3rd ANNUAL

Student Research and Creative Activity Fair

University of Nebraska at Omaha

Official Proceedings of Fair and annual Honors Symposium

April 5-7, 2011
The Student Research and Creative Activity Fair is administered by the Office of Research and Creative Activity at UNO and was made possible through the generous support of the Office of Sponsored Programs and Research and the Office of Academic and Student Affairs.

Many thanks to Senior Vice Chancellor Terry Hynes for her support of UNO students’ scholarly endeavors.
SCHEDULE

University of Nebraska at Omaha
Milo Bail Student Center

April 5, 2011
Oral presentations and performances | 5:30–8:00 PM | Chancellor’s Room—2nd floor
Oral presentations and performances | 5:30–8:00 PM | U-Mo-Ho Room—3rd floor
Poster presentations and exhibits | 6:30–8:30 PM | Nebraska Room—2nd floor
Reception | 8:00–9:00 PM | Nebraska Room—2nd floor

April 6, 2011
Oral presentations and performances | 5:30–8:00 PM | Chancellor’s Room—2nd floor
Oral presentations and performances | 5:30–8:00 PM | State Room—3rd floor
Poster presentations and exhibits | 6:30–8:30 PM | Nebraska Room—2nd floor
Reception | 8:00–9:00 PM | Nebraska Room—2nd floor

April 7, 2011
Awards program | 6:30 PM | Chancellor’s Room—2nd floor
Dear UNO Community and Friends,

The third annual student Research and Creative Activity Fair was a resounding success and a true highlight of my first year as UNO’s chief research officer. Initiated by my predecessor, Harmon Maher, this event has continued to grow and, in conjunction with the annual Honor’s Program Senior Symposium, over 160 undergraduate and graduate students showcased their research and creative activity. Their presentations and displays were inspiring examples of the wealth of knowledge, inspiration and talent that make up the UNO community. The student participants and their faculty mentors have my sincere thanks for their participation in the Fair. The world awaits their continued contributions to knowledge, community service and artistic endeavors.

This event would have been impossible without the invaluable contributions of UNO faculty and staff. Our session moderators — Lisa Scherer, Jeffrey French, Harmon Maher, Carol Ebdon, Kenneth Kriz, Sara Myers, and Angela Eikenberry — kept the event running smoothly, and challenged the students with insightful questions. Senior Vice Chancellor Terry Hynes provided financial support. Mary Laura Farnham, Nancy Schlesiger, Mike Mohatt, Beth White and Kristen Hendershot of the Office of Research and Creative Activity assisted generously with logistics and encouragement. Special thanks go to Wendi Jensen of ORCA who was the motivational force behind this celebration and the linchpin of its success.

Community support is vital to the mission of any university and is especially important to UNO and its role as a metropolitan university. Our judges volunteered their time and talents and were rewarded by interacting with an amazing group of students. Our thanks go to judges Adam Haeder, AIM Institute; Herb Hartman, UNMC; Leslie Kuhnel, Alegant Health; Yuri Lyubchenko, UNMC; Linda Mannering, UNO/Institutional Research; Tim McIvor, Omaha Public Power District; Todd Morris, eBay; Amy Recker, Bio Nebraska Life Sciences Association; Robert Runyon, emeritus faculty, UNO; Marty Skomal, Nebraska Arts Council; Paula Turpen, UNMC; Mike Watkins, Buena Vista University; and Lyn Wallin Ziegenbein, Peter Kiewit Foundation.

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

Sincerely,

Scott D. Snyder
Associate Vice Chancellor
Office of Research and Creative Activity

University of Nebraska at Omaha
University of Nebraska at Omaha
SESSION MODERATORS

The faculty session moderators introduced student speakers, monitored time, transitioned from one student to the next, and maintained the timeliness of the schedule.

Our gratitude to:

Dr. Lisa Scherer, Psychology

Dr. Jeffrey French, Psychology

Dr. Harmon Maher, Geology/Geography

Dr. Carol Ebdon, Public Administration

Dr. Kenneth Kriz, Public Administration

Sara Myers, Health, Physical Education and Recreation

Dr. Angela Eikenberry, Public Administration
JUDGES
Community representatives donated their time and expertise to help evaluate the student presentations. They agreed their jobs weren’t easy, due to the high caliber of scholarly work.

Our gratitude to:

Adam Haeder, AIM Institute

Dr. Herb Hartman, retired from University of Nebraska Medical Center (UNMC)

Leslie Kuhnel, Alegent Health

Dr. Yuri Lyubchenko, UNMC

Linda Mannering, UNO, Institutional Research

Tim McIvor, Omaha Public Power District

Todd Morris, eBay

Amy Recker, Bio Nebraska Life Sciences Association

Robert Runyon, emeritus faculty, UNO

Marty Skomal, Nebraska Arts Council

Dr. Paula Turpen, UNMC

Mike Watkins, Buena Vista University

Lyn Wallin Ziegenbein, Peter Kiewit Foundation
AWARDEES: GRADUATE

Awards were presented in 4 categories, plus Honors. The first name(s) listed under each category earned the Best award; the second name(s) earned the Runner-Up award.

Oral Presentation/Performance

JENNIFER YENTES
“COPD and gait: the hip joint is affected”
Major/minor: Biomechanics
Faculty advisor: Dr. Nick Stergiou

ERIC BURR
“Structural Dynamics of Coxsackievirus B3 Genomic RNA upon Binding of Host Poly (rC) Binding Protein 2”
Major/minor: Biology
Faculty advisor: Dr. William Tapprich

Poster Presentation

CHUN-KAI HUANG, JUNG HUNG CHIEN
“Walking in a Moving Virtual Corridor with Variable Width affects Step Width Variability”
Major/minor: Biomechanics
Faculty advisors: Dr. Nick Stergiou, Dr. Ka-Chun Siu

MOHAMED AMER CHAABAN
“Elastic Photovoltaic Structure”
Major/minor: Architectural Engineering
Faculty advisor: Dr. Mahmoud Alahmad
AWARDEES: UNDERGRADUATE

Awards were presented in 4 categories, plus Honors. The first name(s) listed under each category earned the Best award; the second name(s) earned the Runner-Up award.

Oral Presentation/Performance

EVERETT LEVISON
“What Conversation Analysis Reveals About Turn Taking Organization and Its Role in African American English”
Major/minor: English/Spanish
Faculty advisor: Dr. Frank Bramlett

WYNDHAM JONES
“Narcissism and how it can cause aggression”
Major/minor: Psychology
Faculty advisor: Dr. Lisa Scherer

Poster Presentation

SCOTT MCGRATH, ISHWOR THAPA
“Algorithm based collection of molecular sequence targets for rapid identification of medically important Nocardia species”
Major/minor: General Studies
Faculty advisor: Dr. Dhundy Kiran Bastola

MAGNUM PETERSON, ERICA KUBE
“Predictors of Ear Clasping Behavior in Western Lowland Gorilla”
Major/minor: Psychology
Faculty advisor: Dr. Rosemary Strasser

University of Nebraska at Omaha
AWARDEES

Awards were presented in 4 categories, plus Honors.

Honors

NICHOLAS CONOAN
“To Wish Upon a Falling StAR: Venturing into the World of Steroidogenic Acute Regulatory Protein”
Major: Biology
Faculty advisor: Dr. Alan Kolok

Dr. Scott Snyder, Associate Vice Chancellor for Research and Creative Activity, with the 2011 awardees.

In photo, from left: Scott Snyder, Eric Burr, Jenna Yentes, Scott McGrath, Everett Levison, Nick Conoan, Magnum Peterson and Mohammed Amer Chaaban
ABSTRACTS

ORAL PRESENTATIONS/PERFORMANCES

Graduate Students (Master’s, Doctoral) and Post-Doctoral Research Associates

VIPIN ARORA
Major/minor: Information Technology
Faculty advisor: Deepak Khazanchi
“Sense of Place: Critical Implications for the Design of Technologies for Virtual Learning and Collaboration”

Research suggests that there is no significant difference between e-learning and face-to-face learning in terms of student outcomes. However, recent studies also show an extremely high dropout rate with e-learners compared to traditional face-to-face learners. Most of the current e-learning environments mostly focus on the support of the cognitive learning processes only.

Our research goal is to study the concept of ‘sense of place’ and analyze its impact on the design of e-learning environments. We argue that to support learning, an e-learning environment should be perceived as a place where social interaction is supported. Students should feel that they are actually present in an environment where they can find resources including other students and instructors, and they should enjoy spending time there.

As a starting point for our research, we explored the concept of ‘sense of place’ by drawing from the earlier research in the fields of social and environmental psychology, and human geography. We found that the components of sense of place generally comprise:
  - The physical characteristics of the place
  - The affect and meanings including memories associated with the place
  - The activities afforded by the place
  - The social interactions associated with the place

We also conducted a preliminary survey of some students enrolled in an online class to know about their perceptions of the above mentioned components of sense of place in both physical and e-learning environments. We found that generally students do feel a lack of sense of place in using the current e-learning environment (BlackBoard).

ANDREW BIRNIE
Major/minor: Psychology
Faculty advisor: Jeffrey French
“A Novel Form of Oxytocin and Its Receptor in Marmoset Monkeys: A Proposal for Social Behavioral Testing Paradigms”

Oxytocin (OT) is a naturally-occurring chemical that is produced in the brain and plays a crucial role in many bodily functions including lactation and uterine contractions during childbirth. In both humans and animals, OT has also been shown to influence social behavior, namely social bonding and elements of cooperation. Until recently, the same form of OT and its receptor had been identified in all placental mammal species studied, among which were rats, dogs, chimps, and humans. However, a novel form of OT and its receptor has recently been identified in a group of New World monkeys including Goeldi’s monkeys, tamarins, and marmosets. Our laboratory is currently in collaboration with researchers from Kent State University to study the behavioral effects of this novel form of OT in marmoset monkeys. OT will be administered to animals and then they will undergo testing in a number of different behavioral assays. We review these behavioral paradigms here. These tests will allow us to measure various aspects of social bonding, social cooperation, and aggression towards unfamiliar animals.

MICHELLE BURCHETT WILLIAMS
Major/minor: Sociology/Anthropology
Faculty advisor: Beth Ritter
“FLRCLHP: Will the "Real" Interim Tribal Council Please Stand Up?”

P.L. 101-484 restored the federally-recognized status of the Ponca Tribe of Nebraska (1990) and established the non-profit "Northern Ponca Restoration Committee, Inc." (NPRCI) as the Interim Tribal Council. The primary re-
sponsibility of the NPRCI was to deliver services and draft a constitution to facilitate the new Tribe's first election. In 1992, a rival faction mounted a successful legal challenge to the original NPRCI (based on a technicality of their Nebraska non-profit status). This paper will reflect the recollections of Fred LeRoy (Executive Director of the original NPRCI) and archival research regarding the court case and its aftermath.

ERIC BURR
Major/minor: Biology
Faculty advisor: William Tapprich
“Structural Dynamics of Coxackievirus B3 Genomic RNA upon Binding of Host Poly (rC) Binding Protein 2”

Coxackievirus B3 (CVB3) is an Enterovirus that is a causative agent of viral myocarditis. The (+) ssRNA genome of CVB3 is characterized by four distinct sections, with the 5’Non-Translated Region (5’NTR) being critical, as it contains two highly structured RNA regions required for replication and translation; the cloverleaf and the Internal Ribosome Entry Site (IRES). Interestingly, CVB3 binds host proteins to the cloverleaf and IRES to control host translation by a distinctly viral process: cap-independent translation. Of interest is host poly (rC) binding protein 2 (PCBP2), whose role in CVB3 replication and translation is known to be essential, but whose mechanism is still unclear. The data from our electrophoresis mobility shift assay and chemical probing indicates that PCBP2 binds the 5’NTR to induce dynamic changes in the structure of the RNA. These findings may serve as a model for how viruses direct host protein-viral RNA genomic interactions within biological systems. In addition, we anticipate that our work may generate future opportunities in the identification of therapeutic and immunological targets relevant to viral pathogenesis.

MICHAEL CAMPBELL II
Major/minor: Public Administration
Faculty advisor: Richard Box
“City of the Mind: The cognitive topography of Omaha, Nebraska”

This paper explores the “sense of place” and identity as subjectively constructed and attributed by local residents of the urban core (“downtown”) of Omaha, Nebraska. This research employs and builds upon Kevin Lynch's empirical methods and conceptual framework for exploring how individuals construct mental maps; specifically, his concept of “imageability” or the distinctive characteristics of the urban landscape, defined by paths, edges, nodes, districts, and landmarks. The research methodology involves qualitative data gathering through in-depth interviews with participants and a related “hands-on” image recollection drawing exercise. The central topic of examination is how do residents of the Omaha-Council Bluffs metropolitan area perceive downtown Omaha, which allows for enriched understanding of how they characterize it, remember it, what things seem most important, and what, if any, are the common “strong” visual experiences among residents. Results from the research indicate that there is a degree of consensus and stability among and between residents’ understandings of downtown Omaha. The study findings are exploratory, but suggest several avenues for further investigation into how people construct their understandings of downtown areas and the possible influences that subjective downtown definitions have on society.

GANG CHEN
Major/minor: Public Administration
Faculty advisor: Carol Ebdon
“Defined contribution pension plan management in local governments of Nebraska”

Facing difficulties in pension management, many local governments introduced defined contribution pension plan (401(k), 403(b), 457) to decrease pension costs and to share risks with the employees. In a defined contribution plan, employees can make their own decisions to contribute and to make investments, while their pension savings depend on both their contributions and the investment returns. Currently, about 20 percent of public employees are covered by some kinds of defined contribution plans. However, there are many managerial problems with the defined contribution plan. First, there is no comprehensive regulatory law to specify the fiduciary duty of plan administrators in a governmental defined contribution plan. Second, employees do not have sufficient information and financial knowledge to make rational investment decisions. Third, some governments are not aware of the quality of service provided by the vendors of their pension plans. Above these, there is a lack of research on decision-making process related to governmental defined contribution plans. This study is an exploratory research to investigate the wide variety of defined contribution practices across local governments. We interview six local governments in the State of Nebraska to examine how plan administrators make decisions in plan management and how they provide information to the employees and to the public. This study also identifies some major problems in the governmental
defined contribution plans and develops recommendations that government managers can use in designing, monitoring, and evaluating defined contribution pension plans.

BECKY DEITENBECK  
Major/minor: Management Information Systems  
Faculty advisor: Sajda Qureshi  
“Technology Infrastructures for Healthcare Access to Rural Residents”

The passage of the healthcare bill will provide the opportunity to use electronic health records to enable residents in rural areas the ability to manage, and have better access to healthcare. However, many rural residents lack the resources, and proper infrastructure to access the healthcare they desire. It appears that limited research exists on the adoption of telemedicine, and use of electronic and personal health records in Nebraska. This research seeks to investigate the technology infrastructures, and health care needs of rural people. The purpose of this study is to understand what is known, and how the development of information infrastructures can contribute, and enable rural residents to have health care so they have the ability to track their personal health records, communicate to health providers through telemedicine, and take ownership of their personal health. The question being investigated in this research is what technology infrastructures can provide rural residents better healthcare? This question is investigated through a qualitative research strategy that uses a survey, and personal interviews to arrive at an understanding of what type of technology infrastructures can provide rural people access to healthcare. Exploratory factor analysis was used as a method of analyzing the data from the concepts discovered in this research. Following an analysis of data collected in rural Nebraska this research provides insight into the factors that affect the adoption of potential telemedicine applications. This research contributes to what is known about the perceptions of rural residents as they access healthcare using IT infrastructures.

KATHRYN DEMPSEY  
Major/minor: Bioinformatics  
Faculty advisor: Hesham Ali  
“Identification of Temporal Relationships in Aging-Related Genetic Data using Correlation Networks”

The advent of high-throughput technologies has allowed for analysis of cellular response on a broader scale than ever before. Identification of temporal changes in gene expression can lead to important discoveries behind the mechanisms of aging and disease. Network analysis, particularly correlation networks analysis, offers the ability to model relationships between gene expression, making it particularly well-suited for temporal studies. Changes in network structure are identifiable by implementation of graph theoretical concepts: by modeling data in this manner, we are able to capture these processes. In this talk we illustrate the advantages of correlation network by analysis of multiple gene expression datasets related to aging. We review the process of creating individual networks and describe the identification of critical network structures for a network, such as hubs (high degree nodes whose removal disturbs network connectivity), and cliques (high density clusters of co-expressed genes with common function). We use assessment scores such as lethality enrichment derived from traditional expression analysis techniques to validate our results. Further, we describe a novel algorithm to find critical semi-cut nodes: nodes that, when removed, disconnect clusters of genes from each other. Once such critical nodes are detected, it is possible to render the pathways in which they participate by exploiting the parent-child nature of the Gene Ontology. Through this scope, our approach suggests that temporal changes are the product of a shift of gene modules linked through critical nodes. By application of correlation network analysis to temporal data, we harness the power of high-throughput technologies in an automated way.

KANIMATHI DURAISAMY  
Major/minor: Computer Science  
Faculty advisor: Sanjukta Bhowmick  
“Sampling Techniques for Extracting Properties of Large Scale Systems”

The study of real world networks has important application in many disciplines including social sciences, bioinformatics and software engineering. These networks are extremely large, and therefore analyses of those networks are both computation and memory intensive. Two popular ways to efficiently analyze these networks are graph reduction and applying parallel algorithms. Reduction of large sparse graph is an active area of research. Examples of graph reduction include combining subgraphs and filtering portions of graphs based on random walks. Graph partitioning, parallel graph colorings are some of the research in parallel algorithm area. Our research work involves combining these two approaches by developing parallel algorithms for graph reduction. We introduce subgraph algorithms that maintain important structural and informational properties. The focus of our algorithm is on preserving
the relative combinatorial values rather than the exact ones. Spanning subgraphs such as spanning tree, steiner trees and maximal chordal subgraphs possess many of these properties. we use maximal chordal subgraphs to generate subgraphs. Because maximal chordal subgraphs retain properties like the number of cliques of the network while increasing the distance between vertices, we anticipate that this method would be effective in preserving the high density clusters and eliminating the low density ones. The goal of our work is to develop a stable and scalable parallel graph reduction algorithm to analyze gene correlation networks. Our results show that even with significant reduction of the network we obtain reliable subgraphs and many of the relevant combinatorial and functional properties are retained in those subgraphs.

TRAVIS GOOD
Major/minor: Information Technology
Faculty advisor: Sajda Qureshi
“Investigating Capabilities Associated with ICT Access and Use in Latino Micro-enterprises”

While the process by which Information Technology enables growth in medium and large enterprises has been well researched, the corresponding processes in micro-enterprises are poorly understood. In fact, such micro-enterprises lie at the heart of many economies. This insight is important as information technology enables businesses to connect with each other through knowledge networking to carry out their basic business operations. There is thus a need to build our understanding of how micro-enterprises access and use technology in order to be able to assess the benefits they derive from ICT adoption. Following an analysis of two case studies of Latino micro-enterprises using Sen’s capabilities model, this paper uncovers the ways in which Latino micro-enterprises adopt information technology to grow their businesses in terms of their means, ends and freedoms. The contribution of this paper is to what we know about how Latino micro-enterprises adopt technology. This adds to our body of knowledge on challenges facing Latino micro-enterprises in the U.S. (an important subgroup within the under-researched area of micro-enterprises) and how such businesses may adopt ICT to benefit and grow their businesses. This has implications for global development in enabling adoption by microenterprises to be investigated, and in enabling techniques to be developed and deployed to improve the ability of micro-enterprises to adopt ICT to grow their businesses in ethnically cohesive communities.

JENNIFER GOODELL
Major/minor: Communication
Faculty advisor: Chin-Chung Chao
“Does Tuning In Make You A Better Citizen? The Effects of Radio Localism & Civic Participation”

Civic participation is an importance basis for the democratic functioning of a society. Broadcasting local issues, news, programming, and voices has been associated with higher levels of civic participation. Thus, localism has long been a guiding principle in the communications policymaking of the Federal Communications Commission (FCC) for US broadcasters. While communication scholars have widely researched the effects of such communication from broadcast television, little has been explored about related radio effects. This paper investigates the connection between a citizen’s public affairs-related radio use and individual level of civic participation. Fruitful information for FCC policymaking may result.

SHELLI INNESS
Major/minor: Political/Public Speech Communication
Faculty advisor: Lynnette Leonard
“I am Not Cuba: A Rhetorical Analysis of the Film Soy Cuba: I am Cuba”

By the 1964 release of the film Soy Cuba: I am Cuba, the Cuban revolution had already taken place. Fidel Castro had successfully overthrown the Batista regime. Still, Castro was adamant that the revolution was never really over. Therefore, the Cuban government commissioned Russian filmmakers to produce a Cuban propaganda film to screen in both Cuba and in Russia. The film was Castro’s response to dissenters and westerners. He wanted Cubans to remain enthusiastic about the revolution. The purpose of this paper is to rhetorically analyze the movie I am Cuba in order to better understand why the film failed as a tool of propaganda for Cuban audiences but resonated with American audiences 30 years later.
PRIYANWADA KULKARNI
Major/minor: Biology
Faculty advisor: Paul Davis
"Gene knockouts designed to disrupt the bradyzoite stage formation in Toxoplasma gondii"

Toxoplasma gondii is an obligate intracellular protozoan pathogen which infects human and other mammals. Following acute infection via tachyzoite spread, the parasite forms chronic cysts in the bradyzoite stage. With the help of microarray analysis, we have observed genes putatively involved bradyzoite-to-tachyzoite conversion. We hypothesized that there exist very early responsive genes necessary for stage conversion. Out of these genes, 10 genes are selected for further studies. Genetic knockout is easily done by allelic replacement in this haploid organism. Generated mutants are verified for relative equivalent fitness and viability and infection capability is determined by plaque assay. Selected mutants are screened by using multiple induction conditions. Knocked out genes which significantly reduce bradyzoite formation will be considered important for stage conversion. This information will be used for further vaccine development that would ultimately prevent bradyzoite development.

RANJANA KUMAR
Major/minor: Computer Science
Faculty advisor: Qiuming Zhu
"Semantic Relevance Analysis of Subject-Predicate-Object (SPO) Triples Extracted from Articles Describing Cyber-attacks"

The goal of this research is to explore and integrate several existing measurements for ranking the relevance of a set of subject-predicate-object (SPO) triples to a given concept. As we are inundated with information from multiple sources on the World-Wide-Web, SPO similarity measures play a progressively important role in information extraction, information retrieval, document clustering and ontology learning. This research is applied in the Cyber Security Domain for identifying and understanding the factors and elements of sociopolitical events relevant to cyberattacks. Our efforts are towards developing an algorithm that begins with an analysis of news articles by taking into account the semantic information and word order information in the SPOs extracted from the articles. The semantic cohesiveness of a user provided concept and the extracted SPOs will then be calculated using semantic similarity measures derived from 1) structured lexical databases; and 2) our own corpus statistics. The use of a lexical database will enable our method to model human common sense knowledge, while the incorporation of our own corpus statistics allows our method to be adaptable to the Cyber Security domain. The model can be extended to other domains by simply changing the local corpus. The integration of different measures will help us triangulate the ranking of SPOs from multiple dimensions of semantic cohesiveness. Our results are tuned using rankings gathered from simple surveys of human users where each respondent ranks a list of SPO based on their common knowledge and understanding of the relevance evaluations to a given concept.

CHERIL LEWIS
Major/minor: Communication
Faculty advisor: David Ogden
“When Words are not Enough: How do Non-Profit Organizations’ Use Twitter to Effectively Influence their Followers”

This study examines the impact of Twitter use by non-profit organizations to promote videos to their followers. The research specifically looks at the types of production and messages in each non-profit’s videos as well as their promotion on Twitter in relation to the number of views those videos received. The study seeks to help non-profit organizations decide how best to effectively incorporate social media into their overall marketing and public relations campaigns.

MARIELLA MEDURA
Major/minor: Undeclared
Faculty advisor: Beth Ritter
“Winter Count: Documenting the Fred LeRoy Collaborative Life History Project”

Winter counts document important historical events of a band or tribe. Working collaboratively with Fred Leroy, a Northern Ponca Tribal Elder, students in a Native American Oral History seminar are consulting, collecting and documenting his life history. Collaborative ethnographic methodology encourages cultural awareness and sensitivity (Lassiter, 2005). Fred LeRoy has directed the research agendas of the participants. Topics include: Tribal Resto-
ration, politics and the Chairmanship years, Fred LeRoy Health & Wellness Center, spirituality and traditional sto-
ries. This paper will recount the methodology and experience of the author, who serves as project historian

AARYN MUSTOE
Major/Minor: Psychology
Faculty advisor: Jeffrey French
"Excretion of Urinary Progesterone Metabolite across the Reproductive Cycle in Female Marmosets (Callithrix geof-
froyi)"

Primates of the New World family Callitrichidae, like marmosets, are an important model in reproductive biology. Although researchers assume similarity between reproductive profiles of different genera of callitrichid primates, known variability in reproductive factors like length of gestation, body size, and ecological characteristics warrant more exhaustive investigations of potential temporal and endocrine differences in reproduction within the Callitrichi-
da family. A reproductive profile for the New World primate Callithrix geoffroyi, a species for which information on endocrinology of reproduction is not available, is described in concentrations of an excreted urinary progesterone metabolite, pregnandiol-3-glucoronide [PdG], which were determined using enzyme immunoassays [EIA]. On aver-
age, non-conceptive cycle lengths were between 25 – 30 days with steep increases in PdG concentrations suc-
ceeding the occurrence of ovulation. However, in each conceive cycle, there was an immediate increase in PdG concentration, and PdG concentrations remained elevated through the pregnancy until the third trimester when PdG concentrations gradually declined to normal periovulatory levels. The average length of gestation was 148.72 +/- 1.35 days, with post-partum ovulation beginning as early as one week. Furthermore, contraceptive method affected PdG concentrations. Contraceptives administered via intramuscular injections resulted in normal non-conceptive cycling patterns, but contraceptive implants resulted in very little to no urinary PdG excretion across the cycle. These findings support qualitative similarities to other species in the Callithrix genus and illustrate the utility of using urinary PdG concentrations as an accurate monitor of reproductive status in Callithrix geoffroyi.

BEN NAUSLER
Major/Minor: Sociology
Faculty advisor: Beth Ritter
"Hear me grandfather, this I humbly ask of you: Spirituality and the Life of Wambli Sapa"

Spirituality has long been the mainstay of Native American Peoples; it is no different with Wambli Sapa (Fred
Leroy). This paper will present the story of a 'common man' and how he overcame adversity through his spirituality, hopes, and dreams to restore the future of the Ponca Tribe of Nebraska. We explore the spirituality of Fred Leroy (Ponca Elder and former Chairman) through a collaborative interview process. Through Fred's eyes and word's, we see how his spirituality has guided him through his remarkable life and leadership of his people.

SACHIN PAWASKAR
Major/Minor: Information Technology
Faculty advisor: Hesham Ali
“Dynamic Energy Aware Task Scheduling using Run-Queue Peek”

Scheduling dependent tasks is one of the most challenging problems in parallel and distributed systems. It is known to be computationally intractable in its general form as well as several restricted cases. An interesting application of scheduling is in the area of energy awareness for mobile battery operated devices where minimizing the energy utilized is the most important scheduling policy consideration. A number of heuristics have been developed for this consideration. In this paper, we study the scheduling problem for a particular battery model. In the proposed work, we show how to enhance a well know approach of accounting for the slack generated at runtime due to the differ-
ence between WCET (Worst Case Execution Time) and AET (Actual Execution Time). Our solution exploits the fact that even though some tasks become available based on the actual periodicity of a task they are not executed be-
cause the run queue is determined by the schedule generated in the offline phase I of the algorithm using the con-
servative EDF (Earliest Deadline First) algorithm. We peek at the task run-queue to find such tasks to eliminate wastage of the slack generated. Based on the outcome of the conducted experiments, the proposed algorithm out-
performed or matched the performance of the 2-Phase dynamic task scheduling algorithm all the time.
PRASHANT PAYMAL
Major/minor: Computer Science
Faculty advisor: Hesham Ali
"A New Biclustering Algorithm for Analyzing Biological Data"

The availability of large amount of biological data continues to drive recent activities in biomedical research. In particular, in the last decade, numerous research projects produced microarray data in an attempt to establish useful correlations among genotype and phenotype information. Unfortunately, the availability of such massive data failed to achieve its potential due to the lack of sophisticated data analysis techniques. In the case of microarray data, clustering is essential in extracting useful information from the very fine grain data sets by grouping genes according to their behavior across conditions. However, traditional clustering approaches are not always suitable for extracting useful relationships from microarray data. Many clustering algorithms consider all the conditions to group genes and/or consider all the genes to group conditions. This is not always possible due to large amount of diverse data. And biologically related genes may not show similar behavior under all conditions. Therefore, using standard clustering techniques may not appropriate to discover important clusters that demonstrate similar behavior over a subset of the conditionals or the experiments. To address this issue, Biclustering techniques have been introduced. In Biclustering, clusters of genes are defined using subset of conditions and clusters of conditions are defined using subset of genes. Biclustering can be viewed as a simultaneous clustering of genes and conditions. In this project, we conduct a comparative study of currently available Biclustering techniques. We also introduce a new Biclustering algorithm to analyze time series microarray data. We show that important relationships were uncovered using the proposed approach and compare the overall results obtained from the new algorithm with the results obtained from earlier biclustering approaches.

JOHN POWERS, CARRIE M. LACY
Major/minor: Sociology
Faculty advisor: Beth Ritter
"Ponca Cryptozoology: From Bigfoot to Little People"

The Ponca Tribe of Nebraska has various legends describing a Sasquatch or Bigfoot-like creature as well as Little People. Using ethnographic data from the Human Relations Area Files (HRAF) and personal interviews with a tribal elder, this paper will provide a cross-cultural analysis of multiple Plains Indian tribes’ legends of Bigfoot and Little People. The theoretical body of Cryptozoology, the science of unknown, hidden, or undiscovered animals (Simpson, 1984), will also be addressed.

ZACH RAMAEEKERS
Major/minor: Computer Science
Faculty advisor: Prithviraj Dasgupta
"A Coalition Game-Based Algorithm for Autonomous Self-Reconfigurations in Modular Self-Reconfigurable Robots"

In this presentation, I will consider the problem of autonomous self-reconfiguration by modular self-reconfigurable robots (MSRs). MSRs are composed of small units or modules that can be dynamically configured to form different structures, such as a lattice or a chain. The main problem in maneuvering MSRs is to enable them to autonomously reconfigure their structure depending on the operational conditions in the environment. In my presentation, I will first discuss limitations of previous approaches to solve the MSR self-reconfiguration problem. I will then present a novel framework that uses a layered architecture comprising of a conventional gait table-based maneuver to move the robot in a fixed configuration, but uses a more complex coalition game-based technique for autonomously reconfiguring the robot. We will discuss the complexity of solving the reconfiguration problem within the coalition game-based framework and propose a stochastic planning and pruning based approach to solve the coalition-game based MSR reconfiguration problem. Finally, I will demonstrate experimental results and simulations of our approach on a chain-type MSR called ModRED that is currently being developed.

BRITTNEY RYBA
Major/minor: Communication
Faculty advisor: Chin-Chung Chao
"Healthspeak: Concussion Awareness and the Role of New Social Media versus Traditional Media"

The field of health communication has achieved an important and useful body of knowledge capable of improving our understanding of all communicative processes as well as our understanding of the social intersections and implications of health issues. Concussions are an under reported and under diagnosed invisible injury. Although re-
sources such as journal articles, educational videos, seminars and websites communicate knowledge about concussions, there is no evidence indicating that these modalities are the most appropriate. Facebook is an exceptionally fast-growing social networking site (SNS) containing membership groups and fan pages where individuals, groups or organizations can post information on a wide variety of topics, such as information about concussions. The lack of literature regarding the use of social networking sites for healthcare information specifically about concussion awareness indicates that this medium warrants further research. The purpose of this study is to use a survey to investigate the role and purpose Facebook serves in bringing concussion awareness to the public versus traditional media.

I am researching the social media website Facebook (www.facebook.com) to see whether or not Facebook will increase awareness about concussions. I will sample randomly and use the method of survey to examine the public awareness. My expected contribution will provide more information and show the association between Facebook and concussion awareness to be more strong currently than its relationship with traditional media.

SARA SCHUHARDT
Major/minor:  Music Performance and Music Education
Faculty advisor:  Christine Beard
“The Other Side of the World: Of Flute Music and Salmon”

Flute music is increasingly influenced by the changes and innovations that occur in other areas of music as well as in culture as a whole. Consequently, unconventional flute compositions and atypical performance situations have become numerous and popular in recent years, stepping away from the normal world of the flute. This development in the flute repertoire is reflected in The Other Side of the World, a composition for amplified flute and CD recording. The piece was written in 2004 by composer Cindy Cox and serves as a meditation on Native American loss resulting from European seizure of resources and rights. It illustrates the performance medium of flute accompanied by CD, the use of text and speech with solo instrumental music, the function of music as a statement of belief, and the implementation of extended techniques as a means to create a particular mood. The presentation will include discussion of these elements as well as a performance of The Other Side of the World (duration 4:26).

STEVEN SHERWOOD
Major/minor:  Geography
Faculty advisor:  Rex Cammack
"Location-Allocation and Population Forecasting Methods for Rural and Urban Areas: A Case Study of the Girl Scouts of Nebraska"

The state of Nebraska has a unique spatial distribution of population. Most of the population is located in a few urban areas, in the eastern part of the state. The Girls Scouts of Nebraska wish to re-organize the way they utilize their resources and services. The current system of organization does not take this spatial distribution of population into account. The current system that is in place is made up of service centers, initially designed to provide a physical structure the Girl Scouts can utilize for a variety of purposes, located in various cities around the state. The location of the service centers no longer match the population pattern for the state of Nebraska. The current location of the service centers has led to their under-utilization. Because of this the Girl Scouts are looking for an alternative way to allocate their resources. They wish to transition from using the physical service center buildings to designating "hub" communities, which will be a particular city. Once the hub community is established, proposed re-districting, without the limitation of being tied to a physical structure, will be made. A combination of models, quantitative survey results and geographical information systems (GIS) software will be used to address these problems.

Along with analyzing the current pattern analysis, analysis will also be done on population projections for the year 2030. Various population forecasting techniques will be discussed and a population projection will be made and a location plan completed. A review of the two plans will be done to see if a common redistribution plan developed.

CHANGSOO SONG
Major/minor: Managing Information in the Public Sector
Faculty advisor:  Kenneth Kriz
“A Comparative Study on the Current Practices of State IT Public Policy in the United States”

While numerous studies have been done about information technology (IT) for efficient and effective government operations and public services, little attention has been paid to IT public policy for state or local economic development. Meanwhile, IT public policies are often fragmented in many US states, partly due to the lack of understanding different aspects of IT public policy. This study aims to fill this knowledge gap; it provides a definition of IT public
policy and discusses its key components: IT R&D, IT infrastructure, IT human capital, and IT industry. The study comparatively investigates state public policies in terms of their IT-friendliness through a content analysis of all 50 state statutes to comprehensively grasp the current IT policy practices across the United States. This study shows how states are similar and/or different in their provision for public policies in each of the key components of IT policy. It also develops and discusses an analytical framework that may assist researchers and practitioners in examining the strength or weakness of IT public policy structure. The paper lists good practices of state IT public policy that may have practical implications for the future that may help researchers and practitioners in designing and implementing IT public policies.

MICHELLE SORGENFREI
Major/minor: Social Work
Faculty advisor: Peter Szto
“The Case for Uniformed Judicial Treatment”

This presentation encompasses research on Parental Alienation Syndrome (PAS). The research explores three questions: 1) what is PAS, 2) how it can be understood in the terms of social welfare theory, and 3) why it is not recognized in the field of mental health?

Parental Alienation Syndrome (PAS) occurs frequently to children whose parents are embittered in ugly custody battles. Family courts do not recognize, or in some cases, even know what PAS is or how to address it. The ramifications of this syndrome, which is a form of emotional child abuse, is devastating to families and needs to be addressed judicially. The best judicial responses to children affected by PAS are through a multi-factored, individualized approach disseminated to the parents without regard to income. Social workers expertly trained in PAS can be an invaluable tool in the education of fellow professionals in addressing PAS judicially. Because PAS is a family problem, a family therapy approach is warranted even though parents are involved in separation, divorce or custody litigation. Through the proposed method of judicial and therapeutic intervention, families affected by PAS can then obtain an appropriate level of healthy functioning with one another although permanently living apart.

In addition, the research explains the origin of PAS, its various types, proposed treatment methodology, what its status is in relation to the DSM-IV-TR, legislative issues, international recognition, family courts view, treatment options and why it should be addressed through the judicial system to reduce the negative affects it has upon families.

SATISH MAHADEVAN SRINIVASAN, SRIRAM SRINIVASAN, ABHISHEK TRIPARTHI
Major/minor: Information Technology
Faculty advisor: Lotfollah Najjar
“Sustainability of Technology Usage in Education Sector: A Study among College Students”

This paper discusses about the sustainability of technology usage among college students. In particular this study focuses on understanding the factors that determine the acceptance and sustained usage of virtual learning environment like Moodle, Sharepoint, Blackboard, and ERP designed to enhance the learning experience. These web-based tools emulate a typical classroom environment replacing the traditional lecture style meetings. This study considers fourteen different variables classified into four different models including the Technology Acceptance Model or TAM, Web Of System Performance or WOSP, Elizur’s Work Value and Information Quality. We believe that Usability criteria’s of TAM, functionality criteria’s of WOSP, work value criteria’s of Elizur and Information Quality exhibited by these web-based tools drives the acceptance and sustained usage of virtual learning environment. A sample of several hundreds of respondents from UNO (University of Nebraska at Omaha) participated in the survey ensuring that they have experience with at least one of the above mentioned virtual learning tools. The survey from the respondents indicated that usability and ease-of-use criteria’s of TAM, reliability construct of WOSP, Cognitive, Affective and Instrumental criteria’s of Elizur work values together determined user acceptance and sustainability of the use of the e-learning technologies. When provided with the IQ constructs completeness ranked higher then usefulness of the tool.

BENJAMIN WIGERT
Major/minor: Industrial/Organizational Psychology
Faculty advisor: G.J. de Vreede
“Facilitation in Virtual Worlds: The Role of the Facilitator”

Virtual worlds are becoming a popular medium for meetings and collaborative problem solving efforts. Most challenges of real world collaboration also occur in virtual worlds because humans face social and cognitive problems in
both environments. Thus, the need to overcome the challenges inherent to group work, and the complexity of these challenges is increasing with the sophistication of technology. Facilitators may be effective in guiding virtual world group decision processes using best practices for real world collaboration. However, it is likely that these best practices will have to evolve in order to meet the needs of virtual collaborations. We cannot initiate this evolution until we understand how virtual worlds impact facilitation practices. For example, when interactions are not face-to-face, how do they change? What happens when communication occurs primarily in written form? What happens when participants have varying levels of technical and avatar management skills? How do social perceptions change in virtual environments? What best facilitation practices lead to repeatable collaboration success? When addressing these issues, we must also determine how to measure facilitation success in virtual worlds, and how to train virtual world facilitators.

The purpose of our study therefore was to investigate the role of the facilitator when collaboration is conducted in a virtual environment. More specifically, we were interested in identifying what key differences facilitators perceive between virtual and real world collaboration (e.g., advantages, disadvantages, best practices, and worst practices). Understanding such distinctions is a necessary first step to design productive collaboration processes for virtual worlds.

KATHLEEN WILLIAMS
Major/minor: Public Health
Faculty advisor: Beth Ritter
“Fred Leroy’s Vision: A Ponca Paradigm of Healing”

One of Fred Leroy’s most important legacies has been the establishment of an urban Tribal clinic in Omaha, NE. This has been an expensive and complicated task, especially for a recently restored non-reservation Tribal Nation. Offering both western medicine and traditional healing (e.g., sweat lodge and a ceremony room), required extensive negotiations and acceptance of vastly different medical philosophies. Fred’s vision was instrumental in bringing both worlds together and the Ponca Tribe of Nebraska acknowledged his leadership by naming the clinic in his honor (2002). This paper is drawn from Fred’s own accounts and archival research.

ZACHARY WILSON
Major/minor: Computer Science
Faculty advisor: Prithviraj Dasgupta
“Distributed Multi-robot Terrain Coverage with Dynamic Information Compression”

We consider the problem a distributed terrain coverage by a set of robots that are required to cover an initially unknown environment. In existing multi-robot terrain coverage algorithms, robots exchange their coverage maps with each other so that every robot is aware of regions that have already been covered by itself and other robots, and does not repeat coverage of previously covered regions. In this presentation, we investigate techniques that can be used to reduce the communication overhead between robots performing terrain coverage while exchanging coverage maps, without incurring a significant reduction in coverage quality. In our coverage algorithm, each robot interleaves coverage of polygonal regions it defines and covers, with communication between robots to exchange maps of their covered regions. Each robot then uses a polygonal compression algorithm called minimum-epsilon to compress its coverage information so that it can be represented by a fixed number of points per region. We then use a fitness metric to selectively accept the approximated region. We have validated our approach through accurate simulations on the Webots robotic simulator while using Corobot robots within a 400 square meter arena with differing amounts and dispersal of obstacles. Our results show that our algorithm results in a high efficiency ratio in terms of time and energy expended by the robots, a high coverage percentage in different environments and a low amount of communication overhead per robot.

YAN WU
Major/minor: Information Technology
Faculty advisor: Harvey Siy
“Empirical Results on the Study of Software Vulnerabilities”

While the software development community has put a significant effort to capture the artifacts related to a discovered vulnerability in organized repositories, much of this information is not amenable to meaningful analysis and requires a deep and manual inspection. In the software assurance community a body of knowledge that provides an enumeration of common weaknesses has been developed, but it is not readily usable for the study of vulnerabilities in specific projects and user environments. We propose organizing the information in project repositories around
semantic templates. In this paper, we present preliminary results of an experiment conducted to evaluate the effectiveness of using semantic templates as an aid to studying software vulnerabilities.

JENNIFER YENTES
Major/minor: Biomechanics
Faculty advisor: Nick Stergiou
“COPD and gait: the hip joint is affected”

Chronic obstructive pulmonary disease (COPD) is the third leading cause of death in the US. Patients with COPD have abnormalities in structure and function of skeletal muscle, primarily in quadriceps musculature. It is possible that the abnormalities in skeletal muscle tissue lead to changes in gait patterns. Twenty subjects (10 controls (66.8+6.3 years; FEV1: 1.0+11.1), 10 COPD (64.8+7.8 years; FEV1: 46.2+19.3)) walked at their self-selected pace under a rest condition. During rest condition, subjects rested a minimum of one minute between each trial. A total of five trials were collected. To induce fatigue, COPD subjects were asked to walk at a self-selected pace at 10% incline until the onset of fatigue. Subjects then repeated the walkover trials with no rest. Group means (COPD vs. control) from spatio-temporal parameters and peak joint torques were subjected to repeated-measures ANOVA. No differences were found for spatio-temporal variables in either condition. Peak hip extension moment was significantly increased in COPD subjects as compared to healthy controls (p=0.012) in rest and fatigue (p = 0.017). The hip was the most affected joint. The peak hip extension moment in early stance represents the ability to control the trunk during weight acceptance. It is possible that the COPD subjects walked with an altered trunk; however, this was not measured. Another explanation could be that the abnormalities in the skeletal muscle of patients with COPD affect gait even when they are rested. These preliminary data demonstrate that patients with COPD walk with an altered gait pattern.

ACKNOWLEDGEMENTS
Funding was provided by the NASA Nebraska Space Grant Fellowship program, American Society of Biomechanics Grant-in-Aid, Research Support Fund from the Nebraska Medical Center and the University of Nebraska Medical Center.

YUEJIA ZHUO
Major/minor: Economics
Faculty advisor: Jinlan Ni
“Does domestic savings still drive economic growth?”

I collect data of 211 countries during a period of year 2000 to 2005 from World Development Indicators, the World Bank, and use OLS method to explore whether gross domestic savings can improve GDP growth or not in an open economy. The result shows that although gross domestic savings has a positive effect on GDP growth but is not statistically significant. And technology and human capital have negative effect on improving economic growth, while FDI has a positive and significant effect. So policymakers should focus more on attracting FDI, rather than encourage domestic savings.
ANKIT AGRAWAL
Major/minor: Biotechnology
Faculty advisor: Myrna C. Newland
"Late Failure of Hearing Preservation After Middle Fossa Approach for Resection of Vestibular Schwannoma"

Objective:
Vestibular Schwannoma (acoustic neuroma) is a non-cancerous, often slow-growing benign tumor of the nerve that connects the ear to the brain. The tumor arises from an overproduction of Schwann cells and as it grows it presses against the hearing and balance nerves, usually causing asymmetric hearing loss, tinnitus (ringing in the ear), and loss of balance. The objective is to explore the long-term hearing results after a middle fossa approach for resection of vestibular schwannoma.

Patients:
All patients undergoing a middle fossa approach for resection of vestibular schwannoma at a single institution.

Interventions:
Standard middle fossa approach for resection of vestibular schwannoma, magnetic resonance imaging (MRI), and audiogram.

Main Outcome Measures:
Recurrence of tumor as evaluated by MRI and hearing results as measured by serial audiograms.

Results:
Seventy-eight patients were identified who met study criteria. Fifty-one (65%) of the 78 patients had usable hearing (American Academy of OtolaryngologyYHead and Neck Surgery [AAO-HNS] class A or B) postoperatively. Forty-four patients with successful hearing preservation had follow-up beyond their initial postoperative visit. Kaplan-Meier estimate of preservation of class A or B hearing at 10 years was 72%. Of the five patients with late degradation in hearing, 2 were found to have recurrences of their original tumor on MRI. There were 5 confirmed recurrences in the total study population.

Conclusion:
Late degradation of hearing was an infrequent occurrence after initially successful hearing preservation. When hearing degradation did occur, there seemed to be a correlation with tumor recurrence.

BRITANY DAUGHERTY
Major/minor: Art History
Faculty advisor: Dan Siedell
"Rajput Women: Representations Comparable to Western Gender Constructions"

The focus of this presentation will explore a correlation between circa eighteenth-century French women and the women of the northern Indian state of Rājasthān in works of art; it will include pictorial evidence of these parallels for demonstration. In understanding the similarities of gender representations in art between Rajput and French women other parallels form between the Rajput court and the French royal court. As French style themes fall into the Western pictorial tradition, these familiar paintings are used for reference to help understand and make parallels to the more foreign-looking Rajput paintings. Connections in the identity of gender between the two seemingly foreign types are evident by examining the primary paintings in the Rājasthān State Archives and paintings produced around the Rococo period. Books pertaining to the Rajput miniature style help to illuminate the background of the themes while articles pertaining to specific Rococo artists' styles illuminate similar themes in French paintings. The themes highlighted pertain to the representation of these women as beautified objects, they are a pleasure to the male viewer because of their idealized cosmetic composition and they are often involved in sexual desires as lustful lovers. Not only are the themes common they are also persisting through centuries, continuing the traditions of both cultures and perpetuating an image of women that influences their social structures. Overall the direct examination of paintings exhibit parallel themes that leads to the perception that the identity of women's gender roles is similar no matter the culture.
KAITLYN FILIPPINI  
Major/minor: Neuroscience  
Faculty advisor: Jeffrey French  
“Alloparental experience and Urocortin II Alter Care in the Mongolian Gerbil”

Stress and experience play a role in many processes relating to social behavior. Previous research has demonstrated that parental care is altered by general stressors. The present study examined the effect of Urocortin II (UcnII), one of the family of CRF stress peptides, administration and previous alloparental experience on responsiveness to neonatal pups in adult Mongolian gerbils. While in the natal family group, prepubertal male and female gerbils received alloparental experience with a younger litter of siblings, or remained naïve to young pups. As sexually naïve adults, gerbils received either an i.p injection of UcnII or vehicle two hours prior to exposure to a neonatal gerbil pup. The latency to approach novel pups was reduced in gerbils that received UcnII, but only for inexperienced alloparents. The administration of UcnII significantly decreased alloparental grooming behaviors, and time spent in proximity to the pup, regardless of previous experience. Previous experience with pups was associated with increased grooming behavior. UcnII and experience both play a role in regulating alloparental responsiveness, and for some behavioral measures, the two variables clearly interact to shape responses to novel pups.

NEIL HUBEN  
Major/minor: Biotechnology  
Faculty advisor: Nick Stergiou  
“Validated robotic laparoscopic surgical training in a virtual-reality environment”

A robotic virtual-reality (VR) simulator has been developed to improve robot-assisted training for laparoscopic surgery and to enhance and evaluate surgical performance in laparoscopic skills. This study presents our findings of the VR training environment for robotic laparoscopy. Eight volunteers performed two inanimate tasks in both the VR and the actual training environment. The tasks were bimanual carrying (BC) and needle passing (NP). For the BC task, the volunteers simultaneously transferred two plastic pieces in opposite directions five times consecutively. The same volunteers passed a surgical needle through six pairs of holes in the NP task. Both tasks require significant bimanual coordination that mimics actual laparoscopic skills. Data analysis included time to task completion, speed and distance traveled of the instrument tip, as well as range of motion of the subject’s wrist and elbow of the right arm. Electromyography of the right wrist flexor and extensor were also analyzed. Paired t-tests and Pearson’s r were performed. There were no significant differences between the actual and the simulated VR environment with respect to the BC task, while there were significant differences in almost all dependent parameters for the NP task. Moderate to high correlations for most dependent parameters were revealed for both tasks. The VR environment adequately simulated the BC task. The significant differences found for the NP task may be attributed to an oversimplification in the VR environment. Further research is needed to develop effective and reliable VR environments for robotic laparoscopic training.

WYNDHAM JONES  
Major/minor: Psychology  
Faculty advisor: Lisa Scherer  
“Narcissism and how it can cause aggression”

Aggression can make any environment difficult to be in. Aggressive individuals can make work and school intolerable for everyone they come into contact with. Earlier research has shown that individuals low in self esteem can become aggressive and even violent; however, new research has shown that the trait of narcissism can also cause aggression (Barr et al., 2007; Gollmaryami & Barry, 2010; Penney & Spector, 2002). Narcissism is seen as an unrealistic feeling of self-love for oneself. The view can become so distorted that it causes strains in relationships with peers, friends, and family. Research has shown that individuals high in narcissism with high yet unstable self esteem can become aggressive and even violent due to threats to the ego (Bushman et al., 2009; Konrath, Bushman, & Campbell, 2006). Many can have narcissistic traits in their personality and many of us may work with a narcissistic individual. That is why it is important to find healthy ways to combat aggression in narcissistic individuals to make our workplaces and schools healthier environments to be in and safe from violence. The presentation I will give will contain an overview and short history of narcissism, how narcissism can be tied to aggression, different ways in which we can combat aggression in narcissists and other possible directions that research can go to study solutions to the aggressive narcissist.
LEANNA KEITH
Major/minor: Music Performance
Faculty advisor: Christine Beard
"Chinese to Western Music"

Chinese music is rarely heard in today’s western society. Although Chinese music has been developing since 1122 BC, the average person will not hear traditional Chinese music unless they’re watching a foreign film. The average musician will not have a chance to play the classic pieces either without expending a great amount of effort. Luckily, in the past few decades, Chinese music and styles have been filtering into the realm of western music. Traditional Chinese pieces are being transcribed into a format that western musicians can read and try to replicate on their instruments. Some pieces are easier than others. Traditional pieces that require an orchestra only need to translate various markings in the piece. However, pieces that require traditional Chinese instruments are much harder to recreate into western instruments and notation.

For example, one major traditional Chinese instrument is the Dizi - a wind instrument made of bamboo. It has hundreds of pieces that can be played on it, but since western musicians do not tend to play the Dizi, a similar instrument must be found. In this case, the music for the Dizi is transcribed for the flute, which has similar range and sound. The flutist is then given specific instructions on how to play the music in a fashion that resembles the style of the Dizi.

To truly understand this transition from Chinese Dizi to western flute, I will exhibit a traditional Dizi, and I will also perform a traditional Chinese piece on the flute.

AUSTIN KORGAN
Major/minor: Psychology
Faculty advisor: Jeffrey French
"Links Between Juvenile Play and Stress Reactivity in White-faced Marmosets (Callithrix geoffroyi)"

Play behavior is defined as behavior that may appear purposeless, but utilizes motor activities that may generalize to future contexts. One hypothesis regarding mammalian play behavior suggests that juvenile play experience affects an individual’s ability to cope with unexpected events, both physically and emotionally. If this were true, it would be advantageous for parents to increase their play behavior with juveniles. In the current study, we tested if play behavior in white-faced marmosets (Callithrix geoffroyi) during the juvenile period is related to physiological reactivity to social separation, a mild stressor. Twenty-nine marmosets were included in analysis. Social stress tests occurred three times: ages 6, 12, and 18 months. We measured cortisol levels in urine samples taken before, during, and after social separation. Also, when monkeys were 5-10 months of age (i.e., during the juvenile period), behavioral observations were conducted three times per week when animals were in their home cages with their families. Each occurrence of play behavior was scored between all family members during 20-minute observations. Pearson’s correlations were conducted to assess the relationship between juvenile play behavior and cortisol levels during stressful experiences. Our results show that animals with greater physiological reactivity to social separation at 6, 12, and 18 months also exhibited higher amounts of play with their fathers during the juvenile period. Findings suggest that marmosets may use social play as a means of modulating responses to stressful stimuli, or that features associated with high stress reactivity render the juvenile an attractive play partner.

EVERETT LEVISON
Major/minor: English/Spanish
Faculty advisor: Frank Bramlett
"Music, Overlap, and African American English"

One of the most firmly established models to emerge from the socio linguistic method of conversation analysis over the last thirty years is the turn allocation system proposed by Sacks, Schegloff, Jefferson (1974). Schegloff found that the overwhelmingly fundamental feature of turn allocation is the achievement of one person at a time talk by the use of specific turn overlap management devices. This research project tests to what extent these devices are employed in conversations within the African American English speech community and whether one at a time maintenance is always their primary function within this cultural environment. To this end, the project analyzes overlap resolution devices such as hitches, perturbations, syllabic cadences, frequency and length of overlapping turns, as well as certain post resolution stances adopted by conversation participants. The data analyzed was taken from a recorded conversation of three North Omaha African American males, all in their early 20s, and from the resulting 60 pages of transcribed text. The analysis reveals not only important cultural exceptions to the model proposed by Sacks, Schegloff, Jefferson, but also that those exceptions demonstrate how in certain African American English events talk in unison is generally promoted as an integral part of social interaction. Lastly, evidence emerges from
the data that within this specific context, simultaneous talk creates tonal emphasis and conversational rhythms rooted to a greater degree in musical parallels than those first alluded to by Schegloff.

DHANANJAY NAWANDAR, ANDREW SEBERG
Major/minor: Biotechnology
Faculty advisor: Mark Swanson
“The CCR4-NOT co-activator functions in Gcn4 regulated gene expression after transcription”

Amino acid starvation in the yeast Saccharomyces cerevisiae leads to a global reduction in translation due to the phosphorylation of the alpha subunit of eukaryotic translation factor 2 (eIF2α). Even during this global reduction in translation, some mRNAs need to be translated more efficiently to overcome the starvation, including the mRNAs regulated by the Gcn4 protein. Gcn4 is a transcriptional activator, regulating the activities of about 500 genes in yeast, including the genes encoding amino acid biosynthetic enzymes. The CCR4-NOT complex is one of the six known co-activators of Gcn4. Along with transcriptional activation of the Gcn4 regulated genes, this complex has also been shown to have a post-translational role in mRNA degradation. Very little is known about the role of this complex after transcription and before translation. We are studying the post-transcriptional regulation of the Gcn4 regulated genes by the CCR4-NOT complex. All of these elements of the general amino acid control pathway are also in humans and this its study in yeast will be applicable in humans. Different methods of inducing amino acid starvation have been used by numerous labs, but most of these methods have been limited to studying the mRNA levels of the Gcn4 regulated genes. We are trying to determine the best conditions to induce amino acid starvation in yeast, taking into consideration the both mRNAs and the proteins of Gcn4 regulated genes, along with the eIF2α phosphorylation levels.

ANDREW NELSON
Major/minor: Civil Engineering
Faculty advisor: Shannon Bartelt-Hunt
“At Home Water Kit Testing”

The purpose of this project was to compare results of five at-home water testing kits: the Watersafe Well Water Test Kit, First Alert Water Test Kit, Pro-Lab Do-It Yourself Test Kit, Complete Home Water Quality Test Kit, and the PurTest Home Water Analysis Kit using unmodified and fortified (spiked) tap water. The contaminants measured in each test are pesticides, Nitrate/Nitrate, Total and Free Chlorine, pH, Total Alkalinity, Hardness, e-coli, Lead, Copper, Iron, Sulfate, and Sulfide. Each kit was tested in duplicate on unmodified tap water from Lincoln, Nebraska and on tap water spiked with known concentrations of water contaminants. The evaluation process began with a practice test of Lincoln, Nebraska tap water using each kit to familiarize the tester with each kit’s procedures to minimize the possibility of user error. After becoming familiar with each kit, actual tap water testing was initiated at the Water Sciences Laboratory at the University of Nebraska-Lincoln in July 2010. The order in which parameters were tested with the at-home testing kits was based on the contaminant stability and sample holding time requirements for each parameter. Laboratory methods were then used as a reference point for comparison to test strip measurements using the at-home test kits. The kits all were at various levels of accuracy and precision. However, the most efficient kit was the PurTest Home Water Analysis Kit because of its high number of tests and accuracy.

CHRISTINE QUICK
Major/minor: Psychology
Faculty advisor: Lisa Scherer
“Vicrims of Workplace Bullying: Understanding Effective Versus Destructive Victim Responses”

While bullying in childhood and adolescence has been studied and research in abundance, bullying in the workplace environment occurs more than one may suspect and in many forms that may not be easily recognizable. This presentation discusses bullying as a counterproductive or deviant work behavior that is increasing in many forms including, but not limited to, direct physical harm, indirect verbal insults, and relational aggression. Bullying is defined as experience persisting patterns of negative actions, such as intentional attempts to cause harm or cause discomfort to another, using verbal insults, physical acts, or social exclusion (Owleus 1993). The target of these actions is often felt to be in an inferior position to the perpetrator. The specific focus of this presentation will be to review and develop research propositions, regarding how targets of bullying react to this behavior with a specific emphasis on understanding the factors predicting effective coping and resolution versus more dysfunctional responses such as excessive stress and counter-aggressive behaviors.
AMANDA RIESBERG
Major/minor: Chemistry
Faculty advisor: Alan Gift
"Influence of polymeric excipients on carbamazepine hydrate formation kinetics in aqueous slurries"

Active pharmaceutical ingredient (API) can undergo an anhydrate-to-hydrate transformation during different stages of processing and this transformation may result in an unwanted crystal form of the API in the final drug product. The transformation of the anhydrate crystal to the hydrate crystal can affect various properties of the API including solubility, bioavailability, and stability and thus change the efficacy of the drug. The ability to inhibit this transformation is important to maintain control of the solid state form of the API during processing. The influence of various polymeric excipients was investigated to determine the inhibition on the model API, carbamazepine (CBZ), in aqueous slurries. A mass of 1.0 gram of CBZ was combined with 50 mL of aqueous solution containing a polymer. This solution was continuously stirred and the anhydrate-to-hydrate phase transformation of CBZ was monitored using in-line Raman spectroscopy. The collected spectra were used to create kinetic profiles of the transformations. The results showed that hydroxylpropyl methylcellulose had inhibitory effects on the CBZ transformation. Additionally, the degree of substitution of the cellulose polymer and the chain length of the cellulose polymer showed varying inhibitory effects. Microscope images of the hydrate crystals were also collected to determine changes in morphology of the CBZ hydrate after transformation.

BRITTANY ROBINETTE
Major/minor: Biotechnology
Faculty advisor: William Tapprich
"Mutagenesis of a Functionally Active Region of the Coxsackievirus B3 Genome"

The virus known as coxsackievirus B3 (CVB3) is an enterovirus, of the class that has an RNA genome that is used as mRNA in the infected cell. To multiply and cause disease, this RNA genome must be efficient as an mRNA and also must be efficiently replicated. One part of the RNA genome, called the 5'-non-translated region (5'NTR), is known to be directly involved in mRNA and replication functions. Furthermore, a small portion of the 5'NTR, known as the connecting region, separates Domains I and II, and is responsible for much of the activity. The goal of this project is to further determine the functional role of the connecting region. It is currently held that the cloverleaf structure of Domain I is largely responsible for the replication events of CVB3, and Domain II is thought to be a determinant for virulence. We have begun investigation of the connecting region by constructing a two base mutation at positions 93 and 94. This is a highly conserved site in the connecting region and is thought to play a major role in the folding of the entire genome. After determining that the desired C to A base changes have occurred by comparative genomic sequencing, we have begun to chemically probe the mutated molecule in comparison with virulent (28) strain to determine the effects of this change on the folding and functions of the 5' NTR.

BROOKE SULLIVAN
Major/minor: Biotechnology
Faculty advisor: William Tapprich
“Native Structure of the 5' Nontranslated Region of the Coxsackievirus B3 Genome As Determined By Chemical Probing”

Coxsackievirus B3, strain 28 (CVB3/28) is a positive-sense RNA virus from the Picornaviridae family that causes myocarditis and pancreatitis. The native structure of the 5' non-translated region (5' NTR) of the CVB3/28 genome is necessary to promote replication and is also required for virulence. While the nucleotide sequence of this segment of the CVB3/28 genome is known, its structural orientation has not yet been determined. This study aims to determine the native structure of the 5' NTR by examining the secondary and tertiary interactions occurring within the region. These interactions are currently being examined and analyzed by chemical probing of the full length and fully folded 5' NTR RNA. A complete understanding of the native structure of the 5' NTR region will yield insight into host-virus interactions and will be useful in identifying the mechanism(s) involved in CVB3/28 virulence. This information may then be used to aid in the development of novel therapeutics against the CVB3/28 virus.
MICHAEL SUSTAITA  
Major/minor: Psychology  
Faculty advisor: Juan Casas  
"Incidence and Correlates of Sexting Behaviors among College Students"

Sexting, described as the act of sending sexually explicit content utilizing a mobile telephone, has garnered the attention of the media and public but empirical research on the behavior is scarce. This study assesses the prevalence of sexting behaviors among college students by age and gender and the correlations between sexting and anxiety, depression and affect. Further, it aims to establish the primary causes of sexting. The sample of 369 participants, ranging in age from 19 to 35+ years completed an anonymous questionnaire. Of students surveyed, 16% responded “yes” to having sent a sexually explicit photographic image of themselves or of someone else to another person in the past 6 months and 37% responded “yes” to having received such an image. Significant positive correlations were found between participants who responded “yes” to having their nude photo sent by someone else without their consent and higher scores for depression, anxiety, and negative affect. Further, a positive correlation was found between participants who responded “yes” to having sent a sexually explicit image of themselves in the past six months and higher anxiety scores. Follow-up regression analyses indicated that sending sexting messages while in college significantly predicted depression after controlling for age and gender. The results of this study demonstrate that the prevalence of sexting among college students is such that further research of this behavior is needed, especially given the potential adjustment problems associated with this activity. These and other findings will be discussed along with the implications for future research.
ALICIA AHRENS  
Major/minor:  Developmental Psychology  
Faculty advisor:  Jonathan Santo  
“The Effects of Peer Acceptance and Gender on Social Withdrawal Over Time”

The purpose of the present study was to examine how ratings of peer acceptance influence peer ratings of social withdrawal on early adolescents. Moreover, the effects of time and gender were also examined. A total of 570 fifth and sixth graders (M = 10.9 years) from 25 classes in the Greater Montreal region took part in the study. Participants were met once in October (Time 1) and once in May (Time 2). A sociometric rating was used to assess peer acceptance. Three items were taken from the Revised Class Play (Masten, Morrison and Pelligrini, 1985) to measure peer assessed social withdrawal (e.g., someone who prefers being by themselves). Children with high levels of peer acceptance were predicted to have low levels of social withdrawal, and this association was expected to remain stable over time. Boys and girls were predicted to show no differences in social withdrawal. A three level multi-level modeling approach was used to examine these relationships. Assessments were nested within children as well as children within classes. Nominations of social withdrawal tended to decrease over time (18.71% variance explained). Moreover, a significant interaction was found between time and acceptance on withdrawal in that children who were liked more by their peers showed a significantly larger decrease in social withdrawal nominations than those who were not liked as much (6.13% remaining variance explained). A marginally significant sex difference revealed that girls were generally nominated as more socially withdrawn at first, but this effect disappeared over time.

NICHOLAS ARREOLA, DANIELLE CROUGH  
Major/minor:  Psychology  
Faculty advisor:  Roni Reiter-Palmon  
“Creativity in Teams: The Role of Shared Mental Models”

Shared mental models (SMM’s), which are typically thought of as knowledge shared across team members about how a task is completed and how teams should function, are important to team outcomes such as high performance. Research findings regarding the influence that SMM’s have on creativity are sparse, and therefore this study attempts to make a contribution to that domain. Findings link specific subscales of the SMM scale to measures of quality and originality such that those related to communication and team resources predicted quality and originality, whereas the subscales related to team orchestration only predicted quality.

JASJIT KAUR BANWAIT  
Major/minor:  Information Technology  
Faculty advisor:  Dhundy Kiran Bastola  
“Broodcomb- a computational tool to map microRNAs to mRNA targets”

MicroRNAs (or miRNAs) are short ~21-22 nt long non-coding RNAs which have been annotated as gene expression regulators at the posttranscriptional level. They regulate the expression of genes by inhibiting translation or cleavage of target mRNAs through partial complementary base paring at 3'-untranslated region of target mRNAs. MicroRNAs usually maps to a number of different mRNAs, while only few of such mapping are biologically significant. Existing web based computational tools help in the identification of limited number of microRNA targets. Using the information available in public domain, including the open source programming language, we developed a software module called Broodcomb to efficiently process all know human miRNA mapping of seed sequence (~7-8nt) to all the human mRNA 3'-UTR region. Additionally, Broodcomb has been successfully integrated into gene expression profiling tools to study the regulation of gene expression at the systems level.
ANDY CALLENS, AARON READ
Major/minor: Psychology
Faculty advisor: G.J. de Vreede
"Don't blame the software: The importance of instructions in user requirements generation"

When negotiated software requirements are misunderstood by programmers, thousands of production hours may be wasted making unnecessary changes. Customers often have trouble producing functional user stories; statements that communicate to programmers what software features are desired and why they are needed. Although group support software (GSS) has the potential to enhance both the number and the quality of user stories, our research shows that software alone is insufficient to enhance story development. In addition to the selection and configuration of the GSS tool, useful instructions are a final requirement for creating useful software requirements.

JON CAREY, JESSIE HUISINGA
Major/minor: Exercise Science
Faculty advisor: Sara Myers
“Resistance Training Alters Joint Powers In Multiple Sclerosis Patients”

Multiple Sclerosis (MS) is a progressive, debilitating, neurological disease which affects over 400,000 Americans. Exercise interventions have been shown to positively affect MS patients with respect to aerobic fitness and quality of life. This study examines 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. Data collections were performed before and after MS patients participated in three months of a twice weekly supervised, progressive resistance training program that included lower extremity, upper extremity, and core exercises. Before training, MS patients as compared to controls exhibited significantly decreased ankle plantarflexor power generation during late stance, decreased power generation at the knee during late stance, increased power absorption at the knee during pre swing, decreased power absorption of the hip flexors during late stance, and decreased hip extensor power generation during pre-swing. Following training, MS patients as compared to controls showed significant differences only for power generation of the ankle plantarflexors during pre-swing and power absorption at the knee during pre-swing. The differences that remained between the two groups were present during the pre-swing phase of the gait cycle indicating a remaining deficiency in MS patients’ ability to propel the leg into swing after the stance phase due to decreased power generation at the ankle. The addition of gait initiation training could supplement the improvements to gait parameters gained as a result of resistance training.

MOHAMED AMER CHAABAN
Major/minor: Architectural Engineering
Faculty advisor: Mahmoud Alahmad
“Elastic Photovoltaic Structure”

The research discusses new photovoltaic (PV) system topologies that maximize the energy extracted from PV system using an efficient way under different operational conditions. The proposed topologies provide flexible electrical connection between PV modules to achieve different configurations. A new switching matrix has been developed to achieve the required configurations. Preliminary simulations provide promising results for an adaptive PV array. Comparison between traditional PV system configurations and adaptive configuration is considered by the simulation model. A significant improvement in power curves is achieved by the proposed topologies. A mixture of power conditioning units (PCUs) including DC/DC converter, micro-inverter, and string-inverter configurations are included in the developed switching matrix to achieve efficient system configuration by maximizing the performance of the components of the PV system. Results using Solar Advisor Model (SAM) verify the behavior of traditional PV systems and compare them together. Calculation of the adaptive system is done to verify the performance improvement. Furthermore, a prototype is built to prove the proposed idea. The results are compared and the overall improvement is identical for both the simulation results and the experimental results. Funded by the Environmental Protection Agency (EPA), the research have been started to develop a scalable and modular photovoltaic system for the residential and commercial sector.
KE CHENG
Major/minor: Information Technology
Faculty advisor: Prithviraj Dasgupta
"Robust Multi-robot Team Formations using Weighted Voting Games"

We consider the problem of distributed multi-robot team formation including the dynamic reconfiguration of robot teams after encountering obstacles. We describe a distributed robot team reconfiguration algorithm, DYNREFORM, that uses a game-theoretic technique of team formation called weighted voting games (WVGs) along with a flocking-based formation control mechanism. DYNREFORM works without explicit knowledge of global features such as the presence of obstacles in the environment or the number and location of all other robots in the system. It uses the locally computed metrics of each robot in the team to determine whether a team needs to split or two teams need to merge during reconfiguration. We have tested team reconfiguration using the DYN-REFORM algorithm experimentally within the Webots simulator using teams of e-puck robots of different sizes and with different obstacle geometries. We have also shown that using robots coordinated with the DYN-REFORM algorithm for a distributed area-coverage application improves the coverage performance.

JUNG CHIEN, LESLIE DECKER
Major/minor: Biomechanics
Faculty advisor: Nick Stergiou
"Variability in daily ambulatory activity patterns in aged mice"

It is well established that the aging process depends on a combination of both genetic and environmental factors. The reduction in ambulatory activity with aging has been associated with a loss of complexity in the dynamics of multiple physiological systems. This loss of complexity leads to a general slowing of the intrinsic dynamics of the locomotor system and a concurrent impaired ability to adapt to physiological stresses. The purpose of this study was to explore age-related differences in the regularity and complexity of daily ambulatory activity patterns in young and aged mice. Mouse exploratory behaviors were monitored for 13 consecutive days. The position of each mouse was defined as the X-Y pixel coordinates relative to the origin of the cage. Approximate entropy (ApEn), a regularity statistic, was used to evaluate the likelihood that similar patterns exist within each time series. A time series with a more regular and predictable pattern (lower complexity) has an ApEn value closer to zero, while a time series with a more irregular and unpredictable pattern (higher complexity) has an ApEn value closer to two. Aged mice had a more predictable ambulatory activity pattern than their younger counterparts, both along the transverse lateral (0.23±0.04 vs. 0.13±0.01) and longitudinal (0.17±0.02 vs. 0.14±0.01, respectively) directions of the cage. Our findings support the well-known “loss of complexity hypothesis of aging” and reinforce the prognostic impact of individual’s natural gait speed as a good predictor for the onset of morbidity and functional dependence in the elderly.

JULIE CONNER
Major/minor: School Psychology
Faculty advisor: Lisa Kelly-Vance
“A Third Grade Reading Comprehension Intervention”

This research was part of a service learning project in the “Psychology of Exceptional Children” graduate class at the University of Nebraska-Omaha, in which a third grade student was referred for reading comprehension difficulties. This case study provides information about the implementation and effectiveness of a reading intervention used for a third grade student to increase reading comprehension. This student attended a small, parochial school that is both ethnically and economically diverse. The hypothesis was that the student’s reading comprehension would increase if she received an intervention teaching reading comprehension skills. A research-based intervention was chosen to teach comprehension skills. A main idea graphic organizer, along with a reinforcement strategy, was used to facilitate active and reflective reading to improve the student’s reading comprehension. Progress monitoring of reading comprehension over a 12-week period shows the effectiveness of this intervention in improving the student’s reading comprehension skills. A detailed description of the intervention components and the results of the study will be provided.
KATHRYN DEMPSEY, KANIMATHI DURAISAMY  
Major/minor:  Bioinformatics  
Faculty advisor:  Hesham Ali  
“A Parallel Chordal Graph Algorithm for Analyzing Biological Network Models”

Network models created from high-throughput biological assays are a sophisticated tool for analyzing genome-wide data; however, network complexity and size makes identification of these structures challenging. We present our method for reducing network complexity by parallel implementation of choral graph filtering, and provide evidence that integrity of network structures with biological importance is remains present. Our parallel graph sampling algorithm is scalable to a number of processors and is based on extracting the maximal chordal subgraphs from large networks. Our results show that sampled subgraphs preserve the functional properties of the original network, even in networks where there is significant overlap of clusters. Fewer functional units were retained in the subgraphs, despite good mapping. Our method reduces the density of the network such that it can be used to filter out non-causal edges, making large networks more manageable. By identifying a technique that improves network manageability while maintaining structure, we are able to delve further into the structures that define our network model.

PAUL FALKOWSKI  
Major/minor:  Gerontology  
Faculty advisor:  Karen Dwyer  
“Investigating the Efficacy of Adobe Connect to Enhance Online Immediacy: A Pretest and Recommendations for Future Research”

The purpose of this study was to investigate the efficacy of a newer software program (Adobe Connect) to enhance online immediacy. Previous instructional communication research indicates that student perceptions of instructor immediacy in face-to-face learning environment are positively and significantly related to affective and cognitive learning. With the overwhelming and rapid advances in technology, and lack of formal instructor training on online course design researchers have called for more investigation on perceptions of immediacy and the use of various software used by online instructional designers and instructors. This study investigated newer software technology used frequently in the creation of on-line/distance education college classes. For the methodology, three mini-online lectures were prepared and viewed by students at a large Midwestern university. The students were then asked to respond to survey questions in Survey Monkey, an online data gathering tool, using the following instruments, 1) Verbal Immediacy Behaviors (Gorham, 1988), and 2) Nonverbal Immediacy Scale – Observer (NIS-O). (Richmond, McCroskey, & Johnson, 2003). The results showed that Adobe Connect performed better overall than the narrated only lecture presentation and the narrated lecture that included a video of image of the instructor. Sense of classroom community index scores were strongest for Adobe Connect followed by verbal instructor immediacy scores. Recommendations for future research are discussed.

ABBY FREEMAN  
Major/minor:  Communication  
Faculty advisor:  Karen Dwyer  
“The Influence of Teacher Self-Efficacy on Student Perception of Teacher Credibility: A Pretest and Recommendations for Future Research”

The constructs of self-efficacy and perception of teacher credibility were examined in the instructional environment by correlating teacher self-efficacy scores with a student’s perception of teacher credibility. This pre-test study used Teven & McCroskey’s (1999) Teacher Credibility Scale and Gibson & Dembo’s (1984) Teacher Efficacy Scale for measurement. Surveys were administered to instructors and students of four entry-level communication classrooms at a Midwestern University. The preliminary results indicated that no relationship is present between teacher self-efficacy and perception of credibility. The components of credibility: competence, caring, and character were also assessed with self-efficacy scores. Results initially indicated no relationship; however, post-hoc analysis uncovered significant differences between instructors with the lowest and highest level of self-efficacy suggesting a potential correlation. This pre-test advocates continued research on these interacting instructional constructs through continued study within a larger and more diverse sample size. Further examination should address instructor background and training philosophies.
NATHAN HAMILTON, JENNIFER YENTES
Major/minor: Exercise Science
Faculty advisor: Sara Myers
"Pharmacological treatment for intermittent claudication does not significantly affect gait impairments during claudication pain"

Peripheral Arterial Disease (PAD) is a relatively common condition affecting approximately one in every five older adults in the United States. The condition is characterized by pain or cramping in the lower legs during physical activity due to inadequate blood flow. The root of the inadequate blood flow is from the hardening or narrowing of the arteries. To slow the onset of pain, cilostazol and pentoxifylline are commonly prescribed. Whether these drugs have a substantial impact on walking kinematics, kinetics, or time-distance parameters is not known, and is therefore, the aim of this study. Twenty-four PAD subjects, 14 whom were prescribed cilostazol and 10 whom were prescribed pentoxifylline, partook in five overground walking trials (measuring the affected limb) after they had claudication pain induced through inclined treadmill walking. Means for gait velocity, range of motion, peak joint torques and powers from the hip, knee and ankle joints were analyzed using a 2x2 repeated measures ANOVA (each group with before and after drug intervention) with a Bonferonni correction (p<0.0025). The analysis revealed that there were no significant changes in range of motion, moments, and powers for all joints. There were also no changes in time-distance parameters. Due to the lack of changes, it appears that pharmacological treatment had limited to no improvement in biomechanical parameters for those suffering from PAD. Future treatments targeting mitochondrial function may be a more appropriate intervention since PAD patients suffer from myopathic tissue damage.

SARAH HANIFY
Major/minor: Social Work/Public Administration
Faculty advisor: Karen Rolf
"Posttraumatic Stress Disorder and Post-Combat Therapy Utilization Among Military Veterans and Civilians"

Today, PTSD is issue of increasing importance within the military. In 2008, the Rand Corporation conducted a study with veterans from Operation Iraqi Freedom and Operation Enduring Freedom to determine the rates of PTSD in that population. Researchers found that 18.5 percent of the population surveyed exhibited signs and symptoms of PTSD (Tanielian and Jaycox, 2008). In the past 10 years, new diagnoses of posttraumatic stress disorder have increased, from approximately 1,600 cases in 2000 to approximately 85,000 service members in 2010 (Fischer, 2010). Since the first version of the National Comorbidity Study, and the subsequent Revision, many researchers have used this data tool to study various aspects of posttraumatic stress disorder.

Using data collected from Ronald C. Kessler’s the National Comorbidity Survey Replication, the investigators plan to assess what type of treatment and therapies are most effective and utilized for combat veterans experiencing posttraumatic stress disorder (PTSD). This study uses multivariate analyses to examine after-care service utilization among peacekeepers, individuals who have engaged in combat, and those who have lived in a war zone and not engaged in combat. Types of therapies included in the investigation include group and individual therapies, pharmacoepidemiology, and personal resources for therapeutic services. Civilians who have experienced combat situations (i.e., peacekeepers, non-combative civilians in war zones, etc.) will be used as controls to determine if being a military veteran affects the likelihood of service utilization and the types of services utilized. The investigators will use existing data from the National Comorbidity Survey Replication.

ANN HAVERKOST
Major/minor: Special Education
Faculty advisor: Philip Nordness
"An Examination of Hand-held Computer-Assisted Instruction on Subtraction Skills for Second Grade Students with Learning and Behavioral Disabilities"

Research has demonstrated that students with disabilities who struggle with math, often lack automaticity with basic math facts. When students lack automaticity with number facts, they have difficulty with estimation, identifying multiples when working with fractions, performing algebraic equations, and performing mental math. To compensate for these deficits, special education teachers need to find additional strategies to infuse fluency instruction into daily routines. One strategy for increasing practice opportunities with basic math facts is to use a mathematic flashcard application on a mobile computing device, such as the Apple iPod Touch. The Apple iPod Touch is a hand-held media player, personal digital assistant, and Wi-Fi enabled computing device. Using a single subject multiple baseline design, this study examined the effectiveness of a mathematic flashcard application on an iPod Touch across three, second grade students with learning and behavioral disabilities. After practicing for 10 minutes, three times a week on the iPod Touch with the flashcard application, each of the students improved their subtraction scores by an
average of 17% as measured by the district created, curriculum-based assessment. The results from this study suggest that practice on a mobile computing device with a mathematic flashcard application can improve subtraction skills in second grade students with disabilities.

JOSHUA HAWORTH
Major/minor: Biomechanics
Faculty advisor: Nick Stergiou
“Patterns of object attention throughout the time course of sitting development: A case study”

Sitting posture in infants is important because it provides an opportunity to visually and manually explore environments. Infants near the age of sitting begin to identify and individuate objects, providing information to the correction of posture. Specific interest has been directed at identifying the location of infant’s gaze fixations, inferring attention, during sitting; however, describing the temporal organization of the constantly changing point of visual fixation may in fact be more informative. Approximate entropy measures the complexity of behavior and may provide insight into the general organization of the gaze-object fixation during sitting. In our study, one infant was followed for 13 weeks, from the age of 3.5 – 6.5 months; beginning when initial signs of sitting ability emerged; sitting unsupported for ~10s, with fully competent, unsupported sitting achieved by the conclusion of the study. Eye-tracking equipment captured eye movements; fixation locations and durations, including the identity of the object to which the infant was looking, during 1.5 minutes of sitting. Approximate entropy was calculated from this time series, representing the underlying structure of the temporal complexity contained in the behavior. Our results show that through the 12 weeks of sitting posture development, gaze-object behavior exhibited decreasing approximate entropy, meaning that the pattern of gaze fixation behavior became more organized as posture improved. This evidence suggests that the infant's attention to specific objects becomes refined over time. Whether or not this is due directly to a relationship of improved coordination of sitting posture will require extended and more focused investigations.

CHUN-KAI HUANG, JUNG HUNG CHIEN
Major/minor: Biomechanics
Faculty advisor: Nick Stergiou, Ka-Chun Siu
“Walking in a Moving Virtual Corridor with Variable Width affects Step Width Variability”

Human gait is highly adaptive and adjustable according to the surrounding environment. Previous study indicated that the active control of gait requires higher levels of brain function for stability in the frontal plane. The aim of this study was to determine how human gait is affected in the frontal plane by manipulating visual information. Ten participants walked on treadmill with four different virtual conditions where the width size of the virtual corridor was changed sinusoidally (narrow condition: from 15~45 inches; wide condition: from 15~105 inches). A fixed corridor with 75-inch width was used as the control condition. Step width variability was measured by the coefficient of variation (CV) and the approximate entropy (ApEn). Repeated measures ANOVA were conducted to examine the effect of width size of the corridor on step width variability. Pearson correlation was utilized to examine the relationship between segmental step width measures and width size of the corridor. A significant condition effect was found for the CV (p= 0.04). When compared with control condition, CV in the wide condition was significantly higher (p< 0.001). For the segmental analysis, both step width variability measures showed the strongest correlation in the widest condition (CV: r= 0.475; ApEn: r= 0.545). Both CV and ApEn of gait variability increased when the width size of the virtual corridor become larger, and vice versa. Gait variability in the frontal plane modulated by visual information strengthens the evidence of active control for stability in human gait from higher levels of brain function.

NATE HUNT
Major/minor: Exercise Science
Faculty advisor: Nick Stergiou
“Phonological dual-task interference affects walking regularity”

The objective of the study was to investigate the effects of aging on the control of movements of the lower extremities while performing secondary cognitive tasks of different levels of difficulty. Fourteen young and ten older adults performed phonological language tasks. These tasks were performed while sitting (single-task session) and, one week later, while walking on a treadmill at self-selected pace (dual-task session). Cognitive performance was assessed. Control of the movements of the lower extremities was evaluated with the approximate entropy (ApEn) measure where lower ApEn values indicate a less complex (more regular) control strategy. Repeated measures ANOVAs were used. Older adults produced more breaking-rule errors in PF than the young. Furthermore, during walking, the elderly increased these errors, while the young remained stable in their performance. In both groups, decreased ApEn values were found at the hip and the ankle in WR and PF, respectively, and also at the hip in PF.
for the young. We concluded that the young showed a gradual change in gait control strategy to maintain cognitive performance. We also concluded that the elderly were similar to the young at low interference. However, at higher interference the young used a more periodic control of both hip and ankle, while the elderly used similar control only at the ankle with concomitant cognitive performance decline. These findings suggested the existence of an interference threshold above which the elderly are not able to accommodate to either task effectively.

ANDREA IACCHERI
Major/minor: Communication
Faculty advisor: Karen Dwyer

Characteristics, expectations, and arousal value: three tenants of the expectancy violations theory were examined in relation to instructor self-disclosure. The Instructor Self-Disclosure Scale (Cayanus & Martin, 2004) was used with newly developed statements reflecting the three tenants of the expectancy violations theory to determine if the perceived level of instructor self-disclosure is impacted by communication characteristics of the instructor. Students from three basic communication classes were invited to give feedback about instructor communication. Preliminary results found a significant relationship between instructor self-disclosure and positive communication statements. However, student responses showed no significant relationship between perceptions of learning and positive communication with the use of teacher self-disclosure statements. Future research is suggested using a larger sample size to determine if perceived instructor self-disclosure is related to positive communication characteristics as found in the Expectancy Violation Theory.

ALISON JERGENSON, SARA WOLFE
Major/minor: Physical Activity in Health Promotion
Faculty advisor: Jennifer Huberty
“Ready for Recess: The association between total MVPA achieved and the amount of time for recess”

Children spend as much as 60-70% of their waking hours at school. In Nebraska, more than 3 in 4 school-aged children do not engage in sufficient levels of moderate or vigorous physical activity (PA). According to the Center of Disease Control (CDC) PA guidelines recommend that children engage in 60 minutes or more per day of moderate to vigorous PA (MVPA) involving a variety of activities. The National Association for Sports and Physical Education recommends 20 minutes of recess per day is offered for elementary school children. Therefore, the purpose of this study was to determine if the amount of recess time children receive was associated with their MVPA. This study was a clustered randomized experimental design that was conducted in 4 low-socioeconomic status schools from the Omaha Public School district in Omaha, Nebraska. Each school was randomized into one of four conditions, 1) recreational equipment and staff training, 2) recess staff training, 3) recreational equipment, and 4) no intervention. Accelerometers were used on 257 3rd-6th grade children to assess MVPA. There was a strong correlation between MVPA and total recess time (r = 0.55; p = <0.001). A ten minute increase in total recess time was associated with an increase of 3.6 minutes in MVPA during recess (P <0.001). It appears that with an increase in recess time there is an association with an increase in MVPA. When students were rewarded with extra recess time there was an increase in the total amount of MVPA that they received for the entire day.

JANYL JUMADINOVA
Major/minor: Information Technology
Faculty advisor: Prithviraj Dasgupta
“FORETELL: A Multi-agent Prediction Market for Forecasting Event Outcomes”

My research focuses on understanding and analyzing a category of financial markets called prediction markets, using software agent-based tools. Prediction markets, in which traders trade outcomes of events (like “Barack Obama will win the presidential election”), are similar to stock markets in that they aggregate the beliefs of many agents with different information about an event, and produce a single number, a market price. The main challenge in designing, deploying and operating prediction markets is the lack of understanding about what makes a successful prediction market, i.e. how information affects traders and prediction market price, how to incentivize traders to reveal their socially useful information, and under what conditions do prediction markets perform the best. I address the first question by developing a multi-agent system that is used to analyze the effect of information on the prediction market performance and show that our model provides a better understanding and novel insights into the behavior of prediction markets and its participants. For the second question I propose a correlated equilibrium strategy for the trading agents within a partially observable stochastic game-based model that incentivizes traders to
reveal their true beliefs and show that the market’s participants following my strategy achieve higher profit by 30-150%. And for the third question I apply Boolean Network techniques to study the dynamics of prediction markets under various conditions and show under what parameter values the prediction market stabilizes and how its dynamics change with the introduction of noise and increased number of traders.

ABHISHEK KARPATE
Major/minor: Computer Science
Faculty advisor: Hesham Ali

Wireless Sensor Networks (WSNs) are quickly emerging as the technology of choice for tracking and monitoring applications in many domains. Due to limitation of computational and communication powers of the employed sensors, great attention of WSN research has been directed towards the development of WSNs which use energy efficiently. Depending on the importance of the area being monitored and how critical the nature of the application is a dynamic model for organizing WSNs is highly desirable. In this paper, we propose a graph theoretic approach to model this problem and introduce an evolutionary algorithm to handle the activation and deactivation mechanism in such networks. The algorithm generates a number of possible solutions for a given condition and the best option is selected depending on the nature of the application and the priority of the monitored area. Experimental results show that the proposed approach achieves its goals and provides a solution that matches the required need at any given instance.

MYUNG KIM
Major/minor: Criminology and Criminal Justice
Faculty advisor: Marc Swatt
“Poverty and Spatial Pattern of Homicide in New York City”

There is a link between poverty and crime, especially, violent crime (Hsieh & Pugh, 1993). And, a number of studies in the past showed that high crime communities tended to be poor, urban, overcrowded, and transient (Shaw & McKay, 1942; Agnew, 1999). In order to determine whether there is a relationship between poverty and violent crime, the author conducted a spatial analysis on 2005 New York City homicide data. The author geocoded homicide locations based on 2000 Census tracts, utilizing a Geographic Information Systems (GIS) software, ArcGIS 9.3. Crime maps derived from the spatial analysis showed a conspicuous pattern of homicide locations; the disproportionate number of murders occurred in tracts where there were more residents whose income was less than 10,000 dollars a year. Based on the spatial pattern of 2005 New York City homicide data, the relationship between poverty and homicide appears to be valid.

HILLARY KLINZING
Major/minor: Developmental Psychology
Faculty advisor: Jonathan Santo
“The Influence of Parental Feeling Validation on Young Adolescents’ Use of Relational Aggression and the Moderating Role of Gender Over Time”

The use of relational aggression has been shown to have negative consequences on the social development of youth. For example, Crick and Grotpeter (1995) found highly relationally aggressive children more likely to be lonely, depressed, and isolated from their peers. Previous research has found a link between parental use of psychological control and a child’s use of relational aggression (Barber, 1996). An aspect of psychological control, feeling invalidation, appears to be correlated to girls’ use of relational aggression (Casas, et al., 2006). However, this relationship is not seen for boys. This project explores the possible moderating role of child gender on the relationship between feeling validation and use of relational aggression over time. Participants included 430 fifth and sixth graders (M = 10.9 years) recruited from 25 Montreal classes. Relational aggression was assessed through the use of peer nominations taken at two time points. Feeling validation was measured using parental self-reports. Based on previous research, girls receiving low levels of feeling validation were predicted to increase their use of relational aggression over time while boys receiving low levels of feeling validation were predicted to have no change in use of relational aggression over time. Analysis of this data did not reveal a main effect of time. Also, a main effect of sex was not found. However, boys exposed to high levels of parental feeling validation were found to use less relational aggression over time while girls receiving low levels of parental feeling validation increased use of relational aggression over time.
NICHOLAS KLOTZ  
Major/minor: Communication  
Faculty advisor: Chin-Chung Chao  
"Effects of Social Media Sites on Civic Engagement"

Within the last few years, social networking sites (SNS) have become a popular place for Internet users to visit and subscribe to. Scholars are only in the beginning stages of understanding what affect SNS has on Internet users; however, SNS has started to challenge the notion that the Internet declines social capital. Early research suggests that political communication on SNS can increase civic engagement. In spite of this, research is still limited regarding if engaging in political communication on SNS has any connection with the act of voting. The purpose of this study is to understand what effect there is between engaging in political communication on SNS, and participating in the civic engagement act of voting. This study will conduct a quantitative survey of Facebook users who joined groups in support and in opposition to the Omaha recall election. To be specific, the survey will examine if there is a connection between users participating in political communication on Facebook, and voting in the recall election. The findings presented will be in the hope to provide additional evidence that SNS can increase social capital among users, and provide insight into the influence SNS has on voting. Ultimately, this study will be able to enrich communication research regarding SNS and social capital.

ELENA KOKKONI, JOSHUA HAWORTH  
Major/minor: Exercise Science  
Faculty advisor: Nick Stergiou  
"Discriminant Function Analysis to Predict the Time Course of Sitting Development in Infants"

Sitting is required for the development of other motor actions. A normal time course in the acquisition of sitting is essential, any delay passing along the other developmental milestones. Therefore, our aim was to identify variables whose measures at the very beginning of sitting would allow estimation of sitting. Center of pressure (COP) data were collected from twenty-six typical babies with a beginning ability to sit upright. Spatial, temporal and frequency variables of sway were obtained in both medial/lateral (ML) and anterior/posterior (AP) directions. A discriminant function analysis (DFA) was conducted on these variables, plus age and gender, to identify potential predictors regarding the duration between onset and fully independent sitting. DFA is a technique able to predict outcomes from measures taken a priori, determining which variables differentiate between two or more naturally occurring groups. Three groups were identified based on time between onset and fully independent sitting (F = 65.337; p<0.001). Mean time for each group was 55.5, 83.44 and 96.56 days accordingly. Gender (p=0.025), Median Frequency (p=0.006), and Correlation Dimension (p=0.002) in ML direction were identified by DFA to be grouping predictive with 73.1% correct classification, with only two of the cases expected to achieve sitting earlier than actually occurred. A "leave one out" analysis retains 65.4% correctness with 4 cases of detrimental classification. In conclusion, the time course of sitting development can be predicted from measures taken at the earliest signs of sitting emergence. Subsequently, early identification of infants with developmental delays would benefit from early intervention.

BETTINA LECHNER  
Major/minor: Management Information Systems  
Faculty advisor: Ann Fruhling  
"Using Technology to Enable Foster Youth to a Successful Launch into Independent Living"

In the State of Nebraska, foster youth emancipate from the foster care system and launch into independent living when they turn 19. In advance of this transition, a number of tasks have to be completed in order to prepare the youth in the best possible way. In order to facilitate this, an online information portal has been developed, which lets foster youth and their case workers track the completion of preparatory tasks, store sensitive information and documents (such as birth certificates and social security cards), and allows for the storage of information the youths might find useful (such as information on how to obtain a driver’s license or how to write a résumé). This information portal is supposed to make the case workers’ work easier, because there is a centralized way to manage each youth’s progress in preparation for their launch into independent living. The purpose of this study is to investigate whether this online information portal would be the appropriate technology to assist with the task of preparing a foster youth for their leaving the foster care system. Since the information portal would also store potentially sensitive information, it is important that the future users of the system trust it. To this end, the study also investigates the individual propensity to trust (a general view somebody has of others’ trustworthiness) in relation to the fit between the technology and the task.
ASHLEY MOELLER  
Major/minor: School Psychology  
Faculty advisor: Lisa Kelly-Vance  
“Effective First Grade Reading Interventions”

The following research was conducted through a service-learning component of a school psychology graduate course in which a first grade student at a local parochial school was referred for services in reading. Curriculum-based evaluation and the problem solving process were used to evaluate student strengths and needs and to develop an individualized intervention plan. Research-based interventions were selected to target reading fluency, accuracy, and decoding skills. The referred student improved reading fluency at a rate that is higher than typical readers, increasing from 21 to 52 words read correctly per minute and increasing accuracy from 81% to 93% over the course of the 10-week intervention. Progress monitoring data provides evidence for the efficacy of the selected interventions for use with young readers.

MUKUL MUKHERJEE, PANAGIOTIS KOUTAKIS  
Major/minor: Biomechanics  
Faculty advisor: Nick Stergiou  
“Stroke Survivors Employ Different Stiffness Control Strategies during Learning of Reaching Movements in a Dynamic Environment”

Reaching movements in dynamic environments require accurate control of endpoint stiffness parameters especially orientation and area of the endpoint stiffness ellipse. Stroke can result in abnormalities in these parameters. Our purpose was to determine if endpoint stiffness control during learning of reaching movements is affected by stroke. Stroke subjects performed reaching movements with the affected arm in a velocity-dependent force field using a robotic system. A significant effect of the learning period was revealed for the stiffness area. For the target at 270°, dynamic training increased the stiffness area while at 315°, it reduced the stiffness area. A significant effect of learning period was also revealed for the orientation for the targets at 270° and 315°. For the target at 270°, dynamic training caused the stiffness orientation to shift towards the perturbation axis while at 315°, the shift was towards the movement direction. Stroke survivors demonstrated different stiffness control strategies for movements towards than away from the body. Stroke symptoms like muscle weakness and spasticity are higher for movements away than towards the body. Stroke survivors employ different stiffness control strategies for different directions probably because the directions of muscle activations are affected by the stroke symptoms. In some directions, learning is achieved by increasing the amount of stiffness and directing the stiffness towards perturbation while in others, learning is achieved by reducing stiffness and directing it towards the direction of motion. These results provide useful information for designing specific force fields for stroke rehabilitation.

WISAM NADER  
Major/minor: Architectural Engineering  
Faculty advisor: Mahmoud Alahmad  
“I-SAVE: An Interactive Real-time Monitor and Controller to Influence Energy Conservation Behavior by Impulse Saving”

Residential energy consumption accounts for 21% of the electricity used in the United States, but research shows that almost 41% is being wasted. Fundamental understandings of how energy is consumed, monitored, and controlled are key prerequisites for an energy conservation process. Several real-time monitors in the market present an opportunity to decrease energy consumption by 3%-20%. However, their effectiveness is varied due to inefficient interface design and mixed information, ranging from partial and limited to overwhelming and impractical due to lack of understanding of consumer behavior. To solve this problem, we developed I-SAVE, an interactive real-time monitor and controller (RTMC) system to influence user behavior based on a continuous impulse saving behavior. The I-SAVE is a user friendly interface with a Go-green save-energy button. It is based on an automated sensing and actuating network at each location (receptacle, lighting switch, etc.) and utilizes learning algorithms to determine wasted energy in the entire home and provides the capability to the user to turn it off by pressing the Go-green save-energy button. This proposed system to save wasted energy will improve global climate change and air pollution, promote smaller sizing requirements and greater adoption of renewable energy alternatives and stimulate the development of a broad range of devices in homes including Net-Zero Energy Homes and leading to green job creation and prosperity.
CUONG NGUYEN
Major/minor: Information Technology
Faculty advisor: Ann Fruhling
“Communication media for distributed software design”

As virtual software projects are increasingly popular, it is also more common for software design, one of the key activities in software development process, to be conducted in the distributed context. Previous research has shown that communication media had an impact on the development of shared-understanding among team members in virtual teams. However, how communication media influence the development of shared-understanding among team members in software design, an activity where communication among team members are intense and complicated, is not well-understood. Therefore, within the scope of this study, we would like to conduct a case study to examine how virtual software development teams use communication media in their software design activities and how their usage influence their shared-understanding of the user requirements and design solutions. The outcome of the study is expected to validate media synchronicity theory in distributed software design context as well as informing practitioners of the appropriate communication media usage for conducting software design distributedly.

HENRY NIXON
Major/minor: Communication
Faculty advisor: Karen Dwyer
“Student Perceptions of Appropriate and Inappropriate Humor in the Classroom: A Pretest and Recommendations for Future”

Instructional humor, a variable of the instructional message, was examined by comparing how students and instructors identify appropriate and inappropriate use of humor within the classroom. This pre-test study used the Gorham and Christophel’s (1990) humor categories as a basis for the investigation with additional questions, to query if students could distinguish the appropriateness of instructor humor and if the perception of overall student learning was affected by use of humor. Surveys were administered to basic communication students and their instructors in two different universities in the Midwest. The preliminary results indicated that students and instructors agreed on the appropriateness of humor used in the classroom. Students were also able to identify types of humor used by instructors and how they perceived it impacted their learning. The study recommends that future research continue to examine instructor use of humor in the classroom with larger sample size and the use of Gorham and Christophel’s (1990) humor categories. These categories may no longer be applicable in the college classrooms two decades later, as these findings tend to indicate. Further examination of instructor use of humor needs to include instructor self-disclosure and immediacy as suggested by other researchers.
 Keywords: humor, appropriateness, learning, immediacy, instructional communication

HENRY NIXON
Major/minor: Communication
Faculty advisor: Chin-Chung Chao
“Does this disaster look good: A quantitative approach on media framing and crisis management”

Crisis management is defined as an organization’s concern, preparation, prevention, or response to a disaster that has disrupted a social system (Boin, 2004). The purpose of this paper is to examine how news outlets frame these crises in comparison to how the organization handles the communication of the disaster. Three major on-line news outlets will be used to interpret three of Tony Hayward’s, British Petroleum’s (BP) chief executive officer, statements regarding the Gulf Coast oil spill. Coombs (1995) Five-Category Model of Message Strategies will be employed to analyze three of Hayward’s statements addressing the crisis and utilized to analyze how three major news outlets interpret Hayward’s statements. From examining previous studies, this paper expects that the news statements will contradict Hayward’s press statements. This paper will add onto the small amount of research available on crisis management and focus on a very current issue.

SHARMILA RAMAN
Major/minor: Management Information Systems
Faculty advisor: Ann Fruhling
“Mobile e-Health Emergency Response Consultation System”

STATPack™ public health emergency response information system is designed to speed consultations between medical experts at the state public health laboratories and front-line laboratory technicians.
STATPack™ enables microbiology laboratories around the state (and now the region) to send pictures of suspicious organisms to the state public health laboratory, instead of the samples themselves, thus lessening the risk of spreading potentially deadly bioterrorism agents or infectious diseases and likewise decreasing the feedback time on the consult. Mobile system facilitates quick response as the experts in the field can quickly access the application with the help of their mobile device in the case of an emergency. The digital images of suspicious or unknown organisms are sent electronically to the State Public Health Laboratory for consultation. STATPack™ Mobile system retrieves the images using a mobile device; the medical experts can view this from their blackberry device and responded within minutes. The STATPack™ system includes an alert process that is bi-directional and has various levels of priorities (drills, emergency, urgent, and routine).

The objective of this study was to examining mobile guidelines and strategies used in the development of STATPack Mobile e-health Emergency Response System (ERS). STATPack™ utilizes video telemedicine technology for microbiology laboratory diagnostics and consultation relating to suspicious organisms. A major goal of STATPack™ is to improve remote laboratories’ ability to communicate information and make decisions in biosecurity scenarios. This research was presented at the HICSS 44th annual conference. This study provides an insight into the key issues and unique requirements associated with mobile application development and strategies to assist developers in better designing future mobile applications. STATPack Mobile provides an example for practitioners to see how a mobile e-health system can be applied to processes unique to a laboratory setting as a proof of concept for other healthcare diagnostic applications.

KAMINI SABIR
Major/minor: Management Information Systems
Faculty advisor: Ann Fruhling

"Success factor of a juvenile Diversion Case Management System"

A staggering 40 percent of information-technology projects fail, which costs the average IT organization $1 million each year, according to a joint study by TechRepublic, Inc. and its parent Gartner Group, Inc. (NYSE: IT and ITB). These 40 percent IT projects fail because either they are over budget, over time, have bad functionality or can't obtain the user acceptance.

My study analyzes the factors that enable county crime commissions to successfully use an information technology platform for case management, reporting and information sharing across county jurisdictions. The case study compares and contrasts two systems. The first system is a Microsoft Access application previously utilized by the county commissions. The second is a system currently in place and maintained by the Nebraska Commission on Law Enforcement and Criminal Justice, called Juvenile Diversion Case Management Information System (JDCMIS). Primary success factors of the Access based JDCM system will be identified and compared with a later Java based system. Each system has experienced different levels of user acceptance. By studying the acceptance factors and associating the factors with system functionality, I hope to be able to identify recommendations for system requirements that will result in a system with greater user acceptance.

EVANS SORDIASHIE, HOSEN HASNA
Major/minor: Architectural Engineering
Faculty advisor: Mahmoud Alahmad

"Addressable Power Distribution and Energy Management System for the Built Environment"

"Phantom Loads" cause energy waste in homes and the built environment as a whole. Consumers spend more than $3 billion a year on "Phantom Load" in the United States alone. The goal of this research is to conserve energy by increasing consumer awareness on their energy usage to reduce and/or eliminate phantom loads in the built environment. A further goal is to improve upon existing power distribution systems in the built environment with limited hardware additions to increase energy conservation. This research investigates remote identification of load types and the locations along the electrical circuitry where they (load) are being consumed. The load type and status (on, off, standby) are determined both remotely and in a non-intrusive manner using Non-Intrusive Load Monitoring Methods. Time/Frequency Domain Reflectometry (TDR) is also being investigated to remotely locate energy consumption at nodes or points along the electrical circuitry.
RAHMAN STRUM  
Major/minor: Public Health Informatics  
Faculty advisor: Ann Fruhling  
"Strategic Directions in the Access and Use of Public Health Data Sets"  
To adequately prepare public health workers to combat population health issues, administrators should ensure their employees have access to, and know where to locate public health data and information. Beyond immediate benefits of increased productivity and savings in program costs, the community will benefit from public health practitioners who routinely make decisions based on sound evidence. The goal of this research is to develop a comprehensive and strategic assessment for use by the Consortium for Public Health Informatics (CPHI) that will support evidence-based public health. The focus of this assessment will be on best practices in facilitating access to public health data and information.  
In this study, stakeholder data needs and priorities were identified through the utilization of a 2-year, web-based needs assessment targeting the public health workforce, researchers and students. Next, best practices in facilitating access to public health data and information were surveyed by conducting a national organizational comparison of agencies similar in purpose and methods to CPHI. The poster presentation will include findings, along with recommendations for improving the ability of CPHI to achieve its mission.

DIANE SYLOFSKI  
Major/minor: Physical Activity in Health Promotion  
Faculty advisor: Jennifer Huberty  
"Women Bound to be Active: Effect of a book club intervention on women’s physical activity and self-worth at one-year follow-up"  
Few studies have examined facilitators of women’s long-term physical activity (PA) adherence (≥1 year of regular PA). Our objective was to examine women’s PA and self-worth (SW) one year after participating in Women Bound to be Active (WBA), a PA book-club. Women who completed WBA and controls were contacted one year after WBA ended and asked to complete self-report questionnaires assessing PA, SW, benefits and barriers of PA (TOBB), and BMI. No differences in PA, SW, TOBB, and BMI were observed at baseline between the groups. WBA participants had significantly higher leisure-time PA levels than controls through the intervention to follow-up. A marginally significant interaction between group and time on SW was found. SW scores for both groups increased from baseline to post, but the control group’s SW decreased at follow-up while the WBA group’s SW continued to increase at follow-up. TOBB scores for both groups were significantly higher at post compared to baseline, but no difference in TOBB was observed between baseline or post and follow-up. BMI decreased significantly between baseline and follow-up in both groups; however, no differences were observed between groups. Consistent with our previous research, these results suggest that SW may be an important factor related to PA adherence in women.

CHI WEI TAN, JENNIFER YENTES  
Major/minor: Biomechanics  
Faculty advisor: Nick Stergiou  
“Do lower-extremity joint dynamics change when stair negotiation is initiated with a self-selected gait speed?”  
Stair negotiation is an activity of daily living that is challenging for certain populations. When approaching stairs at a distance away, one can utilize one’s natural gait velocity as a momentum to ascend the stairway. However, when escalating stairs in front of the stairway, this momentum is absent. Thus, we investigated on ten subjects, the differences in lower-extremity joint kinetics when ascending stairs starting from further away and starting directly in front of the stairs. Additionally, we also explored if these differences in joint kinetics are present on consecutive ipsilateral footfalls on the stairs. Peak joint moments and joint powers from the hip, knee and ankle joints were collected using an instrumented staircase and analyzed using a fully repeated two-way ANOVA. Peak ankle powers, peak knee extension moments and the peak knee powers generated when ascending stairs further away were significantly smaller compared to ascending stairs in front of the stairway. The peak ankle power absorptions after heel strike and the peak plantar flexion moments before ipsilateral toe-off were greater on the second step. Also, larger peak hip powers were also generated at heel strike and lesser hip powers were absorbed during toe-off on the second step. In conclusion, our results demonstrated that lower-extremity joint moments and powers differ while ascending stairs under two different conditions. Differences between consecutive ipsilateral steps suggested that while taking the first step, participants placed greater emphasis on the knee joint during both the initial and single limb support phases.
SRIKANT VALLABHAJOSULA, JUNG HUNG CHIEN
Major/minor: HPER
Faculty advisor: Nick Stergiou
“The effect of walking speed on gait variability”

The strength of the long-range correlations in a gait pattern follows a U-shaped function that is centered on the respective preferred walking speed (PWS) of locomotion. However, it is unknown if such effects are present in other speeds and if they can affect the U-shaped relationship. Six healthy middle-age (47±5y) and six healthy elderly adults (75±10y) performed one 5-minute walking trial at each of the following percentages of PWS: 80%, 90%, 100%, 110%, and 120%. For each subject, to determine the degree of the stride interval (time between two ipsilateral heel-strikes) correlations, we applied Detrended Fluctuation Analysis (DFA) on 250 continuous stride intervals. DFA can quantify the long-range, fractal properties of a time series through a fractal scaling index ($\alpha$). Repeated two-way ANOVA was used to understand the age and speed effect. The $\alpha$-values in the 80% and 120% of PWS were significantly higher than the $\alpha$-values in the 100% of PWS condition ($p < 0.001$). Further, the elderly showed significantly larger $\alpha$-values than middle age individuals in the slowest walking condition ($p = 0.05$). Our results confirmed the U-shape relationship between stride-to-stride long-range correlations and walking speed for both the groups.

From our results, we hypothesize that the locomotor system’s ability to produce the long-range correlations of the stride intervals might begin deteriorating at middle-age itself. The elderly individuals demonstrated random walk patterns ($\alpha > 1$) at 80% of PWS PROBABLY DUE TO weaker muscles and the loss of motor units producing less than required energy during slow walking.

AMY WEST
Major/minor: Social Work/Public Administration
Faculty advisor: Jeannette Harder
“Nebraska Foster Youth Council”

Previous studies have revealed that those who spend their adolescence in foster care are at risk for a number of negative outcomes in adulthood. While Independent Living programs focus on providing these youth with the basic skills needed for daily functioning, the importance of lifelong, supportive relationships is oftentimes overlooked and seen as less vital to development. The Nebraska Foster Youth Council (NFYC) strives to address meet this need by providing opportunities for youth with foster care experience to develop lifelong ties to each other and to their community. Specifically, NFYC addresses the vast lack of both formal and informal support systems available to advise and assist youth exiting foster care with their transition into adulthood. The objective of this study was to conduct an evaluation of NFYC using existing data on 85 program participants. While a process evaluation observed the program’s current operations, the proposed outcome evaluation suggested the modification of NFYC’s current research design and the addition of an outcome measurement tool to further understand the program’s impact on youth in foster care. Statistical findings highlighted statistically significant correlations and revealed relationships between specific characteristics of the youth.

DANAE WOLCOTT
Major/minor: Disease Prevention and Health Promotion Research
Faculty advisor: Jennifer Huberty
“Changing health behaviors: exploring families’ participation in a community-based family-centered healthy lifestyle intervention for overweight/obese children”

Background: Family-centered interventions have been suggested as the most effective way to help overweight or obese children change their health behaviors, and communities are beginning to work together to develop cost-effective programs. Unfortunately, attendance to family-centered interventions is limited and few studies have evaluated reasons for drop out. Therefore, the purpose of this case study was to explore the factors related to families’ level of participation and overall satisfaction to guide future design in a community-based family-centered healthy lifestyle intervention (CBFCHLI).

Methods: Purposeful sampling was used for a qualitative case study to recruit 9 families (parent and child dyads) who had completed at least 1 session of a CBFCHLI. Immersion crystallization was used to explore themes found in the data.

Results: Families appeared to be aware of the need to change their health behaviors and felt they had knowledge about healthy lifestyles before they entered the program. In those families that did not complete the CBFCHLI, the major barrier reported was transportation. Of those families that completed the CBFCHLI, active external support helped them to not only finish the program, but also to make more changes together as a family. Overall, families appeared to enjoy the program and wanted to return.
Conclusion: Health promotion professionals may consider designing future CBFCCHLI to help participants avoid barriers such as transportation. Additionally, a focus on encouraging families to actively support their family members may help to assure families finish programs and make more changes to their healthy behaviors together.

SHANE WURDEMAN, JESSIE HUISINGA
Major/minor: HPER
Faculty advisor: Nick Stergiou
“Variability of step width is associated with improvement in cognitive function following resistance training in Multiple Sclerosis patients”

Multiple Sclerosis (MS) is a progressive neurological disease that causes cognitive deficits and impaired gait. Working memory tasks during gait result in reduced step width (SW) variability. Short-term physical activity programs have shown to improve psychomotor processing ability. Our goal was to evaluate SW variability and cognitive skill in MS patients and the effect of a resistance training program on these relationships. Eighteen patients completed a 12 week training program and were given the Paced Auditory Serial Addition Test (PASAT) pre-and post training. The PASAT is a cognitive function test which measures the rate of information processing. SW variability variables included standard deviation (SD), coefficient of variation, approximate entropy (ApEn), and detrended fluctuation analysis (DFA). Paired t-tests were utilized to test for changes pre-to-post training and Pearson correlations were used to determine the relationship between SW variability and cognitive task. Subjects improved in the PASAT (p = 0.011) after training but not in SW variability. There were significant correlations between baseline PASAT and SW SD (r = -0.486, p = 0.041), change in PASAT and pre-training SW ApEn (r = 0.508, p = 0.031), and change in PASAT and post-training SW DFA (r = 0.552, p = 0.017). At baseline, patients with better cognitive function had decreased amount of SW variability. After training, patients improved in cognitive ability and those with less regular and decreased presence of long range correlations of SW variability had the most improvement in PASAT scores. Our results indicate resistance training positively affects working memory ability.

XIAO-DAN YU
Major/minor: Information Technology
Faculty advisor: Deepak Khazanchi
“Adaptive Use of IT Capabilities for the Development of Shared Mental Models in Virtual Teams”

In this paper, we examine the interplay between IT capabilities adaptation and the development of shared mental models (SMM) in virtual teams. Although virtual teams are widely used in many organizations to attain certain benefits (e.g. reducing cost, working round the clock, no snow days, et al.), it is still associated with high failure rate. Virtual team management is made up of three aspects, technology, process, and human. Human side is recognized as an overwhelming issue. One important factor contributes to the major difference between human and the other two aspects is intelligence. SMM offers a useful theoretical lens through which intelligent behaviors, specifically the collectives’ intelligent behaviors, can be understood. Assuming SMM influences the virtual team performance, we examine if the development of SMM in virtual teams is influence by the adaptively use of IT capabilities. We contribute to the extant literature by integrating SMM into the virtual team management and by proposing an IT capabilities view to account for the development of SMM in virtual teams. We present a conceptual model along with the propositions describing the relationships among IT capabilities adaptation and SMM. In particular, the conceptual model consists of three attributes for the assessment of the IT capabilities adaptation, such as usage experience, change of IT capabilities use, and perceived fit, and four dimensions for assessment of the SMM development, such as task work mental models accuracy, task work mental models similarity, teamwork mental models accuracy, and teamwork mental models similarity.
ANKIT AGRAWAL
Major/minor: Biotechnology
Faculty advisor: Myrna C. Newland
"Orientation of First Year Anesthesia Residents: Comparison of High-fidelity Simulation & Supervised Clinical Instruction in the OR"

INTRODUCTION
High Fidelity Patient Simulators (HPS) may be useful for assessment of clinical practice and resident training in anesthesia, but need formal evaluation of validity, reliability and efficacy. We set out to assess the efficacy of high-fidelity simulator training of first year anesthesia residents as measured by comfort level and clinical performance.

METHODS
Residents were randomized to two groups: Simulation & OR
1. Simulation residents underwent intensive simulation course on Day 1 of training (N=5)
2. OR residents were paired with faculty member in the operating rooms on Day 1 of training (N=6)

Standardized topics were established to be covered by both groups

3 major areas were chosen to evaluate the effect of simulation:
- Resident attitude and comfort level
- Measured by 12 question web-based survey for their comfort level in caring for patients and performing procedures on a scale from 1 to 5. 1 indicating “not at all comfortable” and 5 indicating “very comfortable.”
- Resident knowledge
- Measured by Anesthesia Knowledge Test (AKT)
- Faculty evaluation of resident performance

5 key areas of focus included: Technical Skills; Case management; Knowledge & Application; Judgment; and Overall Assessment.

CONCLUSION
Preliminary data suggest simulation produces a positive effect on resident comfort level, resident knowledge & clinical performance. Simulation may provide a superior environment for knowledge retention and clinical and technical skill acquisition especially in the inexperienced resident. Due to small number of residents participating in initial study (N=11) statistical significance cannot be implied. Ongoing study is planned.

BRYAN ARNOLD
Major/minor: Neuroscience
Faculty advisor: Nick Stergiou
"Cognitive challenge causes a differential control of joint kinematics with aging"

We investigated the effects of walking on clustering and switching in semantic fluency. The experiment was performed in two sessions. In one, 22 young and 12 older adults were seated while performing a semantic fluency task. One week later, they walked on a treadmill at their preferred speed while performing the same task. Two categories, animals and supermarket items, were used to minimize the influences of any learning from the previous session. Besides the conventional variable of total number of exemplars generated, task consistent variables and task discrepant variables were analyzed. Number of exemplars generated did not differ between groups at either session. Number of single word clusters (F1,15: 10.260, p = 0.006) and switches (F1,15: 7.884, p = 0.013) as well as number of phonemic words (F1,15=4.631, p = 0.048) and clusters (F1,15:7.421, p=0.016) decreased from single to dual task session. No group differences were found for any dependent variables. The age did not have an effect on number of exemplars generated in either session. Both groups produced fewer clusters but more words within clusters when walking versus sitting. This suggested a reduced attentional set-shifting ability that is compensated by an increased reliance on automatic spread of activation through semantic memory. Accordingly, these findings revealed that attentional demands of walking influence the processing strategies involved in semantic fluency. To maintain the same number of exemplars generated, subjects adjusted their strategies with an increased release of frontal executive retrieval mechanisms, i.e. phonemic clustering, coupled with an increased reliance on automatic spreading activation in the semantic networks.
BRYAN BIALAS  
Major/minor: Chemistry  
Faculty advisor: Alan Gift  
"Analysis of Methanol in Biodiesel by Near Infrared Spectroscopy"

Biodiesel is produced by addition of methanol to triglycerides. In the final product there are trace amounts of the methanol. Biodiesel can only contain less than a certain percent of methanol in order to be sold commercially. Using a near infrared spectrometer (NIRS), a relationship between the region of 5050 cm$^{-1}$ and 4800 cm$^{-1}$ and the mass percent of methanol in the biodiesel can be shown. Samples of biodiesel were obtained from a local producer. From these samples, standards of 0%, 0.01%, 0.1% and 0.5% methanol were developed. The standards were analyzed using the NIRS. A calibration model was developed using partial least squares analysis from the SIMCA-P+ program. In order to check the results from the NIRS, the standards were also analyzed using gas chromatography. The method developed using NIRS will be checked to determine if Biodiesel made from different sources of used vegetable oil can be analyzed using the same calibration curve.

NOELLE BLOOD  
Major/minor: Journalism/Speech Communications  
Faculty advisor: Lynnette Leonard  
“Teens, Tobacco, Slavery and Sex: Analyzing the Persuasion of France’s Non-smokers Rights Association”

Teen smoking is a phenomenon often targeted by PSAs. The problem is global, as exemplified in an ad from France’s Non-smoker’s Rights Association. This particular ad uses themes of sex and slavery to deter teens from tobacco use. The ad was deemed obscene due to its sexual imagery and banned in France. The sexual visual paired with the metaphor of slavery creates a provocative message that Christiane Therry for the Families of France association called “stupid.” Through analysis of target audience with emphasis on intent from the persuasive organization, detail of persuasive tactics at play in the ad, as well as the ad’s adherence to ethical standards, I found this ad to be unethical yet extremely effective in persuading French teenagers not to smoke.

BENJAMIN BOWDER  
Major/minor: Bioinformatics  
Faculty advisor: Nick Stergiou  
“Gait Affects Clustering During Phonemic Fluency”

Generating items in a phonemic fluency task requires search through a phonological route. Use of clustering and switching strategies reflects cognitive flexibility. Older adults produce a greater number of clusters than young. However limited research has addressed whether holds true in a dual-task situation. We investigated the effects of walking on clustering and switching in phonemic fluency. Twenty-three young and 12 older adults performed a phonemic fluency task while sitting, and one week later while walking. Participants generated as many words as possible within one minute. Repetitions, proper nouns, and words with different endings were collected. Two letter groups FAS and PRW were utilized to minimize the effect of learning. Repeated measures ANOVAs (group x session) were performed for each dependant variable. For all of these variables, young adults showed dual-task decrements while older adults showed improvements and produced more repetitions. More stem error occurred while walking compared to sitting. Young and older adults showed differing effects in response to dual tasking. Older adults benefitted more from dual tasking since they generated more words and semantic clusters. Increased frontal lobe activation due to walking may have benefitted executive function strategies. Older adults tended to produce more phonemic cluster regardless of session; however, these benefits came with the cost of more repeated words. Increased productions of phonemic clusters may be the result of a reduced ability to retrieve words within a cluster, while increased repetitions may reflect a failure of executive and attentional aspects of short-term memory.

JEFFREY CARRITT, RYAN TEFFT  
Major/minor: Geology  
Faculty advisor: Harmon Maher  
“Significance of Layer-bound Vein Arrays in the Oligocene Brule Formation, Scotts Bluff National Monument, Nebraska”

At multiple localities the Tertiary White River Group contains layer-bound vein systems. The distinct horizon-bound character suggests that these vein arrays formed due to physical and chemical changes after burial. The lower Brule Formation at Scotts Bluff, in Western Nebraska, contains two layer-bound calcite vein arrays within fine-grained ash-rich sediments. Modeling of vein strike data (n=275) indicate that the orientation of the arrays cannot be
effectively described without a significant uniform component (>50%). This is consistent with an explanation invoking vein formation through a shrinkage process analogous to the generation of mud cracks. A vein strike preferred orientation occurs at 175°, which coincides with other structural trends in the region. Un-mineralized fracture orientations record a different preferred orientation centered at 87°. A secondary peak in this data at 137° parallels the trend of Scotts Bluff.

Mineralogic analysis of the vein arrays show that the vein composition is presently dominated by calcite. Rare fine-grained quartz inclusions within the calcite fill resemble the crystal form of gypsum. These inclusions suggest that the vein arrays experienced multiple mineralogical replacements. The lowest vein array is concentrated within an interval containing ancient gypsum-rich soil horizons. This observation suggests that these veins were originally composed of gypsum.

While a strong uniform component to the orientation of the vein systems can be related to post-burial processes, the existence of a preferred orientation reflects a regional stress field. Different fracture preferred orientations record a change in this stress field possibly related to movement along adjacent large-scale geologic features.

BART CUBRICH
Major/minor:  Geology
Faculty advisor:  Robert Shuster
“Clastic dikes in the cedar pass area, badlands national park, sd”

Clastic dikes in the South Dakota Badlands are still somewhat enigmatic. The dikes are up to 10s of cms thick, can exceed 300m in strike length, locally cut through the Sharps formation, and vary significantly in thickness, grain size, and orientation. This report discusses observations in the Cedar Pass area. Individual dikes are typically composite features, with multiple vertical bands of internal fill (1-4 cm wide) that vary from mud to medium sand. Geometries suggest that earlier fill must have lithified before subsequent intrusions. Two preferred sub-orthogonal strike directions exist (30-40 and 120-130) in the Cedar Pass area, but a significant percentage do not belong to any trend. Cross cutting relationships indicate the two directions are coeval, and some dike geometries indicate simultaneous opening of orthogonal directions. The orthogonal pattern is aligned with local normal faults and a subtle monocline. Marginal conical forms that V inwards and upwards, sometimes grading into massive, coarser interior, consistently suggest upward flow. Abundant cross stratification occurs in dikes. They are dilational, but sometimes wall geometries do not match, suggesting post-parting modification. The sediment sources are not evident. Subtle folding (sub-horizontal axis) of the dikes is consistent with post intrusion compaction. The composite character, cross cutting geometries, and multiple opening directions suggest protracted dike formation—a history consistent with a structural diagenetic origin. The green alteration associated with some dikes suggests reducing fluids were mobilized later in the evolution of the system.

NATASHA FIELDS, ALICIA PHILLIPS BUTTNER, CHRISTINE MORRISON, ERICA PLATCHER
Major/minor:  Neuroscience/Psychology
Faculty advisor:  Rosemary Strasser
“Assessing the Role of Social Environment on Dog Bite Incidents”

Understanding risk factors associated with dog bites is necessary in order to provide the appropriate preventative strategies to at-risk populations and decrease the likelihood of bite incidents. There is still a need for further research into the role of environmental factors in dog aggression and associated bites. Previous studies indicate that a dog’s relationship to humans, how the dog is treated, and how it is allowed to interact with others are major determinants in aggressive behaviors (e.g. biting) toward humans (Hsu & Sun, 2010; Messam, Hass, Chomel, & Hart, 2008). Specifically, it is suggested that dogs with fewer restrictions on their interactions with humans are at an increased risk for biting. In the present investigation, the 2010 Nebraska Humane Society’s Community Dog Bite and Aggression Survey was used to gather information upon report of a dog bite. We examined how variables such as the owner’s reason for acquiring the dog, how much time the owner spends with the dog, the degree to which the owner considers the dog a member of the family, how often the dog is exposed to new people or places, and other social or attachment factors influence the likelihood of the dog biting. Such conclusions will allow dog owners to understand what variables may predict dog bites so that the necessary preventative measures can be taken.
RYAN HASENKAMP, NEIL HUBEN
Major/minor: Exercise Science
Faculty advisor: Nick Stergiou
“Gait Impairment in PAD Patients Is Independent of Level of Disease”

Peripheral arterial disease (PAD) is a manifestation of atherosclerosis in the lower extremities which causes reduced blood flow to the legs and leads to muscle ischemia and claudication. PAD can manifest as one of three levels of disease based on the location of atherosclerosis in the leg arteries. Atherosclerosis occurs in the iliac arteries in aortoiliac occlusive disease (AIOD), in the femoral and popliteal arteries in femoropopliteal occlusive diseases (FPD), and in one or more of the iliac, femoral and popliteal, and posterior tibial and peroneal arteries in patients with multiple-levels of disease (MLD). In previous studies in our laboratory, we have determined that PAD patients have altered joint kinetics and kinematics as compared to controls. However, it is unknown if these differences are consistent for patients with varying levels of occlusion. Comparisons between the three PAD groups identified only three out of 42 comparisons as significant. When each level of disease group was compared to controls, 30 of the 42 comparisons (i.e. 9/14 for AIOD, 11/14 for FPD, and 10/14 for MLD) were significantly different. These results show that joint kinetics are consistently altered as compared to healthy controls, regardless of the level of disease occlusion. The overall absence of significant differences between the three PAD groups emphasize that these biomechanical alterations are due to documented metabolic myopathy and altered neural function, which affects proximal muscles in addition to distal muscles, regardless of occlusion location.

HEATHER HENNING
Major/minor: General Science
Faculty advisor: Nick Stergiou
“Gait affects clustering and switching on semantic fluency”

Semantic fluency performance requires the ability to generate words within semantic subcategories (clustering) and to shift to new subcategories (switching). Studies have reported that enumerating animal names while walking altered stride-to-stride variability but had no effect on the number of exemplars generated. Whether walking has an effect on clustering and switching strategies is undefined. Aging is accompanied by a loss of cognitive flexibility. Therefore, we investigated the effects of walking on clustering and switching in semantic fluency. In one session, 22 young and 12 older adults were seated while performing a semantic fluency task (animals and supermarkets) and later walked on a treadmill while performing the same task. The total number of exemplars generated, number of semantic clusters and switches and phonemic clusters and words were analyzed using two-way ANOVAs (session x group). Number of exemplars generated did not differ between sessions. Number of single-word clusters (F1,15: 10.260, p = 0.006) and switches (F1,15: 7.884, p = 0.013), and number of phonemic words (F1,15: 4.631, p = 0.048) and clusters (F1,15: 7.421, p = 0.016) decreased from single- to dual-task session. No group differences were found. Both groups produced fewer clusters but more words within clusters when walking versus sitting. This suggested reduced attentional shifting ability with a possible increase in automatic spread of activation through semantic memory. These findings revealed that attentional demands of walking influence the processing strategies involved in semantic fluency.

TODD HERPY, AMBREEN KEDWAI
Major/minor: Medicinal Chemistry
Faculty advisor: Haizhen Zhong
“Docking studies on drug resistance of H1N1 and H3N2 neuraminidase inhibitors”

Mutations in the seasonal H1N1 influenza virus have allowed the almost all strains of the virus to be resistant to one of the two available neuraminidase inhibitors, oseltamivir. The virus’s resistance to anti-influenza inhibitors has called researchers to develop new drugs that target the influenza virus. In this study, ninety different small drug molecules were designed based on models found in other scientific literature. Through the Maestro program, the molecules were reduced to their lowest energy state, optimized and glide-docked to various known strains of both the H1N1 and H3N2 virus. Known drug resistant site mutations including those found at H275Y and G247S were analyzed in order to see how these drug molecules interacted with resistant strains of the virus. Through docking-based molecular modeling, the intra-hydrogen bonds between the active site of the influenza neuraminidase and the drug molecules were written down in order to develop more powerful inhibitors that fit better into the active site.
Peripheral arterial disease (PAD) is atherosclerosis of the lower extremities, which leads to insufficient oxygen delivery to the working muscles. PAD is often accompanied by pain during walking resulting in altered spatial-temporal (ST) parameters. Specifically, PAD patients have decreased walking velocity cadence (steps/min), step length, and stride length. Recent studies suggest that gait function remains compromised following surgery. With walking velocity serving as a global marker for health-related risk and overall functional status in older adults, the purpose of the current study is to explore whether slow walking or fast walking PAD patients experience gait improvements post-surgery. Baseline gait parameters may serve as an indicator of post-surgery functional outcomes. Seven slow walkers (0.6 - 1.0 m/s) and nine fast walkers (>1.0 m/s) with PAD underwent biomechanical gait analysis pre- and three months post-surgery. ST parameters were calculated and averaged across ten walking trials. Dependent t-tests were performed to determine if slow walking or fast walking PAD patients experience gait improvements post-surgery. Slow PAD patients yielded no significant improvements in ST parameters following surgery. However, fast PAD patients experienced significant improvements in ST parameters following surgery. PAD gait alterations are due to metabolic myopathy and altered neural function. Fast walkers may have less severe myopathy, resulting in greater potential to reverse baseline damage. Such evidence suggests that baseline walking velocity indicates functional outcomes post-surgery. Predicting post-surgery functional outcomes may lead to the development of earlier and more aggressive interventions to maximize functional improvement.

As people grow older, their mobility patterns show characteristic changes. These changes include reduction in average daily locomotion, total time spent on locomotion, and changes in the variability of locomotion. These changes are enhanced in people suffering from Alzheimer’s disease, which is associated with increased falls. Our goal was to determine characteristic daily mobility activity patterns in Alzheimer’s disease patients through variability measures. Alzheimer’s disease patients were fitted with an activity monitoring system (the Actigraph GT3X). Ambulatory activity data was collected over 6 days. Raw step count data was analyzed to obtain average daily values for four ambulatory activity parameters: total number of steps, total minutes of activity, COV and ApEn. Findings were compared to previous studies with healthy young and elderly subjects. Preliminary results showed that in comparison to healthy young and elderly subjects, Alzheimer’s disease patients engage in very low amounts of daily activity. Compared to previous literature, current results demonstrate deterioration in average daily locomotion, total time spent on locomotion, and changes in the variability of locomotion for Alzheimer’s disease patients compared to healthy young and healthy and active elderly subjects. The deterioration in mobility patterns, specifically in terms of reduction in complexity, signifies reduced locomotor adaptability to task demands and environmental conditions increasing susceptibility to falls. This data also proves the feasibility of this instrument to serve as a quantitative measure to examine the impact of interventions such as exercise training.

This is a study to assess the correlation between age and level of physical attraction in 514 male and female participants 19 years of age or older when rating photographs of individuals 19-22 analyzed using multilevel modeling. The hypothesis is in support of the evolutionary perspective, which is based on the idea that males prefer a younger female mate, and females prefer on older male mate. Additionally, this perspective also suggests that initial attraction is influenced the most by reproductive factors. The assessment tool used was a 328 question survey done online (roughly 30-45 minute completion time). Multilevel modeling was used test this model by utilizing a variety of survey questions. This survey contained demographic questions, photographic rating questions (multilevel modeling analysis), photographic heat-mapping questions (Qualtrics analysis), and open-ended survey questions. By utilizing a variety of question types, the theory was tested more thoroughly. The multilevel modeling analysis partially supported our hypothesis, showing that age influenced male participant ratings more so than female participant ratings. The analysis of the heat-mapping results partially supported our hypothesis. Our research showed that male participants were influenced by reproductive factors more heavily than female participants. Our research showed statistically significant results for the variables of age and attractiveness rating.
cally significant correlations despite the limited age range studied. This suggests that the late-adolescent age group is heavily influenced by factors supporting the evolutionary perspective.

SCOTT MCGRATH, ISHWOR THAPA
Major/minor: General Studies
Faculty advisor: Dhundy Kiran Bastola
“Algorithm based collection of molecular sequence targets for rapid identification of medically important Nocardia species.”

Nocardiosis is opportunistic infections caused by pathogenic bacterium known as Nocardia. Approximately 50% of catalogued species of Nocardia can infect humans and the mortality due to this infection ranges from 14 to 40%. However, if the infections spread to the central nervous system, the mortality rate increases to 75-90%. Currently, the culture based-methods of laboratory testing for the presence of Nocardia take 2-3 weeks, which can significantly delay the treatment and increase the risk of systemic infection. The use of DNA-sequence based identification methods can reduce this time to less than three days. Using algorithmic approach to distill target sequences into categorized clusters and discern the differences between gene targets, we have collected 34 unique molecular target sequences from 84 different species of Nocardia. This algorithmic approach of data collection is expected to greatly assist in the development of DNA-sequence based molecular identification method, which will enhance rapid identification and subsequent treatment of infections caused by pathogenic bacteria like Nocardia.

CHRISTINE MORRISON, ERICA PLATCHER, NATASHA FIELDS, ALICIA PHILLIPS BUTTNER
Major/minor: Psychology/Neuroscience
“Assessment of Training Factors on Dog Bites”

Dog bites are a major public health concern and animal welfare issue. Many studies acknowledge the deficit and subsequent need for information on environmental factors predicting dog aggression. The results would be beneficial to the community by providing information for education and other preventative measures. A common issue was the presence of aversive and improper training techniques; common knowledge and resources of most dog owners have negative implications which include aggression (Herron, Shofer, & Reisner, 2009; Hiby, Rooney, & Bradshaw, 2004). That is, aggression may be influenced by owner’s previous experience with dogs and the time spent and consistency of these types of training methods. Obedience, age, purpose, acquisition, source, and primary caregiver of the dog could also be important factors in determining dog bites. The following research was conducted to better understand certain risk factors involved in dog bites. The data was obtained from the Nebraska Humane Society using a Community Dog Bite and Aggression Survey.

MAGNUM PETERSON, ERICA KUBE
Major/minor: Psychology
Faculty advisor: Rosemary Strasser
“Predictors of Ear Clasping Behavior in Western Lowland Gorilla”

Ear clasping behavior has been noticed in captive western lowland gorillas (Gorilla gorilla gorilla) after being diagnosed with cardiovascular disease. In this study, we examined different factors that may cause ear clasping behavior. We observed a captive western lowland gorilla at the Henry Doorly Zoo in Omaha, Nebraska, who has been known to display this behavior and has been diagnosed with cardiovascular disease. We were able to find that temperature has a significant effect on ear clasping behavior. Specifically, ear clasping behavior is evident in higher temperatures than it is in lower temperatures. Also, we found that ear clasping behavior is shown more when alone in an enclosure. Altogether, these findings are helping us understand ear clasping behavior and, in the near future, help with the welfare of the animal.

THANE SEELEY, COLE HARTFIEL
Major/minor: Air Transportation Administration
Faculty advisor: David Byers
“Counting Aircraft: Applying marine X-Band radar as an alternative to current aircraft counting techniques”

Uncontrolled airports do not have many accurate or efficient ways of counting aircraft. The different methods of counting aircraft are unreliable and require physical counting or estimating. The goal of our research project is to apply X-Band radar as the first step in a system to prevent aircraft collisions. We will use X-band radar to individually count aircraft at the Council Bluffs Airport to help determine the accuracy of this system.
RAESSA SINGH  
Major/minor: Social Work  
Faculty advisor: Theresa Barron-McKeagney  
"Under the Platform"

This project is the culmination of my volunteer trip to New Delhi, India. While in India, my time was spent working with a Non-Governmental Organization to better understand the current child welfare laws and the affect they are having the country. 'Under the Platform' shines light on the lives of the thousands of children living in and around the railway station in New Delhi. It also explores India’s current approach to child welfare and whether or not this approach is meeting the needs of the community. Finally it highlights the resilience of this beautiful country by discussing the current efforts being made by the NGOs dedicated to making change in the lives of street children throughout the country. This project will be displayed in the form of a poster presentation with pamphlets about a specific NGO to accompany the poster presentation. The poster will incorporate both facts and visual images to relay the above mentioned information.

COLLEEN SNOZA  
Major/minor: Exercise Science  
Faculty advisor: Kris Berg  
"Comparison of Peak VO2 and Achievement of Peak VO2 Criteria in Three Modes of Exercise"

The purpose of this study is to compare peak aerobic capacity across three modes of exercise related to the training of triathletes: treadmill, cycle and arm ergometer. It is hypothesized that there will be less difference between these three modes of testing compared to normative data. Secondly, the study will also compare indicators used to determine if a true peak oxygen uptake was achieved in each test. Six such indicators have been used in the literature: respiratory exchange ratio, plateauing of oxygen uptake, heart rate, lactate threshold, rating of perceived exertion, and oxygen saturation. Little information as to the differences that may exist across these indicators has been reported. This will be the first study, to the author’s knowledge, that will include a detailed statistical analysis of the criteria that are used to determine VO2 peak.

JULIA WARNKE, SACHIN PAWASKAR  
Major/minor: Bioinformatics/Mathematics  
Faculty advisor: Hesham Ali  
"An Energy-Aware Bioinformatics Application for Assembling Short Reads in High Performance Computing Systems"

The massive size and complexity of datasets being produced by current biomedical technologies makes the analysis of many types of biological data computationally intensive. High Performance Computing (HPC) has been successfully applied to major bioinformatics applications to reduce computational burden. However, a naïve approach for developing parallel bioinformatics approaches may achieve a high degree of parallelism while unnecessarily expending computational resources and consuming high levels of energy. To address this issue, we have developed an energy-aware scheduling (EAS) model to run computationally intensive applications that take both deadline requirements and energy factors into consideration. An example of a computationally demanding process that would benefit from our scheduling model is the assembly of short DNA fragments produced by next generation sequencing technologies. Next generation sequencing produces a very large number of short DNA fragments from a biological sample. Like a piece of a puzzle, a single DNA fragment represents only a fraction of the original genome, providing no information in itself. Multiple overlapping fragments must be aligned and merged into long stretches of contiguous sequence before any useful information can be gathered. The assembly problem is extremely difficult due to the complex nature of underlying genome structure and inherent biological error present in current sequencing technologies. We apply our EAS model to a newly proposed assembly algorithm, giving us the ability to generate speed up profiles. Our EAS model was also able to dynamically adjust the number of nodes needed to meet given deadlines for different sets of assembly fragments.

TAYLOR WHIPPLE  
Major/minor: Computer Science  
Faculty advisor: Prithviraj Dasgupta  
"Automated Landmine Detection in COMRADES using Explorer robots"

We present the recent developments and our experiences in using off-the-shelf Explorer robots for cooperative landmine detection in the ongoing COMRADES (COoperative Multi-Robot Autonomous DEtection System) project.
at UNO's College of IS&T. The main objective of the COMRADES project is to use robotic technology to detect landmines in post-conflict regions for humanitarian demining. The main research contribution of this project is the ability to detect buried landmines with greater accuracy, lower costs for fielding robots and lower risk to human lives, as compared to existing robotic demining techniques. The key enabling technologies of our research are the use of relatively inexpensive, off-the-shelf robots that are equipped with different types of commercially available landmine detection sensors, and, the use of artificial intelligence-based multi-agent techniques to dynamically form teams among these robots to detect landmines rapidly and accurately. We are using the Explorer robot from Coroware as the main robot for performing the cooperative landmine detection task. The Explorer robot was modified by attaching a pulse induction metal detector that communicates with the robot over USB. The metal detector works by sending high current pulses to a search coil and detects echoes from metallic objects. To localize the Explorer robot localization data from a GPS, compass, and wheel encoders are fused with an Extended Kalman Filter. Some Explorer robots will be fitted with two different sensors - ground penetrating radars and infra-red sensors, so that multiple signatures of landmine-like objects can be obtained and fused to increase the accuracy of landmine detection.

TEDDY WOOLMAN
Major/minor: Chemistry
Faculty advisor: Haizhen Zhong
“Design, Synthesis and Biological Evaluation of Epidermal Growth Factor Receptor Inhibitors”

Inhibition of the epidermal growth factor receptor (EGFR) is a widely investigated potential treatment for selective solid tumor cancers. In this study we report the design, synthesis and biological screening of a series of novel EGFR inhibitors. We applied pharmacophore search to identify lead compounds, which were optimized with docking studies. The proposed molecules were synthesized using a two step Friedel-Craft acylation and were subjected to biological screening to measure EFGR inhibition. Biological screening indicated the computationally designed molecules had moderate activity in inhibiting EGFR regulated solid tumor cell proliferation. Current structure-activity relationship and the pharmacophore model will provide insight to further optimize the design and discovery of new EGFR inhibitors.
GERARD BEAL  
Major/minor: Accounting  
“Strategic Audit of Southwest Airlines”

This brief presentation will outline the steps taken to complete a strategic audit of Southwest Airlines. By analyzing different internal and external elements, our group was able to complete the task of figuring out where Southwest was currently oriented strategically and develop some short and long term strategic options for Southwest Airlines.

BRANDON MARK BENNETT  
Major/minor: Biotechnology and Neuroscience  
“Secondary Structural Analysis and Comparison of the 5’ Nontranslated Regions of a Virulent and a Nonvirulent Strain of Coxsackievirus B3”

Coxsackievirus B3 (CVB3) is a virus representing the Enterovirus genus. This virus is a known causative agent of myocarditis, a condition characterized by inflammation of heart muscle cells known as myocytes. The virus has a genome encoding 11 proteins from a single 7,400 nucleotide RNA strand. Viral virulence is believed to be determined in the highly structured 5’ nontranslated region (5’ NTR). There are different strains of the virus, some virulent and some nonvirulent. The virulent strain (CVB3/28) and the nonvirulent strain (CVB3/GA) both have a similar 5’ NTR but contain subtle yet crucial differences. In this experiment, E. coli bacteria were utilized to prepare high yields of each viral strain, for modification with chemical probing. Following modification, the sequences of each viral strain were compared to their respective models which have been previously proposed. Observations of variations in secondary structures following modification indicated structural differences in the strains which may be related to the difference in virulence. Studying these differences is important because they may play a role in future development of antiviral medications. The sample preparation method used in this experiment was refined from previous protocol to produce tremendous yield and should be repeated.

TAKIJAH R. COLLINS  
Major/minor: Secondary Education, Mathematics, and Spanish  
“The Power of Foldable Notetaking”

This presentation discusses a 5-day segment of a unit about circles in an Honors Geometry course. These first five days were devoted to the teaching of basic theorems and definitions about circles, chords and arcs, as well as assessing their knowledge and understanding of the material. Since students in this day and age tend to be such visual learners, notetaking was done on a foldable so students have easy access to the material and can also utilize the foldable as a flashcard-like study tool. This played a role in the assessment of this material and this standard to determine the effectiveness of such notetaking methods in the desired learning goals for the students of achieving a basic understanding of circles.

NICHOLAS HYNEK CONOAN  
Major/minor: Biotechnology  
“To Wish Upon A Falling STAR: Venturing into the World of Steroidogenic Acute Regulatory Protein”

The exposure of aquatic species to emerging contaminants, such as veterinary pharmaceuticals and pesticides from row crop cultivation, is a major issue facing the environmental health of local watersheds. The effect that these compounds have on fathead minnows can be discerned through assessing altered gene expression patterns. In this study, we were interested in exploring the effect two sex hormones, trenbolone acetate and estradiol, have on Steroidogenic Acute Regulatory Protein (STAR) levels in the gonad and liver tissue of male and female fathead minnows. Given that STAR controls the first step in the production of sex hormones, it was hypothesized that levels in the gonad would decrease upon exposure to the exogenous sex hormones, and remain unaltered in the liver. Contrary to the first hypothesis, STAR levels in the ovaries actually increased and remained unaltered in the testes. Consistent with the second hypothesis, there were no significant changes in STAR levels found in the liver, regardless of hormone exposure. The results of this study support the use of STAR as a method for determining the effects of exposure to sex hormones only in a limited capacity.
BART CUBRICH  
Major/minor: Geology  
“HPLC Exploration of Variations in Caffeine Content in Loose Leaf Tea”

The amount of caffeine in a beverage brewed from loose leaf tea has been a matter of interest, debate, and, commonly, misconception. For example, it had been thought that white tea contained the lowest concentration of caffeine, and black tea the highest. This thought has been challenged recently. In an attempt to dispel such rumors, and to provide answers based on evidence in their stead, we determined the concentration of caffeine in a variety of different tea types with HPLC. We chose teas were picked at different seasons (first flush, second flush, monsoon, autumnal) and oxidations levels (e.g. black, white, green), and brewed them for different lengths of time and at different temperatures. We had the advantage of not only knowing exactly which estate each tea came from, but also when it was picked, and how it was treated after picking. Our results suggest that the concentration of caffeine in a beverage is not easily generalized. We found, however, that the temperature at which a tea is brewed has a much more significant effect than the time at which it is brewed. We also found that there is a decrease in the amount of caffeine as the seasons go on.

WHITLEY FRANK  
Major/minor: Psychology  
“Can We Take Him Home? An Investigation of an Adoption Program Based on Animal Personality”

This study investigated the Meet Your Match Program which is based on matching adopters and animals through behavior assessments. An online survey was sent to 331 Nebraska Humane Society adopters before and after program implementation about their experience and satisfaction. Hypotheses of MYM inducing a better adopter-animal match found mixed support. Overall satisfaction was significantly higher post-MYM. Before and after implementation there was no significant difference in ratings of helpfulness of animal descriptions, adoption process, or any characteristics of better fit between adopter and dog. There were statistically fewer problems post-MYM. Adopters who chose dogs that were a match reported their pet having a higher ability to learn. Personality categories predicted experiencing more or fewer problems.

ERIN GESELL  
Major/minor: Creative Writing and Spanish  
“Boys, Buttholes and Boundaries: My Summer at the Joplin Art Institute by Amy Delancy (A Young Adult Novel by Erin Gesell)”

My thesis is a young adult novel written from the first person point of view of high school freshman Amy Delancy. Like most YA fiction this is a coming of age story. Amy is a suburban girl spending her summer at an elite art program in her city’s downtown museum. Not only does she learn about art, her passion, but she is forced to confront racism and stereotypes of her more urban and ethnically diverse classmates. She also has her first romance and discovers who she is and wants to be. Her success and confidence that grow from this experience help her parents to better understand her and her passion.

ASHLEY HAMERNIK  
Major/minor: Creative Writing & Library Science  
“Exploring Characterization through the Natural Progression of a Short Story”

Understanding characters is a key component in any piece of fiction and is something I have striven to achieve in my short stories this semester. I wanted my stories to achieve believability and therefore delved deep to understand my characters on a personal level. Through flashbacks and key scenes involving dialogue, I was able to explore my narrators in a more natural circumstance—allowing the stories to evolve around the scenes. By allowing myself to write without preconceived ideas, I was able to create situations that seemed authentic instead of fabricated. I allowed the stories to progress naturally, letting myself decide what was going to happen by simply allowing the stories to evolve as I went along. The result was a set of stories containing true-to-life characters faced with real and emotional situations.

BRYAN A. HREBIK  
Major/minor: Management Information Systems  
“Security Awareness Campaign: Backing Up Your Data”

Ensuring the integrity and availability of data is becoming increasingly important in today’s technology driven world.
One of the most crucial aspects in protecting against the loss of data in the event of a disaster is ensuring that a current backup of important data is maintained in order to be able to restore the lost data. I am creating a security awareness campaign emphasizing the need to have a backup and recovery plan in place in the event of a disaster. This campaign will consist of security awareness training classes, posters that can be placed in computer labs, brochures highlighting the importance of backup and recovery plans, an email program aimed at raising awareness of the risks associated with not having a backup, and a suggested general backup and recovery plan that can be used by the average person. This campaign will be targeted primarily at students of the University of Nebraska at Omaha.

NEIL BARRINGTON HUBEN
Major/minor: Biotechnology
“Functional Loss in Peripheral Arterial Disease is Not Improved Post Revascularization Based on Spatio-Temporal Gait Parameters”

Peripheral arterial disease (PAD) is atherosclerosis of the lower extremities, which results in altered spatio-temporal (ST) parameters. Specifically, PAD patients have decreased gait speed (m/s), cadence (steps/min), step length (m), and stride length (m) as compared to controls. The purpose of this study was to evaluate the impact of revascularization on these ST gait parameters. A total of 17 PAD patients (age: 61.6 ± 8.2 years) underwent advanced biomechanical gait analysis pre- and 3 months post revascularization. Parameters studied included gait speed, cadence, and stride length, which were calculated and averaged across 10 walking trials. Patients undergoing revascularization demonstrated absence of improvement in ST gait parameters despite significant postoperative improvement in arterial blood flow. Our findings are supported by a systematic review of the literature where ST parameters post intervention demonstrate absence of improvement. Collectively, the current literature and our revascularized patients suggest gait function remains compromised in the face of intervention. These findings are consistent with a significant underlying locomotor system pathology that is blood flow independent. Further advanced biomechanical analyses are needed to determine if revascularization can reverse the abnormal gait of PAD patients.

DANIEL S. JENSEN
Major/minor: Broadcast Communication
“KVNO News Reports”

It is my intention to partner with KVNO and their news team in a series of news reports regarding campus security. The News Director of KVNO will assign and advise me on the specifics of each report. I will also be working with the Gateway, UNO’s student newspaper, to facilitate a partnership between the two news organizations. I will write, research, edit, voice, and produce each report in the series. In addition to these news reports, I will also be producing the news on KVNO two days per week for their noon newscast. This will require preparing the news, which entails finding and editing AP articles, producing and editing audio samples, and gathering relevant information to the listener. Once the newscast is prepared I will read it live, on the air. I will also upload the audio to KVNO’s website for the newscast that day.

CHRISTOPHER M. JOHNSON
Major/minor: Political Science
“Dual Country Poverty: An Examination of Policies in the United States and Canada Regarding Poverty and the Less-Advantaged”

In analysis, one finds that Canada and the United States differ in seven major categories of poverty alleviation programs: social assistance; social insurance; employment insurance; medical care; affirmative action; minimum wage laws; and non-governmental organization roles. The United States has a very centralist role in the alleviation of poverty, and many of the laws in the United States support this claim. For instance, the Federal government mandates affirmative action, social assistance, employment insurance, minimum wage laws, social insurance, and certain types of medical care. Canada works much more like a confederacy of provinces, with many provinces setting their own laws regarding these six principles and how they may or may not be used. Because of the manner in which power and responsibility have been dictated in the two countries, one can see that the two countries are equally efficient at providing relief to its poverty-stricken citizens, but both excel in different aspects of poverty alleviation.
EMILY KIRKLAND
Major/minor: Business Administration (Management, Human Resource Management, Marketing, and Entrepreneurship)
“Strategic Audit for The Walt Disney Company”

My strategic audit for The Walt Disney Company is an analysis of the Disney Corporation as a whole. The audit includes the company’s background, corporate governance, an analysis of the external and internal environments and strategic factors, corporate resources, and strategic alternatives. I also explain and analyze my strategic recommendations for how Disney can sustain and promote corporate growth.

JASMINE D. MAHARISI
Major/minor: Journalism
“True Story: A Creative Nonfiction Body of Work”

My project, “True Story: A Creative Nonfiction Body of Work,” combines the two subjects I’ve focused on during my undergraduate college career: journalism and creative nonfiction. While these programs are rooted in two different schools, the School of Communication and the Writer’s Workshop, the experience of moving from one type of writing to another has been extremely valuable and has allowed me to develop flexibility in my style and approach. My project reflects this flexibility. “True Story” is comprised of eight essays, all nonfiction, all exploring different vehicles in which to tell my own story, as well as the stories of some of those around me. Place, grief, and the search for a place to grieve, are major themes in this body of work. My hope is that readers will find that “shiver of recognition” that connects each essay to a larger portrait of being human.

ALEXANDRA MCKEONE
Major/minor: Creative Writing
“And Your Unbeautiful Darkness”

And Your Unbeautiful Darkness is a genre-blending collection, containing both poetry and creative nonfiction essays. The author’s intent was to capture the way in which the two genres can converse, exploring similar themes, obsessions, and ideas. Both the poetry and essay portions of the collection wrestle with the loneliness, uncertainty, and isolation that accompany loss. While the poems approach their subjects in a more abstract, indirect manner, the essays face them head-on, exposing the author’s vulnerabilities while still maintaining a lyrical quality.

CATHY R. MILLER
Major/minor: Theater
“The Creation of The Collective Unconscious Theater”

With the creation of the social theater The Collective Unconscious in the summer of 2010, it was found that there is a certain organization structure that must be followed to apply for non-profit status. This project explores that process and its possibilities while discussing the creation of The Collective and the structural modifications made.

DHANANJAY M. NAWANDAR
Major/minor: Biotechnology
“Post-transcriptional Expression of Gcn4 Regulated Genes by the CCR4-NOT Complex and Determination of Appropriate Conditions to Study Amino Acid Starvation in the yeast Saccharomyces cerevisiae”

Amino acid starvation in the yeast Saccharomyces cerevisiae leads to a global reduction in translation due to the phosphorylation of the alpha subunit of eukaryotic translation factor 2 (eIF2α). Even during this global reduction in translation, some mRNAs need to be translated more efficiently to overcome the starvation, including the mRNAs regulated by the Gcn4 protein. Gcn4 is a transcriptional activator, regulating the activities of about 500 genes in yeast, including the genes encoding amino acid biosynthetic enzymes. The CCR4-NOT complex is one of the six known co-activators of Gcn4. Along with transcriptional activation of the Gcn4 regulated genes, this complex has also been shown to have a post-translational role in mRNA degradation. Very little is known about the role of this complex after transcription and before translation. We are studying the post-transcriptional regulation of the Gcn4 regulated genes by the CCR4-NOT complex. Different methods of inducing amino acid starvation have been used by numerous labs, but most of these methods have been limited to studying the mRNA levels of the Gcn4 regulated genes. We are trying to determine the best conditions to induce amino acid starvation in yeast, taking into consideration the both mRNAs and the proteins of Gcn4 regulated genes, along with the eIF2α phosphorylation levels.
LIUDMILA SAVVINA
“Stock Purchase Recommendation”

The project consists of a recommendation for the Maverick Investment Club to purchase a specific stock for their portfolio. The decision to recommend the stock is based on in-depth analysis of the company (and how it compares to the industry) and the economy in general.

AXELLE VERBOON
Major/minor: Music Education, K-12 Instrumental Music
“Experiencing Music: The Critical Analysis of Music”

This unit is the fifth of the semester, following units called Music in our Lives, Music in History, Beat and Rhythm, and Music in Dance. This unit is designed to introduce students to critical thinking about music and musical concepts. The objectives include successful (1) identification of the levels of listening, (2) identification of the composition of a major scale, (3) aural labeling of intervals within the major scale, (4) comparison of various solo and ensemble instruments and their uses, (5) completion of an analysis of music based on criteria used by professional music critics, (6) identification of the various levels of musical performance and artistry within an educational setting. This project includes lesson plans and strategies utilized to meet the unit objectives, demonstrate differentiation of instruction, and discuss the various formative and summative assessments used. It will also include the outcome of assessments and discuss modifications made to the lessons in order to accommodate student progress.

ZOE VERBOON
Major/minor: Piano Performance
“Senior Recital Analysis”

Compare and contrast Mozart sonata (18th century) with Ginastera sonata (20th century) with historical context and technical discussion of large sonata form and sonata movements. A discussion of Chopin’s Ballade as a unique form with historical context.

JULIA WARNKE
Major/minor: Bioinformatics/Mathematics
“A Domain Specific Approach for Assembling Fragments from Next Generation Sequencing Data”

Next generation sequencing (NGS) has become a major focus in many recent biological research applications. NGS produces thousands to millions of short DNA fragments in a single run. Individually, these fragments represent only a small fraction of an original biological sample. To obtain any useful information, overlapping fragments must be assembled into long stretches of contiguous sequence. Various assemblers have been developed to address the fragment assembly problem. The majority of current assemblers were developed to fill an important gap; however, they were developed with a pure computational focus without taking the properties of the input datasets into consideration. NGS dataset characteristics such as fragment coverage and underlying genome complexity varies dramatically from project to project. Generic assemblers that are data independent are unlikely to produce accurate solutions in all problem domains. In this study, we propose a graph theoretic approach to develop a domain specific assembler. The proposed assembler analyzes the input dataset and captures optimal parameter configurations as a function of assembly domain. Results from this study will allow for the assembler to be applied in an intelligent and customized manner to a wide variety of datasets, resulting in more efficient assembly tactics and improved assembly quality.

TAYLOR WORKMAN
Major/minor: English
“The Effects of Suburbia on Jewish Americans”

This project examines the move that many Americans have made from traditional cities to Suburbia and the impact that move has made on Jewish life. I investigate what makes people want to move to Suburban areas and, once they have moved, how their social roles, specifically their roles in a Jewish community, are altered.
3rd annual Student Research and Creative Activity Fair

PHOTOS

University of Nebraska at Omaha
3rd annual Student Research and Creative Activity Fair

University of Nebraska at Omaha
3rd annual Student Research and Creative Activity Fair

University of Nebraska at Omaha
3rd annual Student Research and Creative Activity Fair

University of Nebraska at Omaha