



Centennial Celebration of Student Research and Creative Activity

University of Nebraska at Omaha

Milo Bail Student Center

March 24, 2009

Oral presentations and performances | 5–7:45 p.m. | Chancellor's Room—2nd floor
Posters presentations and exhibits | 7:45–9 p.m. | Nebraska and Aksarben Rooms—2nd floor

March 25, 2009

Oral presentations and performances | 5–7:45 p.m. | Council Room—3rd floor
Posters presentations and exhibits | 7:45–9 p.m. | Nebraska and Aksarben Rooms—2nd floor

March 26, 2009

Keynote address and awards program | 7 p.m. | Ballroom—2nd floor

The event was made possible with support from the Office of Sponsored Programs and Research,
Graduate Studies and the UNO Centennial Committee.

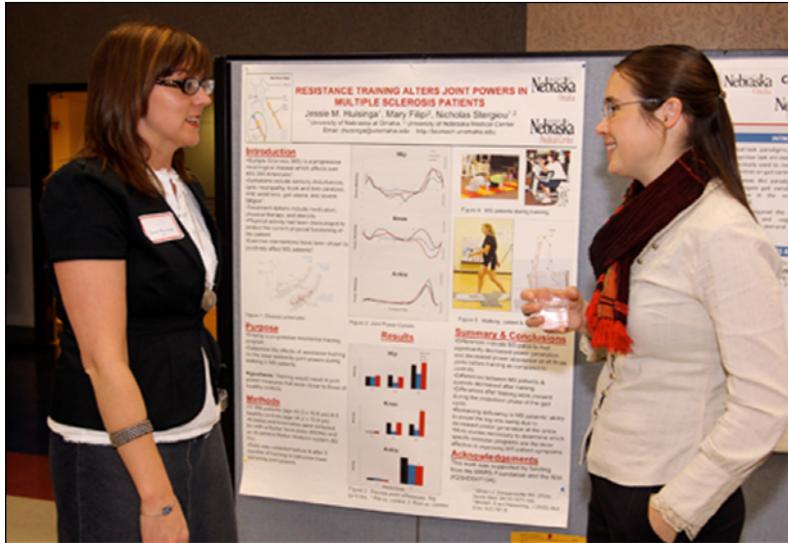


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Dear Colleagues, Students and Friends:

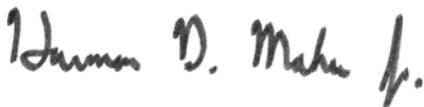
As a student-focused university, the University of Nebraska at Omaha provides a variety of quality research and creative activity opportunities for students. This centennial year, the first Student Research and Creative Activity Fair was planned in conjunction with the annual Honor's Program Senior Symposium. Undergraduate and graduate students showcased their research and creative activity as oral presentations, performances, poster presentations and exhibits.

Thank you to the planning committee members for their time and expertise: Christine Beard, Christopher Decker, Shelton Hendricks, Lexie Hollertz, Wendi Jensen, Jerri Maxwell, Christine McIvor, Rosalie Saltzman, Robert Shuster, Russell Smith and Sandra Wetig. Special thanks to Lexie Hollertz, Wendi Jensen and Jerri Maxwell for contributions too numerous to detail here, but including organization, responding to questions, and compiling student entries and this document.

We appreciate the willingness and time of those who served as judges for this event, our UNO friends Rivkah Sass, Omaha Public Library; Tanya Wright, Boystown; Kim Sosin, emeritus faculty, UNO College of Business Administration; Stephen Shorb, UNO Library; Lyn Ziegenbein, Peter Kiewit Foundation; Garry Ruliffson, Omaha Public Power District; Karen Coates, Council Bluffs Community School District; Mariana Fox, Ponca Tribe of Nebraska; and Nicole Regan, Omaha Public Schools.

I would finally like to thank the students and their advisors for their participation and abundant energy and enthusiasm. I found this event strongly encouraging in so many ways, and I look forward greatly to next year's celebration of student accomplishment.

Sincerely,

A handwritten signature in black ink that reads "Harmon D. Maher Jr." with a stylized flourish at the end.

Dr. Harmon D. Maher Jr.

Interim Associate Vice Chancellor for Research and Creative Activity

AWARD WINNERS

Awards were given in six categories: Oral presentation—undergraduate, Oral presentation—graduate, Poster presentation—undergraduate, Poster presentation—graduate, Performance and Honors Presentation. In each category first prize was \$120.00, second prize was \$60.00 and third prize was \$30.00.

ORAL PRESENTATION—undergraduate

- First place: ALEX HOSTETTER, Physics/Math
“Surface Induced Magnetization Switching in Nanoparticles”
Advisor: Renat Sabirianov
- Second place: SARAH VOLLMER, English
“Keeping the Bromance Alive: The Use of Self-Repair in Male Conversation”
Advisor: Frank Bramlett

ORAL PRESENTATION—graduate

- First place: KAELE SAMSON, Psychobiology
“Studying Developmental Plasticity in Rats: The Effects of Orally Administered Capsaicin on Taste Buds”
Advisor: Suzanne Sollars
- Second place: KE CHENG, Information Technology
“Flocking-based distributed Terrain Coverage with Dynamically-formed Teams of Mobile Mini-Robots”
Advisor: Raj Dasgupta
- Third place: JOHN BUCKLEY, RICK MANTHEY, MIKE LEWIS
KYLE KOVAR, and ANAND KUMAR, Business Administration
“Restructuring of the Power Industry in South Africa”
Advisor: Phani Tej Adidam
- Honorable mention: DIMITRIOS KATSAVELIS, Medical Sciences interdepartmental area in Surgery
“Nano Legends: An Interactive Virtual Reality Game Induces High Level of Physical Activity”
Advisor: Nick Stergiou
- DAE-YOUNG KIM, Criminology and Criminal Justice
“Risk Assessment and Classification of Day Reporting Center Clients”
Advisor: Robbin Ogle
- TASHA JARRETT, Organizational Psychology
“Organizational Retaliatory Behavior as a Function of Work-life Programs and Emotion Regulation Ability”
Advisor: Lisa Scherer

POSTER PRESENTATION—undergraduate

- First place: KATHERINE LAWRY, Biology
“Fishes of the Lower Elkhorn River”
Advisor: Richard Stasiak
- Second place: JOHN TRAN and SEAN BERGSTEDT, Architectural Engineering
“The Undergraduate Seismic Design Competition”
Advisor: Terri Norton
- Third place: SYDNEY BROMMER, Biology
“Analysis of Expressed Sequence Tags from Parasitic (*Cuscuta Pentagone*)
and Non-Parasitic (*Ipomoea Hederacea*) Convolvulaceae”
Advisor: Mark A. Schoenbeck

POSTER PRESENTATION—graduate

- First place: RAMEZ MINA, Computer Science
“On Evaluating the Performance of Compression
Based Techniques for Sequence Comparison”
Advisors: Hesham Ali and Dhundy Bastola
- Second place: SARA MYERS and PANAGIOTIS KOUTAKIS, Exercise Science
“Induced Lower Extremity Vascular Occlusion Affects Gait Variability”
Advisor: Nick Stergiou
- Third place: ANASTASIA KYVELIDOU, Medical Sciences interdepartmental area in Pediatrics
“Reliability of COP Measurements During Sitting in Developmentally Delayed Infants”
Advisor: Nick Stergiou

PERFORMANCE PRESENTATIONS

- First place: TIMOTHY VALLIER, Music Composition, graduate
“Two Stylized Dances for Saxophone Quartet and Percussion”
Advisor: Roger Foltz
- Second place: SARA SCHUHARDT, Music Performance, graduate
“The Influence of Popular Music on 21st Century Flute Repertoire”
Advisor: Christine Beard

HONORS PRESENTATIONS

- First place: MALLORY A. MARTINEAU, Psychology
“The Effects of In Ovo Hormone Levels on Adult Behaviors and
Their Subsequent Effect on Future Generations of the Zebra Finch”
Advisor: Rosemary Strasser
- Second place: ERICA K. ANDERSON, Environmental Studies
“Endocrine Disrupting Compounds and the Elkhorn River: Developing the Western
Mosquito fish (*Gambusia affinis*) as a Bioindicator for the Androgenic Pollutants”
Advisor: Alan S. Kolok
- Third place: TYLER A. PIETZ, Psychology
“Anxiety and Depression in Diabetic and Non-Diabetic Native Americans”
Advisor: Jessiline Anderson

STUDENT RESEARCH AND CREATIVY ACTIVITY

Oral Presentations

“What We Do When They Are Good: How Parents Reward Their Preschool Children’s Pro-social Behavior”

ALICIA BOWER (O-1)

Major: Developmental Psychology, graduate

Faculty advisor: Juan Casas

Previous research has shown that child prosocial behavior depends upon the age and gender of the child, the type of behavior, and specific characteristics of the parent-child relationship (Eisenberg, Fabes, & Spinrad, 2006). In regards to the parent-child relationship, investigators have found that positive parent-child relationships, parent’s modeling of prosocial behavior and parent’s use of inductive discipline strategies for correction of antisocial behaviors are all positively related to children’s prosocial behavior (Lamb & Lewis, 2005; Hoffman, 1970, 1975). Researchers have also found that, positive reinforcement in the educational setting is also related to children’s prosocial behavior (Lepper, Greene, & Nisbett, 1973; Grusec & Redler, 1980). However, little research has been conducted regarding the effects of parent’s use of positive reinforcement for child prosocial behavior on subsequent child prosocial behavior. Therefore, an investigation into parental reinforcement for children’s prosocial behavior and its relation to preschool children’s prosocial behavior (accounting for child gender and whether the behavior is feminine or masculine) is proposed. The sample would consist of mothers, fathers and teachers of 130 Midwestern preschool children of varying ethnicity and SES. Self-report measures will be used to record parent’s reinforcement and teacher report measures will be used to record child prosocial behavior. Data will be analyzed using correlation and regression procedures. Limitations and implications are discussed.

“Toys & Tots Part Duex: A Survey Approach to Understanding Parental Mediation Techniques Among Mothers with Varying Economic Statuses”

SALLY BUCK (O-2)

Major: Communications, graduate

Faculty advisor: Teresa Lamsam

For almost 40 years, scholars have been researching the impact of children’s television advertising on America’s youngest youth. Current researchers believe that in order to combat the effects of advertisements aimed at children, parents must mediate those effects by employing certain techniques. Three mediation techniques—restrictive, active, and unfocused—are explained and help to focus the current study proposal. First, current literature in communication is examined in order to formulate a proposal for a quantitative study that utilizes a survey questionnaire instrument. The proposed study focuses on whether or not a relationship exists between a mother’s economic status and her use of any or all of the three mediation techniques. Mothers who have at least one child between the ages of 7 and 10 will qualify to participate. A proposed methodology follows and outlines the specific procedures for completing the data collection. The following paper is a research proposal and does not contain actual research results and discussion. However, instrumentation to implement the proposed study can be found in Appendix A.

“Restructuring of the Power Industry in South Africa”

JOHN BUCKLEY

RICK MANTHEY

MIKE LEWIS

KYLE KOVAR

ANAND KUMAR (O-3)

Major: Business Administration, graduate

Faculty advisor: Phani Tej Adidam

South Africa is currently beset with tremendous electricity shortages. In order to overcome the inefficiencies in the system, and boost electricity coverage to its population, South Africa is embarking on an ambitious plan to restructure its power industry. Therefore, EDI Holdings, an agent of the South African

national government, sponsored a UNO Executive MBA team (five students) to investigate the feasibility of restructuring this industry by providing benchmarks of similar efforts in various other countries. The restructuring is critical to addressing areas of the power business where greater efficiency is required including: tariff rationalization, maintenance of power plants, and expansion of the power grid to new customers that have never had electricity. The students conducted secondary research on international trends for power sector reform in China, India, Brazil, Argentina, Western Australia and the United States and identified three components required for successful restructuring. The research identified that unbundling wires and retail within the distribution operating model was the dominant international trend. The students conducted primary research in South Africa and met key stakeholders including Eskom, EDI Holdings, government, and municipalities. The students presented their international findings to these stakeholders, and understood the various political and infrastructural factors within the South African context. The team's sponsor Nigel Waters, Regional Manager EDI Holdings, commenting on the value of the teams' work stated "A number of local players are very up to date with international trends, but the manner in which UNO students packaged the international research enabled a common understanding of the key international trends and emphasized the need for South Africa to consider each of these aspects in finalizing a perspective on the business model." EDI sponsored a return trip to South Africa to conduct a workshop on the findings of the research.

"Computational Fluid Dynamics of Bridge Hydraulics"

AFZAL BUSHRA (O-4)

Major: Civil Engineering, undergraduate

Faculty advisor: Junke Guo

Highway bridges across rivers may be submerged during large floods, where the bridge deck may be turned over if the moment of hydrodynamic forces around the deck center is very large. Traditionally, these studies are physically modeled in hydraulics labs with expensive costs and laborious time. The present study examines the Computational Fluid Dynamics to estimate the drag, lift and moment of an inundated bridge deck. The standard k- ϵ model and Large Eddy Simulation (LES) were used to simulate the flow fields around the bridge deck. The numerically calculated drag, lift and

moment coefficients were then compared with the reduced scale experiments conducted at (FHWA) J. Sterling Jones Hydraulic Laboratory. The simulation results showed that: 1) The drag coefficient values for both LES and k- ϵ is in good agreement with the experimental data from FHWA Hydraulics lab, 2) For the lift coefficient, both LES and k- ϵ provide good results when bridge decks are totally submerged, whereas both simulations overestimate the lift coefficient for partially submerged decks; and 3) since the moment is a result of drag and lift, it is found that the moment coefficient agrees with experimental data for totally submerged decks while it is less than the experimental data for partially submerged decks. Finally, the velocity fields from both simulations are very close to the Particle Image Velocimetry (PIV) measurements. In brief, the predictions of drag, lift and moment coefficient using both LES and k- ϵ show trend similar to experimental data. Therefore with high speed supercomputers future bridge designers and engineers can use the numerical CFD model without much effort for rapid development of various bridge scenarios, which will be much easier than physical modeling in hydraulics labs.

'The New Ice Age: A Content Analysis of Meth Stories in Midwestern Newspapers'

SCOTT CHENAULT (O-5)

Major: Criminology and Criminal Justice, graduate

Faculty advisor: Rebecca Trammell

The United States criminal justice has historically dealt with a number of victimless crimes. These crimes were labeled victimless because both parties willingly choose to participate in them, causing some moral ambiguity regarding the punishment of these offenses. In terms of impact on the criminal justice system, drug related offenses represent the most important of these victimless crimes. The current research examined coverage from a rural Midwestern newspaper of a specific drug, methamphetamine. This content analysis revealed coverage that is transforming this drug from a traditional victimless crime, into a crime with several potential innocent victims.

“Flocking-based distributed Terrain Coverage with Dynamically-formed Teams of Mobile Mini-Robots”

KE CHENG (O-6)

Major: Information Technology, graduate
Faculty advisor: Raj Dasgupta

My research addresses an important problem in the area of robotic systems called the distributed terrain coverage problem. This problem requires a set of mobile robots to cover every portion of an initially unknown environment within which they are placed. The robots have to use coordination mechanism that reduces the time required to cover the environment, and reduces the overlap in the regions covered by multiple robots. This problem is encountered in many practical domains including security applications such as surveillance of an unknown region for possible intruders, space applications such as exploring the surface of an extraterrestrial planet, agricultural applications such as automated lawn mowing or crop harvesting and even for domestic applications such as automated vacuum cleaning. I envisage that the multi-robot coverage problem can be solved efficiently if multiple robots can be coordinated to form small teams while covering the environment. I have used the flocking-based model observed in migratory birds to enable robots to move together as a team. However, the flocking-based model does not provide a formal mechanism for robots to change teams based on their performance and on the environmental conditions. Currently, I am extending the basic flocking-based mechanism using techniques from game-theoretic coalition formation to enable robots dynamically split into subgroups and reform a larger groups based on their performance. In my presentation, I will discuss the salient aspects of my work and show video demonstrations of simulated as well as actual robots that use the team-formation techniques that I have developed.

“Moving First Life to Second Life: An Exploratory Study of Virtual World Projects”

ALANAH DAVIS

DAWN OWENS (O-7)

Major: Information Technology, graduate
Faculty advisor: Deepak Khazanchi

Until recently, most people thought of virtual worlds (VWs) as social or gaming environments. However, lately virtual worlds have started gaining the attention of organizations, researchers, and individuals. In fact, organizations such as IBM, NASA, and Sears have begun exploring uses in the business context. Most of their efforts have involved branding and marketing activities, but some have recognized the potential for these environments to enhance virtual team collaboration. These virtual worlds offer a place for people to interact with each other and their environment, using the metaphor of the real world but without its physical limitations. Unique technology capabilities of virtual worlds have the potential to enhance the conduct of virtual projects, however little is known about virtual worlds in this context. Applying a theoretical foundation for virtual world technology capabilities based in a socio-technical view of collaborative work, we conducted an exploratory study of project teams in a virtual world. The study examined the interplay of communication, representation, interaction, and team process tools with role clarity, shared understanding, and coordination behaviors. While each individual technology capability contributed to project execution and outcomes, much of the power of the environment emerged through the interplay of social behaviors with technology capabilities. The results have intriguing implications for how virtual world technology capabilities might provide new ways to address gaps in the current research and practice of virtual projects.

“Who Checks the Sex Offender Registries? A Look at Legislative Intent and Citizen Action”

MARY EVANS (O-8)

Major: Criminology and Criminal Justice, graduate
Faculty advisor: Lisa Sample

States are required to maintain an Internet-based sex offender registry in order to comply with community notification laws. Such legislation, however,

relies on citizens to proactively access information regarding sex offenders' whereabouts in order to take precautions to protect themselves and their families. This study used survey responses from a representative sample of Nebraska residents and logistic regression to examine who was likely to access the Nebraska sex offender registry and also who was likely to take preventative action in response. Our findings and the implications of the results on notification laws are discussed.

“Structure, Culture and Homicide: A Cross-National Test of Institutional Anomie Theory”

BENJAMIN GIBBS (O-9)

Major: Criminology and Criminal Justice, graduate
Faculty advisor: Lorine Hughes

This paper presents a cross-national test of Messner and Rosenfeld's (1994) Institutional Anomie Theory. Using data from the World Values Survey, in conjunction with statistics reported by other well-known sources, we examined the relationship between homicide rates and the institutional balance of power across a maximum sample of 45 countries. Additionally, we assessed the thesis of “American exceptionalism,” a cultural complex thought to be unique to the US and implicated as one of the main reasons for increased rates of serious crime in this country and, presumably, elsewhere in the world. Although findings reveal a marginal association between homicide and a combined measure of “achievement orientation” and “universalism,” neither the institutional balance of power nor any of the remaining cultural elements emerged as a significant predictor. Further, the data suggest that the American Dream does not distinguish the US from other advanced nations, either culturally or with respect to homicide. Study limitations and implications are discussed.

“Cyber Bullying”

HEATHER GILES-WOERNER (O-10)

Major: Psychology, graduate
Faculty advisor: Juan Casas

There is a new form of bullying using technology. This is called cyberbullying, internet bullying, internet/electronic aggression, or internet harassment. These terms are reserved for children or adolescents

under the age of 18. Cyberbullying is defined as, “...willful and repeated harm inflicted through the use of computers, cell phones, and other electronic devices,” (Hinduja & Patchin, 2009; p. 5). Cyberbullying is an extension of bullying from school in other words the victim knew the cyberbully before the online incident. Usually, the target is a victim of traditional bullying from school and the bullying continues in cyberspace. The perpetrator of cyberbullying was strongly associated with both physical and verbal bullying. Cyberbullying usually occurs within the same age group and occurs most often at home. This is because schools have rules against cell phone and school computer use for visiting social networking sites. Many children and adolescents know how to use technology better than their parents. Parents have difficulty keeping up with the technology and terminology the children are using. Having a poor parent child relationship, low parental monitoring, and low child self-disclosure are all strong predictors of both being a perpetrator and victim of cyberbullying. Strong technology skills are associated with cyberbullying. Most cyberbullies self-reported as being an almost expert or an expert in internet usage. Bully/victims had the highest use of internet using it six or more days a week and at least three hours per day. High internet use was strongly correlated with being a cyber victim. Three or more hours of daily use increases the chances of being a cyber victim.

“Surface Induced Magnetization Switching in Nanoparticles”

ALEX HOSTETTER (O-11)

Major/minor: Physics/Math, undergraduate
Faculty advisor: Renat Sabirianov

We show that the competition between FM and AFM interactions between surface and interior in nanoparticles can lead to surface induced magnetization switching if surface exchange parameters are changed by external stimuli. The modification of the surface exchange parameters of nanoparticle may lead to a magnetic structure that is nearly non-magnetic, noncollinear or FM, depending on the relative strength of the competing exchange interactions.

“Organizational Retaliatory Behavior as a Function of Work-life Programs and Emotion Regulation Ability”

TASHA JARRETT (O-12)

Major: Industrial/Organizational Psychology, graduate
Faculty advisor: Lisa Scherer

Within the last two decades, organizations have responded to the changing dynamics of the workforce by implementing programs to assist employees with balancing work and personal life. Many researchers have noted the positive outcomes that both the organization and the employee may receive as a result of these programs (Cohen, 1997; Grover & Crooker, 1995; Orthner & Pittman, 1986). Despite these efforts, research has indicated that some employees may perceive these programs as unfair and thus harbor feelings of resentment toward the organization (Young, 1999). The purpose of this study was to examine the effects of the perceived fairness of work-life benefits on employees' emotional and behavioral responses. Emotion regulation ability was hypothesized as a moderator of negative emotions and organizational retaliatory behavior. Results of this study suggest that negative emotions fully mediate the relationship between perceived work-life unfairness and organizational retaliatory behavior. However, emotion regulation ability was not found to moderate the relationship between negative emotions and organizational retaliatory behavior.

“Nano Legends: An Interactive Virtual Reality Game Induces High Level of Physical Activity”

DIMITRIOS KATSAVELIS (O-13)

Major: Medical Sciences interdepartmental area in Surgery, graduate
Faculty advisor: Nick Stergiou

We wanted to measure the energy expenditure of a novel interactive virtual reality game that can be used for education. Movements of the upper and lower extremities while playing the Nano game can be translated to the screen, where the hero of the game fights against carcinogens and viruses. Results from 11 middle school students showed that oxygen consumption, heart rate and rate of perceived exertion were similar to those found when subjects walked at 3.5

mph. When compared to other commercial video games, Nano had much higher oxygen consumption and therefore energy expenditure. This game can definitely serve the triptych of education, entertainment and physical activity that is getting even more essential nowadays.

“Risk Assessment and Classification of Day Reporting Center Clients”

DAE-YOUNG KIM (O-14)

Major: Criminology and Criminal Justice, graduate
Faculty advisor: Robbin Ogle

The day reporting center (DRC) has become an increasingly popular sentencing option in many states that are using more community-based alternatives to jail and prison sentences. To protect the community and improve the likelihood of rehabilitation, improving the quality of risk assessment and classification at the DRC is an essential task. In this regard, with data collected in Nebraska, the study sought to identify significant variables influencing both termination from a DRC program. This study found that a number of significant risk and need variables (e.g., type of offense, education, relapse prevention) had been overlooked by the current risk assessment. The authors provide an alternative risk assessment and classification scheme by calculating predictive probabilities of a client's termination through the use of logistic regression models.

“Influence of Parental Care on the Timing of the Onset of Ovarian Activity in Female Wied's Black Tufted-Ear Marmosets”

STEPHANIE MATTHEWS (O-15)

Major: Psychology, graduate
Faculty advisor: Jeffrey French

Early social environments are known to play a large role in mediating trade-offs among growth, maintenance, and reproduction. In humans, the quality and quantity of early parent-daughter interactions predict pubertal timing in daughters. The proximate mechanisms that mediate the relationship between early parent-daughter interactions and pubertal timing are yet

to be identified. We examined the relationship between parental care, baseline hypothalamic-pituitary-adrenal (HPA) axis activity, and the timing of the onset of ovarian activity in Weid's black tufted-ear marmosets (*Callithrix kuhlii*). Parental care measures included maternal and paternal retrievals, rejections, grooming, and food sharing with female infants for the first two months of life, and parental carrying during the first two weeks of life. Urinary cortisol (CORT) and pregnanediol-3 α -glucuronide (PdG) concentrations were used to evaluate baseline HPA axis activity and the onset of ovarian activity respectively. Daughters who received higher rates of paternal rejection had lower baseline CORT at 12 months of age and an earlier onset of ovarian activity. The relationship between the timing of the onset of ovarian activity and paternal rejections was not significantly mediated by baseline HPA axis activity. There was a trend for increased maternal carrying during the first two weeks of life to be associated with an earlier onset of first ovulation. The data suggest that the quality of early parental care is associated with the timing of onset of first ovulation in the marmoset daughters.

“Shame and Honor in Yemen: Examining Braithwaite’s Theory in Cultural Context”

WILLIAM MORRIS (O-16)

Major: Criminology and Criminal Justice, graduate
Faculty advisor: Rebecca Trammell

The following ethnographic study is an attempt to operationalize and examine shame/honor in a Middle Eastern context using John Braithwaite's theoretical model of reintegrative shaming. The focus was to operationalize expressions of shame/shaming in to determine if and how they differ from western constructs. Furthermore restorative justice is derived from models which existed in ancient Greek, Roman, Arab and Babylonian civilizations. If restorative justice was founded in these societies; does it still exist there? If so, what is its current form? The follow research sought to determine the manner in which restorative justice exists in Yemeni society. It was hypothesized that the notions of what constitutes shame and shaming in Yemen would differ and often conflict with western definitions in a formal rational system of justice. Based on Braithwaite's emphasis on familism, interdependency, and communitarianism combined with national, cultural, religious factors creates a need to operationalize these concepts in a cultural context before

any comparisons can be made. Using data collected from interviews in Sana'a , the capital city of Yemen, and Mahwait province, the findings showed that there were conflicting models of what constitutes shame and what is considered restorative. The study also discusses various degrees of 'shame' and the relationship that exists between honor and shame. Analysis of the data reveals that formal rational systems and informal systems of justice intersect forming a restorative hybrid model.

“Garlic and Onions: New Flavors for Nebraska’s Economy”

JAMIE RYE (O-18)

Major: Economics, graduate
Faculty advisor: Catherine Co

The agriculture industry represents less than one percent of US Gross Domestic Product, and less than seven percent of Nebraska's GDP. In Nebraska's once agriculture-based economy, services account for over 75 percent of the state's GDP, but the agriculture industry still contributes significantly to other sectors. Agriculture generates 65 percent of the freight loaded in Nebraska, and food processing accounts for 28 percent of manufacturing output. ConAgra Foods, Inc. is one of the ten largest employers in Nebraska, with over 3,000 service-based positions at its global headquarters. This paper discusses agricultural products not often associated with the Midwest, but whose tradability has found them an unlikely home at ConAgra. In the last two decades, onions and garlic have shown dramatic increases in demand in the US. Onions rank fourth in vegetable consumption, and garlic has maintained the strongest sustained demand growth of any vegetable. Gilroy, California is the self-proclaimed garlic capital of the world, but significant comparative advantage has allowed China to rule the fresh garlic market. This has resulted in an anti-dumping battle against China since 1996, with duties as high as 376 percent. In the midst of this international trade dispute, ConAgra purchased Gilroy Foods, a garlic and onion operation. ConAgra has since become the world's leading provider of garlic and onion products for the food-manufacturing and food-service industries. Thanks to its agricultural and international expertise in our increasingly global economy, Nebraska-based ConAgra enjoys success as a provider of products grown and processed entirely outside the state.

“Formalizing Regulatory Security Requirements Specification”

COBRA RAHMANI (O-17)

Major: Information Tech./Software Assurance, graduate
Faculty advisor: Robin Gandhi

The ever increasing cyber threat to software systems for several critical functions/businesses/missions has led to the regulation of their quality by mandating certain management, operational and technical security requirements. To assure compliance with regulatory security requirements, organizations conduct a Certification and Accreditation (C&A) process throughout the lifecycle of the software system. As part of the C&A process, the first set of activities is concerned with certification. These activities establish the level of compliance of a particular design and implementation with regulatory security requirements. However, the regulatory security requirements are often specified in thick natural language documents that are authored by multiple stakeholders. The lack of regularity in their specification makes it difficult to introduce automation in their processing, while allowing many subjective interpretations and non-standard implementation. As a result, certification activities often turn into a long, exhaustive and ineffective paperwork exercise with significant monetary costs. To address these issues, in this research we tackle the challenging problem of formalizing the specification of regulatory software security requirements. We follow a scenario-driven approach, where a sequence of activities performed by the software system are modeled and then tested using automated verification techniques to prove that the mandated security properties are preserved. This project employs formal software design languages like Alloy Analyzer to represent functional as well as security requirements to introduce rigor in the certification activities. We also expect the formal specification of security requirements to promote a common understanding among various stakeholders.

“Studying Developmental Plasticity in Rats: The Effects of Orally Administered Capsaicin on Taste Buds”

KAELI SAMSON (O-19)

Major: Psychobiology, graduate
Faculty advisor: Suzanne Sollars

Taste buds of rats can be found in fungiform papillae, which are small protrusions on the surface of the tongue. Studies in the past have looked at what happens to the size of taste buds after neural damage in both young and adult rats. Cutting the nerve that innervates taste buds leads to a near complete, permanent degeneration of taste buds when the cut is performed on young rats; rats that receive the cut as adults maintain most of their taste buds (Sollars, 2005). Cutting the nerve that innervates the papillae but not the taste bud (i.e. the lingual nerve), reduces the size and number of taste buds when the cut is performed on young rats, but the buds eventually regenerate to normal size and numbers; the same cut has no effect on adults (Gomez and Sollars, 2006). The current study seeks to identify the outcome of using a ‘natural’ neurotoxin. Capsaicin, the spicy chemical found in peppers, is known to be toxic to the lingual nerve (Nagy et al., 1982). Capsaicin was given to both young and adult female rats in a sucrose solution everyday for 36 days; control animals were given a plain sucrose solution. Contrary to the findings of the lingual nerve cut research, capsaicin treatment had no effect on taste bud size when given to young rats, but reduced the size of taste buds when given to adult rats. Tongues were also analyzed 50 days post-treatment to identify long-term effects of capsaicin treatment.

“The Galatea Effect: Training Managers to Raise the Specific Self-Efficacy of Subordinates to Improve Performance”

DANIELLE SEYMOUR (O-21)

Major: Psychology, graduate
Faculty advisor: Wayne Harrison

The Galatea effect is a boost in subordinates’ self-efficacy to improve performance. Outside facilitators have successfully produced the Galatea effect in employees, using techniques for raising specific self-

efficacy (McNatt & Judge, 2004). To date, managers have not been trained to produce the Galatea effect in subordinates. Four managers and 69 subordinates from a large Midwestern organization participated in this study. Managers in the organization were randomly assigned to an experimental or control group. Managers in the experimental condition were trained to enhance the specific self-efficacy of subordinates through performance feedback. Managers in the control condition were trained to give traditional performance feedback. Subordinates who received the Galatea performance feedback from managers in the experimental condition were hypothesized to have higher specific self-efficacy and performance as compared to subordinates with managers who received traditional feedback training. Mindset and general self-efficacy were hypothesized to moderate the relationship between specific self-efficacy and performance. The main hypotheses were partially supported, but the moderated analyses were not supported. Implications and limitations of these results are discussed.

“Effects of Implicit Theories of Intelligence and Achievement Goals on Help Seeking Behavior”

REBECCA SHIVELY (O-22)

Major: Industrial/Organizational Psychology, graduate
Faculty advisor: Carey Ryan

This study examined the effects of differences in implicit theories of intelligence and achievement goals on help-seeking behaviors among college mathematics students. Students in Intermediate and College Algebra at the University of Nebraska at Omaha completed measures of entity and incremental implicit theories of intelligence, performance and learning achievement goals, and confidence in math ability at the beginning and end of a semester. The frequency of help seeking behaviors and perceptions of the usefulness of the help that is received were tracked over the course of the semester. Consistent with previous research, it was expected that students who held an incremental view of intelligence would endorse learning goals and those with an entity view of intelligence would endorse performance goals. It was expected that students who endorsed an incremental theory of intelligence would seek more help than those who endorsed an entity theory. Students who endorsed learning goals would also be more likely to seek help when struggling than those who endorsed achievement goals.

“Oxytocin and Pair-Bond Formation and Maintenance in Marmosets”

ADAM SMITH (O-23)

Major: Psychobiology, graduate
Faculty advisor: Jeffrey French

Pair-bonding is marked by mutual attraction and selective sociosexual behavior during pair formation and maintenance. Central oxytocin (OT) affects social preference and behavior in rodents but has not been studied in heterosexual primate relationships. The present study evaluated the effect of OT on social behavior during pair-bond formation and maintenance of marmosets, *Callithrix penicillata*. Central OT activity was stimulated by intranasal OT, and inhibited by an orally-administered nonpeptide OT-receptor antagonist (OTA). Social behavior throughout the pair-bond varied as a function of treatment condition. Individuals actively sought social contact with a partner at different rates depending on treatment condition, as measured by initiating close proximity with partner [$F(2,18)=7.03$, $p < .01$] and starting huddling with partner [$F(2,18)=16.96$, $p < .001$]. Compared to the control condition, an individual came into close proximity [$t(9)=2.11$, $p=.06$] and started huddling [$t(9)=3.71$, $p<.005$] with a social partner more often when receiving intranasal OT but reduced both close proximity [$t(9)=-2.60$, $p<.05$] and huddling [$t(9)=-2.92$, $p<.05$] when receiving an oral OTA. The amount of food that an individual shared with a social partner depended on treatment condition, $F(2,18)=5.14$, $p < .05$. Both males and females shared food equally in the OT ($M=1.80, SD=1.32$) and control ($M=1.80, SD=1.69$) conditions [$t(9)=-0.04$, $p=.97$], but this behavior was all but eliminated when an individual received the OTA ($M=0.20, SD=0.42$), $t(9)=-2.99$, $p<.05$. Individuals receiving intranasal OT increased social contact and affiliative behavior, but these behaviors were reduced when individuals received oral OTA. Our findings imply that oxytocin is involved in couple interactions and close relationships in monogamous marmoset monkeys.

“Data Aggregation in Multi-Agent Systems in the Presence of Hybrid Faults”

SATISH MAHEDEVAN SRINIVASAN (O-24)

Major: Information Technology/Statistics, graduate

Faculty advisor: Azad Azadmanesh

Data Aggregation (DA) is a set of functions that provide components of a distributed system access to global information for the purpose of network management and user services. With the diverse new capabilities that sensor and ad-hoc networks can provide, applicability of DA is growing. The DA research for Fully Connected Networks (FCN) is relatively mature. In contrast, the research in Partially Connected networks (PCN), e.g. sensor, mobile, and ad-hoc networks, is very limited. The objective of this project is to research the DA problem in PCN under the influence of node density, link density, and faults. More specifically, the objectives of the research proposal are:

- To find the maximum and the average number of rounds needed to reach a network-convergence, for any given network topology.
- To find the asymptotic convergence rate per round, for any given network topology.

The above achievements will make it possible for a system designer to decide on a suitable network topology. To reach these objectives, the following must be investigated:

- Under which conditions network-convergence is possible and how fast can it be reached. For instance, what should the link density (or node degree) or distribution of faults should be to ensure convergence?
- Which network topologies provide reasonable convergence rate and number of rounds to attain a network-convergence?

The aforementioned objectives will be obtained with the following benign and/or malicious faults in mind: omissions, crash failures, symmetric, and asymmetric failures.

“Acute Effects of Exercise on Endothelial Function”

TAMRA TREHEARN (O-25)

Major: Exercise Science, graduate

Faculty advisor: Jessica Meendering

Purpose: The purpose of this study is to observe the differences in endothelial function between rest and after a 30-minute treadmill exercise session at 60% vVO_{2max} in young, healthy subjects. The function of the brachial artery is correlated to the function of the coronary blood vessels. Therefore, it is important to understand the transient changes in the vasculature after exercise. Methods: Eleven young, healthy subjects completed blood vessel function tests at rest and immediately after a 30-minute treadmill exercise session at 60% vVO_{2max} . At rest and after exercise, wall tracking of high resolution ultrasound images of the brachial artery were used during flow mediated dilation (FMD) and nitroglycerin administration to test endothelium-dependent and endothelium-independent vasodilation, respectively. Results: After exercise, FMD (expressed as percent change and normalized for shear rate) was reduced compared to the rest condition ($p < 0.05$). Additionally, baseline shear rate and the FMD shear rate AUC were significantly greater after exercise than at rest ($p < 0.05$). Baseline diameter, time to peak diameter, and endothelium-independent vasodilation were not significantly different between the two conditions. Conclusions: These results suggest that in young, healthy subjects endothelial function is blunted acutely after exercise. Even though a greater shear stimulus is evoked by the FMD test, a diminished dilation was observed. Noteworthy, the potential dilation for a given shear stimulus may depend upon baseline shear rate, which was heightened after exercise. Therefore, as shear rate seems to be affected by exercise itself, it may affect the subsequent responsiveness to hyperemia.

“Keeping the Bromance Alive: The Use of Self-Repair in Male Conversation”

SARAH VOLLMER (O-28)

Major: English/Writing and Linguistics, undergraduate
Faculty advisor: Frank Bramlett

Nobody speaks perfectly. This is especially true in natural conversation – we are forever making mistakes and correcting them in our speech, or other conversants are correcting us. This conversational feature, known as repair, takes place every day in nearly every conversation when there is a problem with speaking (finding a word, using the wrong word, etc.), hearing a particular phrase or sentence, or understanding what the speaker is saying. The two main types of correction – correcting oneself and being corrected by someone else – create social as well as linguistic interest and analysis; the dichotomy between “self” and “other” has long been an integral part of studying how society works. In this research project, I look at how repair is used in male conversation. How do men accomplish masculinity through talk? More specifically, what role does self-repair play in creating and maintaining the relationship between men during their conversation? I argue that self-repair – more specifically self-initiated self-repair – is the preferred form of correction in male conversation because it does not pose a threat to masculinity. Self-repair also keeps intact the delicate balance of politeness and maintaining one’s social face; it strengthens the “bond” created through conversation.

“Lower Extremity Joint Kinetics are Altered in Patients with Unilateral Peripheral Arterial”

JENNIER YENTES

JEFFREY P. KAIPUST

SARA A. MYERS (O-29)

Major: Biomechanics, graduate
Faculty advisor: Nick Stergiou

Peripheral arterial disease (PAD) affects over eight million people in the US and is a manifestation of atherosclerosis leading to decreased blood flow to the legs. The present investigation extends this work to the evaluation of joint kinetics in patients with unilateral PAD. We hypothesized that the joint kinetics of unilateral PAD patients would be different between the affected and the non-affected limbs and as compared to healthy matched controls and that these differences would become worse after the onset of claudication pain. Thirteen patients with unilateral PAD.

“Juvenile Offenders and Possible Selves: Are They Prepared for a Future Outside of Incarceration”

TUSTY ZOHRA (O-30)

Major: Criminology and Criminal Justice, graduate
Faculty advisor: Samantha Clinkinbeard

Possible selves are what individuals envision for themselves in the future by identifying their aspirations, goals, motives, and fears. It enables individuals to envision images of themselves and identify what they expect and/or fear in the near or distance future. For juvenile delinquents, possible selves may be a motivational tool for planning positive goals and/or identifying self-constructs that they wish to avoid in the future. It allows many juveniles with the motivational capital necessary to make a smooth transition from detention facilities to the outside world. The primary question asked in this paper is “Do juveniles have enough motivational capital to face what lies ahead?” The current paper describes the planning mechanisms of a group of juvenile offenders and asks whether or not these plans seem plausibly adequate. Further, suggestions will be made on how the juvenile correctional system might facilitate the planning process and build motivational capital by utilizing possible selves.

“Depictions of Female Offenders in Front-Page Newspaper Stories: The Importance of Race/Ethnicity”

ABBY VANDENBERG (O-27)

Major: Criminology and Criminal Justice, graduate
Faculty advisor: Pauline Brennan

This paper examined how a female offender’s race/ethnicity influenced how she was portrayed by the media. Existing literature on gender stereotypes, racial and ethnic stereotypes, and media depictions of offenders provided the basis for this study. Few have focused solely on the media’s treatment of offenders, in general, and fewer have looked closely at how the media depict female offenders, in particular. This study, therefore, filled a void. We predicted that minority women would be portrayed less favorably than white women, and conducted a content analysis of front-page newspaper articles that featured female offenders to test our expectation. The articles were gathered from two different U.S. newspapers for the 2006 calendar year—the Los Angeles Times and the New York Times. We found that stories about the white female offenders were more likely to contain excuses for their alleged or actual offenses and were therefore, more likely to take on an overall favorable tone than stories about minority female offenders.

Performances

“Two Stylized Dances for Saxophone Quartet and Percussion”

TIMOTHY VALLIER (O-26)

Major: Music Composition, graduate
Faculty advisor: Roger Foltz

I propose to collaborate with the UNO Music Department student saxophone quartet and percussion studios to present a performance of “Two Stylized Dances,” an original composition, at the Centennial Celebration of Student Research and Creative Activity. The composition will last 7 minutes and 30 seconds, and will be produced exclusively by UNO students. I composed “Two Stylized Dances” for saxophone quartet and percussion during 2008. It was

submitted as an entry in the Music Teachers National Association Composition Contest, where it was awarded third place for the 2008-09 competition. This competition is open to students from all 50 states, and the winners are selected by a panel of distinguished composers from various parts of the United States. The piece was inspired by classical dance suites, but I re-interpreted them to include modern dance styles. The two dance styles being featured are “mashing” and “rhythm and blues”. The music is a reflection of the dance itself, and not the music typically associated with those dances. It features an eclectic and highly rhythmic vocabulary that is appealing to all listeners while retaining colorful harmonic and melodic embellishments.

“The Influence of Popular Music on 21st Century Flute Repertoire”

SARA SCHUHARDT (O-20)

Major: Music Performance, graduate
Faculty advisor: Christine Beard

Despite any perceptions of a widening gap between the popular and classical music of today, there are many areas in which the two are influencing one another. Flute playing is one of these areas; the last fifty years have seen the development of “extended techniques,” which are unconventional methods of playing the flute that produce nontraditional sounds. In the pool of extended techniques, one finds practices such as percussive key clicking, singing while playing, pitch bends, playing two notes at once, and flutter tonguing. These all serve to expand the range of sounds possible on a flute, increasing the possibilities for composers for the instrument. Often, the result is flute music that contains many elements of rock, jazz, and other popular genres. One notable composer who writes such music is British flutist Ian Clarke. His music incorporates extended techniques and is infused with the sounds of rock and jazz. Clarke describes one of his compositions as “sort of, but not, Pink Floyd for flute.” This piece, entitled “TRKs”, for solo flute with CD backing, demonstrates the mixing of “classical” flute sounds, extended techniques, and popular music. “TRKs” provides a good example of how popular music genres are impacting today’s new compositions, especially through extended techniques for flute. The presentation will include a brief demonstration of each individual extended technique used in “TRKs” and will conclude with a live performance of the entire piece.

Poster presentations

“Organizational Commitment and Willingness to File Grievances as a Function of Minority Protected Class Status and Interactional Justice Perceptions”

NICHOLAS ARREOLA

NATALIE SIMMONDS (P-1)

Major: Psychology, graduate

Faculty advisor: Lisa Scherer

The purpose of this investigation is to give better understanding of the importance of embracing diverse individuals in the workplace setting. We will examine the effects of minority protected class status and the perceptions of interactional justice on organizational commitment and the willingness to file grievances. References to class status are defined in terms of the United States’ anti-discrimination and fair employment laws, which protect certain classes of individuals from discrimination in the workplace. Specifically, the United States anti-discrimination laws protect individuals on a basis of race, ethnicity, sex, color, national origin, religion, age, familial status, veteran status, and disability status. Although certain state laws and city ordinances prohibit discrimination on the basis of sexual orientation, homosexuals do not have protected class status under United States federal law. We propose that perceptions of interactional justice will have a positive relationship with organizational commitment, regardless of minority class status. Further, we predict an interaction between minority protected class status and perceptions of interactional justice such that those minorities with protected class status will be more likely to file grievances in low justice work environments than minorities without protected class status. A 2 x 2 between-subjects analysis of variance (ANOVA) will be utilized to examine the effects of minority class status and interactional justice on organizational commitment and willingness to file a grievance.

“Analysis of Expressed Sequence Tags from Parasitic (*Cuscuta Pentagone*) and Non-Parasitic (*Ipomoea Hederacea*) *Convolvulaceae*”

SYDNEY BROMMER (P-2)

Major: Biology, undergraduate

Faculty advisor: Mark A. Schoenbeck

The parasitic habit has emerged several times among flowering plant lineages. The adoption of parasitism by plants may be accompanied by such changes as altered morphology or organ loss, reduced photosynthesis, and specialized mechanisms of host discovery and infection. To discover the molecular changes that accompany the adoption of parasitism, we are comparing genes expressed in organs of the plant parasite *Cuscuta pentagona*, commonly called dodder, and the non-parasitic *ipomoea hederacea* (ivy leaf morning glory), both currently assigned to the family *Convolvulaceae*. We have examined populations of expressed sequence tags derived from growing shoots of dodder seedlings, and from developing leaves and root tips (organs missing from the parasite) of morning glory. The genetic similarity of the two species facilitates the comparison of cognate genes between the two plants. This strategy has allowed us to identify several sequences putatively derived from genes involved in processes that might have been impacted by the adoption of parasitism, such as carbohydrate metabolism and respiration: starch synthase, alpha-amylase, sucrose phosphate synthase, and the non-photosynthetic form of ferredoxin. Also identified among the expressed sequences are genes, such as the chlorophyll A/B binding protein, that may help to reveal how the parasite’s strikingly different perception of and response to light has been altered relative to photo-autotrophic plants.

“Military Advisors Training Systems (MATS) – A project overview”

TRIPARNA DE VREEDE

TALEEN BRADY (P-4)

Major: Psychology, graduate

Faculty advisor: Roni Reiter-Palmon

MATS is a collaboration project between University of Nebraska at Omaha, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), and Aptima Inc., a human factors engineering consulting firm. Appropriate training design goes a long way to ensure training is successful. In the case of military advisors, training must include information regarding various methods of training, approaches to training design, and matching the content to the appropriate methodology in a cross-cultural context. Though the primary purpose of this project is to develop a system that will allow military advisors to train military personnel from other nations, it is intended to also look at the theoretical perspectives and models of training and communicating across cultures. The paper provides an overview of the development of a theoretical model for training across cultures and discusses three important aspects associated with training: 1) relationship development; 2) training methodology and techniques; & 3) cultural and language issues. The model is meant to strike a balance between having sufficient academic rigor and being relevant for the advisors to understand and apply in their workplace. The main focus of the model is on advisor behavior and characteristics, counterpart behavior and characteristics, interpreter characteristics, situational effects, and information and knowledge transfer. MATS also provides a modular approach to training. That is, the various modules can be included or removed from the training based on various determinants like prior knowledge or experience of the advisors, culture of the trainees, etc. Future implications and other applications, and the limitations of the model are also discussed.

“Integrating and Assessing Computational Tools for Regulatory Motif Detection with MTAP”

KATHRYN DEMPSEY

DANIEL QUEST (P-5)

Major: Bioinformatics, undergraduate

Faculty advisor: Hesham Ali and Dhundy Raj Bastola

Transcription factor binding sites (TFBS) regulate the expression of genes in the cell. Their discovery remains one of the most challenging problems in molecular biology. To solve this problem, traditional techniques have been supplemented by the development of computational prediction methods. Today over 100 algorithms exist for detecting TFBS in various problem domains, yet it remains unclear how to assess their performance. Comparing these tools across datasets is nearly impossible due to a lack of standards for running programs and reporting results. This work proposes a novel method for standardizing runtime procedures and assessing tool performance. To appropriately compare each method, a standard reporting format was developed for each tool. We developed a pipeline framework to integrate, score, and evaluate TFBS identification for each method. We evaluated 9 computational methods for detecting TFBS and obtained statistics that describe their performance. These results allowed us to rank each method by performance on a range of datasets. Computational detection of TFBS remains a challenging problem. Sensitivity and specificity remain low for the algorithms regardless of dataset. Our method for comparing tools exposes a unique view into the behavior of TFBS detection and enables the improvement of methods in the future.

“Cognitive performance on high-demanding tasks affects gait variability in healthy young adults”

LESLIE DECKER

SARA MYERS (P-6)

Major: HPER, post-doctorate

Faculty advisor: Nick Stergiou

Study objective was to evaluate the extent that the simultaneous performance of cognitive tasks and walking affects kinematic gait variability. The

experimental protocol: Twenty young adults walked on a treadmill for three minutes at their self-selected pace under the following conditions: without cognitive loading (control test) and while performing a secondary task (dual-tasks): naming, reading, semantic fluency, phonemic fluency, and dichotic listening. For each test the subjects walked for 3 minutes and adequate rest was provided between conditions. Data analysis: Gait variability measures were identified from both continuous (joint angles) and discrete variables (joint range of motion) for all strides of each condition. The Coefficient of Variation (CoV) was calculated to quantify the amount of variability in the discrete variables. The largest Lyapunov Exponent (LyE) was calculated to quantify the temporal structure of variability in the continuous variables. Results: As compared with the control test: 1/ CoV values for knee and hip range of motion significantly decreased in response to dual tasking, 2/ LyE values for all joint angles significantly decreased in dichotic listening tasks, and 3/ LyE values for knee and hip angles significantly decreased for the verbal fluency tasks. Discussion: Our results indicated that kinematic gait variability significantly decreased due to dual-tasks as compared to control test. Contrary to reading and naming tasks, dichotic listening and verbal fluency tasks that require high-level of cognitive functioning affect the temporal structure of this variability by turning the system to a more periodic and rigid behavior in healthy young adults.

“Earthscope Research”

LU HUG

ADAM GRAMKE

SARAH SCHNEIDERWIND

JON KINKADE (P-7)

Major: Geology/Environmental Studies, undergraduate
Faculty advisor: Robert Shuster

In conjunction with National Science Foundation funded Project Earthscope, four students from UNO helped identify suitable sites for the emplacement of temporary seismographs in the state of Nebraska. Earthscope is a large scale, 15 year project to study the lithospheric structure, age and evolution of the North American plate. Included in this is a rolling array of 400 seismic stations equipped to sense, record and transmit ground motion associated with earthquakes from around the world. The number and proximity of these stations provides context and scale for activity sensed by the stations. The students’ role in this experiment was to locate suitable sites for one permanent and 43

temporary stations across Nebraska through the use of maps, on site reconnaissance and public information resources, to initiate contact with, and to inform landowners of the purpose and intentions of Earthscope and the US Array. Criteria for sites were to include but were not limited to: well drained terrain, privately owned land, access to power source and communication utilities or cellular signal, and remoteness from public areas, heavy or regular traffic, pumping stations, railroads, large or fast moving bodies of water, or any other source of noise that could disturb readings.

“Resistance Training Alters Joint Powers in Multiple Sclerosis Patients”

JESSIE HUISINGA (P-8)

Major: Exercise Science/MSIA, graduate

Faculty advisor: Nick Stergiou

Multiple Sclerosis (MS) is a progressive, debilitating, neurological disease which currently affects over 400,000 Americans. Treatment options depend greatly upon the range and severity of symptoms and may include medication, physical therapy treatments, and steroids. The current study employed a progressive resistance training program to determine the effects of resistance training on the lower extremity joint powers during walking in MS patients. It was hypothesized that the training would result in joint powers measures that were closer to those of healthy controls. Eleven MS patients (age 42.3 ± 10.8 yrs) and 5 healthy controls (age 34.2 ± 10.9 yrs) participated in the study. Patients and controls walked through a 10 meter walkway at their self-selected walking pace, while kinetics and kinematics were collected for 10 trials with a Kistler force plate (600 Hz) and an 8-camera Motion Analysis system (60 Hz). Data collection was performed before and after the MS patients participated in three months of a twice weekly supervised, progressive resistance training program that included lower extremity, upper extremity, and core exercises. Hip, knee, and ankle joint powers were calculated from the ground reaction forces and the kinematics. Baseline differences between healthy control and MS patient joint powers were present prior to the intervention. These differences indicate that MS patients had significantly decreased power generation and decreased power absorption at all three joints. Changes in the joint powers were revealed following the resistance training intervention which reduced the number of differences between the controls and MS patients.

“Unilateral Intermittent Claudication Affects Joint Kinematics During Gait”

JEFFREY KAIPUST

JENNIFER M. YENTES

PANAGIOTIS KOUTAKIS

SARA A. MYERS (P-9)

Major: Exercise Science, graduate

Faculty advisor: Nick Stergiou

Peripheral arterial disease (PAD) affects over eight million people in the US and is a manifestation of atherosclerosis leading to decreased blood flow to the legs. The result is ischemic pain (claudication) that is induced by physical activity and results in diminished ability to walk. The present investigation extends our work to the evaluation of kinematics in patients with unilateral PAD. We hypothesized that the kinematics of unilateral PAD patients would be different between the affected and the non-affected limbs and as compared to healthy matched controls and become worse after the onset of claudication. Thirteen patients with unilateral PAD and eleven matched healthy controls walked at their self-selected pace along a ten meter pathway while kinematic data were recorded. Five trials were collected for each limb in the pain free (prior to the onset of claudication) and pain induced conditions. The group means of specific spatial-temporal parameters and the range of motion (ROM) from the hip, knee, and ankle joint during stance from the PAD patients were subjected to a 2x2 fully repeated measures ANOVA (Limb x Condition) with independent t-tests for post hoc analysis. Our results demonstrated that compared with healthy controls, unilateral PAD patients walk slower, with decreased cadence and stride length, and increased step width. In addition, claudication further decreased velocity, stride and step length, and increased ankle ROM, indicating that pain worsened the gait of these patients. Taken together our findings establish the need for more research to better describe the gait handicap of these patients using gait analysis.

“Scale Dependence of Chalcedony Vein Strike Uniformity within the Chadron Formation of Badlands National Park”

JON KINKADE

WHITNEY HOFF

SARAH SCHNEIDERWIND

BRANDON WEIHS

JORDAN MERTES (P-10)

Major: Geology, undergraduate

Faculty advisor: Robert Shuster

Fairly dense arrays of chalcedony veins occur locally within the Eocene Chadron Fm. (White River Group) of South Dakota and Nebraska. The subvertical veins are restricted to stratiform intervals that vary from 8 to >20 m in thickness. Host rocks are volcanic ash rich siltstones. Veins are typically cms thick, zoned, display tip curls, and have structures indicating vertical shortening. Vein strike orientation patterns are the focus of this study. Over 1700 strike readings and GPS (hand-held) positions were recorded from three study sites in Badlands National Park during June, 2007. In the areas surveyed strikes were taken from the middle of every well exposed vein (avoiding tip curls). Statistical tests on strikes from the sites indicate two have random strike distributions at scales of 1000s m² and larger, while the third is strongly non-random over an area of 10,000s m². Within the two, overall random Badland sites, are areas of several 100 m² whose veins (n>5) are all or mostly parallel, an extremely improbably geometry given a larger random distribution. Thus, vein strikes can be locally organized, but in aggregate and at a larger scale unorganized. The orientation pattern is scale dependent. Associated questions are: what are the scales and geometries of these organized patches, what produces local organization, is there an overall regional pattern not yet detected, and what does this indicate about local stress fields? A poster on this project was presented in 2007 at the National GSA meeting in Denver.

“Reliability of COP Measurements During Sitting in Developmentally Delayed Infants”

ANASTASIA KYVELIDOU (P-11)

Major: Medical Sciences interdepartmental area in Pediatrics, graduate
Faculty advisor: Nick Stergiou

We wanted to determine the intra-session and inter-session reliability of linear and nonlinear measures for sitting posture of developmentally delayed (DD) infants. Twenty-five DD infants participated in the study. Infants came to the lab for two sessions per month for four months. The first three trials of each session were used to determine intra-session reliability. The second session each month, collected one week after the first, was used for the inter-session reliability. Each trial consisted of recording COP data for 8.3 sec of unsupported sitting. The COP data were analyzed using two linear and two nonlinear measures. The linear consisted of Root Mean Square (RMS) and Range and the nonlinear consisted of the Approximate Entropy (ApEn) and the Lyapunov Exponent (LyE) for both the anteriorposterior and mediolateral directions. Intraclass Correlation Coefficients (ICC) were used to quantify reliability. Inter-session ICCs for all parameters were between 0.21 to 0.79. LyE presented the higher ICCs. Intra-session ICCs for all parameters were between 0.14 to 0.75. RMS presented the higher ICCs ranging from fair to excellent reliability. It is important to state here that months three and four of data collection showed the highest ICCs for most of the parameters ranging from fair to excellent reliability. Since sitting is a very early motor milestone, the reliability of COP measures in sitting is important in the evaluation and treatment of motor disorders, such as cerebral palsy.

“Fishes of the Lower Elkhorn River”

KATHERINE LAWRY (P-12)

Major: Biology, undergraduate
Faculty advisor: Richard Stasiak

The T. L. Davis Preserve was established in 2005 as an environmental research and teaching site for the UNO Biology Department. Located just south of Q Street in western Douglas County, the preserve provides access to the Elkhorn River approximately 8 km (5 miles) north of its confluence with the Platte River. This study was part of an ongoing project to identify and monitor the fauna of the preserve. Fishes were collected by seining a 500 m stretch of the river on a weekly basis during the late spring, summer, and early fall of 2007 and 2008. Fishes were identified, counted and released. Care was taken to sample all of the available habitats equally and in a consistent fashion each week. A total of 28 fish species were collected during this period, representing 10 families. Included were 25 native and 3 self-sustaining introduced species. Heavy precipitation in the fall of 2007 and the spring of 2008 produced higher sustained river flows, breaking a several-year drought cycle. Compared to 2007 collections, 6 additional fish species were collected in 2008. The relative abundances increased for several genera (Hybognathus, Macrhybopsis, Platygobio, Pimephales, and Carpiodes) traditionally associated with “big rivers”. The most common species (Cyprinella lutrensis, Notropis stamineus, Notropis blennioides, and Ictalurus punctatus) remained at high abundances throughout both years. Young of the year blue catfish (Ictalurus furcatus) were common in each collection for both years, indicating that this section of the Elkhorn River is one of very few locations in Nebraska with good natural reproduction for this important sport species. The presence of Johnny darters, *Ethostoma nigrum*, (taken in 5 out of 10 collections over both years) is considered an environmental indicator of high water quality in Nebraska. This study served as part of the field experience for Katherine Lawry, who was awarded Hutton Junior Fisheries Biology Scholarships by the American Fisheries Society for both 2007 and 2008.

“Women of Troy Costume Design”

MATTHEW LOTT (P-13)

Major: Theatre, undergraduate
Faculty advisor: Sharon Sobel

I designed the costumes and oversaw the creation of the actual costumes for UNO Theatre’s production of *Women of Troy*. I worked collaboratively with the director and other members of the production team. The show traveled to the regional Kennedy Center/American College Theatre Festival and is taken into consideration for presentation at the Kennedy Center in Washington DC. My presentation was originally presented at the Region 5 American College Theatre Festival. The director’s initial vision was a dreamscape. It was a vision of a surreal, melancholy statement of loss. She saw the show as very movement heavy and wanted the movement to express emotion. The director saw a correlation between ancient Greek culture and ancient tribal Celtic culture and wanted to bring Celtic elements into our production. My concept for the costumes comes from the idea that after the destruction of these women’s lives come hope and a way to survive in the future. They have lost everything after ten years of war, and they have to rebuild themselves in order to survive. Taking the remnants of what they once had, these women use the pieces to reconstruct their human dignity in the face of life long slavery. The costumes reflect this concept by the interweaving of the pieces and parts of various garments. The fabrics I chose have and organic texture in the prints that combined with the primitive pleating promote the tribal and deconstructed feel of the costumes.

“Lysine Adducted Estrogen Quinones as a Platform for Redox Cycling”

BRITTNEY MALOLEY (P-14)

Major: Biology, undergraduate
Faculty advisor: Douglas Stack

Factors that increase a women’s lifelong exposure to estrogen, for example, early menarche, late menopause, or late age of first child birth, lead to an increase risk of breast, ovarian and other human cancers. Increased formation of estrogen metabolites also leads to increased production of reactive oxygen species (ROS) in tissues prone to hormonal

carcinogenesis. Two major routes of estrogen metabolism exists: 1) formation of 2-hydroxyestrogen catechols (2-OHE) and their corresponding estrogen-2,3-quinones (E-2,3-Q), and 2) formation of 4-hydroxyestrogen catechols (4-OHE) and their corresponding estrogen-3,4-quinones (E-3,4-Q). 2-OHE is not carcinogenic in animal models while 4-OHE is carcinogenic. The formation of ROS is taught to stem from redox cycling between catechols and *ortho*-quinones. However, the redox properties of 2-OHE (noncarcinogenic) and 4-OHE (carcinogenic) are similar and this similarity does not explain why one isomer, 4-OHE, would form ROS and the other not. We have explored the chemical differences between the two estrogen quinones, E-2,3-Q and E-3,4-Q, in regards to their reaction with lysine, a common amino acid found in proteins. E-2,3-Q is reduced by lysine back to 2-OHE. E-3,4-Q is adducted by lysine at the 1-position to form aminoquinone. The aminoquinones had their structures unambiguously assigned using 1-D and 2-D NMR spectroscopy. These aminoquinones readily converts between quinone and hydroquinone forms under ambient conditions. The observation that E-3,4-Q forms aminoquinones capable of redox cycling while E-2,3-Q does not offers an explanation as to why the former estrogen metabolite is carcinogenic but the latter is not.

“On Evaluating the Performance of Compression Based Techniques for Sequence Comparison”

RAMEZ MINA (P-15)

Major: Computer Science, graduate
Faculty advisor: Hesham Ali and Dhundy Bastola

Comparing biological sequences remains one of the most important problems in bioinformatics. Sequence alignment has been the method of choice specially when comparing DNA and Protein sequences. This approach of comparative analysis has been used in detecting functional and structural similarities and for classification purposes. While the alignment method has proven to be a reliable approach for sequence comparison, it fails to produce accurate results in many cases, particularly when the input sequences are incomplete, have a high degree of dissimilarity, or contain large number of repeats or mobile subsequences. We conducted a study to evaluate the performance of compression based algorithms in detecting similarity among biological sequences. These algorithms use data

compression techniques to generate a dictionary of non-redundant and non-overlapping words. Subsequently dissimilarity measures (complexities) are obtained by comparing the dictionaries. We implemented different compression algorithms including LZW and Huffman and evaluated the distance between input sequences using Lempel-Ziv and Kolmogorov complexities. Using different datasets, we compared the results obtained from using Kolmogorov and Lempel-Ziv complexities against the gold standard trees. Additionally, the trees obtained through alignment and compression based approaches were compared. Our preliminary results show that compression based algorithms outperform alignment techniques in several datasets that contain highly dissimilar sequences.

“The Effect of Virtual Reality on Locomotor Adaptation”

MUKUL MUKHERJEE (P-16)

Major: HPER, post-doctorate

Faculty advisor: Nick Stergiou

The ability to walk encompasses a highly complex ability to adapt to environmental alterations demands and task constraints requiring multiple-sensory integration. Self-perception of motion through visual stimulation may play an important role in adapting to locomotor alterations through underlying neurophysiological mechanisms. We explored the effect of self-perception of motion through Virtual Reality (VR) on locomotor adaptation. The findings of this study may have a significant impact on the rehabilitation of individuals with gait and balance disorders. Methods: Thirteen healthy young adults were randomly assigned to either a VR or a Non-VR group. Each subject walked on a treadmill at a self-selected pace under three conditions – baseline, locomotor adaptation and washout. All subjects adapted to a load attached to one of the lower limbs. VR subjects were exposed to the visual stimuli of walking in a virtual corridor during the experiment. Electromyographic (EMG) data was recorded from four muscles of each lower limb. Temporal kinematic data was recorded using a footswitch system. Results: Repeated measure ANOVAs revealed significant overall effects of condition for temporal data ($p < 0.01$) and EMG data ($p < 0.001$) which were significant across VR exposure for both measurements. Post-hoc analysis showed that differences were due to adaptive changes on the unloaded side. Conclusions: VR effects locomotor adaptation. Subjects adopt specific strategies

to counter environmental changes. VR can influence these strategies. These findings may have a significant impact on neuro-rehabilitation programs. Further studies will explore the mechanism behind such adaptations and also investigate such adaptive correlates in the elderly and patient populations.

“Induced Lower Extremity Vascular Occlusion Affects Gait Variability”

SARA MYERS

PANAGIOTIS KOUTAKIS (P-17)

Major: Exercise Science, graduate

Faculty advisor: Nick Stergiou

Peripheral arterial disease (PAD) is a manifestation of atherosclerosis that leads to a decrease of lower extremity blood flow. The most common symptom is intermittent claudication, a cramping pain occurring in the legs brought on by physical activity and relieved with rest. Our previous studies indicate that PAD patients have altered gait variability patterns prior to the onset of claudication pain, however the contributing factors are unclear. Therefore our study investigated the potential effect of vascular occlusion on ambulatory function by examining gait variability. Healthy young subjects walked for three minutes while kinematics were captured during natural walking at subjects' self selected pace. Next, blood pressure cuffs were placed on the upper thighs and inflated to 220 mmHg for three minutes to induce lower extremity vascular occlusion. Following three minutes of vascular occlusion, the cuffs were removed and subjects immediately walked at the same speed for another three minutes. Gait variability of lower extremity joints was studied using the Lyapunov Exponent (LyE). The LyE describes variability by quantifying the exponential separation in the trajectories of the joint angles with time in state space. More divergence means more variability and higher values. Induced lower extremity ischemia led to increased gait variability in young healthy subjects and indicates that reduced blood flow, in the absence of neuromuscular abnormalities results in increased variability in gait patterns. The current work sheds light into the mechanisms of altered gait function in patients with PAD and has direct implications for future evaluation of patients with PAD.

“Consortium of Public Health Informatics”

JASON NIVEN

RAHMAN STRUM (P-18)

Major: Public Health, graduate

Faculty advisor: Ann Fruhling

Effective public health practice requires timely, accurate, and authoritative information from a wide variety of private and public sources, including data warehouses, primary and secondary databases using computerized information and surveillance systems and ever-growing information technologies (Linkins, Kilbourne, Koo, O’Carroll, Yasnoff, 2000). Utilization of these sources allows the development of a knowledge base, which can be disseminated using the tools of information technology. Concurrent with these successes and benefits are barriers. A primary concern is that public health officials and researchers spend significant amounts of time searching multiple and disparate sources to find the needed information. Often the needed expertise and resources to aggregate and analyze such data is not available. One of the major reasons for this situation is lack of clear definitions of public health data needs and the failure to establish a consensus on data and communication standards (Linkins, Kilbourne, Koo, O’Carroll, Yasnoff, 2000). This deficiency creates a substantial roadblock to researchers, educators, health professionals and service providers in their endeavors to improve public health. In an effort to fill these gaps the intent of our study will be to better understand and prioritize important data needs and analytical tools utilized by public health officials/researchers in public health informatics as well as to determine their familiarity and accessibility to currently available public health information. Therefore, our goal is to conduct a comprehensive public health data needs assessment for the State of Nebraska.

“Treatment Integrity & Outcomes in Parent-Led Interventions: A Program Evaluation”

SAMEENA NOETZEL

JESSICA MALLORY (P-19)

Major: School Psychology, graduate

Faculty advisor: Carey Ryan

This study is an evaluation of an academic clinic in which parents are taught to implement academic interventions for their children in their homes. Survey data were used to examine the relationship between treatment integrity and child outcomes both at the time clinic services ended and at the time the parent completed the survey. Changes in parent knowledge, attitudes, and use of the intervention were also assessed. The types of changes and reasons for change were examined. The results indicated that child and parent outcomes were not impacted by treatment integrity; however, continued use of the intervention was related to more positive outcomes for both parents and children. Directions for future research are discussed.

“The Moderating Effect of Impulsivity on Abusive Supervision and Incivility”

SARA ROBERTS (P-25)

Major: Psychology, graduate

Faculty advisor: Lisa Scherer

The present study will examine the influence of abusive supervision and impulsivity on incivility. Participants will complete Tepper’s (2000) Abusive Supervision Scale, Whiteside and Lynam’s (2001) UPPS Impulsive Behavior Scale, and Martin & Hine’s (2005) Uncivil Workplace Behavior Questionnaire. I propose an interaction between abusive supervision and impulsivity on incivility such that participants who report higher levels of abuse will engage in higher levels of incivility, especially for participants who are high in impulsivity.

“Factors Associated with Long-Term Care Planning Among Older Adults”

PRISCILLA QUINN (P-20)

Major: Human Sciences/Gerontology, graduate

Faculty advisor: James Thorson

This study seeks to understand the factors associated with long-term care planning in an effort to assist individuals in preparing for their long term care needs. Long-term care (LTC) can take many forms (e.g., community-based services, assisted living, institutionalization, etc.), but regardless of how LTC is implemented, as the U.S. senior population continues to age, the future care needs of older adults are certain to escalate. The present study was designed to answer two research questions: (1) what distinguishes those who plan for LTC vs. those who do not; and (2) distinguishes those who intend to pay for it themselves vs. those who will depend of those who plan, what on public support. Survey data were collected from a stratified random sample of adults 60 and over (n=651) in the six-county, greater Omaha metropolitan area. The survey contained a question regarding long-term care planning, along with demographic and background items that could potentially explain variation among older adults in planning behavior. Based on a review of the extant literature, ten potential explanatory variables were included in the model: age, gender, education, religious affiliation (Catholic vs. not), religious attendance, income, subjective rating of overall health, current functional ability, marital status, and awareness of LTC insurance. Data were analyzed using nested logistic regression models. Findings indicated that those most likely to have a plan for LTC were female, unmarried, with higher income, and aware of the availability of LTC insurance. Only income was associated with taking responsibility for one’s own LTC.

“Donated Birthing Kits in Sierra Leone: How Many Lives Can be Spared?”

ELIZABETH RASMUSSEN (P-21)

Major: Public Administration, graduate

Faculty advisor: John Bartle

Every year, between 515,000 and 585,000 women die in childbirth. Approximately 99% of these maternal deaths occur in developing nations with limited access to professional medical care. One half of all births worldwide, each year, occur with the assistance of a traditional birth attendant, or no help at all and these are the most dangerous situations for mother and child. However, this research suggests that by providing birthing kits to these women, thousands of lives can be spared. The focus of this research is to examine the effectiveness and efficiency of a volunteer organization’s program to provide birthing kits to women in Sierra Leone through weighing the costs and benefits of the program. First, a global perspective on infant and maternal mortality of provided. Second, a specific birthing kit program is outlined in detail. The costs of such a program, as well as externalities that may be occurring as a result of the program are explored. Third, a discussion of the improvements in infant and maternal health that are being made, in theory, due to the donated kits is offered. Finally, an analysis of the costs and benefits, accompanied with an author’s opinion of the program’s efficiency and effectiveness concludes this research. The study leads us to the conclusion that birthing kit programs designed similar to the one are incredibly efficient in their pursuit to save lives.

“Incivility as a Function of Workplace Favoritism and Entitlement”

SARA ROBERTS

MELISSA GWARTNEY (P-24)

Major: Psychology, graduate

Faculty advisor: Lisa Scherer

The present study examined two potential antecedents of incivility, namely workplace favoritism and employee entitlement. A total of 210 participants completed an online questionnaire consisting of the Perceptions of Favoritism Scale (Roberts, 2007), the Perception of Entitlement Scale (Campbell, Bonacci, Shelton, Exline, & Bushman, 2004), and the Instigated Workplace Incivility Measure (Blau & Anderson, 2005). We proposed an interaction between favoritism and entitlement on incivility such that participants with higher perceptions of favoritism would report a higher likelihood of engaging in uncivil activities than participants with lower perceptions of favoritism, especially for those participants who are high in entitlement. Results indicated that perceptions of favoritism were positively related to incivility in the workplace. However, the relationship between entitlement and incivility was not significant. Therefore, the interaction between perceptions of favoritism and entitlement on incivility was also found to be non-significant.

“Coherent Control of Azobenzene Isomerization”

RYAN RISKOWSKI (P-22)

Major: Physics, undergraduate

Faculty advisor: Renat Sabirianov

Coherent control is the process of using light to control the dynamics of a molecule. It can be used to induce isomerization, to select a desired pathway in a chemical reaction or to control the direction of motion of electrons in a semiconductor. New uses are being developed continuously. The goal in our experiment is to increase the trans to cis photoisomerization of azobenzene by excitation with modulated ~400 nm pulses. By using feedback from the isomerization process we employ a genetic algorithm along with a spatial light modulator to create a pulse that iteratively improves the quantum yield of isomerization. We start with ~800 nm pulses from a mode-locked Ti:Sapphire

femtosecond laser amplifier which is passed through a spatial light modulator and a nonlinear crystal, generating a second harmonic excitation pulse at ~400 nm. In order to generate maximum intensity at 400 nm we use a feedback-loop control algorithm to ensure that, after leaving the spatial light modulator, the pulses are transform limited. Evaluation of the length in which the difference in absorption between the cis and trans isomers is maximum. The probing pulse arrives 50-200 ps after the modulated excitation pulses and measures the differential absorption. It is this data that is fed back into a genetic algorithm to improve the isomerization induced by the pulses.

“Regioselective Deuterium Labeled Estrogens and Estrogen Metabolites”

JUSTIN RITONYA (P-23)

Major: Chemistry, undergraduate

Faculty advisor: Douglas Stack

Elevated exposure to estrogen is a known risk factor for breast, ovarian and other human cancers. The metabolism of estrogen can form reactive compounds that react with DNA. In order to develop strategies to prevent DNA damage caused from estrogen metabolites, a detailed understanding of the mechanism of estrogen metabolites bonding to DNA is needed. The synthesis of estrogen and estrogen metabolites labeled with deuterium (an isotope of hydrogen) at specific locations allows for experiments that reveal the sequential order of bond making and bond breaking. Using a t-butyl blocking group, in conjunction with trifluoroacetic acid catalyzed deuterium exchange, we have synthesized several new deuterium labeled estrogen compounds previously unavailable to researchers. 1-d-Estrone, 1-d-estradiol and 1-d-4-OHE₁ are now available using this new labeling methodology. In addition, by coupling this new deuterium labeling with known hypervalent iodide oxidation, we can selectively label catechol estrogens at the 1-, 2-, or 4-positions. These new, regioselectively labeled estrogen compounds will be employed in mechanistic studies aimed at providing insight to the etiology of hormonal carcinogenesis.

“Type of Music Influences Performance in Robotic Surgery”

JOSEPH KA-CHUN SIU (P-27)

Major: HPER, post-doctorate

Faculty advisor: Nick Stergiou

Music is often played in the operating room (OR) to increase the surgeon's concentration and to mask noise in the operating theater. However, no study has shown the influence of music on surgical performance during robotic surgery. Our goal was to investigate if musical environments affect the performance of simple tasks commonly performed during robotic laparoscopy. Ten participants with limited experience with the da Vinci™ robotic surgical system were recruited to perform two inanimate surgical tasks: Suture Tying (ST) and Mesh Alignment (MA). Four types of music (Classical, Jazz, Hip-pop and Jamaican) were presented to each subject while performing the surgical tasks. Subjects also performed both tasks with no music as a baseline condition. A survey was given to the subjects to rank their preferences among four types of music. Kinematics of the surgical robot was recorded. A two-way repeated-measures ANOVA was applied to examine the effect of the task difficulty and the effect of music in this study. Task effect was shown to be significant that MA was more difficult than the ST task. A significant within-subject music effect was found for both tasks with decreased time to task completion ($p = 0.024$). In particular, all subjects completed the surgical tasks significantly faster when they listened to Hip-pop and Jamaican music. Seven out of ten subjects rated Hip-pop as their most preferred type of music. Our findings show that the implementation of music provides a positive impact on robotic surgical performance. Music with high rhythmicity may enhance surgical performance.

“Examination of a Novel Robot-Assisted Surgical Training Program by Comparing Subjective and Objective Evaluations”

IRENE SUH (P-28)

Major: Medical Sciences interdepartmental area in Surgery, undergraduate

Faculty advisor: Nick Stergiou

As the popularity of Robot-Assisted Surgery (RAS) increases, it is important to develop a functional training program for RAS. This study examined the effectiveness of a novel robotic training program using subjective evaluations and objective measures. Five subjects participated in a 5-day training program using the da Vinci Surgical System. This program included: instrument familiarization; audio-visual tutorial of robotic surgical history, usage and significance; fundamental surgical skills training. We compared surgical performance before and after training and examined the retention one day after the last training session. Twelve training tasks were developed including fundamental to complex skills based on our previous research. Objective measures included completion time and distance traveled by the instrument tips. Performance was graded subjectively by an expert using the modified objective structured assessment of technical skills (OSATS). Lastly, participants self-evaluated their performance with questionnaires. Our results showed that completion time decreased while distance remained the same between pre- and post-training. All objective measurements were maintained at retention. The OSATS showed improved performance from pre-test (48/100) to post-test (72/100) and retention (78/100). Participants reported better mastery, familiarity, and more self-confidence to perform robotic surgical tasks after training. Our training program showed consistent improvement in subjective and objective evaluations. It successfully assisted participants in learning how to use RAS and to complete surgical tasks with different levels of complexity. Further studies are required to verify these findings with advanced objective measures such evaluation of accuracy and physiological fatigue due to training.

“The Undergraduate Seismic Design Competition”

JOHN TRAN

SEAN BERGSTEDT (P-29)

Major: Architectural Engineering/Structural

Engineering, undergraduate

Faculty advisor: Terri Norton

There is little interest in the study of earthquake engineering amongst architectural engineering students in Nebraska. This is in part due to Nebraska’s reputation as a seismically inactive region as well as the limited number of educational programs offered here. The quakes that occur in the Midwest are generally mild and cause little damage, but for much of the world, this is not the case. Devastating quakes across the globe cause billions of dollars in damages and thousands of deaths every year. By entering the 2009 Undergraduate Seismic Design Competition (USDC) hosted by the Earthquake Engineering Research Institute (EERI), the first Nebraska seismic design team seeks to garner interest in the field as well as partake in a hands on project to study performance based seismic frame design. The result from our research and hard work was a five foot balsa wood structure that utilized an innovative dampening system to dissipate energy from simulated earthquake loads. For Nebraska, this is a great step forward towards improving the diversity of the architectural engineering program as well as creating a cornerstone for academic study in the seismic design field.

“Independent Interactive Technology vs. Cooperative Grouping: A Comparison of Instructional Approaches to Improving Spelling and Vocabulary Skills for Students with Emotional and Behavioral Disorders”

KRISTINA WULF (P-30)

Major: Special Education/BD, graduate

Faculty advisor: Philip Nordness

The purpose of this study was to compare the effect of using an interactive webpage designed to improve spelling and vocabulary performance of students with

emotional and behavioral disorders versus the traditional approach of using cooperative grouping to teach vocabulary. To determine which approach was most effective we used an ABAB single subject design in which student instruction alternated between our traditional instruction which consisted of a cooperative work activity with peers and the independent web based computer activity. To determine which method was more effective, we collected data using curriculum based measurements on each student and computed the effect size to determine the effect of the interventions on performance.

“Is It Windy Enough for You: The Potential for Wind Energy to Generate Electricity, Income, and Energy Security in Rural East-Central Nebraska”

ROY ZACH (P-31)

Major: Geography, graduate

Faculty advisor: Jeffrey Peake

Citizens living in the Columbus, Nebraska area once met all of their local electric power needs via the Columbus and Monroe hydropower facilities. Today, this area imports significant quantities of electricity via high voltage power transmission lines, thereby creating dependencies on areas far away. The initial purpose of this study was to examine the potential for wind power within this area of Nebraska—in order to generate electricity, income, and energy security at a more local level. A thorough analysis of the local wind resource, and its comparison to the local electric power demand, demonstrates the economic feasibility of producing electricity from wind power within this area. The study region includes the Cornhusker Public Power District and Loup Power District service areas within east-central Nebraska. I downloaded and processed meteorological data from Columbus Municipal Airport for calendar years 2005 and 2006; subsequently, I utilized standard atmospheric equations to extrapolate wind speeds to a wind turbine hub height of 80 meters. Calculations using these extrapolations and the power curves for Gamesa G87-2.0 and Suzlon 88-2.1 wind turbines project the quantities of electricity that can be generated. The local wind resource and projected power outputs are aligned graphically to the local power districts’ demand loads on an hour-by-hour basis.

“The Use of Zipper Columns to Improve Seismic Performance”

JOHN TRAN (P-32)

Major: Architectural Engineering/Structural

Engineering, undergraduate

Faculty advisor: Terri Norton

Across the world, earthquakes continue to be a destructive hazard to structures and lives. These violent forces often occur without notice, causing excessive monetary damage and loss of lives. Significant advances in research must continue to improve the resistant design of buildings and structures in earthquake prone areas. Current strategies involve the use of control devices. Control devices have typically been utilized in structures to alleviate energy dissipation and reduce the overall structural vibrations caused in seismic activities. These control devices can be very costly, especially when retrofitting existing structures. This research investigates the behavior of structures with a support system known as an inverted-V braced steel frame with suspended zipper columns. It is a continuation on the study of the effects on implementing a structural component known as the zipper column. Zipper columns are structural members that are used in conjunction with conventional braced framing system on a structure. During seismic activities, members designed to resist the lateral forces fail and the unbalanced forces are distributed to the floor causing deflection and failure of the entire structure. The goal of this research is to increase the seismic performance of buildings by redistributing the unbalanced natural forces through the entire height of the structure.

HONORS PROGRAM SPRING SENIOR THESIS SYMPOSIUM

Oral Presentations

“Public Libraries: Education, Entertainment, Exploration”

JENNIFER L. WHISLER

Adviser: Rebecca J. Pasco

Major: Library Science

College of Education

The world is ever changing, and the public library continues to morph along with it. Communities are increasingly looking towards their libraries for far more than just books. The library holds boundless information, certainly, but it also has Saturday night movies and after school games. It is a place to encounter countless possibilities, new worlds, and diverse ideas.

“Physical Metaphor: The Theories of Artaud and Grotowski in the Chorus of ‘Women of Troy’”

RACHEL A. SAMSON

Adviser: Amy M. Lane

Major: Theatre

College of Communication, Fine Arts and Media

This paper intends to fill the artistic gap between a modern-day theater technique (the theories of Artaud and Grotowski) and the oldest of theater styles (Greek tragedy) by examining the success of the merging of these two styles in UNO’s production of “Women of Troy.” The approach to examining this project was based on the author’s personal involvement in the project as well as examining footage taken from the actual performance. The theoretical work of Artaud and Grotowski was also examined. Upon examining the materials it was concluded that the two styles meshed

very well and created a unique approach to the play; therefore the conclusion is drawn that this play (and theoretically others) do not have to stand in stylistic isolation, but rather can be experimented upon with modern-day styles to create a new experience.

“Translational Control of Amino Acid Biosynthesis by CCR4-NOT in *Saccharomyces cerevisiae*”

KELLY A. WESTFALL

Adviser: Mark J. Swanson

Major: Biology

College of Arts and Sciences

When a cell detects a change in its environment, it alters its behavior to adapt to the stimulus. In response to a life threatening stimulus, such as nutrient deprivation, genes important for cell survival are activated, whereas genes less important are repressed. In eukaryotes, genes are activated by being transcribed from DNA into messenger RNA in the nucleus, exported out of the nucleus, and then, translated from messenger RNA into proteins by a ribosome in the cytoplasm. When the yeast *Saccharomyces cerevisiae* receives an environmental stimulus indicating low amino acid availability, the General Amino Acid Control (GAAC) pathway is activated. Activation of the GAAC pathway causes increased translation of Gcn4p, an activator that allows the yeast cell to change its gene expression in order to produce its own amino acids. As soon as the cell no longer needs to produce amino acids, the cell must turn off the GAAC pathway, returning to normal gene expression. Much research has focused on how Gcn4p activates its target genes, but it is not clear how the Gcn4p genes are repressed after the yeast cell is no longer starving. Our data indicate that several subunits of the Gcn4p co-activator, CCR4-NOT, associate with the ribosome during starvation conditions. This suggests that this co-activator, which is required to turn on amino acid synthesizing genes, can also act post-transcriptionally in regulating gene expression.

“Bank Social Networking”

AMBER R. YOUNG

Adviser: John C. Hafer

Major: Marketing

College of Business Administration

The object is to create a social network to provide information and drive customers to the website. Also, I will use other social networking sites as marketing devices for the company.

“Leadership: an Art or a Science?”

DOC R. SCHUMACHER

Adviser: Gerard J. Reidy

Major: General Science, College of Arts and Sciences

Is leadership an art or a science? This is a question that was raised in an Air Force ROTC class of mine, which as fate would have it, gave me a solid direction for my thesis. From what I’ve gleaned about this topic through Air Force ROTC class and reading about it in various books, leadership seems to lean more to the art side of the spectrum. And that is what I hypothesize is the case. Only through further research will I be able to definitively answer the question of whether or not leadership is an art or a science, but I know that the answer will be invaluable to me in my future career as an Air Force officer.

“Princess Bastard: a Novel”

CHRISTINE M. ROGERS

Adviser: Susan N. Maher

Major: English, College of Arts and Sciences

Princess Bastard is a fantasy novel in which the her, Donovan Steele, struggles against the psychological manipulation of Zuma, an enemy to the throne, who attempts to force Donovan to betray and murder Queen Tiana.

“The Effectiveness of Peer Editing on First Grade Writing”

MEGAN K. PROSTERMAN

Adviser: Sandra W. Wetig

Major: Secondary Education – Spanish and English as a Second Language, College of Education

This project was designed to study the effects of peer editing on first grade writing. A writing sample was taken at the beginning of the study and scored according to a national rubric. Then, following the Writers Workshop format, students were taught a different skill and had time to edit in partners every day for six days. The final drafts were graded according to the rubric once again. This project discloses the results of peer editing on writing at this level and discusses challenges and positive effect of this process.

“Anxiety and Depression in Diabetic and Non-Diabetic Native Americans”

TYLER A. PIETZ

Adviser: Jessiline Anderson

Major: Psychology, College of Arts and Sciences

The purpose of this study was to better understand the scope of the mental health challenges related to health issues faced on Native American reservations. Specifically this study examined the relationship between anxiety, depression, and diabetes. There is a higher than average incidence of both depression and diabetes on Native American Reservations. This study set out to examine the relationship between anxiety, depression, and in a small tribal population in northeast Nebraska. This study will help determine if diabetes is associated with an increased risk in psychological disorders, specifically depression and anxiety.

“Addressing the Architects of Moral Panic with Non-Hegemonic and Transnational Narratives: An Examination of Anglo/American Migration Effects upon Mexican/American Citizenry and the Great Myth of Illegal Immigration”

RYAN F. MURPHY

Adviser: Lourdes Gouveia

Majors: Latino and Latin American Studies and Sociology, College of Arts and Sciences

The Latino immigration debate in the United States, specifically Mexican Immigrants, has dominated this decade of public policy debate and discourse. A heavily covered topic in the media, Mexican immigration in the United States may actually define this first decade of the new millennium. However, once history has a chance to analyze this era, the result may be that of disbelief and an added symbolic black eye to the United States in its treatment of non-Anglo immigrants and/or racially excluded populations. In this paper I examine the historical narrative of both Mexican/American immigration in the United States as well as Anglo/American immigration into the American southwest and into the lives of Mexican citizenry over the course of almost 200 years. The purpose for this is to determine if the narrative and perception of Mexican immigration is flawed in the popular imagination of the U.S. and if society should re-examine the role of Anglo/American migration and its impacts upon the very contemporary debate of today. My findings are that both the true historical and contemporary narratives in the United States are flawed. Furthermore, the historical narrative of these two populations is a shared story that is straightforwardly ignored. In conclusion, the narrative concerning Mexican immigration in the United States is one that has been artfully constructed for the purposes of maintaining Anglo hegemony in the United States.

“The Effects of In Ovo Hormone Levels on Adult Behaviors and Their Subsequent Effect on Future Generations of the Zebra Finch”

MALLORY A. MARTINEAU

Adviser: Rosemary Strasser

Major: Psychology, College of Arts and Sciences

Steroid hormones can influence brain development and subsequent behavior in developing offspring. In the following study, we used Australian Zebra Finch (*Taeniopygia guttata*) as our model system because they are a bi-parental species and manipulation of hormone levels can be confined to the egg. Subjects were injected with: (a) high pharmacological level of testosterone, (b) low ecologically relevant levels of testosterone, (c) Flutamide, an antiandrogen, or (d) a control substance. Birds were injected while in the egg during development. At approximately 36 months of age, we combined treated birds with control birds and allowed them to breed to look at possible transgenerational effects in subsequent offspring. We predicted that birds treated with high or low levels of testosterone may influence: (a) courtship behavior, such as behavior and nest quality, (b) reproductive behavior, such as number of eggs and weight of the eggs, and (c) parental behavior, such as time spent in the nest box and the offspring body mass. Results from this study predict a relationship between in ovo prenatal hormone levels, adult behaviors, and their subsequent effect on future generations.

“Capstone ‘Copter”

AARON P. KRAUSE

Adviser: Herbert E. Detloff

Major: Electronics Engineering, College of Engineering

The Capstone ‘Copter will be an autonomous helicopter platform. It will utilize an onboard network of sensors connected to a central microcontroller to enable autonomous flight. The microcontroller will also allow the helicopter to communicate back its current position and acquire new destination information using a wireless communications module.

“Lighting of a Commercial Distance Learning Venue”

SCOTT A. LINDGREN

Adviser: Clarence E. Waters

Major: Architectural Engineering, College of Engineering

This project focuses on a ceiling and corresponding lighting scheme for an international marketing company specializing in three-dimensional artwork. Serving as both a video conference venue and a product display area, each mode is to function both independently and collectively of the other. The room itself contains four focus areas: two display areas, a lectern, and general seating. In the final design a central dome and outer ring provide exceptional lighting with respect to IESNA criteria and considerations.

“Façade Lighting Project: Taylor Place at ASU”

STEPHEN P. GOLLEHON

Adviser: Andrea M. Wilkerson

Major: Architectural Engineering, College of Engineering

Taylor Place is an on-campus housing option for students attending Arizona State University’s Downtown Phoenix Campus. It combines the functionality of a residence hall with the excitement of a student center. The first floor contains retail areas, a fitness center, a shade garden, and a dining facility. The other floors contain residents’ bedrooms, quiet study areas, laundry facilities, and commons areas. In this project, we were tasked with developing a unique and memorable lighting solution that will create a lasting impression on students as well as the general public. The following summarizes the final solution for illuminating the façade of Taylor Place at Arizona State University:

1. Develop a concept that portrays and appropriate image for Arizona State University.
2. Utilize color and contrast to make this project memorable and aesthetically pleasing.
3. Create a lighting solution that emphasizes the verticality of the structure.

Our concept that encompasses these ideas is “Fire: Bounded yet Dynamic.” In addition to an aesthetic theme, function of the building has been taken into account. Appropriate care has been given to function of the space while providing successful and sustainable

operation. In conclusion, this design has the ability to create a bold identity for Arizona State University while providing vivid light for everyday use.

“Comparing Views on Rape in the United States and Saudi Arabia”

KILEY M. CAMERON

Adviser: Robert F. Meier

Major: Criminal Justice
College of Public Affairs and Community Service

Countries practicing Sharia Law have been brought into the media spotlight in recent years due to an increasing interest from Western nations such as the United States. In particular, countries practicing Sharia Law have been criticized for their implementation of corporal punishment as well as their severe discrimination against women in all aspects of life. Though attempts at reform have taken place, victimization of women such as rape is an issue in Saudi Arabia, a country known for a strict adherence to Sharia Law. Rape is also an issue in the United States due to a conflict in views on the responsibility of the victim in the crime. This study will focus on Saudi Arabia and compare public perception on rape to perceptions of the same crime in the United States. Information on this topic could be beneficial for increasing the awareness and understanding of the Islamic culture in the United States.

“Analyzing Paring Interactions in the 5’ Nontranslated Region of the Coxsackie Virus B3 RNA Genome”

ALISHA M. ANDERSON

Adviser: William Tapprich

Major: Biology

College of Arts and Sciences

Coxsackievirus B3 (CVB3) is a member of the genus Enterovirus and family Picornaviridae. CVB3 infections cause pancreatitis and myocarditis, and play a role in type I diabetes. Upon entry into the host cell, the single stranded RNA genome serves directly as mRNA and contains an internal ribosome entry site (IRES) on the 5’ end that is used to recruit ribosomes for translation. This IRES is embedded in a long, highly structured 5’ nontranslated region (5’NTR). The structure of the 5’ NTR controls the process of translation and, after a conformational change, also controls genome replication. A large body of experimental evidence shows that specific structures in the 5’ NTR are essential for all of these functions. Our lab is looking at a potential long RNA pairing interaction between nucleotides 113-118 and 562-566, found in the IRES element of the 5’NTR. We seek to understand the 3-dimensional structure that is created from this pairing. Furthermore, we wish to evaluate the role of the long range pairing in the overall viral multiplication cycle and ultimately in the virulence of the virus.

“Gandhian Nonviolence: An Absolute Truth?”

HUMAIRA B. QASIMYAR

Adviser: Michele M. Desmarais

Majors: Biotechnology and Religion

College of Arts and Sciences

History has immortalized the Gandhian principle of nonviolence. During his lifetime and after his death, Gandhi’s view of resistance has often been glorified as an absolute truth. Gandhi’s satyagraha, however, is neither universally effective nor unequivocally moral. Instead, it is a token of resistance that is contingent upon the circumstances at hand.

“INVADR – Autonomous Sentry Robot”

AUSTIN E. STEINER

Adviser: Herbert E. Detloff

Major: Electronics Engineering

College of Engineering

INVADR is built on an all-terrain vehicle (ATV) base. My partner and I replaced all controls with electric motors, allowing the vehicle to be driven remotely. A central control unit allows the robot to drive itself to a specific location using input from GPS and a magnetic compass. Once at the location the robot will monitor the area with a combination of motion sensors and a video camera. Upon sensing an intruder it will notify the user at a base station, allowing the user to take further action.

“An Analysis of the Graphical Representation of Parabolic Equations”

AUSTIN M. METER

Adviser: Michael E. Matthews

Major: Secondary Education – Mathematics

College of Education

This project will focus its analysis on a single problem of graphing a parabolic equation. It will discuss different aspects of the problem by posing other relatable problem, and include areas such as existence and uniqueness of solutions, extreme cases, specialization and generalization, analogous problems, and various interpretations and representations.

“Previously Unreleased: A Collection of Short Stories and an Essay”

NEIL P. SANDHOEFNER

Adviser: Joan Latchaw

Majors: English and Philosophy

College of Arts and Sciences

This is a collection of short stories which range in topic and genre. Notably, some are fiction, while others are non-fiction. And there are some which straddle the boundary between the two classifications. The preface to the collection of short stories is an essay which explores the relationship between fiction, non-

fiction, and truth. Is it okay to fabricate slightly in a work and still call it non-fiction? Does the quantifier “creative” make it okay? And what about fiction? Isn’t it, in some sense, based on real life? Isn’t everything “based on a true story” by the very nature of writing and experience itself? This collection of short stories probes those questions and explores the nature of fiction.

“Categorization of *de novo* regulatory motif discovery algorithms”

ADAM S. CORNISH

Adviser: Dhundy R. Bastola

Major: Bioinformatics

College of Information Science and Technology

The problem of *de novo* regulatory motif discovery has been extant for as long as computers have been in use as a biological tool. Over the years, various tools have been created to accomplish the task of finding these motifs. Unfortunately, there has been no way to rank the effectiveness of these programs. Additionally, due to the lack of ability to provide a good assessment, it follows that there is no way to determine whether one program performs better under certain conditions. For example, it would be useful to know that algorithm X performs well at identifying regulatory motifs in gram-positive bacteria but not in gram-negative bacteria. With the creation of the MTAP scoring system, this categorization of motif finding software is now possible. The desired result of the project is to ultimately make available motif discovery software more accessible and more useful. Researchers will be able to more easily identify the program(s) that suit their data. Consequently, irregular results are not produced by incorrectly used software packages.

“The Social Networking and Marketing Connections: Looking for Response on Facebook”

NICOLE E. MASSARA

Adviser: Amy R. Rodie

Major: Marketing

College of Business Administration

The phenomenon of social networking sites has created an extraordinary opportunity for the world of marketing. This thesis was written to explore the relationship between the social networking site,

Facebook and consumer response to marketing. The goal was to answer the question “what kinds of marketing do Facebook users respond to”. Response was measured by secondary actions of involvement with various mediums. Research was conducted on studies relating to this question. In response to limited studies and information, a questionnaire was devised and distributed to 163 students in the College of Business at the University of Nebraska at Omaha. The results of this survey were recorded and analyzed for understanding. These data was then reviewed and compiled for the completion of the written thesis. Results revealed that Facebook users respond to marketing when it is a subject that they have a prior and vested interest in. Users show a slight increase in their involvement with marketing forms when they choose to become members of interactive applications. While the data is beneficial to marketers it is still deemed inconclusive what is effective use of marketing on Facebook.

“Designing a Multiuse Zone on a Land Parcel”

BRIAN T. KELLOGG

Adviser: Tian C. Zhang

Major: Civil Engineering

College of Engineering

I am part of a senior design team that is working to develop a land parcel into a multi-use zone. My work on the project deals with its transportation aspect: designing/sizing parking lots, designing the roads throughout the site, and running analyses on the traffic into/out of the site as well as the distribution of traffic within the site.

“Rational Functions Unit Plan and Assessment”

ALICIA A. KROGSTRAND

Adviser: Saundra L. Wetig

Major: Secondary Education – Mathematics

College of Education

For my project I have to develop a unit plan containing 5-7 lessons. Each lesson has to include 1-2 formative assessments and 1 summative. After each lesson I have to write a reflection about my strengths, thoughts, and areas of improvement. If a test is used as a summative, then include data on how the students performed. After the unit is completed, I will evaluate the whole unit by examining my strengths, lessons learned, and areas of improvement. This will be turned in a three ring binder and is to include the lessons, reflections, a unit outline, summative evaluation, and the final evaluation.

“Business Strategy Game Online”

LACI M. DROPINSKI

Adviser: Wendell Nekoraneec

Major: Real Estate and Land Use Economics

College of Business Administration

The Business Strategy Game is an ongoing web-based simulation where teams of students run an athletic footwear company in head-to-head competition against companies run by other class members. Just as in the real-world, companies compete in a global market arena, selling branded and private-label athletic footwear in four geographic regions – Europe-Africa, North America, Asia-Pacific, and Latin America. Each group began with the same physical resources and capacity, and will have set strategies that will hopefully take the company to the top of the market.

“Sun Yellow Caskets for Us All!”

GAVIN L. GEIS

Adviser: Lisa J. Knopp

Major: English

College of Arts and Sciences

Sun Yellow Caskets for Us All! is a collection of essays by Gavin Geis that focuses on the irony and understanding that can be gleaned from hardship and tragedy. Stories examine suicide, funerals, weddings and flight, among other topics, with humor, thought, and respect. Far from an intentional theme, but a theme none-

theless, the narratives present in this collection are merely framed by sadness, not preoccupied with it, searching for a spark of hope instead.

“Mutations of the Sum 1 Complex Subunits Derepress the TRP Genes Independently of the Gen4p Transcriptional Activator in Yeast”

SHAYNA L. GARD

Adviser: Mark J. Swanson

Major: Biology

College of Arts and Sciences

The conserved general amino acid control (GAAC) pathway in *Saccharomyces cerevisiae* is frequently utilized to study activation, repression, and derepression of amino acid biosynthesis genes as a model system for regulating gene expression. Under limited amino acid conditions, GAAC is initiated through signal transduction, which increases expression of Gcn4p, a transcriptional activator. Gcn4p binds upstream of biosynthesis genes, including the TRP genes, where it recruits cofactor complexes to aid in loosening chromatin, allowing the general transcriptional machinery access to promoters. Since previous data indicated Gcn4p requires a histone acetyl transferase (HAT) coactivator to activate transcription, we hypothesized that a histone deacetylase (HDAC) corepressor would be needed for repression. Mutant strains of Sum1p, Rfm1p, and the deacetylase Hst1p, all part of the same complex (Sum1C), displayed 5-fluorotryptophan (5-FT) resistance indicating that this complex is required for repression of the TRP genes. Immunoblots showed that GAAC was inactivated in the sum1 Δ mutant. Taken together with the fact that Gcn4p is dispensable for the 5-FT resistance of the Sum1C complex mutations, our data implicate the Sum1C complex in directly regulating TRP gene expression.

“Effective Tetracycline Dosage on the LAC Operon”

ASHLEY V. HAYDEN

Adviser: Jodi L. Kreiling

Major: Biotechnology

College of Arts and Sciences

B-galactosidase activity of *E. coli* strain DH5 α was measured for an IPTG induced Lac Operon with a Trc promoter. The intensity of this protein was also analyzed using Western Blotting techniques. The β -galactosidase, of LacZ, protein was found to have increasing activity as time of induction increased to 120 minutes. The Western Blot indicated the protein to be approximately 115 kDa, and only slight increases in intensity for each increase in time induction from 0 to 30 to 60 to 120 minutes. Using this initial data, further experimentation on the *E. coli* strain DH5 α was performed by introducing the antibiotic Tetracycline into the cells. Tetracycline began to inhibit t-RNA attachment in translation as concentration increased. The β -galactosidase activity decreased significantly once the concentration reached 10 μ g/ml. Furthermore, the intensity for the Western blot decreased as concentration of Tetracycline increased. The β -galactosidase was found to bind at 115 kDa in this experiment also.

“Leafdrop: Personal Eavesdropping for Voice-note Documenting and Retrieving”

AUSTIN J. BROCKMEIER

Adviser: Herbert E. Detloff

Majors: Computer Engineering and Mathematics

College of Engineering

Documenting information is an everyday task, that has become essential in many professions, yet it is often tedious. The information comes in a variety of media further complicating documentation. Searching and retrieving the information is simplified by a standard archiving system. Archiving benefits from as much contextual information as possible: allowing multiple ways to find the original information. One easy method for documentation is voice recording: simply saving the oral note from start to end. While little skill or equipment is needed for voice recording, voice notes have to be transcribed for computer searching and little contextual information outside the note is preserved. By augmenting the voice note with additional contextual information, automatically transcribing into text, and providing a

searching interface a more integrated solution for documentation is achieved. Leafdrop is a technological solution for recording, searching, and transcription of voice notes. This project's intent is to design a prototype portable device and interface software. The device 'eavesdrops' on the conversation by gathering the voice note and logging the date, time, and location. An integrated camera can be used to add pictures to the note. This information is then uploaded to a computer and stored. Automatic transcription via speech recognition allows the user the ability to save and edit the note as text. The archive of conversations is searchable by words and phrases stored in the text transcription or added keywords. In addition, the user is able to organize or search the notes using location or time information.

“Practicum Experience: An evaluation of the Effectiveness of Service Delivery of a Domestic Violence Shelter”

MARIA ARREDONDO

Adviser: Henry D'Souza

Major: Social Work

College of Public Affairs and Community Service

This paper will focus on the shelter's strengths as compared to a study conducted by the National Resource Center on Domestic Violence. This paper will also explore the negative implications that the method of service delivery can have on domestic violence clients. Secondly, the changes that occurred in the shelter as a result of the practicum experience will also be mentioned. Lastly, recommendations on the areas of improvement for the shelter will be explored.

**“Endocrine Disrupting Compounds
and the Elkhorn River: Developing
the Western Mosquito fish
(*Gambusia affinis*) as a
Bioindicator for the Androgenic
Pollutants”**

ERICA K. ANDERSON

Adviser: Alan S. Kolok

Major: Environmental Studies

College of Arts and Sciences

Cattle feedlots along the Elkhorn River can contaminate the watershed with excreted androgenic hormones. While the effects of estrogens have been analyzed using fathead minnows, there is currently no good bioindicator organism for androgenicity. The aim of the project is to analyze and quantify morphological abnormalities and gene expression in female *G. affinis* exposed to a known androgenic compound in a laboratory setting. This research is a pivotal first step towards enhancing the knowledge of the effects of androgens on fish and determining the usefulness of *G. affinis* as a bioindicator organism for future field studies involving the Elkhorn River.

KEYNOTE



ROYCE C. ENGSTROM

“The Coffee Pot on the Bunsen Burner”

Royce C. Engstrom, UNO alumnus, serves as provost and vice president for academic affairs at the University of Montana, a position which he began in 2007. He also holds the rank of professor of Chemistry. Engstrom served most of his academic career at the University of South Dakota, first as a professor of Chemistry and later in a variety of administrative positions including department chair, graduate dean, vice president for research and provost and vice president for academic affairs. As a chemist, he taught analytical chemistry, environmental chemistry, and general chemistry. He also conducted an active research program in electrochemistry and analytical chemistry.

Throughout his career, Engstrom has been an enthusiastic participant in undergraduate research, first as a student, then as a mentor and finally as an administrator working to develop undergraduate research programs. He is a past-president of the Council on Undergraduate Research. He has also been active in the Experimental Program to Stimulate Competitive Research (EPSCOR), a federal program designed to help states build their research infrastructure and competitiveness. Dr. Engstrom served as chair of the National EPSCOR Coalition and the National EPSCoR Foundation. He is interested in science policy, higher education public policy, program development and in building relationships between the various stakeholders in higher education.

Engstrom is a Nebraska native. He received his Bachelor of Science degree in Chemistry from the University of Nebraska at Omaha and his Ph.D. degree in Analytical Chemistry from the University of Wisconsin-Madison. His wife, Mary, is also an educator and has worked at both the K-12 level and the university level. The Engstroms have two grown children, Tyler and Carey. In his spare time, Dr. Engstrom enjoys building traditional wooden boats and canoeing both locally and in the Arctic.



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