the adult rat to examine whether changes to neurons occur in the brain as a result of the CT transection. Golgi staining allows the visualization of these neurons. Golgi staining procedures consist of an integration of various protocols including the removal of non-fixed tissue, a 2-week incubation period in histochemicals, tissue sectioning on a cryostat into 200 μm sections and counterstaining with cresyl violet. The ongoing study involves evaluation of the tissue via microscopy and the computer program, NeuroLucida (MicroBrightField, Inc.). We expect that neonatal chorda tympani transection will result in expanded cell body size in the brain. Such a finding would suggest that changes in taste preferences after neonatal chorda tympani transection are a result of neuroplasticity in the brain as opposed to differences in peripheral nerves.

ADENA BARELA

Undergraduate

Changes in Fish Community of Agate Fossil Beds from Introduced Species

Major: Biology-Unclassified

Faculty advisor: Richard Stasiak

Co-Author(s): Richard Stasiak, George Cunningham, Scott Flash, and Andrea Wagner

A series of surveys (completed in 1979, 1989, 2008 and 2011) with the purpose of obtaining fish species inventory, were conducted at the headwaters of the Niobrara River at Agate Fossil Beds National Monument (AGFO) and surrounding areas. Compared to those completed in 1979 and 1989, the survey completed in 2011 showed a significant reduction in species diversity and fish population of the area within AGFO. The study completed in 2008 (Dr. Pegg and Dr. Pope) presented similar results as the study done in 2011; however, 2008 yielded less collected specimens. The low specimen collection and population numbers of 2008 may be attributed to the approach used, electrofishing, as opposed to the techniques used in 1979, 1989, and 2011. The fish inventories of 2008 and 2011 concluded that, although not present in the two earlier studies, the dominant species present in AGFO was northern pike (*Esox lucius*). This predacious, invasive species, introduced for sport fishing, may be responsible for the decrease in diversity as well as the low population numbers. The main objective of this paper is to review results from the four studies to determine if declining population numbers is due to technique (electrofishing) or environmental causes, i.e. the introduction of northern pike and yellow iris.

JUSTIN BARNES

Undergraduate

Effects of Caffeine on Aggression: A Review of the Research and the Future Directions

Major: Psych-Unclassified

Faculty advisor: Lisa Scherer

The psychological and economic costs of workplace aggression are growing exponentially. The cost to replace a single employee victimized by workplace aggression is estimated at \$120,000 (Rayner & Keashly, 2004). Aggression is defined as "any behavior directed toward another individual that is carried out with proximate (immediate) harm" (Anderson & Bushman, 2002, p. 28). Caffeine is the most widely consumed stimulant in the world, but very little is known about the effects of caffeine on aggression. This presentation will address both mediators and moderators of the effects of caffeine on aggression. First, does ingesting caffeine cause individuals to have expectancies resulting in caffeinated individuals blaming their behavior on the stimulant? Second, does caffeine increase blood pressure, heart rate, anxiety, and/or impulsivity causing aggressive behavior or increased susceptibility. Third, does caffeine enhance aggression in individuals who are provoked? Lastly, will caffeine reduce aggression in individuals that are sleep deprived or mentally depleted?

BEN BATES

Undergraduate

Shrinkage Cracks and Subsequent Geometries

Major: Geology

Faculty advisor: Harmon Maher

Shrinkage cracks are attributed to volumetric changes in saturated material. Mudcracks are most common, forming at the sediment-air interface by desiccation (drying). Syneresis cracks form similar geometric patterns, but form subaqueously, still by volumetric alteration. Although both processes may exhibit similar crack geometries, mudcracks are the easiest structures to model. Crack morphology relies on multiple factors: sediment composition, thickness, and surface configuration (discontinuities). Natural mud crack nucleation occurs from the bottom up due to the heterogeneity of the natural sediment. Heterogeneity is key in crack morphology due to a gradient in sediment grain-size. When the more saturated clays and fine-grained sediments exceed their tensile strength from desiccation, a crack forms. It is known that previously existing flaws or discontinuities in sediment surfaces aid in crack morphology. The purpose of this research is to investigate if these flaws orientate cracks based on four factors: (1) size of the introduced anisotropy (2) density (number of discontinuities per area) (3) density distribution (random placement versus clustered placement) and (4) orientation of the anisotropy (angle of alignment). Time-lapse photography will capture the formation of the modeled cracks and be formatted into a video to show crack growth and propagation. Results should show a preferred, directional orientation dictated by the introduced anisotropies.

MICHELLE BECKER

Undergraduate

Role of Chaperones in Type Three Secretion System in *Pseudomonas aeruginosa*

Major: Biology-Unclassified

Faculty advisor: Donald Rowen

The bacterium *Pseudomonas aeruginosa* is an opportunistic pathogen which is primarily known for causing severe respiratory infection in patients with cystic fibrosis. One virulence factor of this bacterium is the exotoxin ExoU which is pumped into host cells by a Type III secretion system (TTSS). Many other bacterial pathogens secrete toxins via a Type III secretion system. Many TTSS toxins require a specific chaperone protein to bind to it for secretion to occur. The role of the chaperone in secretion is not clear. One theory is that chaperones act to mask membrane localization domains (MLD) of toxins. Membrane localization domains (MLD) act to target the toxin to specific membranes after it is secreted into cells of

ABSTRACTS

the infected host. The masking of the MLD by the chaperone is hypothesized to keep the toxin soluble and protect it from forming aggregates and being degraded in the bacterial cell before secretion. I am testing this theory by examining the levels of ExoU in soluble, insoluble, aggregate and total cell fractions prepared from bacterial cells. As expected, I observed a reduction in the overall levels of ExoU in cells lacking ExoU. However, I detected ExoU in both soluble and insoluble fractions even in the presence of SpcU and observed no increase in the amount of ExoU in the insoluble or protein aggregate fraction in the absence of SpcU. These observations suggest that the hypothesis that chaperones act to protect TTTS toxins from aggregation by masking their MLD is not correct for all toxins.

SARA BEHRENS

Undergraduate
Absurdity and Romance
Major: Philosophy
Faculty advisor: Patrice Proulx

If Absurdism is the divorce between man and his setting, then romance is the mechanism through which man resists the temptations of religion, nihilism, other philosophical suicide, and corporeal suicide. Romance is man's vehicle to rebellion, freedom, and meaning. In the Absurd World described by Albert Camus, the Absurd Man is defined by his recognition of his futile and negligible existence in the world. Yet, the Absurd Man is defined further by his rebellion against this knowledge—he seeks meaning in a meaningless world. Within Camus' works, all that is meaningful to his characters is expressed in a romantic fashion, parallels a romantic experience, or is itself a romantic experience. The few instances in which the antithesis of love or romance is executed, as in the case of Caligula, the character executing the action is no longer going against the nature of the absurd world but becoming a mechanism in it. Thus, romance defines the absurd life, and it is present in both the solitary and solidary lifestyles. Camus seems to insist upon the absence of romance in society, yet it is evident that this conviction lessened over time. Camus' discomfort with romance and meaning in society is that members of a society create a whole that resembles the Absurd World; society cannot be depended on to recognize its futility and its role as an existential cog and to rebel against this role. Conversely, the individual is fully aware of his or her own search for meaning.

PETER BOKELMAN

Undergraduate
Application of X-Band Radar at General
Aviation Airports
Major: Aviation
Faculty advisor: David Byers
Co-Author(s): Matthew Pastor and Nghia Cao

Accurate collection of data related to the aircraft and their movement on or above the field is of the utmost importance to airports and their managers. X-band radar can be used to track and count aircraft at non-towered airports. This technology will allow airports to identify the number of operations at their airport, the most frequently used patterns, and track flights over noise sensitive areas. A full understanding of these counts will allow for appropriate management of airfield maintenance, funding, and more. Additionally, the possible ability to transmit the data to pilots in the cockpit will have the benefit of increased safety on airfields with this technology. This project will demonstrate the ability of an X-band unit to track aircraft using four major components: A 1834C/NT NavNet with dome radar, ARP 11 Autoplotter, PG500R rate compensated heading sensor, and BBWGPS. Together, these components allow the radar unit to not only track targets, but also transmit the data to a computer for processing to include a vis-

ual depiction.

In order to use the radar, the team needed to contact the FAA and the FCC to get licenses to use it. This process of waiting for the license took longer than expected and caused a delay in the gathering of data. However, a license was recently obtained and the team is now ready to proceed onto data collection. Aircraft counts and flight paths will be the primary focus of the data collection.

JOSEPH BORO

Undergraduate

Mineralogical Analysis of pottery shards from the Tall al-Umayri Region, Jordan

Major: Geology

Faculty advisor: Robert Shuster

Life of the ancient Middle East can be studied by looking at the ceramics industry of the region. I am studying samples from the Tall al-Umayri region (Jordan). These samples, from the Bronze/Iron Age, were made approximately six thousand years ago and represent a snap shot of the ceramics industry at that time. In the past pottery samples from the Tall Hisban and Tel Jezreel areas of Israel have been studied for their mineralogical composition. The samples I am studying are collar rim jars that were used for storage; these jars were very large, up to three to four feet in height and this is the first time they will have been studied. Using a statistical point counting method, I analyzed samples from 30 jars for their mineralogical composition. My study showed that these samples had quartz, chert, limestone, grog, and organics present. Organics are usually added to create more voids in the pots and make them lighter. With a 3-4 foot tall pot, this was likely a necessity. With the increase of voids it would have been necessary to make the pots stronger; this was accomplished by the addition of grog. There is no evidence that any specific minerals were added to the clay to make these collar rimmed jars. This means that the jars were not made to be of the quality that cooking pots and religious artifacts were. More likely they were made with quantity and mass production in mind.

BENJAMIN BOWDER

Undergraduate

Perceived exertion (RPE) and oxygen consumption (VO₂) during inclined treadmill walking in healthy young adults

Major: Bioinformatics

Faculty advisor: Sara Myers

Co-Author(s): Ka-Chun Siu

This study investigates the effects of virtual reality (VR) on human ratings of perceived exertion (RPE) and oxygen consumption (VO₂) during inclined treadmill walking in healthy young adults. Participants walked on a treadmill at varying degrees of incline (grade of 0%, 3%, 6%) through a virtual corridor with varying virtual degrees of incline (manipulation of virtual environment at 0%, 3%, 6% grade). Oxygen consumption was collected using the Cosmed K4b2 system, and RPE was measured with Borg's scale of perceived exertion during each of the conditions. Both RPE and oxygen consumption were significantly affected by an increased incline of the treadmill ($p < 0.05$). Only the perception measure (RPE) was significantly influenced by an increased incline of the virtual corridor ($p < 0.05$). This study confirms that the VR affects human perception of exercise intensity, but not the actual metabolic consumption during treadmill walking. It is possible that the increase in perceived exertion of exercise is due to the effect of visual input (VR) on the brain and sensorimotor system.

ABSTRACTS

MADLINE BROCKETTE

Undergraduate

Suicide and Depression in Native American Culture

Major: Psych-Unclassified

Faculty advisor: Jessiline Anderson

Co-Author(s): Lindsey Wittry, Evie Abts,
and Annesha Mitra

Research shows that depression and suicide are related, with suicide as the second leading cause of death among Native Americans between the ages of 10 and 34 years (CDC, 2008) and accounting for more than 2.2 times the national average (CDC, 2005). Risk factors for suicide among Native Americans include a history of previous suicide attempts, family history of suicide, depression or any other mental illness, alcohol or drug abuse, stressful life events, and loss of a loved one. The current study took place on the Omaha Indian Reservation at Macy, Nebraska. Two hundred youth between the ages of 14 and 18 from Umonhon Nation and Walthill Public Schools participated. Participants completed the Beck Depression Inventory, Beck Hopelessness Scale, Columbia DISC Depression TeenScreen, and the Suicide Risk Factor Test. Results indicated that 20% of the participants completing these assessments were at-risk for depression and/or suicide.

MOLLY BYSTREK

Undergraduate

Here comes trouble -- and he hasn't slept in days

Major: Psych-Unclassified

Faculty advisor: Lisa Scherer

Co-Author(s): Lisa Scherer

Sleep deprivation is a subject that has gained worldwide attention over the past few decades. We know that sleep deprivation can have profoundly detrimental effects on one's health, but what about one's likelihood of aggression? Recent research has shown that people who report sleeping less than the suggested amount of time each night perceive neutral pictures more negatively, fail to regulate emotions (Tempesta, Couyoumdjian, Curcio, Moroni, Marzano, De Gennaro, & Ferrara, 2006), have increased stress hormone levels, have reduced ability to perform simple cognitive tasks (Kloesch, 2006), display symptoms similar to those suffering from depression and post-traumatic stress disorder (Walker, 2007) and in juveniles have shown to report significantly more violent delinquency when compared to individuals receiving the suggest amount of sleep. As nearly a fifth of the American population suffer from insomnia (National Geographic, 2010) which makes it difficult to fall asleep and/or stay asleep, the subject of sleep deprivation and its' possibility to produce aggressive and/or violent behaviors requires further investigation. This presentation will review the existing literature concerning sleep deprivation and its effect on daily behavior.

MATTHEW CHRISTENSON

Undergraduate
Nebraskan's farmland amphibian springs from
river bank to GenBank
Major: Biotechnology
Faculty advisor: Paul Davis
Co-Author(s): Paul H. Davis, Alan S. Kolok,
Andrew J. Trease, Steven V. Ready,
and Lindsey Knight

Due to the agricultural practices within the Midwestern United States, the human water supply is often contaminated with various chemicals that have a significant negative impact on human health, including the herbicide atrazine. Atrazine is the most commonly used herbicide in the world but is a suspected carcinogen and teratogen. In humans, atrazine exposure is associated with tumorigenesis, birth defects, menstrual problems, and low sperm counts. Male frogs exposed to atrazine, at levels below the regulations set by the environmental protection agency, become sterile and in some cases turn into females or hermaphrodites. The central goal of this study is to develop the northern leopard frog *Rana pipiens* into a sentinel organism that can be used to assess atrazine contamination throughout the region. To this end, we first needed to characterize biomarkers of atrazine exposure in *R. pipiens*. However, because *R. pipiens* is unsequenced, we began by obtaining the transcriptome of male and female livers, gonads, and tadpoles undergoing development, in order to design primers to evaluate the expression of the affected genes using reverse transcriptase-quantitative polymerase chain reaction. In addition, two of *R. pipiens* close relatives, the African clawed frog *Xenopus laevis* and Western clawed frog *Xenopus tropicalis*, are model organisms that are used extensively in developmental biology but only in the past year has the transcriptome of *X. laevis* and *X. tropicalis* been annotated. Therefore, by obtaining the *R. pipiens* transcriptome, UNO is now on the forefront of the molecular developmental biology field.

ERIC CLARK

Undergraduate
Monte Carlo modeling of nanomaterials for
magnetic refrigeration
Major: Physics-Unclassified
Faculty advisor: Renat Sabirianov

Magnetic refrigeration has the potential to replace today's common compression refrigerators. Magnetic refrigeration will provide many advantages over the current technology including 10% more energy efficiency and mechanical systems that are far less likely to break down. Magnetic refrigeration technology requires materials that are very sensitive to magnetic fields. Once this material is synthesized, magnetic fields can then be used to manipulate the spin order of the material and control the magnetic entropy of the system. This change in entropy is the process that results in loss of heat from the system (refrigeration.)

Using computer models which represent the lattice structure of the test material the reaction of the internal magnetization of the material to an external magnetic field can be calculated. These calculations allow me to examine the entropy change as a function of the magnitude of the external magnetic field. This reveals the required microscopic quantum mechanical exchange (electron spin) interactions of the material that will make this technology a reality. I will discuss how changes in the exchange coupling on the surface of nanoparticles and between nanoparticles embedded into the matrix affect the entropy change. I will also discuss what will be required to tailor the magnetic parameters of the test material to optimize the spin interactions and make it usable for refrigeration applications at or around room temperature.

ABSTRACTS

ALYSHA COLLINS

Undergraduate

Displaced Aggression: Victim Characteristics of Dysfunctional Work-Family Spillover

Major: Psych-Unclassified

Faculty advisor: Lisa Scherer

Co-Author(s): Lisa Scherer

Throughout history, displaced aggression has received very little attention, but continues to be a growing issue within the work world. Displaced aggression is defined as the “redirection of a person’s harm doing behavior from a primary to a secondary target or victim” (Tedeschi & Norman, 1985, p. 30). This presentation will review the literature on this topic and propose future research questions that will further our understanding of factors influencing the likelihood of victim displacement of aggression to another target. Specifically victim characteristics and situational moderators of this phenomenon will be explored. Examples of victim characteristics that exacerbate the tendency of workplace aggression to be displaced to family members include: employee alcohol use, personality type and other individual difference variables such as tolerance of frustration (e.g., Denson et al., 2008). Additionally, examples of situational factors that enhance or hinder displacement consist of negativity of setting and level of provocation. The presentation will conclude with a discussion of proposed interactions that reflect an integration of victim characteristics and characteristics of the victims’ work and family situation.

ERIKA CRAWFORD

Undergraduate

Purification of Plasmid DNA Containing the Coxsackievirus Genomic 5' Non Translated Region

Major: Biotechnology

Faculty advisor: William Tappich

Coxsackievirus (CVB3) is a human pathogen that causes myocarditis and pancreatitis. The genome of CVB3 is an RNA molecule that contains a 748 base 5' non translated region (5'NTR) that is known to play a major role in virulence. This region contains an internal ribosome entry site (IRES), a structure known to be involved in viral gene expression. The CVB3 genome has been cloned into an *E.coli* plasmid vector. The *E.coli* cells containing the CVB3 genome can be cultured to generate a high quantity of transfected plasmid DNA. This DNA can be isolated and digested with restriction enzymes to generate a template for transcription of 5' NTR RNA. Once transcribed, the RNA is available for studies to address 5' NTR structure and function. In this study, plasmid DNA was isolated using a standard miniprep procedure and characterized by agarose gel electrophoresis. Digestion of plasmid DNA with restriction endonucleases produced the fragment containing the 5' NTR. The isolated 5'NTR DNA was purified and used as a transcription template to generate CVB3 5'NTR genomic RNA. This RNA will be chemically probed and examined to yield insight into the three-dimensional structure of the 5'NTR of CVB3.

AUSTIN DAVIDSON

Undergraduate

External Work is Increased Using Rocker

Bottom Shoes

Major: Biology-Unclassified

Faculty advisor: Nick Stergiou

Co-Author(s): Heather L. Henning, Shane R. Wurdeman, Neil B. Huben, and Nick Stergiou

External work is the work performed by external forces (i.e. ground reaction force (GRF)). Walking boots with an arc radius on the bottom decrease external work, decreasing energy expended. Commer-

cial rocker bottom shoes incorporate a “rocker” effect. It was hypothesized that rocker bottom shoes will decrease negative work for the lead leg during the initial double support period of stance phase. Seven healthy young subjects (age: 23.4 ± 2.4 years; height: 181.6 ± 3.4 cm; mass: 80.5 ± 9.5 kg) walked across a 10 meter walkway. Subjects initially walked with a standard sole athletic shoe. Subjects then wore rocker bottom shoes for a week. After a week of acclimation, subjects returned to complete a similar data collection with the rocker bottom shoes. External work was calculated as the dot product of GRF and velocity of the body’s center of mass. Velocity was calculated as the first derivative of sacral marker position. External work was normalized to body weight. Stance phase was determined from the vertical GRF. Kinematics was used to divide stance into initial double support, single support, and terminal double support. The three periods and total stance were analyzed for positive and negative external work. The rocker bottom shoes resulted in significantly increased magnitude of negative work and a decreased amount of positive work in the initial double support period. The positive work of the stance leg in single support was increased. For entire stance phase, subjects performed increased total amounts of external work when wearing rocker bottom shoes.

BRANDON DENNEY

Undergraduate
Alternative Wind Energy
Major: Aviation
Faculty advisor: David Byers

People waste energy every day, by leaving their lights on, driving when they could ride a bike, warming their cars up in the winter, and expending energy without gaining any back. At airports, aircraft’s create thousands of pounds of thrust while taxiing, taking off and doing run-ups. All of this energy that is created and expended by these jet and piston engines is going to waste, when it could be recycled. The force caused from a jet engine is so powerful that it has been shown to blow over cars and even buses. Some jet engines can produce more than 72,000 lbs. of thrust, on takeoff. All of the energy being created is expended into the air and only harming our ecosystem. I propose an idea where energy created, can be harvested, and then reused at the very same airport the aircraft had departed, taxied, and ran-up at. The objective of the project is to create a working product that can create, store, and distribute energy that has been gathered from the aircraft’s thrust. Currently I am working on a conceptual model that I can hopefully use to animate the desired effects. My presentation at the fair would include the conceptual model with a poster board presentation explaining the forces associated with the project.

KARI ECHTENKAMP

Undergraduate
Parental Care in Juvenile Gerbils: The Role of Central Stress Systems and Previous Experience
Major: Biology-Unclassified
Faculty advisor: Jeffrey French
Co-Author(s): Caitlynn Gillaspie, Matthew Kirby,
and Andrew Castaneda

Stress and experience play a role in many processes relating to social behavior. The present study examines the effect of blocking anxiety-inducing receptors for corticotropin-releasing hormone receptor 1 (CRH1) in the brain’s stress circuits by administration of antalarmin, a selective CRH1 receptor antagonist. The effects of previous experience, sex, and antalarmin administration on alloparental care were tested in juvenile Mongolian gerbils. Male and female gerbils were either allowed or denied experience with younger siblings in their home cages. At 90-97 days of age the subjects were administered IP injections of antalarmin or vehicle (control). The effects of antalarmin were observed in both an Elevated Plus Maze (EPM) and a novel pup test. Results of the EPM suggest that drug administration had no significant main effect on general anxiety or locomotor activity. Parental care behavior was measured in a novel pup test, yielding results that suggest significant differences between experienced and nonexperienced subjects. The combination of antalarmin, sex, and previous experience played a joint role in latency to approach the novel pup. Previous parental experience decreased latency to approach the novel pup, and was associated with decreased grooming behavior. These findings support that previous expe-

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rience lessens anxiety with novel pups, but also is characterized by an overall decrease in alloparental care. These results suggest that previous experience and activity in the brain's stress circuitry shape patterns of parental responsiveness in mammals.

LAURA ESPEJEL

Undergraduate

Generating Stably Overexpressing Cells to Evaluate Gene Product Involvement During *Toxoplasma gondii* Infection and Growth

Major: Biology-Unclassified

Faculty advisor: Paul Davis

Toxoplasma gondii is an intracellular parasite of great importance because of the immense potential health impact it has around the world. More than 60 million people in the United States carry the parasite. Despite this large number, many people are not aware that they are infected because the human immune system prevents the disease manifestation of the parasite. If primary infection occurs during pregnancy, the parasite can cross the placenta and affect fetal development causing congenital neuropathy and birth defects. *Toxoplasma* is an intracellular parasite, with no demonstrated ability to grow outside of host cells, despite several attempts. Due to this distinct characteristic, we are interested in identifying factors which the parasite requires from the host cell for its growth. Initial findings from a large screen identified twenty-five genes that have a statistically significant and reproducible effect on the parasite's development inside a host cell. The current goal is to overexpress these genes in human host cells which will allow for several follow-up studies, including confirmation of the original phenotype, as well as approaches to understand the altered growth. These results will allow for the identification of host genes that are critical to parasite growth. Those genes that provide crucial nutrients will be expected to increase growth of the parasite while those that inhibit its growth will cause the parasite to halt growth.

BENJAMIN FLOYD

Undergraduate

Ground and First Excited States of a Cross Intersection Quantum Dot: Variational Method

Major: Physics

Faculty advisor: Wai-Ning Mei

Computing the eigenvalues of the Schrödinger Equation can often be very difficult for real-world scenarios often we have to resort to numerical solutions, such as brute-force numerical integration. However, while integration has high accuracy, it is not very efficient. What we propose is that using a numerical approximation such as the variational method is much more efficient and accurate to within a reasonable degree. By utilizing Maplesoft's Grid Computing Toolbox on one of the Holland Computing Center's (HCC) supercomputer clusters we were able to produce eigenvalues to the Schrödinger Equation. These eigenvalues correspond to energy levels of both the ground state and the first excited state of an electron that has been trapped in the intersection of two nanowires, also known as quantum dot that has attracted intensive studies because its importance in fabrication of the future mesoscopic electronic devices.

ABBY GARDNER

Undergraduate

The Impact of Internal vs. External Locus of Control on Occupational Safety

Major: Industrial-Organizational Psyc

Faculty advisor: Lisa Scherer

Experiments were compared to determine the effect of locus of control on occupational safety. A variety of studies were examined and showed a significant correlation between internal locus of control and safe behavior in the workplace. A stronger correlation was shown between external locus of control and unsafe behavior, accidents, and deaths in the workplace. The validity of Rotter's locus of control scale has been strongly researched. The validity of Jones and Wuebker's safety locus of control scale has been shown, but has not been directly compared to Hunter's aviation safety locus of control scale's validity, but showed very similar results.

EMILIANO GRASSI

Undergraduate

Predictors of Emergent Leadership and Leader Effects on the Team Performance

Major: Psych-Unclassified

Faculty advisor: Roni Reiter-Palmon

Co-Author(s): Victoria Kennel and Roni Reiter-Palmon

Teamwork and leadership are key features of today's work environment. Consequently, research seeks to understand individual differences and social dynamics that predict emergent leadership and outcomes in teams. This study examines how individual differences (e.g., personality, self-regulation, and communication) predict emergent leadership and how characteristics of emergent leaders influence team performance, namely, solution evaluation accuracy. One hundred sixty-eight students from UNO were divided into groups of four. Each group was given a problem and asked to evaluate ten problem solutions for quality and originality and select one solution to solve the problem. Participants also completed a measure of the Big Five personality traits, regulatory focus, communication, and rated each group member on emergent leadership behaviors. A logistic regression analysis indicated that communication and promotion focus predicted group member emergent leadership as compared to followers. In addition, each group received an accuracy score for evaluating solution quality and originality. A multiple regression analysis indicated that emergent leaders reporting more openness to experience led groups who more accurately evaluated solution originality. Although communication predicted perceptions of emergent leadership, emergent leaders who self-reported more communication in the group led groups who were less accurate in solution quality evaluations. This study suggests that, there is a discrepancy between characteristics that predict emergent leadership and characteristics of emergent leaders that influence team performance. Results indicate that how we prototypically characterize leaders may not necessarily be consistent with the characteristics of leaders needed to reach team outcomes.

DAVID GROTHEN

Undergraduate

Bradyzoite Reporter for *Toxoplasma gondii*

Major: Biology-Unclassified

Faculty advisor: Paul Davis

Toxoplasma gondii is an obligate, intracellular parasite that infects the nucleated cells of any mammal, including one-third the world population. In humans *Toxoplasma gondii* has two stages of infection the tachyzoite and the encysted bradyzoite. These untreatable cysts formed by *T. gondii* bradyzoites have been found to alter behavior of the host and play a crucial role in a disease known as encephalitis in immune compromised patients. To better understand the differentiation of the two life stages and to create a live feedback model to utilize in the testing of novel compounds a mutant strain was created which differentially expressed fluorescent proteins based on life stage. This mutant reporter line was developed by transforming *T. gondii* RH Δ parasites with the DNA vector pminiHXGPRT/DUAL causing the proteins eGFP and dsRED to be expressed under the control of the bradyzoite gene promoter BAG1 and the tachyzoite gene promoter SAG1.

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THERESA HALLIGAN

Undergraduate

The Relationship of Clastic Dikes in Northwestern Nebraska to those in Badlands National Park

Major: Geology

Faculty advisor: Robert Shuster

Co-Author(s): Ryan Korth, Harmon Maher,
and Robert Shuster

In the summer of 2011, we conducted fieldwork to compare clastic dikes found in northwestern Nebraska to those previously described in the Cedar Pass area of the Badlands National Park (Diggins et al., 2010) in an effort to further our understanding of the genesis of these enigmatic features.

Monroe Creek, located just north of Harrison, Nebraska was the study site. At this location is a suite of clastic dikes, along with faults containing calcite ornamentation. In this area, the clastic dikes and faults cut the upper Chadron and lower Brule Formation strata. The clastic dikes are primarily mud filled in the smaller dikes and composite in the larger dikes, often with associated green alteration zones in the surrounding wall rock. Within many of the clastic dikes are brecciated chalcedony material. Clastic dikes have been observed to pinch out upwards, which indicates an injection mode for filling the dikes from the bottom or sides.

There appear to be three preferred orientation directions of the dikes. These were found to be near 72 degrees, 123 degrees, and 175 degrees. Common dike fill, overlapping crosscutting relationships, and dike interactions suggest that the three dike directions are basically coeval. Some of the faults in this study area formed parallel and locally within the dikes. Many other faults offset the clastic dikes; clearly the faults postdate the dikes. The orientation of the clastic dikes and faults in the Monroe Creek area are similar to structural orientations found at Toadstool and Rock Bass areas (northwestern Nebraska).

RYAN HASENKAMP

Undergraduate

Mechanical Efficiency During Gait is Altered by Multiple Sclerosis

Major: Exercise Science

Faculty advisor: Sara Myers

Co-Author(s): Jenna Yentes and Shane Wurdeman

Multiple Sclerosis (MS) is a progressive, degenerative, neurological disease is characterized by a primary symptom of fatigue. It is possible that this fatigue is a result of poor mechanical efficiency. Maintaining a uniform proportion of positive and negative work during transition from one stance limb to another is indicative of mechanical efficiency. Ten patients with MS (43.6 ± 3.6 years; 81.6 ± 5.3 kg; 169.7 ± 2.4 cm; EDSS: 3.4 ± 1.8) and 10 controls (41.4 ± 3.9 years; 70.1 ± 4.4 kg; 166.2 ± 4.1 cm) walked at their self-selected pace along a ten meter pathway. Five trials were collected for each limb with a minimum one minute of rest between trials to reduce fatigue. Group means of positive and negative work during initial double support, single support and terminal double support phases of gait were subjected to independent t-tests. Total positive and negative work within each group was also subjected to a dependent t-test. Positive and negative work values during both initial and terminal double support phases were significantly different between the two groups. Both the control group and the MS group demonstrated significant differences in total positive work as compared to total negative work within group ($p < 0.001$ and $p < 0.001$, respectively). In order to maintain equivalent gait speed as the controls, it appears that they shift the amount of work performed at different phases of support. Decreased mechanical efficiency demonstrated in patients with MS may lead to decreased physical activity, which leads to inactivity.

SCARLET HEIM

Undergraduate

In Vitro Analysis of Tooth Erosion Caused by Soft Drinks and Other Beverages Using Thin Sectioning Techniques to Examine Internal Tooth Anatomy

Major: Biology-Unclassified

Faculty advisor: Karen Murch-Shafer

Numerous studies have shown a correlation between oral health and overall general health. With the rise of soft drink consumption acid dental erosion has become of great concern. Prior research has also shown a correlation between the pH of a solution and the amount of dental acid erosion. The aim of this study is to further develop a technique to analyze tooth internal anatomy associated with dental acid erosion caused by a variety of drinks in an in vitro environment. Thirty eight extracted molars were cut in half sagittally. The tooth pairs were each numbered and painted with fingernail polish except for an approximate 4mm x 4mm window. The teeth were placed into a variety of liquids, with one half of each tooth placed in a water control. Beverages were selected for this study based on a variety of pH levels. Teeth were exposed to the beverages for 25 hours. The teeth were then dried and cut down the middle of the window and ground flat. Teeth were mounted to slides using an epoxy resin. The teeth were ground to a thickness between 60 and 100 micrometers. Microscopic analysis is underway of the treated and control group slides to determine depth of erosion from the various liquids and internal anatomical changes due to the acid erosion. Findings thus far from the slide development technique suggest that thinner mounting material should be used in future studies to adhere teeth more uniformly to the slide to achieve consistent thicknesses in tooth sections.

AMY HESTER

Undergraduate

Time-titration Experiments to Determine Incubation Time for the Production of Full-length RNA

Major: Biotechnology

Faculty advisor: William Tappich

Coxsackie virus 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. Studies have also shown a correlation between CVB3 infection and juvenile-onset diabetes. The CVB3 genome consists of 7400 nucleotides that make up four regions: a 5'NTR, an open reading frame, a 3'NTR and a poly(A) tail. The 5'NTR is made up of 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'NTR region has been the focus of research. In our lab, DNA containing the 5'NTR sequence is isolated from a plasmid and transcribed into RNA. The production of full-length 5'NTR RNA depends on very specific transcription reaction conditions. Several incubation time-titration experiments, ranging from 1 hour to 8 hours, have been conducted. RNA samples from these reactions are characterized by agarose gel electrophoresis. Our experiments show six hours to be the best incubation time to produce full-length RNA transcripts. This result will enable better production of RNA molecules to further our understanding of structure and function of genomic RNA and its role in viral virulence.

JACOB HETTENBAUGH

Undergraduate

Transformation of Pharmaceutical Drugs in the Presence of Water: Effect of Polymer Additives

Major: Chemistry-Unclassified

Faculty advisor: Alan Gift

Drug tablets contain active pharmaceutical ingredients (APIs) that can be present in various crystalline forms. Typically, the API in a drug tablet is present as an anhydrous crystal, however, it may go through an unwanted transformation to a hydrate crystal if exposed to water. Certain polymers have the capacity to inhibit this anhydrous-to-hydrate transformation of APIs, but the mechanism of inhibition is not well understood. In this study, various polymers were tested on the effectiveness of inhibiting the

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hydrate transformation of the API, carbamazepine. The anhydrous carbamazepine was combined with dilute aqueous solutions of the polymer and the hydrate transformation of the carbamazepine was monitored using an in-line Raman spectroscopy. Raman spectra were collected every 30 seconds. Multivariate software (SIMCA P⁺) was used to quantify the percent carbamazepine hydrate for each spectrum during the transformation process. The percent carbamazepine hydrate was then plotted with respect to the time to obtain a transformation profile. These transformation profiles were used to compare the inhibition of the various polymers tested. The various polymers examined included hydroxypropylmethylcellulose (HPMC), hydroxypropylmethylcellulose acetate succinate (HPMC-AS), polyvinylpyrrolidone (PVP), and polyvinyl alcohol (PVA). For each of these polymers, various properties were varied including degree of functional group substitution and differing chain lengths. Results showed that polymers with shorter chain lengths (lower molecular weights) were better at inhibiting the anhydrous-to-hydrate transformation of carbamazepine.

LAURA HUGHES

Undergraduate

The Success of Native American College Students at the University of Nebraska at Omaha

Major: Anthropology

Faculty advisor: Timi Barone

Although studies of college students often focus on barriers, I want to utilize a positive deviance model and focus on the success and retention of Native American students. In this study, success will be defined as the students having achieved their own personal goals by means of obtaining an education. What does it mean to be a successful Native American college student? What sort of resources do they access to succeed? What made them stay and continue their education? How can the success of the Native college students at UNO be used to recruit and retain more Native American students through the University of Nebraska system? One difficulty recognized anecdotally is the lack of support, emotionally, financially, or otherwise, from family members or the university itself. Interviews conducted among Native students and faculty on campus will be used to examine economic, social, educational and cultural factors contributing to their success and retention at UNO. This information will be used to improve the recruitment and retention of Native American students throughout the University of Nebraska system. In addition, results from this study will be used to propose the implementation of a cultural awareness program throughout the University of Nebraska system. I have hypothesized that the findings from my study will show having a sense of community on campus for Native American students is imperative in improving their success and retention rates.

ANDREW JEZEWSKI

Undergraduate

Discovering the Mechanism of Action for the Novel Drug Compound, KG2, Against the Parasite *Toxoplasma gondii*

Major: Biotechnology

Faculty advisor: Paul Davis

Toxoplasma gondii (*T. gondii*) is a parasite that infects all mammals. Much of the developed world is infected with this parasite! There is currently no treatment for the life-long infection caused by the bradyzoite stage of this parasite and only a handful of treatments available for the acute tachyzoite stage. Preliminary trials of a novel drug compound have shown that KG2 is effective at killing the tachyzoite stage of this parasite. The mechanism by which KG2 is able to kill the parasite is unknown. Understanding this mechanism may result in discovery of a new target for drug development. This discovery can be made through chemical mutagenesis of a parasite population caused by the application of *N*-ethyl-*N*-

nitrosourea (ENU). This process generates millions of random genomic mutations. It is likely that at least one parasite will experience a mutation in the region of its genome that produces the target of KG2. This mutation can provide this parasite with an advantage that allows it to survive KG2 application. Following chemical mutagenesis and then KG2 drug application the proliferation of KG2 resistant parasites is expected. These parasites can then be isolated and their genomes can be sequenced. Comparing the sequence of the chemically mutated KG2 resistant parasites with the sequence of unmutated parasites will show where mutations occurred in the genome. With an already mapped *T. gondii* genome, this aids in determining the mechanism of action of KG2 in killing the parasites.

SUSHRUT KAMERKAR

Undergraduate

Investigation of the putative DNA motif involved in bradyzoite transition initiation in *Toxoplasma gondii*

Major: Biology-Unclassified

Faculty advisor: Paul Davis

T. gondii is an apicomplexan parasite which infects humans and a wide variety of other mammals. In the United States, it is a leading cause of congenital defects. We are investigating the formation of the bradyzoite, or chronic, stage of *T. gondii*. This stage is completely resistant to chemotherapy or other form of clearance, and has recently been associated with host behavioral changes. We are particularly interested in studying a novel CT-rich DNA motif found upstream of recently identified bradyzoite-specific genes, which may serve as a transcription factor binding site responsive to bradyzoite transition initiation. Initial studies suggest the binding of yet unknown transcription factors present only in the bradyzoite stage to this conserved motif. Our current study involves measuring transgene expression under the control of motif-containing and known stage-specific promoters. The data from our quantitative PCR experiments suggests that certain motifs function as early and unique bradyzoite transcription factors and are therefore involved in bradyzoite induction. These findings may serve as a model for the production of biological tools to better understand bradyzoite transition, and potentially develop a vaccine strain in the future.

KEVIN KAWA

Undergraduate

Measuring the Methanol Concentration in Biodiesel Using Near-Infrared Spectroscopy

Major: Chemistry-Unclassified

Faculty advisor: Alan Gift

Biodiesel is produced by reacting vegetable oil with methanol in the presence of a catalyst. The products of the reaction are methyl esters (biodiesel) and glycerol. However, there are also small amounts of unreacted methanol and vegetable oil present in the biodiesel after the reaction has come to completion. The biodiesel must be processed to remove the glycerol, methanol, and other possible contaminants. ASTM regulations state that the methanol content in the biodiesel must be below 0.2% to be sold commercially. Testing the methanol content in biodiesel is typically done using gas chromatography, but this testing method can be time intensive and expensive. This project was to determine if Near-Infrared spectroscopy (NIR) could be used to quantify the methanol concentration in biodiesel. Biodiesel samples were supplied by our collaborator, Tighe Biodiesel, and these were used to create calibration samples with varying amounts of methanol. Spectra of these samples were collected on the NIR spectrometer. The NIR spectra were processed using a multivariate calibration program (SIMCA-P+) and a model was constructed which could be used to quantify the methanol concentration. A variety of models were developed by implementing different preprocessing methods and by analyzing different NIR spectral ranges. The results showed that the NIR spectrometer and calibration model could be used to quantitate the methanol content in the biodiesel with a prediction error of approximately 0.55%.

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BRENT KELDERMAN

Undergraduate

Investigation of capstone course curriculum for secondary mathematics education majors

Major: Teacher Education

Faculty advisor: Michael Matthews

In 2001, the College Board of Mathematical Sciences made recommendations in a book titled "The Mathematical Education of Teachers". One of these recommendations included the idea of creating a capstone course for preservice secondary mathematics teachers. The major purpose of the course would be to explore "conceptual difficulties, fundamental ideas and techniques of high school mathematics" from an advanced standpoint (CBMS, 2001, Chapter 5). This focus was later clarified to helping these future teachers see connections between the mathematics that they have been taking as undergraduates and mathematics that they will eventually teach in grades 7 through 12. Within the last decade, several universities across the nation have adopted such courses, including the University of Nebraska at Omaha in 2007. Since this initial conception of the course, the faculty member that normally teaches this course and has helped develop the course is Dr. Michael Matthews. Dr. Matthews has agreed to be my mentor/faculty advisor for this undergraduate research project. Within the last few months, I have been working with Dr. Matthews in an attempt to determine what is being done within these courses in universities throughout the country. My brief presentation would discuss my process of receiving information and also discussing my findings through my research.

LINDSEY KNIGHT

Undergraduate

Is direct ingestion of contaminated sediment an important route by which fish are exposed to steroidogenic compounds?

Major: Biotechnology

Faculty advisor: Alan Kolok

The hydrophobic nature of steroidogenic compounds allows them to sorb to sediments where they can enter surface water through run-off. These compounds may desorb back into the water column where they become bioavailable to resident fish. Sediment-bound contaminants may also be directly ingested. The primary objective of this study was to determine if sediment ingestion was a primary route by which sediment-bound steroidogenic compounds could become biologically available to the fathead minnow. Female fathead minnows were exposed to either sediment treated with 17β -trenbolone, blank sediment, or aqueous 17β -trenbolone. Esophageal ligation was used to prevent ingestion of sediment in select fish. Ligated and unligated fish were exposed to treated sediment in which the unligated fish were able to freely ingest sediment. Differential vitellogenin expression, a commonly used biomarker for endocrine disruption, was used to determine if ventilation or ingestion was the primary route of exposure. Vitellogenin expression in aqueous exposed fish was significantly lower than unexposed fish as expected, while the treated sediment fish were not significantly different from either positive or negative controls. No significant differences were found between ligated and unligated fish. These findings suggest that short-term ingestion is not a significant route of exposure when 17β -trenbolone is bound to sediment particles. This study shows that esophageal ligation may be a useful tool for determining the bioavailability of sediment-associated contaminants.

BENJAMIN KNUTSON

Undergraduate
Relation of Shape Equations (ROSE) Analysis
Major: Physics
Faculty advisor: Renat Sabirianov

A metal detector is a device which responds to concealed metal. Most current metal detectors can infer the approximate size, density, and material composition of detected objects, but cannot discriminate against harmless objects such as metallic watches and jewelry, which must first be removed. It is our goal in this analysis to statistically compare the shapes of detected objects so that metal detectors can quickly and accurately infer the presence of concealed metal weaponry, thereby making them a more practical means of security. Though potentially useful in many areas, this shape analysis will be developed for further implementation of weapon detection systems in public buildings, specifically in schools.

Two shape equations are built from creating a helical mesh which wraps around the surface of each object. One shape equation denotes the coordinates of the surface points as distances from a central axis; the other as distances from the origin. A relation of shape equations (ROSE) compares the detected object's equations with those of other objects in a library to determine the relative amount of work it would take to transform the detected object into each member of the library. An Analysis of Variance test statistically compares the work values. The probability that the detected object is of the same class of objects as those in the library is given by the F-test. The shape analysis will be performed on a test prism with respect to a library of prisms. The performance will measure the strength and efficiency of the analysis.

ROBERT KOPP

Undergraduate
The United States' Increasing Vulnerability to Cyberterrorism and the Necessity of Preparing Immediate Countermeasures
Major: Political Science
Faculty advisor: Jonathan Benjamin-Alvarado

Our economy and society is becoming increasingly dependent on electronic mediums for their mere existence much less prosperity. This presentation examines how the United States remains vulnerable to cyber-attacks every day and how important it is for countermeasures to be put in place quickly as a successful attack would be devastating to the US economic infrastructure. It specifically looks at the Protecting Cyberspace as a National Asset Act of 2010 and why it needs to be implemented as a defense. It also looks at how much of our infrastructure is online now and the economic, psychological, and societal ramifications should a major or even minor terrorist attack succeed. Historically no major cyber-attacks have occurred against the US, but this should not be used as an indication they will never happen. There are factors in the world that are increasing the likelihood of a cyberterrorist attack and our cyberdefenses are not expanding to match the importance of what they would be protecting. As of right now our cyberdefenses are inadequate and a successful terrorist attack against the cyberspace of the US could be severely damaging not just on a structural level, but a psychological level as well.

WHITNEY KORGAN

Undergraduate
Reduced Vertical Displacement of Body's Center of Mass Coincides with Increased Metabolic Energy Expenditure
Major: Neuroscience
Faculty advisor: Nick Stergiou
Co-Author(s): Shane Wurdeman

The six determinants of gait proposed that the goal of healthy gait is to minimize displacement of the body's center of mass (COM) in order to optimize energetics (Saunders et al. 1953). More recently, investigations have suggested that the reduction of displacement beyond an optimal amount leads to in-

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creased energetics (Gordon et al. 2009). However, to achieve this, subjects had to alter their natural gait by either reducing step length or utilizing increased knee flexion, which may have increased energetics as a secondary effect. The purpose of this study was to measure the relationship of decreased vertical displacement and increased energy expenditure while not altering changes in natural gait. To accomplish this, the Woodway® Curve was introduced in order to catch the foot in the falling stage to minimize hip movement. Five subjects were asked to walk at three different speeds on both the curved treadmill and a standard flat treadmill. VO₂ was measured while the vertical displacement of COM was recorded through sacral marker movement (60Hz; Motion Analysis Corp., Santa Rosa, CA). Vertical displacement of the sacral marker was quantified as the dispersion about the individual's mean COM height as well as maximum range of displacement through all steps within each trial. Subjects were able to walk on the curved treadmill without consciously altering their natural gait. This resulted in decreased vertical displacement of the COM, but also increased VO₂ measures proving that decreased vertical displacement does not coincide with decreased energy expenditure.

CLAY LANE

Undergraduate

The How to on Making an Effective Apology

Major: Psych-Unclassified

Faculty advisor: Lisa Scherer

Co-Author(s): Lisa Scherer and Eric Faurote

Many have deemed this the “age of apology” because of the numerous historical apologies that have come about during the past century (Brooks, 1999). For instance, when the United States apologized for the Tuskegee Syphilis Study conducted between 1932-1972 (Philpot & Hornsey, 2008). One fundamental question for forgiveness researchers is what influences apology acceptance leading to forgiveness versus retaliation. Most people believe that by saying they are sorry they will be forgiven, but researchers have demonstrated this to not always be the case. In Nadler and Liviatan (2006) a Palestinian community apologized to a Jewish community, and even though the apologies were very empathetic and sincere, not all of those in the Jewish community forgave the Palestinians. In situations like this, researchers believe that not only the degree of empathy in the apology but additional variables may be important for true forgiveness to occur (e.g., the way the apology is delivered).

This presentation address the ways in which a person apologizes and its effect on the response to the apology. By manipulating the way in which we present the apology (i.e. tone of voice), we will examine the subject's willingness to accept the apology (Lazare, 2004), and measure the propensity of forgiveness over retaliation. In doing so, we aim at maximizing the effect of anger and aggression reduction, which is the fundamental and salutatory effect of forgiveness (Gassin, Enright, & Knutson, 2005).

JOSHUA LARSON

Undergraduate

A Novel Compound is Efficient in Killing *Toxoplasma gondii* in vitro

Major: Biotechnology

Faculty advisor: Paul Davis

Toxoplasma gondii is an obligate, intracellular, eukaryotic parasite in humans. Individuals infected with *T. gondii* are subjected to a chronic, lifelong infection. *T. gondii* infection consists of two stages: an acute infection, during which the parasite, in the fast growing stage of its life cycle (tachyzoite), reproduces rapidly and causes flu-like symptoms in its host, and a chronic infection, during which the parasite, in response to attack by the infected individual's immune system, converts itself to its slow growing, resili-

ent stage in its life cycle (bradyzoite).

Currently, medications that can treat individuals during the acute infection are available. There are, however, no drugs available to treat the chronic infection. The purpose of my experiment is to determine whether a novel compound, which was initially determined to show at least some efficiency in killing *T. gondii*, can kill the parasite *in vitro*. The project also aimed to determine the concentration of the compound that efficiently kills the parasite, and the efficacy of the drugs at killing the parasitic cells compared to its efficacy at killing human host cells (therapeutic index). Since the drug was shown to be effective at killing the parasite and its therapeutic index could be determined, the final goal of this project was to determine how the drug affected the phenotype of the parasite, as could be observed microscopically (in progress). This will provide insight into molecular mechanism the drug uses to kill the parasite.

SARAH LEHN

Undergraduate

Effects of *Toxoplasma gondii* growth in host cells over-expressing CYP17

Major: Biotechnology

Faculty advisor: Paul Davis

Toxoplasma gondii is a parasitic protozoa that can infect all mammal including humans. Humans can ingest *Toxoplasma* by eating undercooked meat or by exposure to cat feces. *Toxoplasma gondii* can cause birth defects, encephalitis, and more recently has been shown to cause behavior alteration in the chronic stage of infection.

Recently, a cell-based screen evaluating *Toxoplasma* growth within modified host cells suggested that steroid hormones positively affect parasite growth. In particular, one experiment in transiently transfected cells demonstrated that CYP17 over-expression may cause *Toxoplasma* to divide more rapidly. CYP17 is a gene that produces a protein involved in sterol synthesis, upstream of testosterone synthesis. To test this hypothesis, U2-OS clones that over-express CYP17 will be stably generated. The growth of *Toxoplasma gondii* in this mutant cell line will be used to test the growth of *T. gondii* in comparison to standard U2OS cell line. Increased growth will indicate a benefit to *T. gondii* by increased sterol production of the mutant cell line. However, it is also possible that CYP17 products promote more efficient invasion or egress, which will also be evaluated.

AMANDA LUDES

Undergraduate

Design of insulating nanocrystalline materials with enhanced electrostatic affinity to proteins

Major: Physics

Faculty advisor: Renat Sabirianov

The structure of an inorganic solid surface has a major impact on its interactions with proteins. The roughness of the surface and the charging of the surface both strongly affect the extent to which the protein is attracted to the surface. We argue that because forming surface features of a very small size (a few nanometers) also creates locally charged regions corresponding to various surface textures (due to edges, vertices, and flat surfaces), these two effects are interconnected. In other words, using nanostructures increases the density of the charged surface regions. Previously, surface roughness has been characterized by the root mean square roughness, Wenzel's ratio (the ratio between the actual surface and the projected surface), and, more recently, the ratio of the surface area to the perimeter. However, these parameters fail to describe the nanostructure's scale and symmetry, so we propose that instead local principle curvatures should be used to describe the roughness, since this description would include those necessary features. We show that structures that have higher curvatures at the scale of individual atoms effectively have larger local charge because these atoms have more dangling bonds. In addition, we show that the portion of the surface occupied by low coordination sites increases with the decrease of the structure's local curvature (calculated at the scale of the adsorbing protein).

ABSTRACTS

NATALIE MCCLELLAN

Undergraduate

Cultural Adaptation through Foodways: South Sudanese in the Omaha Area

Major: Sociology-Unclassified

Faculty advisor: Timi Barone

“Foodways” is defined simply as “the intersection of food and culture,” (Brunvand, 2006, 622-628), but more specifically, the production and consumption of food, and how it is tied to cultural/ethnic identity, social relationships, gender roles, economy, religion, and rituals (Fredericksen, 2005). “Tell me what you eat, and I will tell you what you are,” (Brillat-Savarin, 2005). This is a well-used quote in the field of food studies. It’s a very interesting one when applied to people who have recently relocated to an entirely foreign land. It means adapting familiar foodways to a new environment where traditional ingredients may be unavailable and traditional cooking techniques are not feasible.

Immigrants rely on the familiarity of their foodways for stability, comfort, and dissemination of knowledge to younger generations, but at the same time, are called to assimilate through them as well. This research project, rooted in grounded theory, records how these ideas are seen in a population of South Sudanese people in the Omaha area. The data analyzed is taken from recorded and transcribed semi-structured interviews with six women from South Sudan living in the Omaha area who are the primary food preparers in their households. From data analysis emergent themes will reveal the ways in which these women and their families have undergone cultural adaptation through foodways.

BRITTNEY MEAYS

Undergraduate

Tobacco Use in Methamphetamine

Dependent Patients

Major: Neuroscience

Faculty advisor: Jamie Simpson

Co-Author(s): Jamie L. Simpson, Stephanie Sinclair Kelley, James R. Meyer, Sangeeta Agrawal, Debra J. Romberger, and Kathleen M. Grant

Few studies have examined tobacco use or tobacco cessation attempts in methamphetamine users. The purpose of this study was to acquire information about the use of tobacco products and quit attempts in persons receiving treatment for methamphetamine dependence. Participants were recruited from residential substance use disorder (SUD) treatment programs in the Midwest. Participants reported a variety of information regarding previous and current tobacco, methamphetamine, and other substance use and abstinence. Of the participants, 86% were current tobacco users and 94% had at some time been a current tobacco user. Interestingly, the smokers reported smoking more cigarettes when abstaining and withdrawing from methamphetamine compared to the number of cigarettes smoked when using methamphetamine. Also, there were no differences in methamphetamine use characteristics between rural and urban residents. The methamphetamine use characteristics are similar for males and females. The lack of a gender difference is a unique characteristic of methamphetamine. Many of the participants had attempted to quit smoking tobacco at least once, but only 24.7% of the current smokers and 38.5% of participants who had ever smoked abstained from cigarette smoking for at least one year. Methamphetamine dependents achieve tobacco smoking cessation at a lesser rate than the general population. A large portion of the sample had been current smokers and very few (6%) of the sample had successfully maintained tobacco cessation. This phenomenon could be a result of SUD treatment programs not offering tobacco cessation programs.

ANNESHA MITRA

Undergraduate

Using Self-Continuity and Self-Discontinuity as predictors of General Self-Worth among Early Adolescents: A comparison of samples from Montreal, Canada and Curitiba Brazil

Major: Neuroscience

Faculty advisor: Jonathan Santo

Co-Author(s): Jonathan Bruce Santo,

Josafa M. Cunha, and William M. Bukowski

Self-continuity refers to the ways in which people reconcile the physical and psychological changes that they undergo into a cohesive self-concept. The current study sought to test this conceptualization in an early adolescent sample from Montreal, Canada and Curitiba Brazil. This study focused on the underlying structural relation between self-continuity and general self-worth while also measuring indices of the cultural context such as individualism and collectivism. The sample consisted of 372 early adolescents in Grade 5 and 6 (mean age = 10.68, S.D. = .56) who participated in a cross-cultural research project (Curitiba n = 189, Montreal n = 183). Measures included the Harter (1982) perceived competence scale, the Singelis (1995) INDCOL scale and a measure of self-continuity and self-discontinuity. As might have been expected, collectivism scores were significantly higher among the participants from Curitiba ($t_{(244)} = 2.17, p < .05$). Using multi-group comparisons in structural equation modeling, a model was tested for each sample where a latent construct of general self-worth was predicted by self-continuity, self-discontinuity, individualism and collectivism. In both samples, individual ratings of collectivism were positively associated with general self-worth (explaining 13% of the variability). Individualism and self-continuity on the other hand were not significant predictors. Finally, among participants from Montreal, self-discontinuity was significantly negatively associated with general self-worth (explaining an additional 6.2% of the variability). The final model remained a good fit to the data ($\chi^2_{(49)} = 64.55, CFI = .95, RMSEA = .05, p > .05$).

CHRISTINE MORRISON

Undergraduate

Dog therapy as a stress buffer in an induced stress event

Major: Psych-Unclassified

Faculty advisor: Rosemary Strasser

Co-Author(s): Natasha Fields

This study focused on demonstrating the immediate benefits of dog therapy as a stress response buffer. Previous studies have looked at the stress reduction benefits of dog therapy, but most have focused on the ill, elderly, or children populations, or specifically to dog owners, using their own dogs. This study focused on a normal, healthy population, without having the prerequisite of pet ownership by using licensed and trained therapy dogs, as well as dog therapy being a buffer to the stress response preemptively, rather than just reducing the stress after the fact. Participants were 19 or older and all female to prevent gender differences confounding the results. They were subjected to a false stress stimulus for which they were asked to put together a complex presentation to be given to a panel of experts, in order to provoke and measure the stress response in the individuals. Evaluations included salivary cortisol sampling and survey forms—drafted and compiled from standardized surveys, including one about average and immediate caffeine intake, measured as a possible confounding factor—as methods of stress response measurement. It is expected that the dog therapy will have a stress buffering effect, with those in the dog therapy group showing lower cortisol and perceived stress levels throughout the stressor period when compared to a group of controls. Going forward, this study could serve as a basis for further study into non-medicinal stress treatment and prevention measures.

ABSTRACTS

KIMBERLY MORSS

Undergraduate

The Lead Around our Homes: Distinguishing

between sources of anomalous lead concentrations in an urban setting (Omaha, NE) via distribution of lead and lead isotopes

Major: Environmental Sciences

Faculty advisor: Dana Richter-Egger

There are several sources that contribute the elevated lead concentrations found in Omaha's soil, most specifically downtown. Some lead occurs naturally in soils; however, lead-based paint, leaded gasoline, and emissions from the old lead smelting plant (ASARCO) have all contributed to elevated levels of lead. The goal of this study is to discern the proportion of the contamination for which each source is responsible. This project uses the distribution of lead and its isotopes in the soils around Omaha to accomplish this goal. Through the use of special instrumentation, samples taken from both the yards and the area within the drip zone of UNO students' homes were analyzed. The lead isotope data supports previous conclusions that the lead contamination found in downtown Omaha is not naturally occurring. More significantly, this research provides new insight into the extent and distribution of contamination from specific sources. The improved ability to match source and site of lead contamination is a significant addition to existing knowledge and methods.

CHIA MOUA

Undergraduate

Elastic Properties of Rare Earth

Hexaboride Nanostructures

Major: Physics

Faculty advisor: Wai-Ning Mei

In this project, we first carried out electronic structure calculations utilizing the standard first-principles computation schemes on the LaB_6 (lanthanum hexaboride) nanorods with various widths. Our models are infinitely long logs with periodic structure along the longitudinal direction, the cross-sections consist of up to sixteen unit cells, i.e. $(n\mathbf{a} \times n\mathbf{a})$, where \mathbf{a} is the lattice vector with magnitude about 0.3 nm and $n \leq 4$. Next we focus on computation of two specific elastic modules: namely the Young's modulus, an elastic constant describing the elongation of a long wire due to stress along the longitudinal direction, and the shear modulus, an elastic constant describing the shear deformation due to stress along transverse direction. With the aid of computer software Material Studio that performs the structure optimizations, we calculate all the stress tensor elements of LaB_6 using the Holland Computer Center (HCC) supercomputer. Then based on standard definitions, we deduce the Young's and shear modulus from ratios of strain to stress along different directions.

JAY NEWSTROM

Undergraduate

Improving the Accuracy of Measuring Microscopic Organisms Using Information Technology

Major: Innovation & Entrepreneurship

Faculty advisor: Ann Fruhling

Co-Author(s): Greg Hoff and Ann Fruhling

The STATPack micrometer functionality helps the laboratory technicians save time while analyzing a microscopic sample. This is accomplished by using a calibrated camera when taking an image of the sample. After the image has been taken, the laboratory technician can choose one of multiple methods to measure the image. My research project involved developing the calculations used to determine the size of the image. This has reduced the time needed to measure an organism by about thirty percent, and decreased the possibility of human error. Although saving the laboratory technicians time would have been adequate to convince them to use it, I added the ability to color lines as an extra incentive, because through interactions with the users they found it difficult to see black lines in some samples. In addition, I will also present some of the other important considerations for a critical process in a medical setting.

LUKE PFEIFFER

Undergraduate

Survey on Image Fusion Techniques When Applied to Microbiological Pictures

Major: Computer Science-Unclassified

Faculty advisor: Ann Fruhling

Co-Author(s): Greg Hoff, Ann Fruhling,
and Jay Newstrom

Image fusion allows multiple pictures to be combined into one coherent image that displays more meaningful and useful information than the pictures displayed separately. There are many different methods for image fusion, including Laplacian pyramid transformation, dual wavelet transformation and the nonnegative matrix factorization method. In the context of my research, I will survey and compare the various methods and determine which is most applicable to a microbiology laboratory. These image fusion methods will be analyzed in the context of images taken with a backlit microscope for image fidelity, contrast and sharpness using the STATPack system as the medium for taking the images. We will present the results of my findings at the research fair.

TAYLOR PIZINGER

Undergraduate

Idea Generation: Does generating multiple ideas lead to increased creativity?

Major: Psych-Unclassified

Faculty advisor: Roni Reiter-Palmon

Co-Author(s): Roni Reiter-Palmon and Nick Arreola

Divergent thinking, which refers to thinking of multiple, diverse ideas, has been thought to be synonymous with creativity (Harrington 1975). However, due to mixed findings, creativity researchers have questioned the influence that divergent thinking (DT) has on creative problem solving. The purpose of this study was to evaluate the influence that DT has on creative problem solving. Specifically, findings from two studies were compared. In one study participants were instructed to think of multiple solutions to an ambiguous, ill-defined problem and select the solution that they thought was their best. These instructions were intended to induce DT. Solutions were evaluated for quality and originality, an accepted operationalization of creativity, by trained, independent raters. In the other study, participants were instructed to come up with just one best or creative solution to the same problem. Statistical comparisons were made using *t*-tests. It was found that when participants were given instructions to engage in DT, they generated solutions, on average, that were less original and not as high quality than participants in the other study who generated just one solution. The solution that participants chose as their best was less original and not as high quality in the DT condition. Using the solution that was rated the most original and high quality by raters in the DT condition showed that DT actually helped produce more original solutions; however, there was no difference in quality between the two studies. The results of this study indicate that instructions have an important influence on creativity.

ABSTRACTS

ANDREW PRINE

Undergraduate
How Frustration Correlates with Perceived
Reward Value
Major: Psych-Unclassified
Faculty advisor: Jessiline Anderson

Frustration is a phenomenon encountered by all persons, and with consistent frequency. Frustrations are encountered at work, at school, and with family and peers. But how does this impact our perceptions? Or, more specifically, how does an externally imposed frustration impact potential rewards for dealing with such an event? Overall research investigating frustrations impact on subjective reward perception seems to be slim or non-existent. The present study aims to examine how a frustrating event impacts an individual's perception of a positive outcome. After facing a frustration, is a reward's value over-evaluated, under-evaluated, or does one remain neutral to it? Participants will be given a PANAS mood survey to assess mood. They will then complete three puzzles: Tagoes, Tangled Nails, and The Perplexing X in a Box. They will then be administered another PANAS survey, and told they will receive extra credit in their Psychology course for participation. This will be followed by a questionnaire inquiring as to how they feel about their reward for participating. Data collection will begin in 2012.

JEROME PRUSA

Undergraduate
Structural Comparison of the Coxsackie Virus B3 Virulence Determining 5' Non-Translated Region
Major: Biotechnology
Faculty advisor: William Tappich
Co-Author(s): William E. Tappich

Coxsackievirus (CVB3) is an enterovirus in the Picornavirus family and a human pathogen associated with myocarditis and pancreatitis. The virus has a 7,500 base single stranded positive sense RNA genome. One critical region in the virus's genome is the 5' non-translated region (5'NTR) whose structure is essential for viral replication and viral protein synthesis. The 5'NTR is divided into seven domains. Our laboratory has proposed a model for the structure of the seven 5'NTR domains. The goal of this investigation is to understand how nucleotide changes in the 5'NTR influence the genomic structure and viral virulence. This study uses chemical probing to compare the 5'NTR structure from a non-virulent CVB3 strain with that of a virulent CVB3 strain. Chemical probing is a technique that modifies unpaired or unprotected nucleotide bases with chemical reagents. After chemically modifying both strains, the two 5'NTRs are compared to find the differences in nucleotide modification. It is believed that the differences in nucleotide modification corresponds to the 5'NTR structural differences responsible for virulence.

CHRISTINE QUICK

Undergraduate
Affect and Experience of Work-Life Unfairness on Decision Making
Major: Industrial-Organizational Psyc
Faculty advisor: Lisa Scherer
Co-Author(s): Stephanie Weddington and Lisa Scherer

Forgas' (1984) Affect Infusion Model (AIM) was used to better understand the moods and subsequent decisions experienced by employees perceiving family- friendly benefits to be unfair to other employees (i.e., work-family backlash). Thirty-eight out of 58 adults indicated on an online open-ended survey that

their supervisor had extended preferential treatment to employees experiencing work-family conflict. Using a mixed-method approach, participant affective reactions to the situation (coded neutral/moderate or intense), the quality of their decision in response to a hypothetical situation (coded 1= poor to 5 = high), and the degree to which they used merit-based criteria in arriving at their decision (coded 0% to 100%), revealed that participants who had perceived unfairness made higher quality decisions based more on merit compared to people who hadn't perceived unfairness. As a result, we postulate that changes need to be made to AIM to account for how early affect can impact a decision and how characteristics of processing strategies need to be modified.

JESSICA RENZ

Undergraduate

Adaptations in Joint Kinetics Over Consecutive

Steps in Stair Negotiation

Major: Exercise Science

Faculty advisor: Nick Stergiou

The purpose of the current study was to investigate adaptations in joint kinematics and kinetics as one approaches the stairway and then continues towards stair ascent. Ten healthy subjects (age: 26.4 ± 3.7 years; height: 1.78 ± 0.08 meters; mass: 76.2 ± 13.6 kg) were asked to start from a distance of three meters in front of the stairway. Five trials were collected and analyzed for each subject. It appears that the hip demonstrates decremented function at early stance and the knee generates an extra boost of energy in late-mid stance. These changes are potentially due to the increased hip and knee flexion that is needed to clear the first step of the stairway. During early stance, the hip displays increased power generation almost immediately before the knee displays increased power absorption. In addition, the knee demonstrates an increased knee flexion moment at late-mid stance, followed closely by the ankle exhibiting increased plantarflexion moment at late stance. These findings appear to support a redistribution of joint moments and powers. It is known that this is an adaptation seen in level walking in older adults and quite possibly could be demonstrated in young adults under certain demanding tasks as well. Mechanically, this could also be due to the changes in joint ROM seen during stair ascent. Increased ROM in the hip and knee would allow for increased angular velocity, which is directly associated with power.

NICHOLE RUCKER

Undergraduate

Purification of Poly(rC)-binding protein 2 for Coxsackievirus B

Major: Biotechnology

Faculty advisor: William Tappich

Coxsackievirus B3 (CVB3) is a common human pathogen that causes myocarditis, pancreatitis and encephalitis. In addition, it may also play a role in type I diabetes. CVB3 belongs to the *Picornoviridae* family and has a single-stranded 7,400-nucleotide genome. The 5' nontranslated region (NTR) contains a cloverleaf and an internal ribosome entry site (IRES). Both of these are important in viral virulence. The critical role of the IRES in cap independent translation relies on its interaction with viral and cellular proteins. One protein in particular, poly (rC) binding protein 2 (PCBP2), enhances 5'NTR activity, promotes RNA stability and initiates genome replication. The objective of this particular experiment was to complete a large-scale production of PCBP2 to be used in toe printing within the 5' NTR to provide evidence on the transfer of PCBP2 from domain IV to domain I of this region. Further research of the poly (rC) binding proteins could potentially lead to treatment of Coxsackievirus.

ABSTRACTS

CHRISTOPHER SAUTTER

Undergraduate

Fracture Orientation Analysis: The Central US

Major: Geology

Faculty advisor: Harmon Maher

Fracture patterns in rock layers are due to tectonic stresses occurring in the earth. Joints, the fracture type studied here, form perpendicular to the least principal stress. Literature on the mineralization of the Mississippi Valley Type – sulfide deposits indicate its occurrence along joints. This mineralization is caused from hydrothermal fluids traveling along fractures/joints caused by the formation of the Appalachian Mountains. The field data from the Omaha area on fracture orientations indicate certain trends in regional patterns. The Schramm Park and Platte River State Park sites both show a 60-degree Northeast - 240-degree Southwest running strike trend, as well as a 20-degree Northwest (340 deg.) to 20-degree Southeast (160 deg) bearing trend. The same strike directions are seen in data from across the Missouri River in the Crescent, Iowa rock quarry. Mineralization is occurring on Northeast-Southwest bearing strikes with limited amounts of iron sulfides. The mineralization was seen on the northern wall of the Crescent, Iowa quarry. The mineralization occurring on the wall indicates that the hydrothermal activity was localized and occurred along the Northeast-Southwest fractures after they formed. After comparing the sites thus far, the northwest-southeast strikes at the Louisville site truncate against the Northeast-Southwest fractures. Suggesting at this site the northwest-southeast fractures post-date the Northeast-Southwest fractures. Further research on more quarry sites will be conducted to allow for a better analysis of this observation. Even though the formation of the Appalachian occurred at such a distance, it influenced fracture development and fluid flow far into the interior of the continent.

BRIAN SCHUELE

Undergraduate

Evaluation of Biosand Filter Technology
in Madagascar

Major: Civil Engineering

Faculty advisor: Shannon Bartelt-Hunt

Biosand filters are a technology that can be used for drinking water treatment in developing countries that lack centralized water treatment infrastructure. Biosand filters consist of a cement filter body filled with sand and gravel. A biologic layer is established within the sand layer that can be effective at removing pathogens and oxygen-demanding material from water. In this project, biosand filters were constructed and installed at seven schools in the community of Kianjavato, Madagascar. The biosand filters were tested over a period of 5 days, using contaminated river water as a water source. The biosand filters demonstrated removal of fecal coliforms and *E. coli*, which provides further evidence that this technology is effective for drinking water treatment in developing countries.

AMY SCHWEID

Undergraduate
Split Decision
Major: Theatre-Unclassified
Faculty advisor: Douglas Paterson
Co-Author(s): Colin Ferguson and Aaron Ellis

The Omaha community is one that is full of vibrant artists in the underground community. However, there are not many collaboration projects brought to life, and many of these artists go unnoticed. Split Decision is a project attempting to bind together a variety of artists in the community as well as to explore innovated art forms and bring about a project that is rooted in the local art scene. The result is a movement based film that is directed, filmed, choreographed, scored and performed in by local artists, many of whom have never worked together before. A project that is unique in and of itself due to the fact that the research is all behind the scenes, but contributed to every aspect of this challenging and creative process.

MOR SCHEINBEIN

Undergraduate
Identifying and Analyzing Lesbian and Female Stereotypes in Terry Moore's Graphic Novel
Strangers in Paradise
Major: English-Unclassified
Faculty advisor: Frank Bramlett

Comics and graphic novel have become an increasingly popular art form of fiction writing. As such, graphic novels portray, reveal and discuss social standings and changes in our rapidly changing society. Among those is gender identity. Terry Moore's graphic novel *Strangers in Paradise* provides an interesting example for this presenting and using linguistic and artistic (visual) features that identify the main character Katchoo as a lesbian, basing these features on shared cultural stereotypical assumptions of its readers. These features are analyzed using both Robin M. Queen's analysis of lesbian speech and Sherri Klein's analysis of visual representation of women in the media. Queen's defined lesbian speech as constructed by various and different features, focusing mainly on how these linguistic features are "a set of stereotyped assumptions about a set of linguistic features... rather than actual linguistic features" (Queen 239). Klein's visual analysis refers to the composition, visual representation of the women portrayed, considering the male viewer, and other visual objects used within the artifact to portray the woman (Klein 61-62). By using both Queen and Klein, this work demonstrates how *Strangers in Paradise* uses common stereotypical assumptions to portray Katchoo as a confused lesbian, attempting to define and discover her own sexual identity. By examining several panels in the first chapter of the novel, one can identify these linguistic and visual features, forming a stereotypical assumption to Katchoo's sexual identity. Therefore demonstrating that comics can provide an accurate portray of society and social norms, mirroring changes and trends.

SARA SHINN

Undergraduate
Optimal Values for Disrupting x86-64
Reverse Assemblers
Major: Computer Engineering
Faculty advisor: William Mahoney

We present experimental results from intentionally obfuscating binary instruction data on the x86 64-bit environment. The work is a part of a larger research project to implement an obfuscating compiler, where the intent is to make reverse engineering of compiled binaries more difficult by hiding instructions from the reversing tools. We empirically determine good selections of "junk" bytes in order to maximize the number of instructions hidden or misrepresented by reverse engineering tools.

ABSTRACTS

DEIBI SIBRIAN

Undergraduate

Aspiring to Higher Omaha, NE High School Graduation Rates

Major: Sociology-Unclassified

Faculty advisor: Thomas Sanchez

The future of Nebraska, The United States, and the world lies in the hands of the youth, which can be largely affected by the education they receive. Unfortunately, in Nebraska, Omaha is the city with the highest high school dropout rate. In average, high school dropouts earn less and are more likely to become incarcerated. Certain organizations realize that there are many potential benefits from raising high school graduation rates. In attempt to improve their services, with the given findings, this exploratory research project focuses on analyzing such organizations in the Omaha, Nebraska area. Some of the questions this study seeks to answer include the following: What organizations/programs are trying to raise high school graduation rates in the Omaha area? How long have these organizations been around? What types of support are these organizations receiving? Is the type of support they are receiving affecting how they target potential high school dropouts? The data for this project is being collected using a qualitative method. The leaders or representatives of organizations who are trying to raise high school graduation rates in the Omaha, Nebraska area are currently being interviewed using a researcher-administered survey. The project is in the final interview research stage. A final report should be available in February, 2012.

ELIZABETH SILKNITTER

Undergraduate

Depression Rates Among Native American Youth at Walthill Public School

Major: Psych-Unclassified

Faculty advisor: Jessilene Anderson

Co-Author(s): Jessica Ishmael, Janelle Butler,
and Juan Quevedo

As stated by Senator Byron L. Dorgan (D-ND) in 2010, suicide is the second leading cause of death among 10 to 34 year old Native Americans and more predominant among 15 to 19 year olds, resulting in Native Americans having the highest rate of youth suicide. To help support this evidence, seventy-five participants between 11to14 years old from Walthill Indian Reservation Public School were given four assessments. The assessments were administered in the following order: Columbia DISC TeenScreen, Beck Depression Inventory II, Beck Hopelessness Scale, and Suicide Risk Factor Checklist. These assessments were administered to clarify if depression or hopelessness is a better predictor of suicide. Preliminary results of the assessments demonstrated that about 20% of the youth tested were moderately to severely depressed and at risk for suicide. These students were referred to the counseling staff at Walthill Public School.

PHILLIP SMITH

Undergraduate

it may not always be so: A Presentation of New Music

Major: Music

Faculty advisor: Kenton Bales

I propose to present the video recording of an original composition, "it may not always be so," from its premiere on my Junior Composition Recital, November 11, 2011. The piece is a setting of an E.E. Cummings poem of the same title for Mezzo Soprano soloist and chamber ensemble. I also intend on giving a brief analysis of the work.

BROOKE SULLIVAN

Undergraduate

Structural Transitions Induced By Mutations in the 5'NTR of Coxsackievirus B3 Genomic RNA

Major: Biotechnology

Faculty advisor: William Tapprich

Co-Author(s): William E. Tapprich

Coxsackievirus B3 (CVB3) is a positive-sense RNA virus from the Picornaviridae family that causes myocarditis and pancreatitis. The native structure of the 5' non-translated region (5'NTR) of the CVB3 genome is necessary to promote replication and is also required for virulence. The structure of the wild type 5'NTR has been determined previously in our laboratory by chemical probing and comparative sequence analysis. The current investigation identifies and characterizes structural transitions in the 5'NTR induced by mutations in an RNA domain known to affect virulence. RNA structure is examined and analyzed by chemical probing of the full length and fully folded 5'NTR RNA. Results have yielded evidence of significant structural transitions in a single, as well as a double mutant CVB3 genome when compared to the wild type. These preliminary results have led to a collaborative effort with laboratories from UNMC to determine not only the structural differences between wild type and mutant CVB3 strains but, also determine if there is any variation in viral efficacy between the strains. Full investigation of these induced structural transitions and their effect on virulence will identify the mechanisms involved in CVB3 virulence and may yield insight into host-virus interactions. This information may then be used to aid in the development of novel therapeutics against CVB3.

DANIELLE SUPONCHICK

Undergraduate

The Effects of Treadmill and Overground Running on Attentional Focus and Performance

Major: Physical Ed-Exercise Science

Faculty advisor: John Noble

Health professionals must find ways to improve adherence to physical activity programs. Running provides an easily accessible form of exercise to improve health; however, adherence to one form of running may be superior to another form. The form may have an influence on the participants' attentional focus during exercise, and subsequently on their adherence to the exercise program. Exercise scientists have found running on a treadmill and overground to be similar (Jones, Doust, 1996; Riley, Paolini, Croce, Paylo, & Kerrigan, 2007) yet the psychological differences, including attentional focus, have not fully been investigated. Associative thoughts are directed towards the salient features of exercise fatigue. Dissociative thoughts are directed away from these same fatigue symptoms. One study found that a dissociative thought condition provided lower heart rates and perceived exertion compared to an associative condition (Stanley, Pargman, & Tenenbaum, 2006). The aim of this study was to evaluate the effects of treadmill and overground running on attentional focus and performance. Twenty subjects ran 5K in both the treadmill and overground conditions, on separate days. Subjects ran at a self-selected pace equal to a rating of perceived exertion (RPE) of 15 in both conditions. Runners were assessed on the level of attentional focus (associative or dissociative thoughts) and heart rate every 1000 m, and the time taken to complete the task. While heart rates and focus did not vary between conditions, subjects ran faster in the overground condition. Results will be discussed in relation to the likely impact on exercise adherence.

BRIAN TIPTON

Undergraduate

Subterranean vs Subaerial Formation of Flared Slopes on Granite Terrain Vedauwoo State Park, WY

Major: Geology

Faculty advisor: John F. Shroder, Jr.

Granitic erosional residuals known as *pedestal* or *mushroom rocks* occurring in Vedauwoo State Park, Medicine Bow National Forest, WY, possess a wide variety of atypical flare orientations. Conflicting ar-

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guments continue today as to whether these formations are produced from subaerial and/or subterranean mechanisms. Intense climatic variations on the Sherman erosion surface have a large influence on the weathering front of the granite. Locating these pedestals with GPS (hand) measurements, measuring their profiles, and methodical photographic documentation were the primary field methods used in this study. Logging the features on topographic maps and Google Earth™ has shown no preferential geographic locality or flare orientation in the direct study area. Excavation by hand was done on one particular feature to examine the depth of bedrock near a sample as well as to expose any additional potential subterranean basal flares. The upper bulbous cap of the pedestals tended to be darker in color and covered in various lichens. The supportive columns, however, were significantly lighter in color suggesting faster weathering rates than the cap above. Accumulation of moisture containing salts in the surrounding regolith can produce extreme chemical weathering in and around the pedestals. Continuous exposure to moisture can therefore enhance the subterranean rotting of biotite into clays, weakening the rock into residual feldspar and quartz clasts (grus). Old plain surfaces originally located at widest points of the upper caps have progressively lowered over time from water and wind erosion. Continuous erosive events exposing columnar basal flares suggest possible polygenetic formation.

LEVI TODD

Undergraduate

Malleability of the Chorda Tympani Nerve Terminal Field in the Nucleus of the Solitary Tract Following Neonatal Nerve Transection

Major: Neuroscience

Faculty advisor: Suzanne Sollars

The chorda tympani (CT) nerve is a branch of the cranial facial nerve and is involved in gustatory function. The CT innervates taste buds and plays a critical role in maintaining fungiform papillae; the support structure of taste buds. The CT is also involved in relaying gustatory information from the tongue to the brain and this communication junction occurs at the Nucleus of the Solitary Tract (NTS), a structure located in the medulla of the brain stem. Removing the input from the CT by nerve transection (CTX) has been shown to have drastic effects on peripheral tissue, behavior, and NTS organization. These stark differences only occur when the CTX is done in a sensitive period during neonatal development. In this study we sought to further elucidate the effects of CTX on CT terminal field volume of the NTS during development. CTX surgeries were performed on neonatal rats at either five or ten days of age. At least 50 days post surgery, CT terminal field volume was compared against age matched shams. Terminal fields will be visualized using nerve labels biotinylated dextran or a fluorescent tracer tetramethylrhodamine dextran. CT terminal field volumes will be analyzed using the computer program NeuroLucida. Previous data relating to gustatory development and other sensory systems suggest that neural insult at an early age leads to central nervous system reorganization, which is particularly pronounced during critical developmental windows.

DAVID VANOSDALL

Undergraduate

Design and Develop a GIS database to consolidate field observations of the Lower Jurassic Nugget sandstone

Major: Geology

Faculty advisor: George Engelmann

The Lower Jurassic Nugget sandstone is the hardened accumulation of sediment from a vast, ancient sand sea that once covered much of the southwestern part of this continent including Dinosaur National Monument in northeastern Utah.

The consolidation of Lower Jurassic Nugget sandstone field observations from the past several years in and around Dinosaur National Monument has now been constructed into a GIS database. The data stored inside of this GIS database includes and will include future localities of sedimentary features, vertebrate and invertebrate fossils and tracks, and collected specimens from scientists in the park. In addition to the previously mentioned, localities of carbonate layers within the Lower Jurassic Nugget sandstone were recorded this summer. We focused on the carbonates within an area of 32 x 20 miles in and around Dinosaur National Monument. Through the use of the ArcGIS software suite and the database created we are able to begin visualizing this data within its geographical context and analyze data to find correlations and associations that may have paleoecological and paleogeographical significance. Specifically, a map of the carbonate layers correlating their occurrences at different geographical locations in and around the park as they are exposed in section.

JULIA WARNKE

Undergraduate

Customized Assembly of Short Read Sequences: Using Dataset Characteristics, Graph Theoretic Properties, and Domain Specific Information to Improve the Assembly Process

Major: Bioinformatics

Faculty advisor: Hesham Ali

Within a few years of its introduction to the marketplace, next generation sequencing was successfully applied to numerous research endeavors in diverse biomedical fields including whole genome sequencing, gene expression analysis, and metagenomics. Current sequencing technologies are capable of producing several millions of short reads at a high coverage of the target sequence. Special software algorithms, called assemblers, are used to align, order, and merge the short reads into a representation of the original target sequence. The dramatic difference of the read length, coverage, and error rate characteristics of next generation sequencing technologies from previous sequencing methods created a need for novel assembly algorithms. Rapidly, multiple assemblers were developed to fill this technology gap; however, most were designed with a pure computational focus and do not take the properties of input datasets into consideration. The continually expanding array of sequencing applications makes it unlikely that generic assembly algorithms will produce accurate results in all problem domains. For the purpose of developing a flexible, data-centric approach for the assembly problem, we introduce a graph theoretic assembler that is able to take the characteristics of input datasets into consideration during assembly. Our method analyzes dataset characteristics such as average read length and quality, graph theoretic properties such as node degree, and domain specific user provided information to make customized adjustments during the assembly process. In this presentation, we present the results of applying our domain specific algorithm on both simulated and real datasets.

STEPHANIE WEDDINGTON

Undergraduate

Self-Control Training and Other Antecedents of Impulsive Aggression

Major: Psych-Unclassified

Faculty advisor: Lisa Scherer

Co-Author(s): Lisa L. Scherer

A high level of impulsivity has been shown to be correlated with aggression across various populations (Vigil-Colet, Morales-Vives, & Tous, 2008). Though this relationship is not in debate, it is not clear why some individual's decide to act aggressively whereas others do not. The purpose of this presentation is to provide a synopsis of the extant literature on the factors that moderate the relationship between impulsivity and aggression and to suggest specific research propositions for reducing the impulsive-aggression relationship. Some examples of moderators of the impulsivity aggression relationship include trait anger (Shorey, Brasfield, Febres, & Stuart, 2011), neighborhood economic status (Zimmerman, 2010) and the extent to which individuals engage in rumination (Denson, Pederesen, Friese, Hahm, & Roberts, 2011). A promising avenue for minimizing the relationship between

ABSTRACTS

impulsivity and aggression is the use of self-control training, which has been shown the potential to reduce impulsive aggression in adolescents (Ronen & Rosenbaum, 2010) as well as in a prison setting (Shelton, Sampl, Kesten, Zhang, & Trestman, 2009). Further implications for this prevention method and suggested directions of future research will be proposed.

HOLLY WILSON

Undergraduate

The Linkage Of Black Feminine Agency Through Musical Expression

Major: English/Creative Non-Fiction

Faculty advisor: Peggy Jones

Music was a crucial change agent for black women in the 20th century. "The struggle of women to define themselves on their own terms in male-dominated musical expressions is nothing new" (Norfleet 378). An examination of a simple phrase, "none of your business" reveals an historical evolution of artistic black female agency from 1922 to 1993, as seen in the genres of blues and hip-hop. Early blues music was an artistic vehicle for black women, less than one generation from American slavery, to express agency through overt and subjugated references. The song, "Tain't Nobody's Business If I Do" (Grainger, 1922) was a popular blues song recorded by numerous artists, notably Gertrude "Ma" Rainey, Bessie Smith, and Billie Holiday. It provided one of the earliest public acknowledgements of domestic violence, exposing misogynist violence (Davis). A popular medium, music, conveyed a reality that many Black women had not yet dared to voice; the mere articulation of violence against women by these early female blues singers was revolutionary art. The most objectionable for modern listeners, as evidenced by an interpretational pushback by Gladys Knight, appear to accept beatings, accompanied by a heroic tonal determination to not report sexual brutality because "t'ain't nobody's business." By 1993, the same rhetorical construction reappeared in the landmark hip-hop composition, "None of Your Business" recorded by the trio known as Salt-N-Pepa. Their performance provided an explicit proclamation of female empowerment within a male-dominated, frequently misogynist genre.

MENGYI ZHA

Undergraduate

Comparative Analysis of Phosphorylation in the Protein Data Bank: What have we known?

Major: Mathematics

Faculty advisor: Haizhen Zhong

Co-Author(s): Julia Warnke and Haizhen Zhong

Protein phosphorylation is involved in many cellular processes, such as DNA replication, gene transcription, cell growth and metabolism, cell adhesion and intercellular communications. In mammalian cells, signal transduction within a cell is governed by protein phosphorylation, a process that adds a phosphorylated group on the hydroxyl (-OH) moiety of an amino acid side chain. These phosphorylated amino acids are pSer, pThr, pTyr, pCys, pHis, and pAsp. A comparative analysis of protein phosphorylation networks revealed a different distributions of pSer, pThr and pTyr in human, worm, and yeast []. Several other databases for phosphorylation were developed: Phospho.ELM [], PhosphoSite [], PhosphoBlast [], Predikin and PredikinDB []. All these available databases only contain certain families and/or only certain aspects of phosphorylated proteins and they only contain pSer, pThr, and pTyr. The important pAsp, pCys and pHis residues in bacteria were largely ignored. In addition, all available phosphodatabases focus only on protein sequences and have not taken into account the three-dimensional structures of phosphorylated proteins. Therefore, it results in a missing link between phosphorylation and protein conformational changes, an important piece of information for understanding the structures and functions of phosphorylated proteins.

GRADUATE

KAYLETA ADAMS

Graduate: Masters

Helping Early Literacy Practice Strategies (HELPS): Primary vs. Intermediate Grade Level Implementation

Major: School Psychology-Unclassified

Faculty advisor: Lisa Kelly-Vance

Helping Early Literacy with Practice Strategies (HELPS) is a one-on-one literacy program designed to improve students' reading fluency. It combines multiple evidence-based strategies including verbal cueing for fluency and comprehension, repeated reading, modeling, phase-drill error correction, goal setting, performance feedback and a motivational/reward system into a comprehensive and scripted protocol. Several studies have established the utility of each individual strategy in improving reading fluency and comprehension in elementary students of various ability levels. Only a few, however, have investigated the effects of combining these treatments. A review of the current literature indicates that all published studies related to HELPS were conducted by its developer. Of these studies, grade level implementation differences were not examined. The present study examines the use of HELPS in 2nd and 4th grade classrooms in urban-area schools, comparing the rate of increase in the number of words read correctly per minute for HELPS participants to classroom peers who did not receive the intervention. It also attempts looks at rate of increase differences between the two grade levels to determine if earlier implementation has a greater impact on student outcomes. Preliminary results indicate that implementation at the primary (2nd grade) and intermediate (4th grade) levels produce similar rates of improvement.

ALYCIA AHRENS

Graduate: Masters

I Don't Want to Play: A Longitudinal Examination of Asocial Withdrawal

Major: Psych-Unclassified

Faculty advisor: Jonathan Santo

The purpose of the present study was to examine how ratings of peer acceptance within classrooms influence peer ratings of social withdrawal on early adolescents. Moreover, the effects of time and gender were also examined.

A total of 570 fifth and sixth graders ($M = 10.9$ years) from 25 classes in the Greater Montreal region took part in the study. Participants were met once in October (Time 1) and once in May (Time 2). A sociometric rating was used to assess peer acceptance. Three items were taken from the Revised Class Play (Masten, Morrison and Pelligrini, 1985) to measure peer assessed social withdrawal (e.g., someone who prefers being by themselves). Children in classrooms with high levels of peer acceptance were predicted to have low levels of social withdrawal, and this association was expected to remain stable over time. Boys and girls were predicted to show no differences in social withdrawal. A three level multi-level modeling approach was used to examine these relationships. Assessments were nested within children as well as children within classes.

Nominations of social withdrawal tended to decrease over time (18.71% variance explained). Moreover, a significant interaction was found between time and acceptance on withdrawal in that children who were liked less by their peers showed a significantly larger decrease in social withdrawal nominations in classrooms with higher levels of peer acceptance (3.56% remaining variance explained). A marginally significant sex difference revealed that girls were generally nominated as more socially withdrawn at first, but this effect disappeared over time.

ABSTRACTS

NICHOLAS ARREOLA

Graduate: Doctoral

The Effect of Emergent Leader Extraversion and Problem Construction on Creative Problem Solving

Major: Industrial-Organizational Psyc

Faculty advisor: Roni Reiter-Palmon

Creativity is increasingly being recognized as a valuable resource to organizations. In addition, working in teams is more common now than ever, which is a concern for practitioners and researchers because it is being realized that what is known about creativity at the individual level does not necessarily translate to creativity at the team level. The purpose of this study was to examine the influence that emergent leaders' extraversion, a personality trait known for high energy and sociability, and problem construction, the act of structuring an ambiguous and ill-defined problem, have on team creativity. Specifically, 85 three-person teams were recruited to work on a creative problem solving task. Half of the teams were instructed to engage in problem construction while the other half did not receive these instructions, and went immediately to the problem solving portion of the task. In addition, team-members completed measures of emergent leadership, which is the act of identifying a team leader, and extraversion. It was found that teams who were instructed to engage in problem construction generated solutions that were less creative. This is interesting, as problem construction is known to enhance creativity at the individual level. Further, performance in this condition was hurt by having a leader who was high in extraversion, whereas having a leader who was high in extraversion was beneficial for teams who did not receive instructions to engage in problem construction. These findings have implications for creativity training programs and leadership selection in organizations.

JASJIT BANWAIT

Graduate: Doctoral

Effect of co-localization of miRNAs and target genes on miRNA-mediated post-transcriptional regulation

Major: Information Technology

Faculty advisor: Dhundy Bastola

Co-Author(s): Dhundy Bastola

MicroRNAs are small (approx. ~22nt) noncoding RNAs that regulate gene expression by either degrading messenger-RNA (mRNA) that has already been transcribed or by repressing the translation of the mRNA. This mechanism of gene regulation by binding of the microRNA to 3-prime-UTR of target mRNAs is a novel and sequence-specific post-transcriptional regulation process that affects large set of target mRNAs involved in various biological pathways. Analysis of gene expression data from human brain using computational techniques revealed miRNA-mRNA regulatory modules. We report the effect of co-localization of miRNAs and their target mRNAs in the human genome.

MATTHEW BATTEY

Graduate: Masters

Quasi Group Block Ciphers

Major: Computer Science-Unclassified

Faculty advisor: Abhishek Parakh

This presentation, on a cryptographic system, covers a proposed modification of Quasi Group (QG) stream ciphers, for use as block cypher transformations. A description of Latin squares (the basis for Quasi Groups), QG stream ciphers, and the proposed definition for a QG block cipher are covered. Additionally, experimental results, from a reference implementation, are to be provided to the

audience. Through the talk, we show that QG block ciphers are a viable crypto system, comparing resulting encrypted output to that of the Advanced Encryption Standard (AES). Using the Statistical Test Suite for the Validation of Random Number Generators (STS in short) developed by the National Institute of Standards and Technology (NIST), we show that in best, worst and average cases that QG block cipher outputs have a similar entropy profiles, to those of the outputs from the AES crypto system. Concluding remarks identify potential follow up research around key generation for QG block ciphers, improvements on the definition, and crypto system throughput performance.

SAMANTHA BAYER

Graduate: Masters

The Impact of Reading Interventions with Sudanese Children

Major: School Psychology-Unclassified

Faculty advisor: Lisa Kelly-Vance

Co-Author(s): Madeleine Moody and Kristin Moody

This poster will present the results from three case studies using reading interventions with Sudanese children. All three students' parents did not speak or read English fluently and had lower socioeconomic status. Session attendees will learn how a one on one reading intervention can benefit a student and improve reading fluency especially if guided reading instruction is not being provided at home.

OLIVER BONHAM-CARTER

Graduate: Doctoral

An analysis of palindromic content in the intergenic and non-intergenic regions of selected bacteria

Major: Bioinformatics

Faculty advisor: Dhundy Bastola

Co-Author(s): Dhundy Bastola, Lotfollah Najjar, and Ishwor Thapa

DNA palindromes, the reversed and complemented genetic words, are read the same in the 3' to 5' as the 5' to 3' direction and form the unique restriction sites where enzymes are able to cut DNA. Several studies have confirmed that the palindromes, behaving as active restriction sites, are few (from an exhaustive list of the particular length) and that their occurrence along bacterial genomes is extremely rare when compared to expected values. This observation implies that their natural distribution is statistically abnormal.

The current studies in the literature inform of the existence of avoidance but do not express detail concerning the location of the highest avoidance in the genomes. In our study, we compare the palindromic content of the gene-coding regions (CDS) to that of the non-coding (non-CDS) regions of selected bacterial genomes to provide statistical evidence that avoidance resonates in the CDS regions and not in the non-CDS regions. We study the exhaustive lists of palindromes (lengths 4, 6, 8, and 10) to conclude that at least half of the motifs of each list (and sometimes, nearly all of the motifs of a list) show the same trends of reduced presence in the CDS compared to the non-CDS. Palindromic repeats and spacers, residing in intergenic regions, help to form the basis of immune memory against bacteriophages and plasmids. Our results can be used to determine strategies for finding and studying mechanisms which depend on palindromic involvement such as, auto-immune function, restriction enzyme activity and methylation systems.

ABSTRACTS

EMILY CALLISON

Graduate: Masters

Grunting in Tennis: The Effects on Energy Expenditure and Ball Velocity

Major: Exercise Science

Faculty advisor: Kris Berg

In recent years grunting in tennis has become increasingly common among tennis players. In theory, players grunt during stroke execution as a means of hitting the ball harder. The purpose of this study is to determine if grunting improves ball velocity in groundstrokes and secondly if grunting increases ventilation thereby increasing the oxygen cost of playing. Approximately 15 male and female tennis players will participate in this study. (Division I, age 19-35 years) The subjects will attend 2 hitting sessions for 30 minutes. During one session players will be wearing a portable metabolic cart and will be asked to hit a series of baseline shots and will breathe normally with no grunt. The other session players will be asked to hit the same series of shots and will be asked to grunt while executing the stroke. A radar gun will be used to measure ball velocity and a portable metabolic cart will be used to measure the volume of oxygen consumed during the drill. Rating of Perceived Exertion will be assessed.

JON CAREY

Graduate: Masters

Effectiveness of an Elastic Load-Based Exercise Program in Improving Balance in Healthy Individuals

Major: Exercise Science

Faculty advisor: Sara Myers

Co-Author(s): Sara A. Myers

The central nervous system derives spatial orientation, and subsequently balance, by interpreting input from the vestibular, visual, and somatosensory systems. These systems may be damaged by physical injury and/or disease to the degree that an individual's ability to control posture and balance is compromised. Elastic loading exercise is a potential method of rehabilitation for individuals with balance impairments, but its effectiveness in improving balance has not been previously investigated. This study tests an elastic loading exercise program on young healthy individuals to assess its potential for improving balance. Ten healthy subjects with no contraindications to exercise and no previous history of balance impairment participated in this study. Subjects underwent elastic band training instruction with a fitness professional and then completed an elastic band exercise protocol three days per week for eight weeks. Pre- and post-exercise training balance testing was performed utilizing NeuroCom International, Inc.'s EquiTest® Balance Master. Subjects underwent the Balance Master's Sensory Organization Test, which contains a total of 18 trials (3 trials in 6 different conditions) and provides a Composite Score, which provides an overall assessment of balance control. Our results indicated that the elastic band training protocol has the potential to improve balance. All subjects either increased or maintained their Composite Scores Post-protocol. Of the three subjects that had identical Baseline/Post-protocol scores, their Baseline scores were among the highest, suggesting less opportunity for balance improvement than most of the other subjects. Overall, the results indicated that a short-term elastic band training protocol can lead to balance improvement.

CAN CHEN

Graduate: Doctoral

Educating Citizens about Budgeting: A Qualitative Content Analysis of Web-based Citizens' Guides to the Budget in local Governments in the U.S.

Major: Public Management

Faculty advisor: John Bartle

Calling for meaningful citizen participation and an effective role for citizens is widely encouraged by many scholars and practitioners. However, in practice, to engage citizen participation in budgeting is not without barriers or challenges. Public budgeting is a highly complicated technical field. Educating and informing citizens about budgeting knowledge and processes is critical for citizens' awareness of their roles and responsibilities of participating in budgeting. The primary purpose of this exploratory research is to systematically analyze and compare the content and characteristic of web-based citizens' guides to the budget in local governments in the U.S., and to assess the extent to which information and communication on the websites facilitate citizens' participatory opportunities. The author utilized a qualitative content analysis to analyze the web-based citizens' guide to the budget in 20 selected local government websites in the U.S. The findings from this research indicate that accessibility, quality as well as online and offline participatory opportunities involving the content of web-based citizens' guide to the budget are varying in degree across the selected local governments websites in U.S. In order to improve the overall performance of web-based citizens' guide to the budget, the author suggests that local governments may need to: increase access for individuals with disabilities and non-English speakers, provide complete budgeting information; provide a brief explanation of the local budget process; attach an online budget glossary on the content of web-based citizens' guide to the budget; and increase the various types of online interactive budget tool.

JUNG CHIEN

Graduate: Doctoral

Sensory interaction under perturbations during locomotion in health individuals

Major: Exercise Science

Faculty advisor: Nick Stergiou

Co-Author(s): Chun-Kai Huang, Mukul Mukherjee,

Ka-Chun Siu, and Nick Stergiou

Successful locomotion relies on three major sensory systems: visual, somatosensory and vestibular. Each sensory system monitors postural changes independently through specific pathways. During this sensory conflict period, humans demonstrate different control strategies, such as increasing body sway during standing without vision, or shortening the step length during walking on a slippery ground. The Sensory Organization Test (SOT) has been a validated and reliable assessment tool to detect control strategies during the standing posture under sensory conflict. However, the SOT only examines control during standing. Most patients fall during walking than during standing stressing the importance of studying control when it matters. Our objective was to establish a novel assessment tool, the Locomotor Sensory Organization Test (LSOT), and use it to investigate how healthy subjects control walking under sensory conflict. Similar to SOT, LSOT includes six conditions to investigate the dynamic control under sensory perturbations during walking. Compared to SOT, our results showed that healthy individuals demonstrated worse dynamic control even when simply the visual system was disturbed. Moreover, when subjects relied exclusively on vestibular information (the other two sensory systems were disturbed), we observed the worst dynamic control. When both visual and somatosensory systems were disturbed simultaneously, the subjects showed worse dynamic postural control when vision was blocked than when incorrect visual information was given. Based on this result, we speculate that vision plays a dominant role in dynamic posture. These preliminary data indicated that it is feasible to test dynamic control during walking with the LSOT.

ABSTRACTS

NARESH KUMAR CHINNI

Graduate: Masters

Analysis of Very Large Networks Using Graphics Processing Units

Major: Computer Science

Faculty advisor: Sanjukta Bhowmick

The advent of large scale networks has changed the landscape of graph theory algorithms. Like graphs, networks represent relations in a system, using vertices and the edges connecting them. The main difference is that networks are much larger, but with low diameters. For example, facebook has over a million users (or vertices), but according to the famous six-degree of separation, most people are connected within a few hops. Therefore, unlike general graph theory we can take advantage of some of these special properties, but at the same time, due to the large size of the network, executing these algorithms on a single computer becomes prohibitively expensive.

We present some of our research on developing fine-grained parallel graph algorithms on an exciting architecture of graphics processing units (GPUs). GPUs, traditionally used for scanning pixels, are composed of many small parallel units (threads), of the order of thousands per GPU unit. Therefore the network can be broken down to much smaller subsections than allowed in multicore processors. However, this comes at a cost--the amount of memory available for threads is low and each thread has to perform similar operations (for example addition). We will present our algorithms on traversing and finding communities in very large networks using GPUs, with a particular focus on the challenges and possible pitfalls in using this new parallel programming paradigm.

JULIE CONNER

Graduate: Masters

A Fifth Grade Reading Fluency Intervention

Major: Psych-Unclassified

Faculty advisor: Lisa Kelly-Vance

Co-Author(s): Mark Shriver

This presentation provides information about the implementation and effectiveness of a reading intervention used for a fifth grade student to increase reading fluency. A combination of repeated reading and listening passage preview strategies was used to improve the student's reading fluency skills. A detailed description of the intervention components and progress monitoring results will be provided. This case was part of a clinic-based practicum for the School Psychology Graduate Program at the University of Nebraska-Omaha.

ERIC CUTLER

Graduate: Doctoral

Differences in Gait Improvements Following Surgery in Slow and Fast PAD Patients

Major: Exercise Science

Faculty advisor: Nick Stergiou

Co-Author(s): Neil B. Huben, Austin C. Korgan,

Sara A. Myers, Jason M. Johanning, Iraklis I. Pipinos, and Nick Stergiou

Peripheral arterial disease (PAD) is the result of atherosclerosis in the lower extremities, which is often accompanied by intermittent claudication or pain during walking due to insufficient oxygen delivery to the working muscles. Previous studies have documented that PAD results in functional loss through abnormal gait patterns[1]. In particular, patients with PAD demonstrate decreased walking velocity, ca-

dence, step length, and stride length as compared to controls during pain-free walking, with further decrements after the onset of claudication[2,3]. Recent studies have suggested that gait function remains compromised following intervention, including surgery[2]. However, it is not clear whether the level of baseline gait impairment affects the success of surgical outcomes. Therefore, the purpose of the current study is to explore whether slow walking or fast walking PAD patients experience gait improvements post surgery.

KATHRYN DEMPSEY

Graduate: Doctoral

Maintenance and discovery of genetic cohorts
via chordal graph filtering in large-scale
correlation networks

Major: Bioinformatics

Faculty advisor: Hesham Ali

Co-Author(s): Kanimathi Duraisamy,
Sanjukta Bhowmick, and Hesham Ali

The use of networks to model high-throughput data has emerged as a powerful tool for discovering systems of interest in multiple studies of aging and disease. One of the most challenging problems in current systems biology is how to manage and analyze these volumes of available biological data. Further, as technologies continue to expand and grow, this challenge becomes even more complex with the addition of different types of relationships and data objects. Techniques that can properly analyze models containing heterogeneous data will need to expand and become equipped to deal with multiple sources of data. In this work we present a new approach for creating and analyzing an integrated network model that highlights how structures created by different types of data entities can imply biological function. We find that if heterogeneous data is properly incorporated, we are able to improve network clarity and the resolution by which we view pathways of network communication. Additionally, we present case studies in aging and disease that highlight the benefits of using the integrated data model. This work allows us to obtain a clear view of the many levels of cellular communication and to better understand mechanisms behind chronic illness, disease, and aging. Consequently, the proposed model allows us to maximize the data obtained new technologies while utilizing the massive amount of data currently.

KATHRYN DEMPSEY

Graduate: Doctoral

Discovering Mechanisms of Aging and Disease using Heterogeneous Integrated Network Models

Major: Bioinformatics

Faculty advisor: Hesham Ali

Co-Author(s): Hesham Ali

Correlation networks are a powerful modeling tool, uncovering critical nodes and subsystems in high-throughput data. Network analysis of entire genome production is necessary for systems biology analysis, however, massive network size and high levels of background noise often results in a lack of algorithms that are capable of accurate network analysis. In this work we propose a method of filtering noise from the graph that represents the correlation networks. The proposed filter uses chordal graph sampling that attempts to remove coincidental edges and reduce network size while maintaining critical biological relationships and relevant clusters. Additionally, the proposed method uncovers systems previously hidden by noise, resulting in discovery of new functional cohorts within the network. Our results show that the chordal graph filter, along with edge enrichment, allows us to confirm the ability to conserve critical subsystems present in the original network, and to validate the discovery of new subsystems that can only be obtained from the sampled networks.

ABSTRACTS

SAFIATOU DIALLO

Graduate: Masters
Food Security in Developing Countries
Major: Economics
Faculty advisor: Catherine Co

How can we explain great food security disparities among developing countries four years to go from the Millennium Development Goal of halving the number of hungry people by 2015? This paper, using panel data from 83 low income, middle income and upper middle income countries, over 1995-2005, gives evidence that food availability yet necessary is not sufficient to grant food security. The results demonstrate a statistically significant and negative impact of health environment, government lack of effectiveness, population growth and armed conflicts, on food security. In order to respond adequately to the global concern of ending poverty, it is essential for the vulnerable people to be able to fulfill their basic needs, such as the right to sufficient and adequate food to live a healthy and active life. Therefore, policy makers need to focus on non-food factors such as women empowerment and political stability to promote sustainable food security.

ANDREA DRYDEN

Graduate: Masters
The Effect of Teacher Wait-time on Student Responses in the Second Language Classroom
Major: Teaching Languages
Faculty advisor: Frank Bramlett

Although the role of teacher wait-time has been explored in the content-based classroom, little research has been conducted into the role of teacher wait-time in the second language (L2) classroom. According to Mary Budd Rowe (1974), teacher wait-time refers to the period of silence occurring after a question has been asked by the teacher and before the next utterance has been made, which may be a continuation by the teacher or a response by the learner. Norman Fairclough (2001) argues that having the ability to control and constrain contributions to the classroom (such as by permitting or prohibiting substantial wait-time) is an exercise of "power in discourse." This research project uses discourse analysis to examine the role of power in the L2 classroom as reflected in teacher wait-time and students' opportunities to participate in classroom discourse. Forty-five minutes of classroom interactions were recorded and transcribed for analysis. Findings show that the most common combination of teacher wait-time and student response length was about one second and less than ten words, while the average wait-time was 1.57 seconds and the average response length was eight words. The results demonstrate that the limited amount of teacher wait-time and power sharing in the second language classroom restricts the length of student responses. Therefore, teachers must seize the opportunity to extend valuable wait-time to students in order to improve the quality of discourse contributions in their classrooms and create a learning environment best suited to second language acquisition.

ERIC FAUROTE

Graduate: Doctoral
I would be healthy...but who has time?
Major: Industrial-Organizational Psyc
Faculty advisor: Lisa Scherer
Co-Author(s): Lisa Scherer

The healthcare costs in American are rising at a staggering rate to over 2.7 trillion dollars in 2008 (Centers for Medicare and Medicaid Services, 2010). Due to the consistent increases in healthcare

costs insurance premiums are expected to rise 9% in 2012 (Appleby, 2011). Although an estimated 90% of companies now offer some type of wellness program (Aldana, Merrill, Price, Hardy, & Hager, 2005) and research has constantly demonstrated the positive benefits of wellness programs, researchers and practitioners have failed to examine the psychosocial factors that increase or decrease an individuals' likelihood of engaging in these programs. Although the connection between healthy eating and physical activity is well established few employees consistently engage in healthy behaviors. This presentation will lay out a new line of research, applying psychological principles, to examine the psychosocial factors that influence an employee's likelihood to engage in a healthy lifestyle.

Recently, research by Allen and Armstrong (2006) has begun to examine the influence of work-family conflict on employees' likelihood to engage in healthy eating behaviors. Building on the job-demand-control-model (Karasek, 1979), this research will examine the influence of role conflict (job demands) and flexibility (job control) on employees' health behaviors. Constantly encouraging employees to be healthy when the psychosocial work environment does not support this behavior is disingenuous at best. By better understanding the environmental forces that enhance versus detract wellness participation practitioners will be able to better assist employees in improving their overall health and begin to address the skyrocketing rise in healthcare costs.

LORA FRECKS

Graduate: Doctoral

Microenterprise Collaboration Communities

Major: Public Admin-Unclassified

Faculty advisor: Jay White

Co-Author(s): RJ Redden and Andrew Lescelius

Microenterprises are small businesses or nonprofits with one to five employees (Association for Enterprise Opportunity, 2011). These organizations constitute a vital part of a region's economy, providing not only jobs, but the innovation and entrepreneurial dynamic that benefit communities as a whole. Due to their size, microenterprises have difficulty allocating resources to creating collaborative communities. Community building is necessary to counter the isolation and lack of access to technical expertise microenterprises commonly experience (Redden, in press). Given the large number and diverse nature of microenterprises, much of this expertise would be made available to microenterprises if they were connected through a collaborative community (Census data, 2010). This study provides a model for bringing microenterprises together in a community that not only meets their needs, but also allows for self-driven sustainability. Microenterprises are brought together to focus on the common problem of determining how their websites and physical locations are perceived by clients/customers. This experience will generate a sense of trust and reliance in various and unique expertise. Together, these experiences will counter the isolation experienced by microenterprises and provide them with an incentive for sustaining the new relationships. This proposed model of community building also has characteristics that are able to be replicated in other communities.

LORA FRECKS

Graduate: Doctoral

Comparison of Communication Strategies Utilized by Public, Nonprofit and Corporate Entities

Major: Public Administration

Faculty advisor: Jay White

Citizens experience difficulties in obtaining government services and as a result underutilize government funded services (Graber, 2003). In the last thirty years there has been a trend towards privatization where nonprofit and forprofit entities are now providing services previously provided exclusively by government organizations (Cusac, 2003). At the same time, the introduction of the internet and increased availability of cell phones have revolutionized the ways in which we communicate. The altering of the source of government funded services and a change in communication methods lead one to

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wonder how citizens have been impacted. A few previous studies have examined how service delivery varies between government and either nonprofit or forprofit organizations (Desai et al., 2000; Vasigh and Gorgidooz, 2006;Yampolskaya et al., 2004). However, this study was the first to examine how government, nonprofit, small forprofit and large forprofit organizations communicate the availability of services. Discovering that large forprofit organizations provide the most understandable and accessible information is relevant to predicting where citizens will seek government funded services. The discovery that this information is also often highly persuasive in nature has important ramifications for the field of public administration.

VINOD KUMAR GODAVARTY

Graduate: Masters

Using Quasigroups for Generating
Pseudorandom Numbers

Major: Management Info Systems

Faculty advisor: Abhishek Parakh

We present an algorithm for generating pseudorandom numbers using quasigroups and discuss the future directions for research. Random numbers have several applications in the area of secure communication. The proposed algorithm uses a quasigroup of size $n \times n$ which is pre-generated and stored. The efficiency of the proposed algorithm is in its utilization of resources available specifically computation power and memory space, and generation of random number sequence at high speed. The quality of random numbers generated is compared with other pseudorandom number generator using Marsaglia's Diehard battery of tests. The future research work includes utilizing and testing the results of proposed algorithm for secure communication and cryptography.

JENNIFER GOODELL

Graduate: Masters

Guarding the Public Interest in the 21st Century:

A Decade of Federal Communications

Commission Forfeitures

Major: Communication-Unclassified

Faculty advisor: Randall Rose

Broadcasting within the United States is a public trusteeship with the American people (Hopkins, 2009). In requiring that station licensees satisfy the "public interest, convenience and necessity" (Communications Act, 1934, ¶ 1), the Federal Communications Commission (FCC or Commission) has created regulations with which licensees must comply, and if necessary, enforce punishment of their violation through its Enforcement Bureau. The author applies structuration theory as an overarching framework to explain the production and reproduction of FCC policymaking, as well as elaborates on how normative First Amendment theory continues as a basis for broadcast regulation made by employing the "public interest standard." The purpose of this paper is to propose research that explores actions taken by the FCC in the first decade of the 21st century (March 2000-2010) in regard to violations made by licensees and also to highlight any patterns surrounding the actions during this period of enforcement, as well as detect possible future trends presenting in the next decade.

AMANDA HAARBERG

Graduate: Masters

Association of staff behaviors and afterschool program features to physical activity: Findings from Movin' Afterschool

Major: Hlth Phys Ed & Rec-Unclassified

Faculty advisor: Jennifer Huberty

Co-Author(s): Scott Wissing, Jennifer Huberty, Michael Beets, and Aaron Beighle

Children's achievement of recommendations for moderate-to-vigorous physical activity (MVPA) in after-school programs (ASP) is complex. It is unclear what elements of the ASP environment influence children's PA. The purpose of this study was to determine the relationship of staff behaviors and ASP features (e.g., organized activity, recreational equipment) to MVPA participation in youth attending ASPs. Data was collected in 12 ASPs in the Midwest. Staff behavior and child PA was measured using the System for Observing Play and Leisure Activity in Youth (SOPLAY). The percentage of children's MVPA were examined in relation to staff behaviors and ASP features. Increases in MVPA were observed when staff were directly engaged in PA, verbally promoted MVPA, and when PA was organized and equipment was present. When 3 or more of these characteristics were present, the proportion of children engaged in MVPA increased by 25 to 30%. Conversely, MVPA levels decreased when these characteristics were absent and when staff were attending to other ASP duties or were supervising. This study provides evidence about the specific staff behaviors that may influence higher proportions of youth being active during ASP and implies specific skills that need to be incorporated into ASP staff training.

DANIEL HARRIS

Graduate: Masters

The Relationship between Emotional Intelligence and Malevolent Creativity in Response to Different Tasks

Major: Industrial-Organizational Psyc

Faculty advisor: Roni Reiter-Palmon

Co-Author(s): Roni Reiter-Palmon

Malevolent creativity (MC), or using original means to inflict harm, is an aspect of creativity that has received little empirical attention. We hypothesized that individuals higher in emotional intelligence (EI), or those who often solve problems in a beneficial and positive manner, would generate fewer malevolently creative ideas than individuals lower in EI. Specifically, we analyzed whether EI would be negatively related to the amount of malevolently creative ideas generated by participants even after controlling for intelligence and task effects. Our hypothesis was supported across two studies, the first of which included a social problem-solving task and the second of which included a divergent thinking task. These results suggest that individuals with lower EI are more likely to respond to different types of problems with increased instances of MC even when the social or emotional factors of those problems are factored out.

JOSHUA HAWORTH

Graduate: Doctoral

Evaluating concurrent development of cognitive and motor behavior in typical and delayed infants

Major: Exercise Science

Faculty advisor: Nick Stergiou

Co-Author(s): Elena Kokkoni, Regina Harbourne, and Nick Stergiou

Many research domains are interested in describing the development of human behavior, including both motor and cognitive abilities. Extensive evidence exists describing the development of sitting posture in infants. However, less information is available to evaluate the influence that development of posture has on subsequent cognitive ability. We investigated the look-time behavior of two infants (typically developing and motor delayed) across the progression of sitting skill acquisition; measured at the earliest stage of sitting performance (Stage 1), and again when they were nearly fully competent to maintain independent sitting (Stage 2). For each collection, the infant sat quietly and unsupported in the center of a playroom with toys

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available for viewing. Eye tracking equipment was used to measure the percent of gaze time directed at the toys relative to time attended elsewhere. Results show that percent of gaze to toys increased from 24% at Stage 1 to 72% at Stage 2 for the typically developing child and from 8% at Stage 1 to 24% at Stage 2 for the motor delayed child. Look-time follows a similar developmental trajectory between the two children. These upward shifts in object detection and interest occur at similar points in the development of sitting posture, suggesting that improvements in sitting lead to increased freedom onto the cognitive domain and thus enhancements in the development of object identification and attention. This phenomenon is evident regardless of the absolute level of performance, as the trend is characteristic of developmental trajectory of both the typical and delayed child.

KATHERINE HECKENBACH

Graduate: Masters

The Effects of Breathing Control on Cardiopulmonary and Subjective Measures on Collegiate Intermediate to Advanced Female Modern Dancers

Major: Athletic Training

Faculty advisor: Melanie McGrath

Co-Author(s): Kris Berg, Neal Grandgenett,
and Josie Metal-Corbin

As dancers become more skilled, they are often unaware of their breathing patterns. Upon observation, dancers appear to hold their breath while performing the most basic exercises. It is unclear whether breath holding negatively impacts modern dance performance, and whether providing verbal breathing 'cues' may enhance physiologic and performance measures during dance. The purpose of this study is to identify the effects of conscious breathing control cues on cardiopulmonary and performance measures & subjective effort ratings during modern dance activity. Cardiopulmonary measures include the cardiopulmonary profile of each participant (%VO₂max, VO₂, PV, HR, O₂sat, etc.), and blood lactate concentration. Subjective measures include rating of perceived exertion (RPE), pulmonary RPE, and performance grading scored by a panel of dance experts. Twenty female modern dancers from The Moving Company are being recruited for this study. They will be randomly assigned to either control or breathing cue groups and will attend three testing sessions: one submaximal-baseline exercise test and two dance sessions. During the first dance session, dancers will complete a two-minute combination while a portable metabolic cart collects physiologic data. During the second dance session, conscious breathing control cues will be delivered during the dance to the breathing cue group via examiner instruction. The control group will complete the second dance session without cues. We expect that verbal cueing will improve performance scores, and will decrease pulmonary effort, perceived exertion, and blood lactate concentrations. The results of this study may provide new techniques to improve performance, while reducing stress on cardiovascular and pulmonary systems, during modern dance.

MATT HEESCH

Graduate: Masters

Small Differences in Exercise Intensity May Impact Muscle Glycogen Without Concurrent Changes in Metabolic Gene Expression

Major: Exercise Science

Faculty advisor: Dustin Slivka

Co-Author(s): Dustin Slivka, Charles Dumke,
John Cuddy, Walter Hailes, and Brent Ruby

Intensity in exercise studies is often established relative to VO₂ peak. However, the absolute intensity may depend on the altitude at which VO₂ peak is measured. The purpose of this study is to determine

the impact of different absolute intensities associated with 60% VO₂ peak, when measured at 975m or at a simulated altitude of 3000m on metabolic gene expression. VO₂ peak was measured on twelve recreationally trained males on a cycle ergometer at 975m and 3000m. Participants then cycled at 975 m elevation for 60 min at 60% VO₂ peak as measured at (A) 975m and (B) 3000m. Skeletal muscle biopsies were obtained from the vastus lateralis before exercise (PRE) and after 4 hours of recovery (POST4). Gene expression was measured using real-time RT PCR. VO₂ peak was statistically similar when measured at 975m and 3000m ($p=0.139$). The absolute intensities were 174 ± 33 watts for trial A and 158 ± 23 watts for trial B ($p>0.05$). Skeletal muscle glycogen was similar between trials at PRE but was 37.6% higher in trial B at POST4 ($p<0.05$). There was no difference between trials for COX, HIF, PGC1, FIS, MFN, OPA, HK or PFK ($p>0.05$). However, gene expression increased as a result of exercise regardless of trial ($p<0.05$) with the exception of OPA. Data indicate small differences in exercise intensity created by completing initial VO₂ peak tests at 975m versus 3000m environment affects muscle glycogen but not select metabolic genes.

CHUN-KAI HUANG

Graduate: Doctoral

Reduced Visual Input Affects Gait Characteristics during Treadmill Walking

Major: Hlth Phys Ed & Rec-Unclassified

Faculty advisor: Ka-Chun Siu

Co-Author(s): Jung Hung Chien,

Srikant Vallabhajosula, and Ka-Chun Siu

Vision is one of the most important sensory systems in controlling locomotion. Humans rely on visual information from the environment to mediate the foot placement during level walking. The aim of this study was to investigate the effect of reduction of visual input on treadmill walking and identify how reduced visual input affects gait characteristics in a virtual reality (VR) environment. Ten healthy adults walked on a treadmill in four different conditions, and the average step length, step width and the corresponding coefficients of variation were calculated using the NDI motion capture system with 24 active markers. Significant interaction exists between VR and visual input conditions on the step length and step length variability; significant main effect of visual input revealed that step length was decreased with reduced visual input condition. Multiple comparisons indicated step length variability was significantly increased only in the reduced visual input condition when dynamic VR as presented. Public Health Relevance: The present study provides evidence that visual input plays an essential role in gait modulation during treadmill walking in a VR environment. In addition, the factor of light intensity should be addressed and taken into account in the future fall-related issues.

BRAD HULLSIEK

Graduate: Doctoral

Career Velocity and Challenging Work Experiences

Major: Psych-Unclassified

Faculty advisor: Roni Reiter-Palmon

Co-Author(s): Jeff Weekley and Roni Reiter-Palmon

Challenging work experiences are used by many organizations as a mechanism to develop future leaders and as part of a leadership and talent development program. How well these challenging experiences do in supporting development and subsequent advancement is therefore an important question. Career success can be defined in terms of "velocity," the speed with which one advances up the ranks. The purpose of this study was to determine whether challenging work experiences are related to faster advancement, above and beyond cognitive ability and personality. Results indicated that challenging work assignments were related to rate of advancement.

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NATE HUNT

Graduate: Masters

Evidence of Different Control Processes in the Maintenance of Standing and Sitting Posture

Major: Exercise Science

Faculty advisor: Nick Stergiou

Co-Author(s): Fabien Cignetti and Nick Stergiou

The purpose of this study was to characterize the different control processes involved in quiet sitting and quiet standing. Insight on hidden postural control processes may be obtained with nonlinear analyses of the movement outcomes. Here, we examine the movement of the center of pressure (COP) using Detrended Fluctuation Analysis (DFA). DFA examines the fractal scaling of a time series and quantifies (α) the persistence (a fluctuation tends to be followed by a fluctuation in the same direction) or antipersistence (a fluctuation tends to be followed by a fluctuation in the opposite direction) of the system. The α value of DFA is directly related to the fractal dimension of the time series. Thus, DFA of COP data will give us insight into the fractal motor control processes involved in posture. Subjects sit or stand quietly for five minutes with either eyes open or eyes closed. A significant main effect of sitting versus standing was found. Greater alpha values for sitting are more similar to Brownian noise and indicate that COP is being more loosely controlled. No significant difference between eyes open and eyes closed conditions were found. This indicates that vision is not a critical sensory component that contributes to the fractal motor control process during quiet sitting or standing.

ZACH JACOBS

Graduate: Masters

Gulliver and the Giant King: Swift's 'History of England' and Anglo-Saxon Nostalgia in Brobdingnag

Major: English

Faculty advisor: Kristin Girten

This project investigates the ways in which Brobdingnag, a land of giants in Jonathan Swift's Gulliver's Travels (GT), is presented as a realm at once fantastic and real, an insular nation reminiscent of a nostalgic England of the past that is simple and peaceful. Much of the work on Swift himself and on GT between the 1920s and the 1980s concerns the politics of author and text: commentary, allegory, parallel, etc. And it would seem that this vein of inquiry has been exhausted, as there has been a shift to other approaches, including studies of the Utopian tradition and empiricism, among others. However, previous political scholarship has failed to flesh out the implications of Swift's politics within the second and often over-looked part of GT—"A Voyage to Brobdingnag." Using Swift's History of England (an unfinished work that covers the nation's history from the invasion of Julius Caesar to the mid-12th Century) to inform my analysis of the Brobdingnag Voyage, I propose that, in the land of the giants, the reader finds a nostalgic Anglo-Saxon England. And it is especially through discourse between Gulliver and the giant king that the text paradoxically suggests a progressive view by looking to the past.

ERIKA JACOBSON

Graduate: Masters

A Policy of Vengeance: California's Three Strikes Law

Major: Social Work

Faculty advisor: Kerry Beldin

Towards the end of the 'red scare' in the 1980's, the major threat assessed by the American people shifted from the fear of communism to the fear of crime and the war on drugs. This led to an increase in the passage of harsher sentencing laws at both the federal and state level. In California, a fuse was lit in the early

90's by two brutal murders which led to the passage of the harshest habitual offender law in history. The crusade was led by two grieving fathers that started out as allies and became bitter enemies. The wedge that drive them apart was their view as to what crimes should constitute 25 year to life imprisonment. This presentation will consist of a policy analysis of California's Three Strikes Law. Issues to be discussed include the historical background of the law, the problems the law was supposed to have remedied, a description of Three Strikes, and an overall analysis of the policy. The aim of this presentation will be to demonstrate that California's Three Strikes Law was a policy crafted out of vengeance not only by two grieving fathers but of the citizens of California. Finally, this research will demonstrate that the Three Strikes Law in California is in desperate need of reformation if California is to survive its current budget crisis and the flight of its citizens to other states out of fear and desperation.

ALEXANDRA KALE

Graduate: Masters

Understanding Early Adolescent General Self-Worth: Sex Differences in the Association of Gender Roles and Body Image

Major: Psych-Unclassified

Faculty advisor: Jonathan Santo

Co-Author(s): Alicia Bower, Heather Giles, Terry Stone, Jonathan Santo, and William Bukowski

Research on gender differences in depression suggests that males and females differ in their responses to the pressure to conform to gender roles (Priess, Lindberg, & Hyde, 2009). In order to more fully understand these gender differences, data were collected from 186 (94 boys) early adolescents in grades five (n=74) and six (n=112) in Montreal, Quebec, Canada. Self-report measures of general self-worth, gender typicality, felt gender pressure, as well as expectations for appearances, behavior, academics and prosociality were administered. Classroom-based sociometric popularity was assessed using the sum of same-sex first, second and third best friend nominations. Structural equation modeling was used to examine a latent factor model of GSW and its correlates. Sex differences were also explored. Felt pressure was regressed on self-reported expectations for appearances, behavior, academics and prosociality. Each were positively associated with felt pressure except for prosocial behavior which was negatively associated. All told, the variables explained 14.10% of the variability of felt pressure. Next, a latent factor model of GSW was created which was regressed on popularity, gender typicality and felt pressure. Popularity, and typicality were positively associated with GSW while felt pressure was a negative predictor. The resulting model was a good fit to the data explaining 9.60% of the variability in GSW. Finally, a multi-group comparison of sex differences revealed interesting disparities in the structure of felt pressure and the correlates of general self-worth. The current findings revealed that sex differences in gender related expectations translate into differences in understanding general self-worth.

VICTORIA KENNEL

Graduate: Masters

Teams and Creativity: Accuracy in Idea Evaluation and Selection

Major: Industrial-Organizational Psyc

Faculty advisor: Roni Reiter-Palmon

Co-Author(s): Roni Reiter-Palmon

While research on team brainstorming is abundant, there is little research on the cognitive process of team idea evaluation and selection. This process is critical to innovative success as many ideas are often generated to solve a problem but few of these ideas are ever implemented. Thus, evaluation accuracy is essential: if the evaluation process is less than optimal, less than optimal ideas are likely to be chosen. Forty teams of four read a story problem and evaluated 10 problem solutions generated by students from a previous study for quality and originality. Teams then selected the best solution to solve the problem. Logistic regression indicated that teams more accurate in their evaluations of solution quality were more likely to accurately select a solution that was high in quality than teams who

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were not as accurate in their solution quality evaluations, controlling for the accuracy of their solution originality evaluations. Teams more accurate in evaluating solution originality were more likely to accurately select a creative solution, that is, a solution both original and high quality, than teams who were not as accurate in their solution originality evaluations, controlling for the accuracy of their solution quality evaluations. This study provides a snapshot of the role that idea evaluation accuracy plays in the accuracy of selecting solutions to solve a problem and suggests that accuracy in evaluation criteria influences the type of problem solution teams select for implementation.

PAMM KILLEEN

Graduate: Masters

I Want to Rock your World: Becoming an Authentic College Instructor and Mentor by Embracing Student Diversity in a Global World

Major: Communication-Unclassified

Faculty advisor: Chin Chung Chao

By combining the constructs of authentic leadership, instructional communication and mentoring, college professors can find new insight in becoming a teacher that changes the world of their students. This paper and its qualitative, case study research gives a voice to college students who long have been unheard about the attributes great teachers and mentors provide. The rich, compelling stories of three college students from a Midwestern urban university identify the core characteristics their authentic mentor teachers provide, give insight into how gender, race and age influence their relationships and offer testimonials to how far-reaching their relationships with these professors have been in their lives. The case studies suggest not only that there are common themes in expectations across both genders and multiple races/ethnicities, but they also are instructive, offering guidance for professors about how they might overcome concerns when they do not match the gender, race or age expectations of their students. Do not focus, they say, on what divides you, but rather on what binds you. The data from this study confirms the combined definition of authentic mentoring and provides great hope within the field of instructional communication.

PRIYAWADA KULKARNI

Graduate: Masters

Gene Knockouts Designed to Disrupt the Bradyzoite Stage Formation in *Toxoplasma gondii*

Major: Biology-Unclassified

Faculty advisor: Paul Davis

Toxoplasma gondii is an obligate intracellular protozoan pathogen which infects human and other mammals. Following acute infection via tachyzoite spread, the parasite forms chronic cysts in the bradyzoite stage. With the help of microarray analysis, we have observed genes putatively involved tachyzoite-to-bradyzoite conversion. We hypothesized that there exist very early responsive genes necessary for stage conversion. Out of these genes, 2 genes are selected for my further research studies. Genetic knockout can be easily done by allelic replacement in this haploid organism. Generated mutants are verified for relative equivalent fitness and via routine microscopy, viability and infection capability is determined by plaque assay. Selected mutants are screened by using multiple induction conditions. Knocked out genes which significantly reduce bradyzoite formation will be considered important for stage conversion. This information will be used for further studies as possible strain for vaccine development that would ultimately prevent bradyzoite development.

BETTINA LECHNER

Graduate: Masters

Using IT to Enable Large-Scale Elkhorn Watershed Herbicide Testing

Major: Management Info Systems

Faculty advisor: Ann Fruhling

Co-Author(s): G. Hoff, A. Fruhling, G. Ryskamp,
and A. Kolok

In the months of April and May of 2011, Dr. Alan Kolok and Gwendolyn Ryskamp from the Aquatic Toxicology Laboratory at the University of Nebraska at Omaha led more than 50 Nebraska citizen scientists to perform two tests to measure the amount of atrazine, the most commonly used herbicide in the United States, in the Elkhorn River watershed. Our results indicated an absence of the compound on the April testing day, but a high percentage of positive data points in May. Single point measurements taken throughout the spring season corroborate this result, as atrazine was only detected during a three-week long period from May 14 to May 28. In order to gather the results of these measurements, a website was developed by the Public Health Informatics Laboratory IT developers at the UNO College of Information Science and Technology. More measurements are scheduled for the farming season of 2012 and a mobile application is being developed to allow citizen scientists to enter measurements on-site. In this study we present important information technology design considerations and functionality that needed to be addressed in order for citizen scientists who have a wide range of technical skills, to easily use the application.

JOHN MCWILLIAMS

Graduate: Masters

"She'll Turn into a Maneater": Language and Power in Axe Shower Gel Packaging

Major: English-Unclassified

Faculty advisor: Frank Bramlett

Research on the packaging of men's grooming products is almost nonexistent, despite the high visibility of these products' advertising campaigns. Because of this lack of previous scholarship, an analysis of the language of men's product packaging is necessary for building a greater understanding of how language both creates and is created by ideals of "manhood." Recent research of advertising in the field of critical discourse analysis (CDA) relates directly to the relationship between language and power; according to Norman Fairclough, central to CDA is the examination of the "connections which may be hidden from people—such as the connections between language, power, and ideology" (4). These connections may be most apparent in the highly visible advertisements for Axe products, which are quickly recognized by their catchy taglines, and more frequently, by their double entendre-laden words and images. In the case of the packaging of Axe shower gels, the words and images create a context wherein themes of action and romantic adventure permeate the text used on the packaging. Most salient, however, are the messages of power, especially the power to transform a potential, (perhaps) unwilling romantic partner into an actual, eager partner. The Axe shower gel packaging employs language that implies transformative power—or, power to attain a conquest—at the lexical, phrasal, and clausal levels.

MICHAEL MEDUNA

Graduate: Masters

Teacher Salary and Student Achievement: A Study of Nebraska's Metropolitan Areas

Major: Econ-Unclassified

Faculty advisor: Catherine Co

The 2009 OECD's PISA results show that the United States of America ranked 31st in math test scores despite spending the second most on education per student. One of the largest expenditures in education is teacher compensation. This paper investigates the effect that teacher salary has on student achievement outcomes in mathematics and reading test scores in the public high schools in Nebraska's metropolitan statistical areas. The average results for each school from the 2010-11

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Nebraska State Accountability test are regressed against teacher salary and seven other variables. The results of this model show that teacher compensation does not impact student achievement on either test. However, the model does show that the percentage of low income students has a significant negative effect on a school's average test score, while the percentage of Asian student enrolled has a significant positive effect on a school's average test score.

KRISTIN MICEK

Graduate: Masters

Chicken or the Egg, Academics or Behavior? What Comes First?

Major: School Psychology-Unclassified

Faculty advisor: Lisa Kelly-Vance

Co-Author(s): Allison Niels and Lisa Kelly-Vance

This presentation will demonstrate the link between behavior and reading using two case studies involving early elementary students diagnosed with ADHD by using the problem-solving process. The importance of the process will be discussed along with descriptions and results of the interventions. In two separate 8 to 10-week interventions, reading fluency and time-on task increased for both children. Attendees will enhance their understanding of the problem-solving process in determining the antecedents of behaviors and academics.

MOLLY MIERAS

Graduate: Masters

The Effects of a Reading Distraction on VO₂

While Participating in a Self-Directed Bout of Submaximal Cycling

Major: Exercise Science

Faculty advisor: Kris Berg

Much attention has been called to the importance of regular physical activity for health. One way individuals and professionals attempt to increase exercise adherence and satisfaction is by using a distraction such as music, television, or reading. The purpose of this study will be to examine the effects of a reading distraction on the energy expended in a self-directed, 30 minute bout of cycling. The study will consist of approximately 30 healthy, physically active college students from UNO. Each subject will participate in three exercise sessions. The first will consist of a test to assess aerobic capacity using a metabolic measuring system and a treadmill. The second and third sessions will consist of a 30 minute self-directed bout of exercise on a cycle ergometer. Subjects will either use a reading distraction in the first or second submaximal session, and the order will be randomly determined. Variables assessed in each session will include HR, oxygen uptake, and percentage of maximal oxygen uptake reached. The results of this study will show whether using a distraction during exercise has an effect on the level of intensity reached in an exercise bout, as well as if the self-directed sessions reach the American College of Sports Medicine's current recommendations of performing moderate intensity aerobic exercise (40% to ≤ 60% VO_{2R}) to vigorous intensity aerobic exercise (≥60% VO_{2R}) three to five days per week.

ASHLEY MOELLER KLUG

Graduate: Masters

Improving Preschoolers' Social Play Skills Through a Peer-Mediated Intervention

Major: School Psychology-Unclassified

Faculty advisor: Lisa Kelly-Vance

Co-Author(s): Lisa Kelly-Vance, Brigette Ryalls,
and M. Susan McWilliams

A play-based intervention was developed to enhance play and social skills among preschool-aged children. The intervention utilized a small group setting including one peer model who demonstrated high levels of complex pretend play and frequent peer-directed prosocial interactions. The group also included three target students who demonstrated inadequate play skills and infrequent social interactions with peers during free play. The program was comprised of a plan-play-review sequence based on the plan-do-review method of the High/Scope curriculum which supports learning and cognitive development by teaching children to plan and reflect on their experiences. The other major instructional component was adult facilitation in the form of modeling and verbal prompts to increase pretending and socialization among group members during free play. This intervention is expected to produce significant improvements in both play and social skills.

MELISSA MOUNT

Graduate: Masters

Effects of urbanization on the species richness and abundance of native grassland birds

Major: Biology-Unclassified

Faculty advisor: LaReesa Wolfenbarger

Native Grassland bird populations have declined and continue to decline, mostly due to habitat loss as a result of urbanization and agriculture. The quality and productivity of the remaining, highly fragmented patches are threatened by further urbanization. In this study, grassland fragments representing an urban to rural gradient around Omaha, Nebraska were surveyed during the 2011 breeding season, to determine the effects of urbanization on the species richness and abundance of native grassland birds. Distance sampling, using point counts and line-transect methods were performed to account for native bird abundance and species richness. The density and structure of vegetation was also measured at each site, to account for possible confounding variables. The degree of surrounding urbanization was also determined for each site, by using aerial photographs to quantify the land cover of random points in ArcGIS. A second set of data will be collected during the breeding season of 2012. Results from the ongoing analyses of the effects of urbanization on grassland birds will be presented. I predict that species richness, and abundance of native grassland birds will decrease as surrounding urbanization increases.

ELIZABETH MULKERRIN

The Effect of a Zoo-Based Experiential

Academic Science Program on High School

Students' Math and Science Achievement and Perceptions of School Climate

Major: Educational Admin

Faculty advisor: John Hill

The purpose of this study was to determine the effect of an 11th-grade and 12th-grade zoo-based academic high school experiential science program compared to a same school-district school-based academic high school experiential science program on students' pretest and posttest science, math and reading achievement, and student perceptions of program relevance, rigor, and relationships. Science coursework delivery site served as the study's independent variable for the two naturally formed groups representing students ($n = 18$) who completed a zoo-based experiential academic high school science program and students ($n = 18$) who completed a school-based experiential academic high school science program. Students in the first group, a zoo-based experiential academic high school

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science program, completed real world, hands-on projects at the zoo while students in the second group, those students who completed a school-based experiential academic high school science program, completed real world, simulated projects in the classroom. The study's two dependent variables were achievement and school climate. Achievement was analyzed using norm-referenced 11th-grade pretest PLAN and 12th-grade posttest ACT test composite scores. Null hypotheses were rejected in the direction of improved test scores for both science program groups--students who completed the zoo-based experiential academic high school science program ($p < .001$) and students who completed the school-based experiential academic high school science program ($p < .001$). Finally, students who completed the zoo-based experiential academic high school science program had statistically greater post-test perceptions of program relevance ($p < .001$), rigor ($p < .001$), and relationships ($p < .001$).

ANDREA NAUGHTON

Graduate: Masters

How do pregnant women and women up to one year postpartum use the Internet for Health Behavior Information? A Descriptive Study

Major: Public Health

Faculty advisor: Jennifer Huberty

Co-Author(s): Danae Wolcott and Jennifer Huberty

Pregnancy is a significant time in a woman's life in which physical inactivity and unhealthy eating habits can result in several adverse health consequences such as gestational diabetes or hypertension. One potential avenue for improving pregnant women's healthy behaviors is the Internet. However, there is minimal research on how pregnant women use the Internet to improve their health behaviors. Women in Douglas County who were at least 19 years of age and pregnant or up to one year post partum were recruited for this study (N=292). The study was funded by a University of Nebraska Omaha FIRE grant. Data was collected using survey and focus group methodology. The survey was modified from a pre-existing reliable and valid survey to assess Internet usage in pregnant women (Lagan, 2010) with added questions regarding physical activity (PA) and nutrition. Most women used the internet for pregnancy (94%), PA (75%), or nutrition (81%) related information. Women reported higher confidence for decision making related to PA (79%) and nutrition (88%) after using the Internet than before (60% and 62% respectively). As a result of information found on the Internet, 26.3% reported increasing their PA. The internet may be a feasible mode for interventions in health behaviors during and after pregnancy. Findings presented here will guide the design of an Internet based health behavior intervention for pregnant women in Nebraska.

CUONG NGUYEN

Graduate: Doctoral

An Ontology for ActionCenter-oriented

Collaboration Platforms

Major: Information Technology

Faculty advisor: GJ de Vreede

Co-Author(s): Azamat Mаметjanov,
Douglas Kjeldgaard, and Robert Briggs

It is expected that there will be a growing number of collaboration technology platforms that support rapid development and deployment of ActionCenter applications –collaborative applications that encapsulate both collaboration expertise and tools for effective collaborative work practices using the facilitator-in-a-box strategy. This strategy enables instantiation and diffusion of state-of-the-art collaboration patterns for high-value recurring tasks. A side effect of the growing number of platforms is the potential for

incompatibilities among ActionCenters that can reduce interoperability, knowledge sharing and reuse. We present an ontology for ActionCenter-oriented collaboration platforms that formalizes key concepts of the approach using OWL. The resulting ontology can reduce ambiguities and promote knowledge sharing, reuse and standardization.

ALLISON NIELDS

Graduate: Masters
Behavior Management: Helping Teachers Beyond
Pre-Service Training
Major: School Psychology-Unclassified
Faculty advisor: Brian McKeivitt
Co-Author(s): Kristin Micek

The lack of focus on behavioral management in teacher training programs is a cause for concern. Because of the high attrition rates among novice teachers, additional support and training in these areas are needed. Attendees will be provided with tips to relay to the teachers within their district or school. Application of these strategies will help teachers improve their classroom organization thus increasing academic engaged time by reducing problematic behaviors.

SARAH NIENHUESER

Graduate: Masters
The Influence of Rater Expertise on Creativity Ratings
Major: Psych-Unclassified
Faculty advisor: Roni Reiter-Palmon
Co-Author(s): Roni Reiter-Palmon, James Kaufman, John Baer, and David Cropley

The Consensual Assessment Technique has been suggested as producing the most valid and reliable results when assessing creativity (Amabile, 1996). The technique requires experts in a domain to rate responses for creativity. However, little research has indicated what criteria an individual needs to meet to be deemed an expert or if experts really are the only judges that can validly rate creativity. Two studies investigated the differences between three groups of raters (experts, quasi-experts, and novices) on judgments of creativity. Correlations from the first study indicated the strongest relationship between the expert group and the quasi-experts, with the correlations between the experts and novices being the lowest. A repeated-measures ANOVA indicated no significant differences between rater groups but observed a significant effect for target (story). The interaction between the expertise of the rater and the story being rated was significant. Correlations from the second study indicated a moderate relationship between the expert group and the quasi-experts, with the correlations between the experts and novices being the lowest. A strong correlation was found between novices and quasi-experts. A repeated-measures ANOVA yielded no significant differences between rater groups but observed a significant effect for target (specific design). The interaction between the group and the task was significant. Based on these results, quasi-experts may be an alternative to expert raters in evaluating creativity. Quasi-experts were more similar to the expert raters, and a smaller number of quasi-experts was required to obtain reliable and valid results.

ABSTRACTS

KATIE NOVICKI

Graduate: Masters

Systematic Observation of Physical Activity in Afterschool Programs: Preliminary Findings from Movin' Afterschool Intervention

Major: Hlth Phys Ed & Rec-Unclassified

Faculty advisor: Jennifer Huberty

Co-Author(s): Michael Beets, Jennifer Huberty,
and Aaron Beighle

National and state organizations have called upon afterschool programs (ASPs) to promote physical activity (PA). Few strategies exist that ASPs can use to increase the PA of children enrolled. This study evaluated a policy-level intervention, Movin' Afterschool (MAS) designed to increase PA through staff implemented policy-level changes and ongoing technical support. Twelve pre-existing community-based ASPs serving 580 children (5-12 yrs, 57% girls) were invited to take part in MAS. Evaluation of children's PA, staff behaviors (engaged or promote PA, other ASP tasks, general supervising), and environmental features (equipment, organized PA) at baseline (Fall 2010) and post-assessment (Spring 2011) were collected using SOPLAY (System for Observing Play and Leisure Activity in Youth) for boys and girls, separately. Random effects models evaluated changes in PA categories (sedentary, walking, vigorous). The percentage of boys and girls sedentary decreased by 11.8% and 11.4%, respectively. Girls walking increased by 6.9% while boys vigorous PA increased by 6.5%. The presence of equipment, organized PA, and staff verbally promoting PA were associated with increases in walking and vigorous PA for boys and girls. Findings indicate a policy-level approach targeting staff training and ongoing technical support can produce notable increases in PA within the ASP setting.

ALICIA PHILLIPS BUTTNER

Graduate: Masters

The effect of stress on social cognitive performance
in shelter dogs

Major: Psych-Unclassified

Faculty advisor: Rosemary Strasser

Co-Author(s): Rosemary Strasser

Dogs have been the subject of numerous studies on social cognition in recent years. Researchers suggest that as the result of thousands of years of convergent evolution with humans, dogs have developed social skills that more closely resemble humans' than do our closest relatives. Yet, no studies have considered how stress impacts social cognition. In the present study, we examined the cortisol levels of 60 shelter dogs in relation to their performance on the object choice task, in which dogs had to determine the location of a hidden treat using a human experimenter's pointing cue. Saliva samples were obtained at two time points prior to testing and were later assayed for cortisol levels. Based on previous animal studies, we expected that performance would deteriorate as cortisol levels increased, and that this relationship would be moderated by sex differences. Specifically, increased cortisol levels would have a negative impact on males' performance on the object choice task, whereas females' performance would not be affected. The dogs' intake type, personality, age, and breed were not expected to influence performance. The findings and implications of this research will be presented.

ERICA PLACHTER

Graduate: Masters

Effects of Testosterone on Social Learning in Zebra Finch, *Taeniopygia guttata*

Major: Psych-Unclassified

Faculty advisor: Rosemary Strasser

Certain animal species display neophobic behaviors to novel stimulus. However, studies have shown approach and acceptance of novel food is increased by social contexts. The current study will examine the acceptance behaviors of zebra finch to a novel food stimulus based on: approach latency, proximity, eating behavior, and contact. The social contexts of zebra finches exposed to novel food when will be examined when alone, with a group, with a group presented with familiar food, and with a group presented with novel food. Since social behaviors are thought to be mediated by certain hormones; for the current study we will examine the effects of testosterone on these social behaviors. The zebra finches were injected prenatally with high and low concentrations of testosterone also included in the design will be an immediate administration of testosterone, via a dermal patch. Previous research has indicated testosterone decreases responsiveness to social learning. It is the specific goal of the following project to examine the relationship between testosterone on the ability of the bird's social learning. Thus, prenatal injections of testosterone and testosterone dermal patch should decrease acceptance of the novel food even when a group is present. Preliminary evidence suggests a trend in increased latency to approach, decreased proximity, decreased eating, and decreased contact to the novel food in the testosterone treated zebra finch.

PRAPUNJA POKHREL

Graduate: Masters

Leveraging IT to deliver telemental health services to rural Nebraskans

Major: Management Info Systems

Faculty advisor: Ann Fruhling

The United States is expected to have a severe medical workforce shortage by 2020 as the aging physician workforce is nearing retirement. Further shortages are likely to occur if previously uninsured Americans enter the care delivery system. In 2009, it was reported that there was a national shortage of 45,000 psychiatrists, 56,462 prescribers and 68,581 non prescribers. In Nebraska, where most service providers are concentrated in Omaha and Lincoln, many people in remote areas have limited access to mental health care. Delivery of psychiatric and mental health services using Information Technology would extend access to mental health care to patients in rural Nebraska. However, many barriers have inhibited the diffusion of telemental health services. In this study, I will present insights from a case study of a UNMC Psychiatrist who is providing counseling services to a rural Nebraska community. The study will focus on some of the technology barriers that were encountered and the valuable lessons learned in the process. The study is expected to be a valued guide for an organization that is considering offering telepsychiatry services.

MARIAM RAHMANI

Graduate: Doctoral

SRN-based Performance Analysis of a Banking Web Service

Major: Information Technology

Faculty advisor: Azad Azadmanesh

Co-Author(s): Azad Azadmanesh and Harvey Siy

This research presents an empirical study of failures observed by a banking web service deployed in an open source application server. For this purpose, a mathematical and a Stochastic Reward Net (SRN) models are developed to predict the web-service failures. Computing the theoretical and the SRN-based results and comparing them against the experimental outcomes determines the applicability and accuracy of the theoretical and the SRN models in failure prediction, and provides better understanding of their limitations and the challenges of future research studies. The models utilize the parameters extracted from empirical testing such as the average response time and arrival rate. The study focuses on the failure of

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HTTP requests blocked by the application server. These failures can be caused by system overloading or mismanagement of configuration parameters. The most important lesson learned from this study is that the SRN model needs to be tuned up repeatedly to account for the new discoveries from the empirical studies.

TROY RAND

Graduate: Masters

Frontal Joint Dynamics When Initiating Stair Ascent with and without Gait Speed

Major: Exercise Science

Faculty advisor: Sara Myers

Stair negotiation is a challenging activity of daily living for certain populations. Previous research has focused on stair ascension starting from directly in front of the staircase. However, when encountering stairs in daily life we often approach the first step via walking. Frontal plane joint dynamics are critical to understand the mechanisms involved in stair case ascension as they contribute to both propulsion and medio-lateral stability. The purpose of this research was to determine lower-extremity joint moments in the frontal plane when one begins stair ascent starting from farther away and at two consecutive ipsilateral steps. Ten healthy young adults ascended a four step custom-built staircase five times under two starting conditions: 1) from farther away with speed; 2) from in front of the staircase, without speed. Kinematics were collected using a motion analysis camera system and kinetics were collected from force platforms embedded in the stairs. Peak abductor and adductor moments at the ankle, knee and hip joints were calculated through a group means for each condition and each step. A repeated 2 (conditions 1 vs 2) by 2 (steps 1 vs 2) ANOVA was performed. The results show that subjects produced greater peak knee abductor moment and peak hip abductor moment during early stance phase after foot-strike when ascending stairs starting from farther away. These findings are important for people with weaker hip abductors, as they may not be able to generate sufficient moments to counteract pelvic drop, resulting in a mechanically inefficient stair ascent.

RJ REDDEN

Graduate: Masters

Agile Training: An Innovative Educational Process for Information Technology Educators

Major: Management Info Systems

Faculty advisor: Peter Wolcott

Information technology (IT) plays an important role in the growth of small businesses. Many businesses unfamiliar with technology tools risk being left behind in the so-called digital divide, rendering them unable to compete in today's business environment. Efforts to train owners of microenterprises often employ plan driven training, which emphasizes structure and linear learning with pre-defined learning objectives. This has been effective to a point, but it is sometimes insufficient to help microenterprises to cross the digital divide. This study proposes an alternative educational method, known as agile training. Agile Training is adapted from the Agile method of information systems development. Agile Training is an iterative method, designed to produce a demonstrable set of valuable technical skills on a short timetable. This innovative educational method adds process and psychological factors to standard plan driven training.

ALI REZAEIAN

Graduate: Masters

Analysis and Experimentation of Mission Space Coverage in Wireless Sensor Networks

Major: Computer Science-Unclassified

Faculty advisor: Azad Azadmanesh

Co-Author(s): Azad Azadmanesh

Wireless sensor networks (WSNs) have been employed in numerous military and civilian applications. Some application areas are in battlefield, surveillance, biological detection, and environmental monitoring. A major challenge to such applications is the sensor area-coverage, which refers to the placement of sensors and their coordination in a mission space (field), so that the application coverage requirements are achieved. Some examples of coverage requirements may be the relationship between the mission space points and number of sensor nodes, the field coverage degree of sensors, or the resiliency of a field coverage in case of sensor failures. One application example of WSNs is target detection and tracking, which has numerous practical uses such as tracking stolen valuable objects and locating victims in disaster response scenarios. This study takes advantage of the target detection application to investigate: 1) various algorithms and enhancements for sensor placements, 2) approaches to detect changes in a network topology, and 3) algorithms to maintain certain quality of service from the perspective of survivability in case of failures and orchestrated intrusions. To validate the results and assist in achieving the goals, a simulation software package is under development for distribution of sensors and evaluating various performance parameters.

COLLEEN SNOZA

Graduate: Masters

Comparison of Peak VO₂ and Achievement of Peak VO₂ Criteria during Three Modes of Exercise in Triathletes

Major: Exercise Science

Faculty advisor: Kris Berg

The purpose of this study was to analyze peak aerobic capacity differences across three modes of exercise related to the training of triathletes: treadmill, cycle and arm ergometer. This study assessed the differences between peak VO₂ values and determined which criteria of assessing maximal effort are met in each mode. The study compared physiologic indicators used to determine if a true peak oxygen uptake was achieved in each test. Six indicators have commonly been used in the literature: respiratory exchange ratio, plateauing of oxygen uptake, heart rate, blood lactate, rating of perceived exertion, and oxygen saturation. This was the first study, to the author's knowledge, that statistically analyzed achievement of the criteria in different modes of exercise. Results indicated that blood lactate and rating of perceived exertion criteria were met by the highest number of subjects across the three modes of testing. Heart rate, one of the most commonly used measures of maximal effort, was only met by a minority of the subjects. The oxygen saturation criterion was not met by any of the subjects. It is concluded that the most valid criteria to determine achievement of a peak aerobic capacity are blood lactate level and rating of perceived exertion and other criteria are of questionable use.

SRIRAM SRINIVASAN

Graduate: Masters

An Efficient Algorithm To Trace Change in Communities in Evolving Networks

Major: Computer Science-Unclassified

Faculty advisor: Sanjukta Bhowmick

Co-Author(s): Sanjukta Bhowmick

Systems of interacting entities can be represented as networks, where the vertices represent the entities in the system and the edges the interactions between them. Networks arise in many different domains, such as social networks (Facebook), biological relations (gene correlations) and epidemiology. In most cases, the networks are dynamic, that is, the edges or the relationships change over time.

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Analysis of network structure under dynamicity can reveal important information about the underlying application. This study concerns tracking tightly connected groups of vertices (called communities) across time steps. The quality of communities is measured based on a combinatorial metric termed modularity, which computes how much more than random are the entities in a community connected. Higher modularity indicates a better division into communities. We explore the characteristics of stable communities---groups that remain together across the modifications. Based on our observations we develop a prediction algorithm that determine which communities are likely to remain unaffected by a set of given changes. We can also use this method to classify the stability of different networks based on their propensity to form new groups under temporal modifications. Our algorithm has important applications in the study of evolutionary systems, for example understanding and predicting likely regions of social or biological changes.

ALVIN TARRELL

Graduate: Doctoral

Reducing information overload via spatialization

Major: Management Info Systems

Faculty advisor: Ann Fruhling

Decision makers are increasingly faced with excessive information; for example, Googling 'information overload' returns over 11 million results in 0.22 seconds. Clearly, most humans would struggle to understand and process that quantity of information within a reasonable period, particularly considering the various contexts, contentions, and conflicts involved. Researchers are focusing more and more on pre-cognitive techniques – things we 'understand' without conscious thought – as a means to reduce that information overload. Fields such as Data Visualization, Information Visualization, and (more recently) Information Design focus on reducing cognitive effort and information overload, often by utilizing visual displays and pre-cognitive techniques in their design. 'Spatialization' is one such approach, and involves giving non-spatial data a spatial component for display purposes. Spatialization seeks to take advantage not only of the enhancements to cognitive processing provided by being able to see the data visually, but also of the human ability to better understand things presented spatially. This research will look at one specific form of spatialization - 'Point Display Spatialization' – which displays non-spatial data as a series of 'points' on a two- or three-dimensional grid. Gestalt Theory – attempting to explain how humans perceive pattern, form, and organization in what we see – will be included as well, guiding development of displays with different Gestalt characteristics. User reactions will be determined, with the goal of addressing the basic research questions: Do users perceive relationships between data points differently given indications of inherent semantic groupings within the data points than they do without those indications?"

ALEX TORRESS

Graduate: Masters

Effects of a Policy-Level Intervention on Children's Pedometer-Determined Physical Activity

Major: Hlth Phys Ed & Rec-Unclassified

Faculty advisor: Jennifer Huberty

Co-Author(s): Jennifer Huberty, Michael W. Beets, and Aaron Beighle

The purpose of this study was to examine an evidence-based policy-level Afterschool Program (ASP) intervention on youth pedometer-determined physical activity (PA).

Methods: Children ages 5-12 years were assessed for PA using Walk4Life pedometers. MAS used a quasi experimental pre- and post-test design. Children averaged 3,145 steps per day at baseline and

3,042 steps per day at post-assessment. There were no effect of gender, BMI percentile, age, or their interaction on steps. Three ASPs experienced substantial declines in compared to the remaining 9 ASPs. Excluding these 3 sites, there was an average increase in 558 steps per day baseline to post-assessment in the remaining 9 sites. No significant contribution was observed with the covariates. This study is the first to provide evidence for the effectiveness of a policy-level intervention on youth PA participation. Further research is necessary to determine: 1) the right amount of support necessary to help ASPs, and 2) what strategies should be emphasized during staff training.

ABHISHEK TRIPATHI

Graduate: Doctoral

Factors affecting the adoption of technology to lead to participation in Crowdsourcing

Major: Information Technology

Faculty advisor: Lotfollah Najjar

Information technology has changed how people interact. The Internet has only increased the intensity and frequency of this phenomenon. Many new technologies and business models have emerged to capitalize on the increasingly social aspect of IT in all of our lives. A relatively new trend among businesses and other organizations is to utilize collective experiences from a varied population to resolve open problems through web-mediated technology, otherwise known as "crowdsourcing." Crowdsourcing, simply, is the act of outsourcing problem-solving to an undefined and unlimited number of people in an open forum. Crowdsourcing has been used in a wide variety of industries: for example, threadless.com (web-based T-shirts), istockphoto.com (photo and video clips), innoCentive.com (R&D challenges), Converse (athletic shoes), IBM's Innovation Jam (targeting potential areas of innovation), IBM global entrepreneur (kickstarter's crowdsourced seed money for innovative ideas), and so forth. Crowdsourcing can only be achieved through technology, and technology in turn may be enhanced through crowdsourcing. In this paper, we are concerned with investigating the factors affecting the adoption of technology to lead to participation in crowdsourcing. This study considers the Technology Acceptance Model (TAM), Web of System Performance (or WOSP), and Information Quality to develop a conceptual model. The discussion of challenges and barriers will show how the model can be enhanced to be even more useful in further research projects.

ABBY WEDDLE

Graduate: Masters

Translating research to the community: A pilot study to determine if a community-based book club can increase physical activity among women

Major: Hlth Phys Ed & Rec-Unclassified

Faculty advisor: Jennifer Huberty

Co-Author(s): Kate Rolfsmeyer, Diane Ehlers, and Jennifer Huberty

The purpose of this study was to determine if Fit Minded (FM), a community-based (face to face and internet) program adapted from a successful research study, was effective for increasing self-worth (SW), self-efficacy (SE), and physical activity (PA) in adult women. A second purpose was to describe FM website use among women. FM was a PA book club in which a facilitator targeted theoretical constructs during weekly book discussions. Women accessed additional support via the FM website through a blog, chat room, pedometer log, and resource page. Women completed questionnaires assessing: SW, SE, and PA before and after FM (8 months). Women's website usage included the number of website logins and pages visited. Nine of 16 FM members provided consent to use their data for research. Significant increases were observed in SE ($p=0.020$) and leisure-time PA (Godin ($p=0.008$) & MAQ ($p=0.039$)). Five women accessed the website 38+ times, with 56% of log-ins occurring during the first half of FM. The blog page was accessed most often, and blog access was consistent throughout the program, with a little more than half of visits occurring within the first half of FM. Few studies have evaluated the potential of community-based programs to promote PA behaviors. Our results provide initial evidence that a book club may be an attractive community forum to help women improve

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their SE and PA participation. Additional research aimed at further exploring the impact of the website, particularly the blog, on women's SE and PA is warranted.

BEN WIGERT

Graduate: Doctoral

You're not as creative as you think you are, but I admire your passion: The Influence of Creative Self-Perception, Self-Efficacy, and Task Realism on Creative Performance

Major: Industrial-Organizational Psyc

Faculty advisor: Roni Reiter-Palmon

Co-Author(s): Diana Dobey, Victoria Kennel,
and Roni Reiter-Palmon

The current study examined how creativity is influenced by perceptions of one's general ability, ability specific to a task, and the task itself. Previous studies have examined self-perception of creativity as a criterion, but few have examined the construct as a covariate of overt creative performance. Consequently, we examined whether general self-perceptions of creativity were positively related to overt creative output. We also contended that self-efficacy—confidence in one's ability to accomplish a specific task—would enhance creativity just as it has consistently enhanced performance quality in other studies. We expected that this task specific confidence would encourage people to overcome the obstacles and risks inherent to creativity. Further, we hypothesized that self-efficacy inspires people to perceive a task as more important and realistic, and it is this task engagement—labeled realism—that drives creative efforts. To test these research questions 364 (106 males, 258 females) undergraduate students were asked to provide a creative solution to a story problem and complete assessments of creative self-perceptions ($\alpha = .87$), self-efficacy ($\alpha = .83$), and realism ($\alpha = .85$). Creativity of solutions was evaluated independently by blind, trained raters. Results indicated that participants' perceived creativity was not related to overt creative behavior. However, as expected, self-efficacy and perceptions of task realism were positively related to creativity. Further, perceptions of task realism mediated the relationship between self-efficacy and creativity, supporting our marquee hypothesis. As such, we found that perceptions of task realism resulting from self-efficacy drive creative performance more so than self-efficacy itself.

SCOTT WIKE

Graduate: Masters

Invoking the Past to Justify the Future: The Tea Party Movement and the American Jeremiad

Major: Communication-Unclassified

Faculty advisor: Barbara Pickering

Since its inception in 2009, the Tea Party movement has become a driving force in American politics. By analyzing a movement-created film, *Tea Party: The Documentary*, this study identifies three core components of the American Jeremiad that are significant within the movement's verbal and visual rhetoric, including a revolutionary idealism established by the Founding Fathers, the failure of the modern political process to meet these promises and finally how a Second American Revolution is central to reaffirming these historical promises.

SAMUEL WILKINS

Graduate: Masters

The Relationship Between Sport Specialization in Baseball and Glenohumeral Internal and External Rotation Range of Motion and Functional Movement Screen Scores

Major: Physical Ed-Exercise Science

Faculty advisor: Melanie McGrath

Co-Author(s): Melanie McGrath, Kris Berg, Jeffrey French, and Kody Moffatt

Early specialization in a single sport has been a controversial topic for several years. Medical providers have concern that overhead throwing athletes who specialize early in adolescence can show anatomical changes and impaired fundamental movement patterns, which possibly pre-dispose athletes to injury. The purpose of this research is to identify baseball players who specialized in baseball in high school and compare their shoulder internal rotation (IR) and external rotation (ER) range of motion to athletes who were considered non-specialists and competed in multiple sports throughout high school. Additionally, these two groups will be taken through a Functional Movement Screen™ (FMS) to identify impaired fundamental movement patterns which could further pre-dispose athletes to injury. Participants are local NCAA Division I baseball student-athletes. Shoulder IR and ER will be measured via digital inclinometer. Participants will also complete the FMS, which involves the assessment of seven fundamental athletic movements. Data related to the shoulder IR and ER will be analyzed using two-way ANOVA ($\alpha \leq .05$). FMS data will be analyzed using independent t test ($\alpha \leq .05$). We hypothesize that those athletes who specialize in baseball will have more of an ER gain and an IR deficit compared to those who were non-specialists. Additionally, we further hypothesize that specialists in baseball will have lower FMS scores compared to non-specialists. This study will help medical professionals identify common functional impairments and limitations that have been associated with increased injury risk, especially those that exist in athletes who specialize in baseball.

SCOTT WISSING

Graduate: Masters

Association of staff behaviors and afterschool program features to physical activity: Findings from Movin' Afterschool

Major: Hlth Phys Ed & Rec-Unclassified

Faculty advisor: Jennifer Huberty

Children's achievement of recommendations for moderate-to-vigorous physical activity (MVPA) in afterschool programs (ASP) is complex. It is unclear what elements of the ASP environment influence children's PA. The purpose of this study was to determine the relationship of staff behaviors and ASP features (e.g., organized activity, recreational equipment) to MVPA participation in youth attending ASPs. Data was collected in 12 ASPs in the Midwest. Staff behavior and child PA was measured using the System for Observing Play and Leisure Activity in Youth (SOPLAY). The percentage of children's MVPA were examined in relation to staff behaviors and ASP features. Increases in MVPA were observed when staff were directly engaged in PA, verbally promoted MVPA, and when PA was organized and equipment was present. When 3 or more of these characteristics were present, the proportion of children engaged in MVPA increased by 25 to 30%. Conversely, MVPA levels decreased when these characteristics were absent and when staff were attending to other ASP duties or were supervising. This study provides evidence about the specific staff behaviors that may influence higher proportions of youth being active during ASP and implies specific skills that need to be incorporated into ASP staff training.

SHANE WURDEMAN

Graduate: Doctoral
Direction of Gait Affects Attractor Divergence
Major: Exercise Science
Faculty advisor: Nick Stergiou
Co-Author(s): Sara Myers, Neil Huben,
and Nick Stergiou

It has been proposed that the fore-aft control of gait is largely a passive action based on reflexive neural mechanisms of the spinal cord whereas lateral stabilization requires more upper motor neuron activation for control. However, motor control studies comparing fore-aft to lateral stabilization have only tested walking in the fore-aft direction. Attractor divergence has been utilized to explore questions in motor control of gait. The purpose of this study was to examine the amount of attractor divergence in the lateral direction compared to the fore-aft direction during lateral step gait at two speeds. It was hypothesized that subjects would have greater attractor divergence in the fore-aft direction and an increase in speed would result in a further increase in attractor divergence. Eleven subjects (age: 23.8 ± 3.4 yrs) performed the lateral step gait at a preferred speed and a fast comfortable speed. The largest Lyapunov exponent was calculated for right and left foot position in the fore-aft and lateral directions. Paired t-tests were used for comparisons. Results supported the hypotheses. The fore-aft direction had greater attractor divergence ($p=0.001$). Furthermore, an increase in speed led to an attractor divergence increase only in the fore-aft direction ($p=0.006$), revealing greater sensitivity to task in this direction. These results would seem to indicate that directional control of gait is not partitioned within the neuromuscular system as believed before.

JIE XIONG

Graduate: Doctoral
Cross Country and State Level Analysis of
e-Commerce Adoption Between Small Businesses in China and the United States
Major: Information Technology
Faculty advisor: Sajda Qureshi

Small businesses represent the majority of all firms in developed countries and emerging countries. As the driving force and the central ingredient behind the economic growth and development of the world including the United States and China, Information and Communications Technologies (ICTs) used for e-commerce have fundamentally shaped a dramatic transformation in both countries. However, the usage of ICT is still a challenge for both developing and developed countries.

California and Nebraska, in the USA and two provinces, Zhejiang and Sichuan in China are selected. California and Zhejiang are famous for their information technology industries, and Nebraska and Sichuan are known for their agriculture-based businesses. The research seeks to study the relationships between e-commerce adoption and contextual factors, and examine how these relationships vary across different economic environments. The research questions being investigated are: *What are the factors that affect e-commerce adoption in China and the USA? How do these vary between the two countries? What are the differences between the development of ICT in Nebraska and California? How can emerging area learn from the more developed area in the ICT area?*

Drawing upon a comparative case study, conducted to further understand the phenomena, a model is developed using constructs developed from the literature. Data from more than 200 small businesses in both countries are collected by phone, Internet, and face to face interview. Preliminary results suggest that there are key differences in the adoption of ICT for e-commerce in China and the USA and lead to further advances in how small business adoption of ICT's for e-commerce can enable sustainable development to take place in their respective regions.

JENNIFER YENTES

Graduate: Doctoral

Gait in Patients with COPD is Mainly Affected in Proximal Musculature

Major: Exercise Science

Faculty advisor: Nick Stergiou

Chronic obstructive pulmonary disease (COPD) is typically thought of as a lung disease; however, the effects of COPD are not limited to the lung. Patients with COPD exhibit abnormalities in structure and function of quadriceps skeletal muscle tissue. Thus, we hypothesized that the abnormalities in skeletal muscle tissue lead to changes in gait patterns in patients with COPD, especially at the hip. Twenty [10 controls (66.8±6.3 years), 10 COPD (64.8±7.8 years)] subjects walked at their self-selected pace along a ten-meter pathway while kinematics and kinetics were recorded. Subjects rested a minimum of one minute between each trial to minimize fatigue. Patients with COPD then underwent a treadmill protocol to induce fatigue and repeated walkover trials with no rest between trials. Group means from peak joint moments were calculated and compared using independent t-tests. REST: Peak hip extension moment was significantly increased in patients with COPD as compared to controls ($p=0.012$). FATIGUE: Hip extension moment was significantly increased in patients with COPD as compared to controls ($p = 0.017$). In accordance with our hypothesis, the peak hip extension moment was the only parameter to demonstrate significant differences in both the rest and fatigue conditions. Since only the extensors were affected, this may not be due to the changes in skeletal muscle structure and function noted previously. Underlying mechanisms to abnormal skeletal muscle tissue could arise from physical inactivity or peripheral inflammation. These results provide preliminary evidence that patients with COPD demonstrate an altered gait pattern as compared to controls.

XIAODAN YU

Graduate: Doctoral

Adaptive Use of IT Capabilities in Virtual Teams: Lessons from Google Site, Blackboard, and Email

Major: Information Technology

Faculty advisor: Deepak Khazanchi

There is great interest in examining how members of virtual teams adaptively use IT capabilities as they accomplish team goals. By adaptively using IT capabilities, virtual team members will change the technology features they use or the purposes of using the technology features so that IT can best support team functioning. Google site is a technology that integrates various features allowing users easily to create and to share websites. Blackboard is a distant learning technology with diverse features which allows students to participate in their online classes. In a distant learning class at a Midwestern University, in the Fall 2011 semester, five virtual teams were formed. Students of virtual teams were asked to use these three technologies--google site, blackboard, and email--to manage their team project and to present their project deliverables on google site. This study first explains what adaptive use of IT capabilities is and the benefits associated with adaptive use of IT capabilities by exploring relevant literature. Second, we report when and how virtual team members will adaptively use IT capabilities from our study. Implications for researchers and practitioners are discussed in the end.

ABSTRACTS

POST DOCTORAL FELLOWS

DENISE MCGRATH

Post Doctoral Fellow

The Effects of Auditory Stimulation on Gait Variability in Healthy Elderly

Major: Exercise Science

Faculty advisor: Nick Stergiou

Co-Author(s): Nick Stergiou

Aging affects the variability of gait parameters. Specifically, elderly demonstrate increased variability of step length, step width, and stance time in terms of their standard deviation and coefficient of variation. Metronomes are commonly used tools in gait rehabilitation to facilitate more robust stepping rhythms. The metronome represents a perfectly periodic rhythm, in that each beat will match all previous and future beats. This study investigated the effect of different auditory stimuli, including a metronome, on gait variability. Twenty-nine healthy elderly (age: 71.3 ± 4.7 yrs) subjects walked for 5 minutes on a treadmill at their self-selected pace while listening to three different auditory conditions (i.e. no noise, white noise, and metronome). Lightweight wireless markers were tracked by a motion capture system and recorded in 3D space. The coordinates were extracted from 151 continuous strides and spatiotemporal variables were calculated in custom-made MatLab program. One-way ANOVAs and post hoc analyses for spatiotemporal (ST) measures and for ST coefficient of variation were performed. Walking to the metronome resulted in increased swing time, step length, and stride length and decreased coefficient of variation for all ST parameters as compared to the other two auditory stimulus conditions. Such a reduction of gait variability may not be ideal in gait rehabilitation. Future research should explore the effect of other types of auditory stimuli on gait variability.

SRIKANT VALLABHAJOSHULA

Post Doctoral Fellow

Impact of starting position on variability of neuromuscular control during stair negotiation

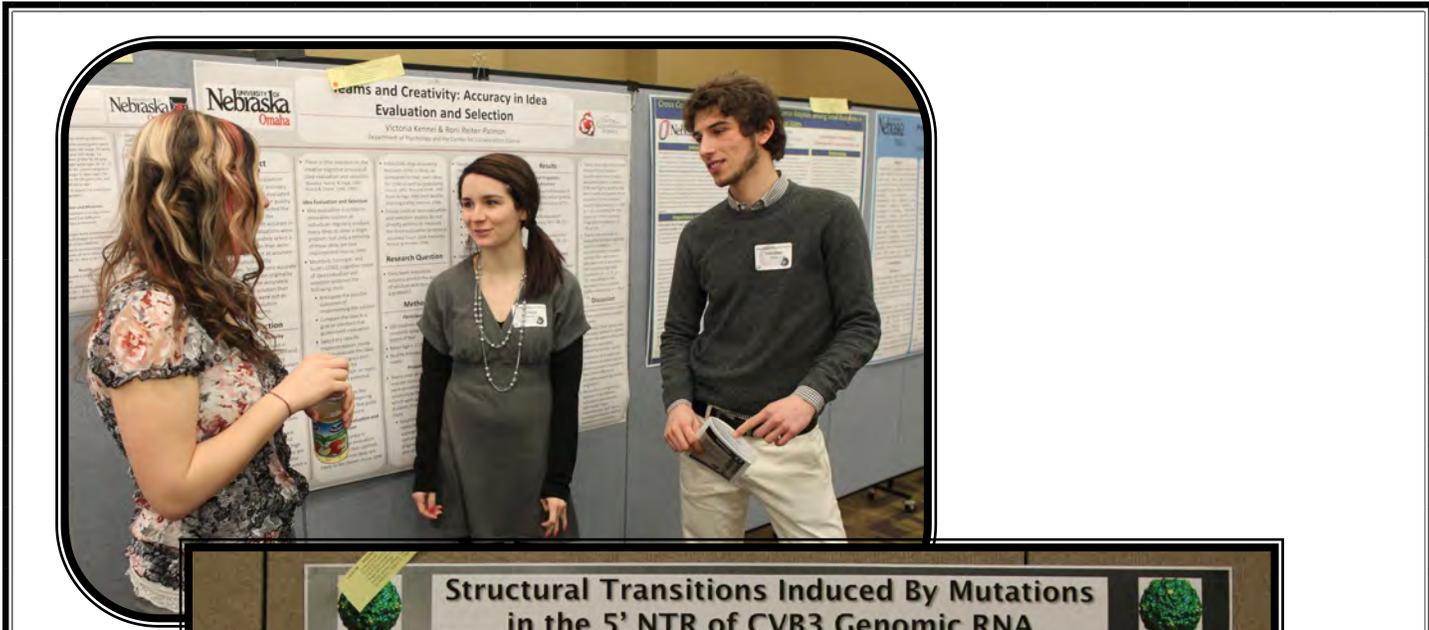
Major: Physical Ed-Exercise Science

Faculty advisor: Nick Stergiou

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Stair climbing is a physically demanding task for the neuromuscular system. Previously, researchers only focused on motor control strategies of stair climbing when starting from in front of the stairs. Particularly, the amount of variability of peak joint moments at the first step, increases from distal to proximal joints in the sagittal plane and decreases from distal to proximal joints in the frontal plane. However it is not known if this holds true when one approaches stairs starting from farther away and also on successive ipsilateral steps. Ten healthy young adults ascended an instrumented four-step staircase. Kinematics data (60Hz) and kinetics data (600Hz) were collected. Five trials of stair ascent were performed in two conditions: starting from farther away and starting in front of the stairs. The coefficients of variation for joint moments in the sagittal and frontal planes were used as dependent variables. Separate two-way ANOVA with two conditions and two successive ipsilateral steps as factors were performed. Results showed only a significant step main effect with a greater coefficient of variation of peak knee extensor moment at the first ipsilateral step ($P = 0.033$). Knee extension primarily happens as the limb enters the weight-acceptance phase during gait cycle. Hence a larger intra-subject variability at the first step could indicate that participants used different control strategies as their gait transitioned from level-walking to stair ascent. Minimal differences in variability suggest that the young adults generate a reproducible neuromuscular control while climbing stairs irrespective of their starting position.



Structural Transitions Induced By Mutations in the 5' NTR of CVB3 Genomic RNA

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Abstract

Coxsackievirus B3 (CVB3) is a positive-sense RNA virus from the Picornavirales order that causes acute and chronic disease. The native structure of the 5' non-translated region (5' NTR) of the CVB3 genome is necessary to promote replication and is vital for assembly. The structure of the wild type 5' NTR has been determined previously in our laboratory by chemical probing and comparative sequence analysis. The current investigation identifies and characterizes structural transitions in the 5' NTR induced by mutations in the RNA domain II of the 5' NTR. RNA structure is examined and analyzed by chemical probing of the full length and full length 5' NTR RNA. Results have indicated evidence of significant structural transitions in a single, as well as a double mutant CVB3 genome when compared to the wild type. These preliminary results have led to a collaborative effort with researchers from UNMC to determine not only the structural differences between wild type and mutant CVB3 systems but also determine if these differences in viral structure between the mutants are distinguishable from natural structural variations of that effect on virulence and identify the mechanisms involved in CVB3 virulence and how yield might vary between mutants. This information may then be used to aid in the development of novel therapeutics against CVB3.

Introduction

Maintenance of the CVB3 5' NTR structure is necessary for virulence. The native 5' NTR structure contains an internal ribosome entry site (IRES) required for viral translation. If the native structure of the 5' NTR is altered, viral translation ceases, preventing successful infection. The current study examines the effects of generating point mutations in Domain II of the CVB3 5' NTR, a region that has previously been shown to be required for virulence. Structural transitions are seen in both a single mutant and double mutant genome in comparison to the wild type genome.

Hypothesis

Point mutations in Domain II will induce structural transitions in the 5' NTR of CVB3 genomic RNA.

Methods

- Plasmid DNA containing the CVB3 genome is extracted from cultured cells. The 850 base fragment containing the 5' NTR is then isolated from the plasmid via EcoRI digestion.
- Dispersed DNA is transcribed by T7 polymerase to yield the 748 base CVB3 5' NTR.
- Transcribed RNA is folded then exposed to one of three base specific chemical modifying agents.
- 10 labeled oligonucleotides are annealed to the modified RNA forming reverse hybridization (RH) extension of cDNA modifications using RT and generate defined fragments.
- Label sizes
- Final steps on CVB3 RNA
- Reverse hybridization to make a cDNA
- Size analysis
- RNA structure analysis

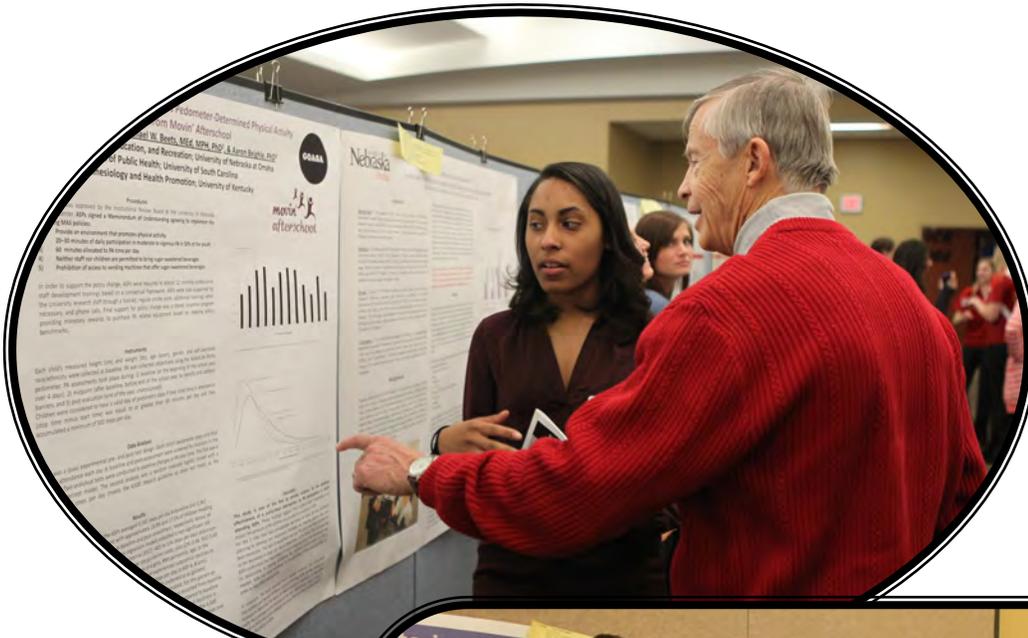
Results

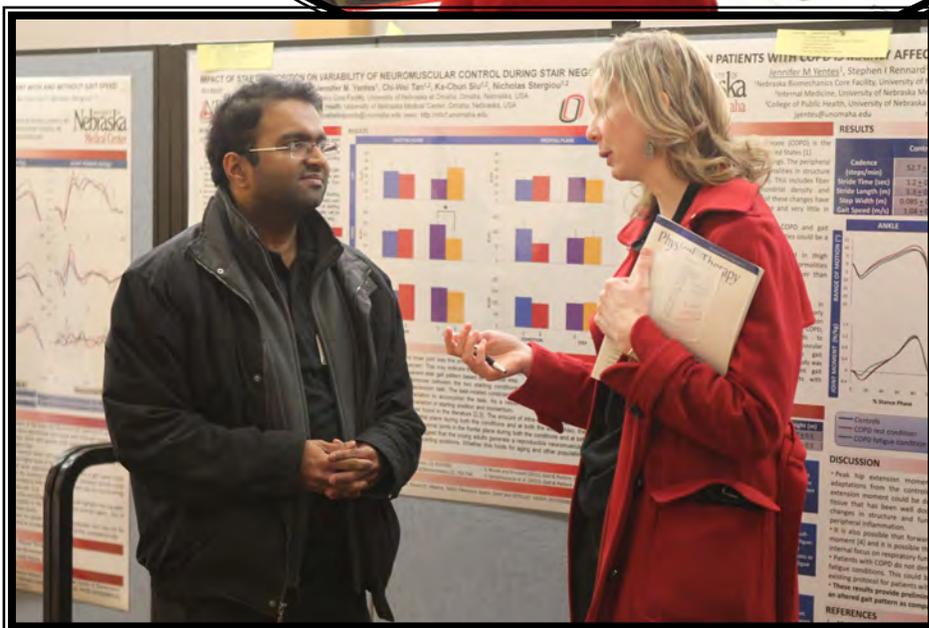
Conclusions

- Mutations in Domain II of the CVB3 5' NTR create structurally unique RNA molecules.
- Collaborative investigations are currently examining the influence of the mutations on CVB3 virulence.









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