Apr 25th, 8:30 AM - Apr 26th, 2:30 PM

2005 Abstract Booklet

Undergraduate Research Center, Minnesota State University, Mankato

Undergraduate Research Conference

MINNESOTA STATE UNIVERSITY
MANKATO

April 25 & 26, 2005

WELCOME

Welcome to the 7th annual Undergraduate Research Conference at Minnesota State University, Mankato. This conference provides an exciting opportunity for the University to showcase the research and creative activity of our undergraduate students. These projects, submitted by 174 students representing five colleges, are the result of collaboration between talented and motivated undergraduate students and their dedicated faculty mentors. This year's conference will again provide a wide array of on-going outstanding scholarly and creative activity on our campus. Abstracts of these oral, performance, or visual arts projects and posters accepted for presentation are contained in this formal publication. I applaud the work of these students and encourage faculty, students, staff and guests to attend the formal presentations that will take place in the Centennial Student Union on April 25 and 26, 2005. The entire University community celebrates the achievements of these outstanding undergraduate students and congratulates all participating students and their faculty mentors.

Richard Davenport
President
Minnesota State University, Mankato

URC PRESENTATION AWARDS

The purpose of judging and awarding is to recognize and promote high-quality research and creative activity. Within each oral or poster session, two judges independently rank each presentation, and the mean rank is the final rank. The best presentation in each session receives a "Best Presentation" certificate and a Barnes and Noble Bookstore gift certificate to be presented at the URC luncheon. Judging of oral presentations is based on delivery and content. Posters are judged while presenters are attending and judges speak with presenters to identify the winner. Judges are graduate students, faculty, or graduate faculty. Judges for each session (one head judge and one assistant judge) are identified by the URC Steering Committee. There are no ties for mean rank; the head judge breaks a tie. The winner is announced at the end of each session. Winners are recognized in the URC online journal.

URC SPECIAL THANKS

Richard Davenport – President
Scott Olson – Vice-President of Academic Affairs
Fernando Delgado – Dean; College of Graduate Studies and Research
Susan Kuyper – Director; College of Graduate Studies and Research
Marilyn Hart – Chairman of the Undergraduate Research Conference
Sarah Bos – Graduate Assistant of the Undergraduate Research Conference
Moderators and Judges

Undergraduate Research Conference Members: Marilyn Hart (Chairman), Barb Bergman, Rebecca Bates, Kellian Clink, Beth Handler, Jasper Hunt, Craig Matarrese, Mark McCullough, Warren Sandmann, Linda Underwood, Mary Visser, Trent Vorlicek, Michelle Washington-Carter, and Gina Wenger

Invited Luncheon Speaker: Dr. Daniel Cronn-Mills, Department of Speech Communications Minnesota State University, Mankato

Portions of this program are made possible through contributions from:
Department of Biological Sciences, Barnes and Noble Bookstore, and TCF Bank

**Abstracts were written by the project facilitator and reviewed by faculty mentors. Any opinions expressed do not represent those of the URC committee or Minnesota State University, Mankato.*

8:15 A.M.-3:30 P.M.	**STUDENT PRESENTER, MODERATOR, AND JUDGE CHECK IN**	**CSU 203**

Monday April 25 Schedule of Events

8:30-10:00	Session A - Psychology	CSU 201
	Session B - English and Computer Science	CSU 202
10:00-10:30	Coffee Break	CSU 203
10:30-Noon	Session C - Speech Communications	CSU 244
	Session D - Biological Sciences	CSU 285
12:00-1:00	Lunch (on your own)	
1:15-3:15	Poster Session A	CSU 253
	Poster Session B	CSU 255
1:15-3:00	Session E - Speech Communications	CSU 244
	Session F - Automotive Manufacturing Engineering and Mechanical Engineering	CSU 201
	Session G - Geography and Urban Studies	CSU 202
3:15-5:00	Session H - Theatre and Dance	CSU 204
3:15-5:30	Session I - Counseling, Ethnic Studies, Modern Languages, Philosophy, Sociology, and Social Work	CSU 285

8:15-10:15 A.M.	**STUDENT PRESENTER, MODERATOR, AND JUDGE CHECK IN**	**CSU 203**

Tuesday April 26 Schedule of Events

8:30-10:00	Session J - History	CSU 284 ABC
	Session K - Speech Communications and Mass Communications	CSU-204
10:00-10:30	Coffee Break	CSU 203
10:00-12:00	Poster Session C	CSU 253
	Poster Session D	CSU 255
10:30-11:45	Session L - English and History	CSU 244
	Session M - Biological Sciences and Chemistry	CSU 285
Noon-1:00	Luncheon (Invited Guests)	Center Ballroom
1:15-2:30	Session N - English	CSU 202

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Monday April 25 Presenters

8:30-10:00 A.M. **Session A** **CSU 201**

Psychology

Moderator: Robert Widner

Janica Smith (K. Filter) *Gender Differences in Perceptions of Sexual Harassment*

Kristin Mansky (K. Filter) *Enhancing Law Enforcement Efficiency and Judgment Accuracy*

Jamie Aspenson (K. Filter) *The Effects of Constraints on Creativity*

Jennifer Kirkland (V. Norasakkunkit) *Cross-cultural Comparison of the Relationship Between Self-enhancement and Attributions*

Abby Geotz Pitts (K. Filter) *Factors Influencing School Success of At-risk Youth*

Jennifer Rye (K. Filter) *Differences in Dissonance Reduction Tendencies between Low-context and High-context Cultures*

GENDER DIFFERENCES IN PERCEPTIONS OF SEXUAL HARASSMENT

Janica S. Smith (Psychology)
Dr. Kevin J. Filter, Faculty Mentor (Psychology)

The study examined the problem of gender variability in relation to perceptions of sexual harassment. The participants consisted of students at Minnesota State University, Mankato. Both males and females participated in the study and ages ranged in the late teens and early twenties. The participants volunteered for the study and read a brief scenario describing an incident of sexual harassment. After reading the scenario the participants answered four questions using a six-point likert scale to determine how he/she viewed the severity of the incident. Four scenarios were used in the study and the genders of both the perpetrator and victim were manipulated in each scenario. Results will be discussed in terms of differences between men and women in their tendency to evaluate the severity of sexual harassment. Results will also be discussed in terms of implications for researchers and practitioners.

ENHANCING LAW ENFORCEMENT EFFICIENCY AND JUDGMENT ACCURACY

Kristin Mansky (Psychology)
Kevin Filter, Faculty Member (Psychology)

A controversial and challenging issue within law enforcement is stereotyping and profiling. Profiling stems from actual observable behavior demonstrated while stereotypes derive from internal perceptions of an individual or group. The purpose of the present study was to distinguish the use of non-racial cues versus racial cues amongst law enforcement and non-law enforcement students. Each participant in this study observed a computer image and chose which action the man in the picture was doing from a list of choices. Each of the participants filled out demographic information, and completed a survey involving race, ethnicity, and socioeconomic status. Law enforcement students completed an extra portion of answering questions relating to their field. The results of the experiment were determined by examining the relationship between law enforcement students who have received education and training in police efficiency and judgment accuracy to non-law enforcement students who have not received any proper education and training in this field. Results will be discussed in terms of implications for training law enforcement officers.

THE EFFECTS OF CONSTRAINTS ON CREATIVITY

Jamie Aspenson (Psychology)
Kevin Filter, Faculty Mentor (Psychology)

Several studies have shown that constraints in the instructions to "be creative" have in turn affected the creative output. Therefore, it would seem that a varying amount of instruction would yield different levels of creativity. For that reason, 70 college students were given four sets of varying instructions to create an art project, specifically a mosaic. The results will be discussed in terms of the differences in the creativity and quality that was generated in the four conditions and then rated by a panel of advanced art students. Results will also be discussed in terms of implications for researchers and practitioners.

CROSS-CULTURAL COMPARISON OF THE RELATIONSHIP BETWEEN SELF-ENHANCEMENT AND ATTRIBUTIONS

Jennifer Kirkland (Department of Psychology)
Vinai Norasakkunkit, Faculty Mentor (Department of Psychology)

The tendency to externalize failure and internalize success is the core of attributional bias, otherwise known as the "self-serving bias" (Nisbet and Ross,1980). Evidence suggests that this attributional style is predominant in the West among non-depressed populations. In contrast, Wan and Bond (1982) found that for Chinese subjects in China, the attributional pattern was reversed. Previous evidence also suggests that self-serving biases are congruent with self-enhancing motives in the West (Heine, et al., 1999). Self-enhancement is the "tendency to maintain and enhance the overall evaluation of the self" (Kitayama, et al., 1997). While self-enhancing tendencies can be found across various domains in the west, this tendency is conspicuously absent among subjects in East Asian cultures (Heine, et al., 1999). Since self-enhancing motives are strong in the west, this motive should influence attributional style, resulting in a strong positive correlation between self-enhancement and attributional style among American subjects. However, with a lack of evidence for self-enhancing motives in the East, it is reasonable not to expect any strong relationship between self-enhancement and attributional style among Chinese. This study explored the relationship between attributional style and self-enhancement among Chinese students in China and American students in the United States. It is expected that the relationship between attributional style and self-enhancement will be significantly stronger among American students. Chinese and American participants completed the False Uniqueness Questionnaire (FUQ) and the Attribution Styles Questionnaire (ASQ). Analytical strategy will involve comparing the magnitudes of correlational results between self-enhancement and attributional style scores across cultural groups.

FACTORS INFLUENCING SCHOOL SUCCESS OF AT-RISK YOUTH

Abby Geotz Pitts (Psychology)
Kevin Filter, Faculty Mentor (Psychology)

Research literature has provided the foundation for identifying significant risk factors present in students that lead to dropping out of high school. Once risk factors are identified students may be selected to enroll in an intervention program designed to counter the influence of these factors. Intervention programs have had measurable success in reducing drop out numbers but improvements still need to be made to ensure the correct students are being serviced by these programs. Through further exploration of risk factors and assessment tools to screen students for self-motivation to complete high school, administrators can tailor student selection for intervention programs to serve those who will most greatly benefit from them. Recommendation for research and program development will be presented based on a review of this literature.

DIFFERENCES IN DISSONANCE REDUCTION TENDENCIES BETWEEN LOW-CONTEXT AND HIGH-CONTEXT CULTURES

Jennifer Rye (Psychology)
Kevin Filter, Faculty Mentor (Psychology)

This study tested the differences in dissonance reduction tendencies between low-context (American) and high-context (Asian) cultures. There currently have been many studies on the causes of cognitive dissonance and dissonance reduction tendencies. The tendency to justify or rationalize decisions is a part of human nature, but arises in culture-specific manners because specific cultures shape how and when rationalization occurs. The results of this study will be discussed in terms of the effects of personality feedback and interpersonal relationships on dissonance reduction tendencies. This study expects to find that when given negative personality feedback the Americans will have re-rated the posters more often, showing a greater need to justify their decisions. It is also anticipated that the personality feedback will have had no effect on dissonance reduction for the Asians because the situations did not threaten aspects of the interdependent self. When rating the posters for a friend the Asians will likely have re-rated the posters more often, showing a greater need to justify their decisions when choosing for others. The poster ratings for a friend or for self will likely have had no effect on dissonance reduction for Americans because the situations did not threaten the self-concept.

English and Computer Science

Moderator: David Haglin

Nickie Kranz (M. Johnston) *Martin Luther Stands in History as a Leader of the Protestant Reformation*

Jacey Greff (M. Johnston) *Mary Magdalene: Who Was She?*

***Marissa Hansen, Christopher Peterson, Jake, Hjelmtveit, and Eric Hoffheiser (R. Robbins)** *Moving On*

****Moved to Tuesday, April 26 at 1:15 P.M. in CSU 202***

Peter Doyscher and Linda Mellen (L. Tesdell) *The Nontraditional Student and Computer Skills*

Patrick Menning (R. Bates) *A System for Labeling and Predicting Group Interaction in Meetings*

Sumit Shrestha (N. Lee and D. Kelley) *Finding Keith Numbers Beyond 10^{26}*

MARTIN LUTHER STANDS IN HISTORY AS A LEADER OF THE PROTESTANT REFORMATION

Nickie Kranz (English)
Mary Susan Johnston, Faculty Mentor (English)

Martin Luther, often called the father of Protestantism, fundamentally changed the Christian world through his force of will and new ideas. He tried passionately to reform the Catholic Church. His desire was to return Christianity to its roots, putting more focus on the reading of scripture and less focus on Catholic dominance. His personal theology inclined him to write works including "The Sermon on Good Works" and the "95 Theses." Once these works were distributed, the Roman Emperor placed him under an imperial ban. Martin Luther escaped and hid in a castle to avoid imprisonment and/or death. During his hiding, he began developing a new church, independent from the Catholics. My undergraduate research focuses on the Protestant movement that began with an Augustinian Monk, and quickly spread throughout the Western world.

MARY MAGDALENE: WHO WAS SHE?

Jacey Greff (English)
Mary Susan Johnston, Faculty Mentor (English)

Although Mary Magdalene was seen as a prominent yet subtle character in the Bible, much of who she truly was is unknown. Due to the recent popularity of the *Da Vinci Code* many people have begun to question her relationship to Jesus and what her significance was in the Bible. This project examines Mary Magdalene as she is perceived in the Bible, scholarships, and throughout history.

MOVING ON
Mari Hansen (English)
Jake Hjelmtveit, (English)
Christopher Peterson (English)
Eric Hoffheiser (English)
Hans Hetrick, Graduate Student Mentor (English)
Richard Robbins, Faculty Mentor (English)

For our group, *Moving On* represented the emotional weight in fiction, nonfiction, and poetry. "Moving on" implies change, and all good prose and verse possess change. As creative writers, we explored this theme through subjects ranging from the death of a loved one to loss of one's faith. By focusing on our theme, we examined our own lives and improved our creative writing skills. We attained our goals through observation, discussion, information gathering, writing, and revision of creative work. We met frequently to discuss our work and ideas. We strove to bring each individual piece to a publishable quality and plan to submit our works for publication. In the hopes that others will gain from our awareness, we plan to present our writing at the conference, individually reading our work to the audience.

THE NONTRADITIONAL STUDENT AND COMPUTER SKILLS
Peter Doyscher (English, Technical Communications)
Linda Mellen (English, Technical Communications)
Dr. Lee Tesdell, Faculty Mentor (English, Technical Communications)

This project concerns the nontraditional students attending Minnesota State University, Mankato and their ability to use computers and software in use at the university. In our research we asked traditional and nontraditional students at MSU to evaluate their computer skills. Previous studies indicated older nontraditional students face challenges in staying abreast with the computer technology in use in university classrooms. This study was designed to determine if nontraditional students at Minnesota State University, Mankato are at a disadvantage and to identify what, if any, technological difficulties they face. In this study faculty and students were interviewed and students surveyed. The information gathered was analyzed to compare computer skills of traditional students to computer skills of nontraditional students.

A SYSTEM FOR LABELING AND PREDICTING GROUP INTERACTION IN MEETINGS

Patrick Menning (Computer and Information Sciences)
Rebecca Bates, Faculty Mentor (Computer and Information Sciences)

Automatic processing of human meetings requires high-level information about group interaction as well as accurate speech recognition (speech-to-text). The goal of this project was to develop a system for labeling meeting styles and use these labels to evaluate automatic prediction. Meeting Acts (MAs) are descriptors for group interaction that specify the high-level function taking place in a meeting. Dialog Acts (DAs) are labels that describe the function of individual utterances. Using the Meeting Corpus, a collection of transcribed meetings and their accompanying DA labels, we have developed a system of MA labels that include Reporting, Negotiation, Planning, and Brainstorming. Several researchers have applied this labeling system to selected meetings in the corpus. When labels were applied to the same meeting by different labelers, significant agreement was found. Prediction results showing the relationship between high-level information (MAs) and given sentence-level information (DAs) will be presented.

FINDING KEITH NUMBERS BEYOND 10^{26}

Sumit Shrestha (Computer Engineering and Electrical Engineering)
Namyong Lee, Faculty Mentor (Mathematics and Statistics)
Dean F. Kelley, Faculty Mentor (Computer and Information Sciences)

A Keith number is an n-digit integer N with the following property: If a Fibonacci-like sequence (in which each term in the sequence is the sum of the n previous terms) is formed, with the first n terms being the decimal digits of the number N, then N itself occurs as a term in the sequence. For example, 197 is a Keith number since it generates the sequence

1, 9, 7, 17, 33, 57, 107, **197** ... (3 digits Keith number)

The simple technique of finding the Keith number is a brute force technique. The fundamental problem with Keith numbers is that the computation time for discovering Keith numbers grows along with the number of digits in the number. For a number N with n digits there are approximately (10/3)n terms in the Fibonacci like sequence. Generating such a sequence would certainly take a long time.

Besides implementing an efficient algorithm to find the Keith numbers, the research will try to solve two mysteries.

1. It is still unknown whether there are an infinite number of Keith numbers as has been conjectured by Heuristic arguments. It appears that about 3 Keith numbers exist between each power of 10 but there is still no proof.
2. There is no Keith number for n = 10 so, Is n=10 the only number of digits for which there are no Keith numbers?

Speech Communications

Moderator: Brian Klosa

Lianna Erickson (D. Cronn-Mills) *An Ethnographic Study of the Communication Practices of a Recovering Alcoholic During the First Month of Sobriety*

Julie Lemley (J. Dimock) *Gendered Construction of the Female Identity*

Elizabeth Drommerhausen (B. Klosa) *Past, Present, and Future Technologies in the Field of Weather Modification*

Emily Kofoed (B. Klosa) *The Sexualization of Female Athletes and the Female Sports Double Standard*

Lindsey Thompson (L. White) *Islamica: Creating a Muslim-American Identity*

Joshua Randall (B. Klosa) *Spider-Man: Sacred Vs. Profane*

AN ETHNOGRAPHIC STUDY OF THE COMMUNICATION PRACTICES OF A RECOVERING ALCOHOLIC DURING THE FIRST MONTH OF SOBRIETY

Lianna Erickson (Speech Communications)
Daniel Cronn-Mills, Faculty Mentor (Speech Communications)

I obtained IRB permission to observe a 33-year old female while she attended Alcoholics Anonymous during her first month of sobriety. For the duration of a month, I took field notes, interviewed, and participated in activities with the subject. I utilized theories from George Mead (Symbolic Interactionism), Walter Fisher (Narrative Paradigm), Clifford Geertz and Michael Pacanowsky (Cultural approach to organizations) to understand the communication practices. With these theories, I illuminate the use of storytelling, metaphors and rituals utilized by the subject and the organization.

GENDERED CONSTRUCTION OF THE IDENTITY

Julie L. Lemley (English and Speech Communications)
James Dimock, Faculty Member (Speech Communications)

Since Garfinkle's ground-breaking work on labeling in the 1950's, the link between identity formation, specifically as constructed by external social messages intentionally directed by authority, and resultant behaviors has been well established. This research has extended upon this assumption, applying critical media and rhetorical methods to advertising aimed at adolescents, a particularly vulnerable group at a point of transition and identity formation. The adolescent negotiation of the transition from childhood (child identity) to adulthood (adult identity), has always been a uniquely critical stage of development. Moreover, the research has indicated that adolescents are particularly susceptible to influence by those in positions of authority. This research, relying in part upon Raven and French's concept of referential power (or a form of authority based upon the subject's self-identification with the authority), demonstrated that advertising directed at adolescents has exerted a significant amount of authority. Print media aimed at adolescents was evaluated from a critical perspective. The research examined the underlying identity messages within various texts, specifically the construction of gender and sexuality. The ideological homogeneity of the marketplace, which has been dominated by sexist (not exclusively male but conceding supremacy of the masculine perspective) and capitalistic exploitation, commoditizes the female identity. The research has articulated implications of this rhetorical practice included, but were not limited to sexual violence, low self-esteem and self-objectification.

PAST, PRESENT, AND FUTURE TECHNOLOGIES IN THE FIELD OF WEATHER MODIFICATION

Elizabeth Drommerhausen (Speech Communications)
Brian Klosa, Faculty Mentor (Speech Communications)

Ancient civilizations used to think our weather was made up of earth, wind, fire, and water. We know now that weather is much more sophisticated. Societies and cultures have tried to manipulate or create favorable weather for years. Today we have the technologies to create and control our weather. The following presentation will detail and explain the past, present, and future technologies dealing with weather modification. This presentation will also discuss the impacts and potential implications that these technologies will place on our future.

THE SEXUALIZATION OF FEMALE ATHLETES AND THE FEMALE SPORTS DOUBLE STANDARD

Emily S. Kofoed (Speech Communications)
Brian Klosa, Faculty Mentor (Speech Communications)

Over the years, female athletes have fought for equal opportunities in the sports world. Currently, with more options than ever before, they are experiencing a new type of discrimination. This discrimination hinges on the sexualization and commodification of physical stature and breeds a double standard of being expected to demonstrate femininity while participating in a historically masculine institution. This presentation hopes to shed light on this situation and provide some possible solutions to impede the sexualization of female athletes. The causes, effects and solutions of this issue will be examined using a humorous perspective while still seriously addressing this pressing matter.

ISLAMICA: CREATING A MUSLIM-AMERICAN IDENTITY

Lindsey R. Thompson (Speech Communications)
Leah White, Faculty Mentor (Speech Communications)

Intertextuality is defined as a textual device in which one text informs another and is used by an author to elicit a specific audience response. Brian Ott and Cameron Walter detailed a humorous approach to intertextuality by looking at three areas: parodic allusion, creative appropriation, and self-reflexive reference. Parodic allusion occurs when one text imitates another and is meant to be humorous. Creative appropriation is seen when one text recreates portions of another text. Creative appropriation is meant to make a statement about the text it recreates; this comment can range from a criticism of a text to a celebration of it. Self-reflexive references are comments or behaviors that draw attention to the fact that element within a text are fictional. This model is applied to the online company Islamica, which was created as an identity-centric company to provide Muslims with a unique, humorous outlet. After application of intertextuality to Islamica, implications regarding the success of Islamica's identity-centric goals are derived; Islamica has created a more contemporary Muslim-American identity among young Muslims. However, in order for an identity to identify a group of people, it must be recognized by those outside the group. Because Islamica is directed only toward Muslims, their identity fails to define them by those on the outside.

SPIDER-MAN: SACRED VS. PROFANE

Joshua E. Randall (Speech Communications)
Brian R. Klosa, Faculty Mentor (Speech Communications)

Emile Durkheim distinguished between sacred and the profane arguing that "the idea of the sacred is always and everywhere separated from the idea of the profane" and this distinction has been extended to the study of communication and rhetoric. Mary Ellen Boyle applied this distinction to Major League Baseball contending that it enacts a tension between these two realms of human interaction: the sacred, baseball as "America's past-time," in conflict with the profane, baseball as big business. This research extended those conclusions, applying the sacred and profane to explain the conflict surrounding Major League Baseball's decision to promote the movie Spiderman II by putting logos on the bases. The research suggests that the dichotomy as constructed by Durkheim and Boyle must be reframed to adequately interpret the public conflict. When fans revolted, Major League Baseball's response, to remove the advertising and restore baseball to it 'sacred' status, sublimated the profane concern for revenue rather than enacting a clear distinction between the two. The performance of the sacred was a profane act and the profane desire was realized through respect for the sacred.

Biological Sciences

Moderator: Tim Secott

Michelle Taylor and Ian Lalich (M. Bentley) *Methods for Analysis of Renal Microvasculature of Aging Rats Using Microcomputed Tomography and Analyze 6.0*

Richard Robinson (P. Knoblich) *The Effect of Reduced Aldosterone Levels on the Development of Hypertension in the Spontaneously Hypertensive Rat (SHR)*

Michelle LaRue (B. McMillan) *Using Distance Sampling to Estimate Densities of Deer in Minnesota's Farmland Region*

Lacey Klungseth (T. Secott) *Antimicrobial Resistance Patterns of Escherichia Coli Isolates from Tributaries of the Minnesota River*

Sunnie McCalla (J. Krenz and R. Sorensen) *Genetic Differentiation of Natural River Otter Populations in Minnesota*

Michelle Imes, Cindy Sparrow, and Robin Erickson (B. Proctor) *Comparison of Macroinvertebrate Populations at Three Locations After Several Major Storm Events*

METHODS FOR ANALYSIS OF RENAL MICROVASCULATURE OF AGING RATS USING MICROCOMPUTED TOMOGRAPHY AND ANALYZE 6.0

Michelle Taylor (Biological Sciences)
Ian Lalich (Biological Sciences)
Michael Bentley, Faculty Mentor (Biological Sciences)

Microcomputed tomography is a promising method used to evaluate renal vascular architecture and can be used to derive quantitative information from resulting images. One of the advantages of microcomputed tomography is that an entire rodent kidney may be studied without physically disrupting its structure. To obtain quantitative information, the ANALYZE 6.0 software program yields a number of computer techniques, which allow the analysis of these three-dimensional images. Measurements obtained can be used to determine the volume and fraction of vasculature within an entire kidney and its tissue components. The diameter of the glomerular units and the total number of glomeruli in a kidney can also be determined by analyzing small sections throughout the entire kidney. Because microfil remains within the vascular compartments, the fraction of vasculature can be derived from vascular opacity measurements of the cortical and medullary tissue. The fraction of vasculature in the glomerular and peritubular tissue was determined in this manner. Glomerular diameters were determined by counting the number of sections through individual glomeruli and by multiplying the number of sections by section thickness. To determine the total number of glomeruli in the kidney, glomeruli were counted in sample volumes systematically taken throughout the entire cortex and the number of glomeruli in the sample volume then multiplied the average cortical volume. In conclusion, these methods provide three-dimensional quantitative information about the kidney that has previously been difficult to obtain.

THE EFFECT OF REDUCED ALDOSTERONE LEVELS ON THE DEVELOPMENT OF HYPERTENSION IN THE SPONTANEOUSLY HYPERTENSIVE RAT (SHR)

Richard Robinson (Biological Sciences)
Penny Knoblich, Faculty Mentor (Biological Sciences)

Hypertension, or high blood pressure, is a common disorder. The underlying cause of hypertension is, as yet, unidentified. Many researchers believe an expansion of blood volume precedes the rise in blood pressure. Aldosterone, an important regulator of blood volume, is produced in the outermost layer of the adrenal cortex. Aldosterone promotes the reabsorption of sodium ions (Na^+) from kidney tubules back into the blood. Since water is reabsorbed with sodium, aldosterone increases blood volume and blood pressure. The role of aldosterone in hypertension has been studied using receptor blocking agents, or complete adrenalectomy, (removal of both adrenal glands), with each method resulting in confounding variables. A surgically-induced low-aldosterone state has been developed in this laboratory. The process involves removal of one adrenal gland, and cryo-destruction of the outer layer of the remaining gland. This procedure markedly reduces aldosterone levels, while maintaining the production of the other hormones of the adrenal gland. This study evaluates the effect of this treatment on the development of hypertension in a genetically hypertensive rat model, the spontaneously hypertensive rat (SHR). Blood pressure in the SHR begins to rise at 6 weeks of age and peaks at 16 weeks, making it an acceptable model for the study of hypertension. **Methods:** Four to six week old SHR were subjected to either sham surgery (identical opening and closing of the abdominal cavity), or the adrenalectomy and freezing procedure. Post-surgery, blood pressure, heart rate, and weight were measured bi-weekly until rats reached 4 months of age.

USING DISTANCE SAMPLING TO ESTIMATE DENSITIES OF DEER IN MINNESOTA'S FARMLAND REGION

Michelle A. LaRue (Biological Sciences)
Brock R. McMillan, Faculty Mentor (Biological Sciences)

Estimation of the size of the white-tailed deer *(Odocoileus virginianus)* population is essential for proper management of the deer herd. Further, a survey of wildlife managers indicated that improved techniques were needed to monitor deer populations in Minnesota's farmland region. We evaluated a new method, distance sampling, in an effort to identify a more accurate and efficient method of estimating the size of deer populations. Distance sampling is an increasingly popular method of estimating the size of animal populations due to its accuracy and logistical advantages relative to other methods. In this pilot study, we used distance sampling to estimate the pre- and post-hunt sizes of the deer population in Watonwan County. We compared mean distances and deer-group sizes between seasons and within habitats, and also estimated densities of deer using DISTANCE software. To evaluate distance sampling, 24 spotlight surveys were conducted from 18 October–28 December 2004. We observed 537 deer during 12 surveys in the pre-hunt period and 620 deer during 12 surveys in the post-hunt period. Preliminary analyses indicated that mean deer-group sizes differed ($P<0.001$) between seasons (mean pre-season = 2.1 deer/group [SE = 0.1], mean post-season=2.9 deer/group [SE = 0.2]). Average distance from deer to observer also differed ($P<0.05$) between seasons (pre-hunt = 128 m [SE = 5] and post-hunt = 145 m [SE = 7]). Further analysis of our findings will likely demonstrate that distance sampling will improve current techniques and, therefore, estimates of the size of white-tailed deer populations utilized by the Minnesota Department of Natural Resources.

ANTIMICROBIAL RESISTANCE PATTERNS OF ESCHERICHIA COLI ISOLATES FROM TRIBUTARIES OF THE MINNESOTA RIVER

Lacey Klungseth (Biological Sciences)
Dr. Timothy Secott, Faculty Mentor (Biological Sciences)

Environmental microorganisms that are resistant to antibiotics can transfer this property to pathogenic microorganisms, making infections caused by the latter more difficult to treat. The purpose of this project is to test Escherichia coli and related bacteria obtained from tributaries of the Minnesota River for susceptibility to commonly used antibiotics, thereby gaining a better understanding of the potential of bacteria isolated from local watersheds to serve as a reservoir for antimicrobial resistance. Escherichia coli and other members of the family Enterobacteriaceae recovered from water samples were tested for antimicrobial susceptibility using the Kirby Bauer disk diffusion method. To date, more than 70% of E. coli isolates were sensitive to amoxicillin, aztreonam, gentamicin, trimethoprim/sulfamethoxazole, and tetracycline; less than 50% were sensitive to ampicillin or cephalothin. More than 65% of other Enterobacteriaceae isolates were sensitive to aztreonam, gentamicin, trimethoprim/sulfamethoxazole, or tetracycline; less than 35% were sensitive to ampicillin, amoxicillin, or cephalothin. Forty-three percent (6/14) of E. coli isolates were resistant to two or more drugs, while 83% (5/6) of other Enterobacteriaceae isolates were multiply-resistant. These trends will be compared with regional resistance profiles for similar organisms isolated at regional veterinary and human clinical laboratories.

GENETIC DIFFERENTIATION OF NATURAL RIVER OTTER POPULATIONS IN MINNESOTA

Sunnie McCalla (Biological Sciences)
John D. Krenz, Faculty Mentor (Biological Sciences)
Robert E. Sorensen, Faculty Mentor (Biological Sciences)

In the early 1900s, otter populations were greatly reduced in Minnesota by human activity. Current populations have rebounded and translocations of animals from source populations to areas of local extinction such as the Minnesota River have occurred or are being contemplated. Knowledge of the genetic make-up of potential source populations would allow conservationists to preserve biological (genetic) diversity. Natural populations within species differ genetically, and knowledge of such differences is important in the conservation of biological diversity. Genetic differences between populations may be caused by a restriction in the exchange of individuals. My goal was to quantify (DNA) genetic differences among populations of river otters intimately associated with drainage systems in Minnesota and hypothesized that populations which are more connected by river systems would be more similar genetically. Otter tissue was collected from trappers. I used DNA sequence data from prior studies in other states to develop a method for genotyping Minnesota otters. I compared DNA of otters from the Upper Mississippi River and Lower Mississippi River populations, and also compared them to the St. Louis River population (which is not connected to the Mississippi River). The development of our methods for obtaining genotypes and our preliminary data will be presented.

COMPARISON OF MACROINVERTEBRATE POPULATIONS AT THREE LOCATIONS AFTER SEVERAL MAJOR STORM EVENTS

Michelle Imes (Biological Sciences)
Cindy Sparrow (Biological Sciences)
Robin Erickson (Biological Sciences)
Beth Proctor, Faculty Mentor (Biological Sciences)

Benthic macroinvertebrates (spineless organisms that live in water and are visible with the naked eye) have been used for decades as indicators of water quality. The purpose of our research was to determine if the number and species composition of benthic macroinvertebrates were different between 3 sites: Blue Earth River upstream of the Rapidan Dam and reservoir; Blue Earth River downstream of the Rapidan Dam and at the LeSueur River just prior to it confluence with the Blue Earth River. Artificial substrates (Hester-Dendy) were placed at each sampling site. The substrates were to be collected after 4-5 weeks of colonization between May and September 2004. Due to the unusually wet weather and high flows, all artificial substrates were lost. In October macroinvertebrates were sampled using the pick method at two of the original sites (Blue Earth River below the Rapidan Dam (Jones Ford) and LeSueur River) and at the Beauford Creek. We will discuss the differences between the macroinverterates found at these sites plus problems associated with field sampling.

Speech Communications

Moderator: Leah White

Elizabeth Drommerhausen (L. White) *The 1000 Journals Project – A Communication Analysis Using Karen Mitchell's Theory of Seamless Intertexts*

Lindsey Thompson (B. Klosa) *Soft Drinks: A Legal Drink of Poison*

Joshua Randall (B. Klosa) *ESPN: 25th Anniversary*

Emily Kofoed (J. Dimock) *Evaluation of Pharmacogenomics and Its Applications to Biological Race*

David Brennan (B. Klosa) *Star Wars: A Critical Analysis of the Social and Cultural Influence of the Films*

Matthew Collie (L. White) *Privatized Military Firms: A Detriment to the United States*

THE 1000 JOURNALS PROJECT–A COMMUNICATION ANALYSIS USING KAREN MITCHELL'S THEORY OF SEAMLESS INTERTEXTS

Elizabeth Drommerhausen (Speech Communications)
Leah White, Faculty Advisor (Speech Communications)

In August of 2000 Brian Singer started leaving blank journals in odd places with the instructions to write, draw, paint or otherwise fill up the pages. Because the 1000 Journals project is an innovative means to connect people across cultures during times of tense international relations, I have analyzed this rhetoric using Karen Mitchell's article: *"Seamless Intertext: Extrinsic and Intrinsic Intertextuality and Emily Mann's Execution of Justice"* found in the January 1993 *Text and Performance Quarterly*. After applying Mitchell's Method to this artifact I have discovered that the 1000 Journals Project uses multiple artistic forms to create a sense of community between strangers.

SOFT DRINKS: A LEGAL DRINK OF POISON

Lindsey R. Thompson (Speech Communications)
Brian R. Klosa, Faculty Mentor (Speech Communications)

Health and Medicine Week of October 4, 2004, reports that soft drink consumption in the United States has increased 135 percent between 1977 and 2001. Most people are unaware of the health risks soft drink consumption causes, and for those who are aware, most underestimate the consequences. *New Scientist* of May 18, 2004, reports that while soft drink consumption may seem insignificant on a small scale, just two cans a day can have a significant long term effect. Soft drink consumption poses a serious risk to our health by damaging our bodies and making us more susceptible to osteoporosis and esophageal cancer. People must be aware of these health problems in order to make informed decisions regarding their health. In order to understand the health problems soft drinks pose, the health problems associated with pop, the societal causes of the problem, and solutions to prevent a soft drink-induced health crisis will be discussed in my presentation.

ESPN: 25TH ANNIVERSARY

Joshua E. Randall (Speech Communications)
Brian R. Klosa, Faculty Mentor (Speech Communications)

ESPN is currently celebrating 25 years of sports coverage and reporting. ESPN has constantly shown the creativity, innovation and quality needed to excel in a fast changing world. We live in a culture obsessed with sports. Since September 7, 1979 ESPN has had their thumb on the pulse of the sporting industry and has fundamentally changed the culture of American sporting life ever since. By taking a critical and humorous approach, my presentation will examine SportsCenter, the economical impacts that ESPN has on the sporting world and ESPN's cultural contribution to American life. Overall, my presentation will achieve a better understanding of mediated sports coverage and ESPN's role in this coverage.

EVALUATION OF PHARMACOGENOMICS AND ITS APPLICATIONS TO BIOLOGICAL RACE

Emily S. Kofoed (Speech Communications)
Jim Dimock, Faculty Mentor (Speech Communications)

Research in the area of pharmacogenomics has burgeoned as more information about the human genome has been discovered. Currently, researchers have combined pharmacogenomics with what is presently known about the biological differences between various races and are seeking to create and market medication for specific racial groups. A vast number of implications have arisen from this developing research, including the theory that further research in this direction will only further intensify racism. Additionally, researchers are faced with a continuum of race; mapping the genome not only in black and white, but also in the gray areas in between. Consequently, the concepts of unique biology, race, and pharmacogenomics must be explored collectively and respectively deserve our attention.

STAR WARS: A HUMOROUS ANALYSIS OF THE SOCIAL AND CULTURAL INFLUENCE OF THE FILMS

David Brennan (Speech Communications)
Brian R. Klosa, Faculty Mentor (Speech Communications)

The film, Star Wars, has had a great impact on society over the last twenty five years. My presentation will take a comical yet insightful in-depth look at the social factors and history that contributed to the creation and impact of the Star Wars films. This will lead to a critique of cultural implications of the films. Taking a humorous look at all of these points can help us peer inside ourselves to see just how Star Wars, and films in general, can have such a huge impact on our lives.

PRIVATIZED MILITARY FIRMS: A DETRIMENT TO THE UNITED STATES

Matthew M. Collie (Speech Communications)
Leah White, Faculty Mentor (Speech Communications)

Privatized Military Firms have quickly become a major part of the U.S. armed forces. The U.S. Government has turned more to Privatized Military Firms to provide security personnel to supplement diminished military recruitment. These armed civilians often resemble soldiers in their scope, armament and deployment yet are deficient in terms of accountability, responsibility and legitimacy. It is my contention the United States' use of Privatized Military Firms, in any context, constitutes an attack on everything the U.S. holds dear. Therefore, through appeal to news articles pertaining to the subject, I will argue the use of Privatized Military Firms must be stopped because they are a detriment to the U.S. Military; the employees who work for them and U.S. Governmental strength. After laying out these tenants it will become evident the best way to protect the United States from attack does not, in any way, involve Privatized Military Firms.

Automotive Manufacturing Engineering and Mechanical Engineering

Moderator: Patrick Tebbe

Jeremy Losinski (B. Jones) *Inertia Dynamometer: Design and Primary Drive Clutch Performance*

Jason Laimonis (B. Jones) *Testing and Evaluations of Ace Racings 6 1/4" Triple Disc Clutch & 8" Clutch Disc and Floater*

Andrew Graham, Wade Kahout, Erik Shallbetter, Joseph Wrobel, Kevin Reiss, Andrew McNair, Bradley Bahneman, Timothy Christensen (B. Jones) *Analysis of an E-85 Turbocharged Four-Stroke Snowmobile*

Marion Okoth (P. Tebbe) *Microelectromechanical Power Sources*

Ben Gruenzner, Nicholas Hanson, Dustin Kallhoff, Christopher Kost, Jason Kuenzli, Justin Moe, Thor Morales, Aaron Pilger, Scott Rector, Jamie Schlachter, Michael Schmitz, Ryan Schommer, Ryan Stebbins, Paul Steevens, Michael Tichy (B. Jones) *2005 Formula SAE Project*

INERTIA DYNAMOMETER: DESIGN AND PRIMARY DRIVE CLUTCH PERFORMANCE

Jeremy Losinski (Automotive Engineering Technology)
Bruce Jones, Faculty Mentor (Automotive Engineering Technology)

This project was concerned with the design and data acquisition from an inertia dynamometer used to test primary drive clutches. These clutches are used on Harley-Davidson motorcycles and custom applications. This presentation will cover the construction of the dynamometer and the methods used to obtain the desired data for this project.

TESTING AND EVALUATIONS OF ACE RACINGS 6 1/4" TRIPLE DISC CLUTCH & 8" CLUTCH DISC AND FLOATER

Jason Laimonis (Automotive Engineering Technology)
Dr. Bruce Jones, Faculty Mentor (Automotive Engineering Technology)

This project involved the testing and evaluation of two products from the Racing division of Ace Manufacturing. The components that were tested include a 6 1/4" triple disc clutch, a new clutch disc material and a bronze coated floater. The clutch disc and floater were testing in a 2001 Pontiac Grand Am Race Car with an 1140 HP 568" engine. The 6 1/4" clutch was tested in a 2004 Chevrolet Cavalier with a NHRA Pro Stock legal 500" engine producing 1240 hp. The goals of the testing were to determine potential performance gains as well as evaluation of the window of operation as it relates to vehicle performance.

ANALYSIS OF AN E-85 TURBOCHARGED FOUR-STROKE SNOWMOBILE

Andrew Graham (Automotive Engineering Technology)
Wade Kahout (Automotive Engineering Technology)
Erik Shallbetter (Automotive Engineering Technology)
Joseph Wrobel (Automotive Engineering Technology)
Kevin Reiss (Automotive Engineering Technology)
Andrew McNair (Automotive Engineering Technology)
Bradley Bahneman (Automotive Engineering Technology)
Timothy Christensen (Automotive Engineering Technology)
Bruce Jones, Faculty Mentor (Automotive Engineering Technology)

The topic discusses the Minnesota State University, Mankato Automotive Engineering Technology program's entry to the 2005 Clean Snowmobile Challenge. Included in this presentation is the snowmobile model chosen for modification, engine choice and applied modification methods used. These modification results affect performance, emission control, noise reduction, production cost, durability, fuel efficiency, safety, and rider comfort.

For Clean Snowmobile Challenge 2005, the MSU Mavericks devoted their focus to improving a 700cc Polaris Frontier four-stroke engine. With alterations such as turbo charging, the incorporation of an EFI head and a unique under-the-seat exhaust system design. To be environmentally safe an alternative fuel known as E-85 is used. E85 is a cleaner burning, renewable fuel that reduces emissions. After the incorporation of these modifications, they are then analyzed and compared to the original stock snowmobile. These comparisons are then weighed to ensure a positive advantage in all areas of the competition.

MICROELECTROMECHANICAL POWER SOURCES

Marion O. Okoth (Mechanical Engineering)
Patrick Tebbe, Faculty Mentor (Mechanical Engineering)

Microelectromechanical power sources (MEMS) are Microsystems which produce power or pump heat. A microsystem is a structure of characteristic dimension which is less than a centimeter and can be as small as a few nanometers. These devices are dependant on energy sources to carry out their function. This paper reviews advancements in MEMS technology and energy sources which are used to power them. The applications, efficiencies and feasibility of these MEMS power sources are also reviewed in this paper.

2005 FORMULA SAE PROJECT

Michael L. Tichy (Automotive Engineering Technology)
Aaron Pilger (Automotive Engineering Technology)
Dustin Kallhoff (Automotive Engineering Technology)
Jamie Schlachter (Automotive Engineering Technology)
Ryan Schommer (Automotive Engineering Technology)
Thor Morales (Automotive Engineering Technology)
Ben Gruenzner (Automotive Engineering Technology)
Jason Kuenzli (Automotive Engineering Technology)
Chris Kost (Automotive Engineering Technology)
Justin Moe (Automotive Engineering Technology)
Scott Rector (Automotive Engineering Technology)
Paul Steevens (Automotive Engineering Technology)
Mike Schmitz (Automotive Engineering Technology)
Ryan Stebbins (Automotive Engineering Technology)
Nick Hanson (Automotive Engineering Technology)
Bruce Jones, Faculty Mentor (Automotive Engineering Technology)

The Formula SAE® competition is for SAE student members to conceive, design, fabricate, and compete with small formula-style racing cars. The restrictions on the car frame and engine are limited so that the knowledge, creativity, and imagination of the students are challenged. The 2005 Formula SAE Competition held in Pontiac Michigan during May 2005. MSU's vehicle is powered by a Honda F4I engine found in the CBR 600cc production motorcycle. We designed the chassis within the rules set forth by SAE. The car is fueled with E85 (a blend of 85% ethanol alcohol and 15% gasoline). E85 is a clean burning renewable fuel. All engine modifications were tested on the engine dynamometer to optimize the performance. The chassis was designed using ProE Computer Aided Drafting (CAD) software. Finite Element Analysis (FEA) was run to validate that the chassis was durable and would not fail in the FSAE competition.

Geography and Urban Studies

Moderator: Cecil Keen

Celme Divino and Teresa Menne (B. Bernhagen) *Community Planning and Citizen Engagement*

James McGrath (C. Keen) *Household Mold – A Reason for Concern*

Zachary Pelz (C. Kim) *Agricultural Contribution to Water Quality in Southern Minnesota*

Robert Berger (C. Kim) *Poverty Distribution in a Developing City: A Case Study of Mankato Region*

Afton Enger (A. Filipovitch) *Comparative Analysis of Urban Design and Criminal Behavior: A Study of New Urbanism and Defensible Space as They Pertain to Crime*

Melanie George and James Worm (C. Kim) *Mapping Risk Areas for Slope Failure in the Greater Mankato Area*

Scott Winter (C. Keen) *Educating Aviators in Visualizing Weather*

COMMUNITY PLANNING AND CITIZEN ENGAGEMENT

Celme Divino (International Relations and Urban Studies)
Teresa Menne (Undecided)
Bill Bernhagen, Faculty Mentor (Urban Studies)

It is a commonly shared belief among urban planners that: "A city that fails to plan; plans to fail." City planners, along with city officials, have long been criticized for developing elaborate and sophisticated city plans that are often not utilized. The case study was divided into two sections: determining the effectiveness of long term planning, and the contributing factors to success of citizen engagement. The central focus of the study was Mankato's ACT 2000 established in 1984 by active members of the community. The effectiveness of ACT 2000 was determined by investigating which of the proposed strategies were in fact implemented. Success of citizen engagement was determined through a survey questioner and a focus group comprised of original ACT 2000 members. The results were then compared to a similar case study analyzing citizen engagement using the cities of Ottawa, Canada and Portland, Oregon. The end result of the research identifies the key variables in successful community planning and citizen engagement programs.

HOUSEHOLD MOLD – A REASON FOR CONCERN

James McGrath (Geography)
Cecil S. Keen, Faculty Mentor (Geography)

Mold in the household, particularly in older homes, has been something occupants have generally accepted, and only when it becomes visible or unsightly do homeowners take action. Following from recent press reports, concern as to the dangers of mold has re-entered the public mind and guidelines have become more available for their removal processes. After an initial false scare of their being a 'killer mold' circulating, there has been a waning interest in the topic. Nevertheless, the consistent presence of mold within the living environment has dangers that should not be ignored and should be addressed for the health of the occupants.

The Minnesota Department of Health has a testing procedure that is generally not a viable option for the average household. This is mainly because of cost, and also because there are many varieties of mold that have yet to be identified and classified. What is most important about mold is to be able to identify what it is, and thus be able to address its source. In most cases, mold thrives in moist conditions, and getting rid of sources or pools of moisture is the key to ridding the household of mold. This paper will address the causes and the prevention of mold in household situations and show mechanisms of identifying and combating its existence.

AGRICULTURAL CONTRIBUTION TO WATER QUALITY IN SOUTHERN MINNESOTA

Zachary Pelz (Geography)
Changjoo Kim, Faculty Mentor (Geography)

Approximately seventeen of the United States' twenty-one water resource regions currently suffer from inadequate surface and groundwater supplies (USGS). There are several factors contributing to this phenomenon; including flooding, soil erosion, sediment accumulation and surface and groundwater pollution. Poorly managed farms in the upper Midwest are a source of increasing pollution to various types of water resources throughout the region. The focus of this research is to provide land users, managers, and planners information relating to cultivated lands, in order to make more educated and timely decisions. Geographic Information Systems (GIS) are employed as the primary tool for collecting, analyzing, manipulating, visualizing and finally, monitoring the effects of commercial scale agricultural operations on soil as well as surface and ground water in southern Minnesota. This research considers the natural factors influencing the quality of streams and rivers in Blue Earth County, Minnesota, as well as the effects of agricultural components-varying tillage practices and soil composition. Finally, complimentary analytical methods-aerial photography and remote sensing-are coupled with the GIS to monitor and track changes in water quality.

POVERTY DISTRIBUTION IN A DEVELOPING CITY: A CASE STUDY OF MANKATO REGION

Robert Berger (Geography)
Changjoo Kim, Faculty Mentor (Geography)

This research attempts to comprehend the changes in poverty as the settings around it evolved. Change of poverty can result in two things: [1] change in poverty distribution among population and [2] change of poverty location. The Mankato / North Mankato area is selected as a case study. Mankato is a small city located in southern Minnesota and is exemplary for its development in the past decades. For this study, datasets from the U.S. Census Bureau and local sources are used and analyzed with Geographic Information Systems (GIS). Analysis of past and future patterns of poverty shows how poverty has evolved in the past 60 years. This study also provides policy makers an opportunity for adequate planning and development initiatives.

COMPARATIVE ANALYSIS OF URBAN DESIGN AND CRIMINAL BEHAVIOR: A STUDY OF NEW URBANISM AND DEFENSIBLE SPACE AS THEY PERTAIN TO CRIME

Afton Enger (Urban and Regional Studies)
Anthony Filipovitch, Faculty Mentor (Urban and Regional Studies)

This research evaluated the correlation between urban design and criminal behavior. Environmental designs observed were New Urbanism, also known as Traditional Neighborhood Design (TND) and Neo-Traditional Neighborhood Design; and Defensible Space, otherwise known as Crime Prevention Through Environmental Design (CPTED) or Secure by Design (SBD). This study analyzed and compared crime rates in Minnesota cities and neighborhoods which have characteristics of one of these urban designs or a 3rd, Vernacular Design. Similar research has been done in a 2004 thesis by Marie E. Hafey titled *"New Urbanism Versus Defensible Space: Design Philosophies Related to Neighborhood Satisfaction and Perceived Crime,"* which addressed the correlation between urban design and perceived crime. A recent Operation Scorpion web posting also claimed New Urbanism is crimogenic. There is little research to either support this argument or refute it. This research aimed to find whether or not either of the two urban designs, Defensible Space or New Urbanism, is conducive to criminal behavior.

MAPPING RISK AREAS FOR SLOPE FAILURE IN THE GREATER MANKATO AREA

Melanie George (Geography)
James Worm (Geography)
Changjoo Kim, Faculty Mentor (Geography)

The goal of this research is to determine areas with a high risk of slope failure in the Greater Mankato Area using Geographic Information System (GIS). Digital Elevation Models (DEM) and soil type information for Mankato region are used as main data sources. The relationship between soil type and slope is also studied. The results of this study can be used for mapping where to place roads and homes so that they are not at risk of being impacted by a slope failure.

EDUCATING AVIATORS IN VISUALIZING WEATHER

Scott R. Winter (Aviation/Geography)
Dr. Cecil S. Keen, Faculty Mentor (Geography/Atmospheric Sciences)

Aviation weather courses traditionally cover a syllabus for the essentials of the FAA weather exam. Learning objectives are tailored to questions likely to appear on those tests and aviation students emerge with a rather 2-dimensional view of weather phenomena and a string of answers learned in parrot fashion. Authentic education implies preparing pilots for real-world experiences. By incorporating some visualization techniques into the aviator's learning modules would greatly expand their understanding of the dynamic nature of weather phenomena and thereby enhance the safety aspects in a pilots professional experiences. This paper focuses on two of the more difficult issues of weather to teach and to visualize — pressure surfaces and wind shears.

Theater and Dance

Moderator: Julie Kerr-Berry

Nora Bichler (J. Kerr-Berry) *The Choreographic Process: Memory Fields*

Janelle Morrison (J. Kerr-Berry) *The Effects of Minimalism/Indeterminacy on the Merce Cunningham and John Cage Collaboration*

Darcy Meier (J. Kerr-Berry) *Ted Shawn: His Dance Aesthetic and How It Affected American Concert Dance*

Melanie Braam (J. Kerr-Berry) *Balanchine*

Meghan Wiste (J. Kerr-Berry) *An Analysis of the Social and Political Influences on the Judson Dance Theater*

Kari Appel (J. Kerr-Berry) *The Divisions of the Works Progress Administration (WPA) and Their Various Influence on Various Art Forms*

Natalie Roe (J. Kerr-Berry) *AIDS in American Concert Dance*

THE CHOREOGRAPHIC PROCESS: MEMORY FIELDS

Nora Bichler (Theatre and Dance)
Julie Kerr-Berry, Faculty Mentor (Theatre and Dance)

This presentation described the choreographic process that resulted in the work "Memory Fields." An excerpt of the work was performed during the presentation. "Memory Fields" began as a solo dance composition assignment and evolved into a full-length work for five dancers that was recently adjudicated at the American College Dance Festival. The infusion of emotion into movement became the basis of the piece. Elements of the choreographic process included the rehearsal process, which gave the dancers time to refine their interpretation and performance skills. Other elements included commissioning a dance costume designer to create the costumes and developing the lighting design.

THE EFFECTS OF MINIMALISM/INDETERMINACY ON THE MERCE CUNNINGHAM AND JOHN CAGE COLLABORATION

Janelle M. Morrison (Dance and Music Education)
Julie Kerr-Berry, Faculty Mentor (Theatre and Dance)

Minimalism is movement in both the visual and performing arts that strive to focus attention on the subject as an object, reducing its historical and expressive content to a bare minimum or art without meaning. John Cage's music stems from the idea of minimalism and expands itself into what he calls "indeterminacy." Indeterminacy means that chance operations will produce the score and performer's choices. Through Cage's study of Zen he learned about The Book of Change, I Ching. Using his charts, based on this book and the toss of three coins, Cage could layout the format of his compositions.

Merce Cunningham's choreography explores the use of repetition and chance. Cunningham also used the I Ching that was passed along by Cage. He also used many other forms of choreography such as everyday movements that an untrained dancer could do, in addition to dance movements and some movements, he devised himself. (Kostelanetz, 48) This opened up a whole new world of exploration. The collaboration of Merce Cunningham and John Cage brings together two art forms using minimalism and indeterminacy.

Music and dance are correlated in many ways although the arts are not always studied together. This project gave me a chance to combine both my music and dance studies into one art form.

TED SHAWN: HIS DANCE AESTHETIC AND HOW IT AFFECTED AMERICAN CONCERT DANCE

Darcy Meier (Theatre and Dance)
Julie Kerr-Berry, Faculty mentor (Theatre and Dance)

This research paper explored the career and dance aesthetic of Ted Shawn and how this affected concert dance in America. The paper focused on three pieces of choreography that Ted Shawn placed on his Men Dancers and incorporated the affect that Ted Shawn's work had on concert dance.

BALANCHINE

Melanie Braam (Theatre and Dance)
Julie Kerr-Berry, Faculty Mentor (Theatre and Dance)

Balanchine aesthetic had a defined method of training. He saw each of his dancers as material to be shaped and molded. He began this process through his training. When Maria Tallchief began to dance with Balanchine she noticed her "whole shape and figure completely changing". (Belle, 1989, video) Balanchine was "very careful about how you used your hands...how they moved. Maria Tallchief a ballet instructor for the School of Chicago Ballet choreographs every work taught to her by Balanchine through the movement memory, exactly how he taught it to her. It is through these dancers and others that the Balanchine aesthetic lives on.

AN ANALYSIS OF THE SOCIAL AND POLITICAL INFLUENCES ON THE JUDSON DANCE THEATER

Meghan Wiste (Theatre and Dance)
Julie Kerr-Berry, Faculty Mentor (Theatre and Dance)

The title of my paper is *"An Analysis of the Social and Political Influences on the Judson Dance Theater."* The gist of the paper is basically how society and politics influenced the movement done by the JDT-how dance could sort of become a 'free speech' movement, minus the speaking part. In the paper I just give a background of social and political happenings from 1961 to 1964, important choreographers and some of their works and how their works were supposed to be interpreted.

THE DIVISIONS OF THE WORKS PROGRESS ADMINISTRATION (WPA) AND THEIR VARIOUS INFLUENCE ON VARIOUS ART FORMS

Kari Appel (Theatre and Dance)
Julie Kerr-Berry, Faculty Mentor (Theatre and Dance)

This research covered the basic outline of the Works Progress Administration (WPA), as well as its origin and development. Specifically, the many areas of art were examined in greater detail. Major points discussed were architecture, visual art, writing, music, theatre productions, and a larger portion on dance. With these points, other aspects such as particular influences on these Arts areas were also described. Finally, the importance of the Works Progress Administration (WPA) on furthering the Arts was addressed.

AIDS IN AMERICAN CONCERT DANCE

Natalie Ann Roe (Theatre and Dance)
Julie Kerr-Berry, Faculty Mentor (Theatre and Dance)

This paper examined the effect of AIDS in American Concert Dance. It discussed how the works of choreographers were influenced by AIDS. It also talked about how it affected their aesthetic, their companies, and their personal lives.

Counseling, Ethnic Studies, Modern Languages, Philosophy, Sociology, and Social Work

Moderator: John Seymour

Lisa Meyer (J. Seymour) *Risk Factors of Suicidal Phenomenon: Prevention and Intervention*

Joseph Mohrfeld (C. Matarrese) *What 'Cannot Be Said' About Fear and Trembling*

Jenna Covey (T. Schmid) *Women in Politics; Gaining Entrance to Minnesota's Legislature*

Rachel Goodloe (K. Contag) *The Differences Between the Public and Private School Systems in Cuenca, Ecuador*

Erik Berquist and Derek Skillings (C. Matarrese) *Applying Early Existential Critiques to Contemporary Themes in American Culture*

Sandy Vue and Susanne Nelson (Y. Lee) *New Arrivals in Minnesota: A Comparative Analysis on White-European and Ethnic Minority Views on New Hmong Refugees*

Joseph Mohrfeld (R. Liebendorfer) *Wittgenstein, Kierkegaard and the Unspeakable*

Kristeen Giese (A. Anwary) *Where Have all the Women Gone: Trafficking on Women, a Global Problem*

Ali Mudey (C. Black-Hughes) *The Demographic Composition of Medically Underserved Population in the United States*

RISK FACTORS OF SUICIDAL PHENOMENON: PREVENTION AND INTERVENTION

Lisa M. Meyer (Open Studies: Counseling, Alcohol and Drug Studies, and Sociology)
John Seymour, Faculty Mentor (Counseling and Student Personnel)

Around the world suicide has caused more deaths per year than homicide or war (World Health Organization, 2002). Suicidal attempts (the person survives) and suicidal ideation (thinking seriously about suicide) are others dimensions of the suicide phenomenon.

A number of risk factors have been considered as factors contributing to the increased likelihood of suicidal ideation, attempts, and completions. Sociological (external) factors and psychological (internal) factors have been considered in increasing suicidal risk.

Beyond the individual factors research has also explained the family, social, and community aspects of the suicidal phenomenon. Helping professionals planning suicide intervention and prevention strategies need to be aware of both the myths and misperceptions of the suicide phenomenon, as well as research based risk factors.

WHAT 'CANNOT BE SAID' ABOUT *FEAR AND TREMBLING*

Joe Mohrfeld (Philosophy)
Craig Matarrese, Faculty Mentor (Philosophy)

Soren Kierkegaard's *Fear and Trembling* has long troubled philosophers due to its complex ideas and themes presented to the reader within its unique literary structure. The literary value of the work is both a blessing and a curse, as it provides readers with an enjoyable reading experience rather then dry philosophical jargon, but also conceals many of the important philosophical themes within this writing. The ambition of this paper is to present what I take to be the main themes of *Fear and Trembling* and provide a clarification of the themes so to be understood by someone other then a Kierkegaard scholar. To accomplish this I will, when it is possible, to avoid sacrificing philosophical depth, employ more commonly understood language rather then 'Kierkegaardian jargon.' This will result in a strong focus on the philosophical meaning of each theme above all else. By extension I will raise the issue of defending Kierkegaard's main arguments which each theme involves, but will not provide an exclusive defense of any one argument from the work. I will be looking at the text from within the text, as a separate entity rather than merely a point along Kierkegaard's philosophical development. The goal of this paper is to provide people with a clarification of this brilliant work with which they can become better associated to the text.

WOMEN IN POLITICS; GAINING ENTRANCE TO MINNESOTA'S LEGISLATURE

Jenna L. Covey (Sociology)
Tom Schmid, Faculty Mentor (Sociology & Corrections)

This study in progress seeks to explore social factors that facilitate or hinder women's participation and success in obtaining office in Minnesota's State Legislature. There currently exists a significant disparity between men and women in politics. Semi-structured interviews are being used to examine the structures and roles that create possibility and difficulty for women's attainment of political power. The sample examined consists of two groups. The first group includes women who are currently serving at lest one term as a senator or house representative in Minnesota's State Legislature. The comparative group consists of women who tried to gain access to positions of power in Minnesota's State Legislature in the 2004 race, but lost to their opponents. Early results are being explored.

THE DIFFERENCES BETWEEN THE PUBLIC AND PRIVATE SCHOOL SYSTEMS IN CUENCA, ECUADOR

Rachel Goodloe (French and Spanish Education)
Kimberly Contag, Faculty Mentor (Modern Languages)

Cuenca, the third largest city in Ecuador, offers both public and private education to its citizens. The value that has been placed upon each system varies from person to person. Therefore, I set out to learn more about the benefits, disadvantages, and overall differences between the two systems. I traveled to Cuenca for a site visit to public and private schools and interviewed teachers in the two systems. The observations I made and the results of the interviews changed my opinions and preconceived notions about what I thought education would be like in Cuenca. The results of this study pointed to the advantages and disadvantages, perceptions concerning lack of funding, parental support, adequate facilities, student-instructor ratio and relationships, student success, and learning outcomes. My research focused on my site visit, observations, and interviews with people who are within the education system in Cuenca.

APPYLING EARLY EXISTENTIAL CRITIQUES TO CONTEMPORARY THEMES IN AMERICAN CULTURE

Erik S. Berquist (Philosophy)
Derek J. Skillings (Open Studies)
Craig B. Matarrese, Faculty Mentor (Philosophy)

Charles Taylor, Carl Elliot, Alexis De Tocqueville, and Lionel Trilling have presented and critically analyzed a number of ideals that animate currents in contemporary
American Culture, which include authenticity, sincerity, pluralism, subjectivism, and self-actualization, but these ideals do not harmoniously coexist; rather, they inevitably conflict. These notions have been realized in a way that is unique in their current understandings. Though there is the appearance of some homogeneity amongst these themes, they inevitably clash and contain internal tensions. The philosophers Kierkegaard and Nietzsche respond to many of the ideas that underlie these modern notions. Though differing in degrees, these critiques anticipate many of the problems that have arisen within discussion of contemporary culture. The themes that Taylor, Elliot, De Tocqueville, and Trilling outline are not limited to those notions that Kierkegaard and Nietzsche criticized. Rather, some cultural attitudes find their lineage in their respective philosophies. Both the historical tradition behind, and the contemporary definitions of these themes, need to be understood in order to explain the fragmented nature of contemporary culture. Kierkegaard and Nietzsche offer a historical perspective to the definitions given by Taylor, Elliot, and Trilling. Understanding the multifarious and contradictory foundations of contemporary culture is essential to demonstrating the potential paradox of realizing a consistent language of contemporary culture, and may include the inability to uphold these themes.

NEW ARRIVALS IN MINNESOTA: A COMPARATIVE ANALYSIS ON WHITE-EUROPEAN AND ETHNIC MINORITY VIEWS ON NEW HMONG REFUGEES

Sandy Vue (Ethnic Studies)
Susanne Nelson (Ethnic Studies and Social Works)
Yueh-Ting Lee, Faculty Mentor (Ethnic Studies)

As the demographics of the United States continue to evolve, so have the perceptions of refugees and/or immigrants entering this land of opportunity. Americans, who had lived on this land before any newcomers, are feeling a sense of fear when the news of refugees or immigrants is arriving in the nation. The purpose of this research paper is to analyze the difference in the perspectives of the White-European majority and ethnic minority populations on the recently arrive Hmong refugees from Thailand. In addition, discover whether attitudes toward the established Hmong population changed due to the influx of refugees. Individuals from different ethnic groups from the Saint Paul and Minneapolis areas took a survey about the Hmong population in the area and the recent Hmong refugees.

WITTGENSTEIN, KIERKEGAARD AND THE UNSPEAKABLE

Joe Mohrfeld (Philosophy)
Dick Liebendorfer, Faculty Mentor (Philosophy)

Soren Kierkegaard and Ludwig Wittgenstein have long been thought of as philosophers with little, if anything in common. There are but a handful of contemporary philosophers who have provided links between works by Kierkegaard and works by Wittgenstein; however no one has, at least explicitly, provided the following link I intend to show in this paper. I will show Kierkegaard's *Fear and Trembling* and Wittgenstein's *Tractatus Logico Philosophicus* have a remarkably common theme in each. The theme is the ability of one to communicate, or understand the unspeakable, that which remains beyond the limits of language. Both Philosophers have a unique approach to arriving at this conclusion, Kierkegaard through religion and Wittgenstein through logic, but each reaches a point in which a person must remain silent.

WHERE HAVE ALL THE WOMEN GONE: TRAFFICKING ON WOMEN, A GLOBAL PROBLEM

Kristeen L. Giese (Sociology)
Afroza Anwary, Faculty Mentor (Sociology & Corrections)

This study examines the problems related to the trafficking on women. Trafficking on women presents a variety of social, legal and moral problems. This study uses a global perspective to define the role of women in society and its implications for the study of trafficking. Secondary data analysis was performed with specific emphasis on the role of women in society, economic factors and documented governmental and non-governmental responses to the problem. Results indicate that trafficking of women is a multi-layered issue. Research on trafficking is further complicated by unavailability of data, inconsistent responses to the issue and the global nature of the problem. Suggestions for further research are also given.

THE DEMOGRAPHIC COMPOSITION OF MEDICALLY UNDERSERVED POPULATION IN THE UNITED STATES

Ali Mudey (Social Work)
Dr. Christine Black-Hughes, Faculty Mentor (Social Work)

The United States defines the medically uninsured and underserved as individuals or groups with no or inadequate heath insurance coverage (and) who do not have access to appropriate health care (US Department of Health and Human Services, 2004). A United States Census Bureau (2002) study indicates that the uninsured population in United States of America is 32.7%. Yet, the number of Hispanics in this country without coverage has increased from 12.8% 2002 to 13.2% in 2003 alone (US Census Bureau, 2003). This proposed research is a quantitative examination of the people who are medically uninsured and underserved that utilize the Open Door Health Center (ODHC) of Mankato. This research is a (snapshot picture) cross-section design using a survey of the demographics of the consumers of ODHC. The purpose of this research is to provide a focused analysis of the consumers in Region 9 who are identified as medically uninsured and underserved.

Leah Anderson (S. Schalge) *A Study of Artists at Minnesota State University, Mankato*

Amanda Simon, Erin Rath, Laura Lindeman, and Kayla Howk (P. Hargrove) *Responding to Direct Questions by Adolescents with William's Syndrome and Their Typically Developing Peers*

Julie Nelson, Katie Kendhammer, Cristen Schnabel, Martha Winch, and Bethany Holbeck (P. Hargrove) *Interruptions in Conversational Speech: A Comparison of Children with William's Syndrome and Their Typically Developing Peers*

Meggon Anderson, Kayla Pudwill, and Katie Trefethren (P. Hargrove) *The Introduction of Irrelevant Topics in Spontaneous Speech by Children with William's Syndrome and Typically Developing Children*

Sara Hastings and Julie Boll (S. Kruse) *Diabetes Screening Among Uninsured and Underinsured Patients Using Random Blood Glucose Samples as an Indicator*

Tina Coy (K. Filter) *The Affects of Quantity and Quality in Adolescent Friendships and the Affects They Have on Adult Quality Friendships*

Nicole Guerre (T. Shanafelt) *Photographic Representations of the Guanatjuatan Culture of Mexico*

Jacquelyn Wright (R. Polk) *Self-Reported Ratings of Self-Esteem and Father-Daughter Relationship in Juvenile Offending*

Sarah Winkelman (R. Widner) *Hemispheric Lateralization, Gender Differences in the Processing of Rapidly Presented Visual Information*

Troy Loveland, James Hawks, Brian Prom, and Alex Taves (P. Sullivan) *Cold Start Improvement of an E-85 Powered Toyota Prius*

A STUDY OF ARTISTS AT MINNESOTA STATE UNIVERSITY, MANKATO

Leah G. Anderson (Anthropology and Art)
Susan Schalge, Faculty Mentor (Anthropology)

My senior project was a study of artists at Minnesota State University, Mankato. My goal was to discover what drives and motivates these artists to continue producing art. I interviewed twenty-one artists from six different disciplines: sculpture/ceramics, painting, printmaking, photography, graphic design and fibers. The questions pertained to their art, life stories and influences. I kept my research open-ended and welcomed surprises that added interest and discovery to my project. I also wanted to discover and build on the conversations that arose from these inquires.

These questions were used to build a conclusion concerning what drives and motivates these artists, among other things which concerned the artists' lives. I achieved these goals by conducting semi-structured interviews with sets of open-ended questions which led to in-depth and enlightening discussions.

RESPONDING TO DIRECT QUESTIONS BY ADOLESCENTS WITH WILLIAMS SYNDROME AND THEIR TYPICALLY DEVELOPING PEERS

Kayla Howk (Speech, Hearing, Rehabilitation Services)
Laura Lindeman (Speech, Hearing, Rehabilitation Services)
Erin Rath (Speech, Hearing, Rehabilitation Services)
Amanda Simon (Speech, Hearing, Rehabilitation Services)
Patricia Hargrove, Mentor (Speech, Hearing, Rehabilitation Services)

Children with Williams syndrome have been described as "children who test as retarded, speak as though gifted, behave sometimes as though emotionally disturbed, and function like the learning disabled" (Semel and Rosner, 2003, p.1). As a result of this complex pattern of performance, researchers have studied their unique characteristics. Research has typically focused on comprehension by standardized tests. However, less attention has been directed to the ability to understand information from conversations and stories. The purpose of this study was to examine the accuracy of responses to direct questions relating to stories (narratives). Six age and gender matched pairs of adolescents with Williams syndrome and typically developing adolescents listened to a prerecorded narrative and responded to direct questions about the narrative. Out of a possible twenty points, the mean score for participants with Williams syndrome was twelve and the mean score for the mean score for the typically developing peers was seventeen. This proved to be a statistically significant difference. Results from this study indicate that adolescents with Williams syndrome performed better than expected for individuals with developmental delays, but lower than their typically developing peers.

INTERRUPTIONS IN CONVERSATIONAL SPEECH: A COMPARISON OF CHILDREN WITH WILLIAMS SYNDROME AND THEIR TYPICALLY DEVELOPING PEERS

Julie Nelson (Speech, Hearing, and Rehabilitation Services)
Katie Kendhammer (Speech, Hearing, and Rehabilitation Services)
Cristen Schnabel (Speech, Hearing, and Rehabilitation Services)
Martha Winch (Speech, Hearing, and Rehabilitation Services)
Bethany Holbeck (Speech, Hearing, and Rehabilitation Services)
Patricia Hargrove, Faculty Mentor (Speech, Hearing, and Rehabilitation Services)

Researchers have shown an interest in children with Williams syndrome because of their unique communication characteristics. Briefly, some aspects of their language skills have been described as superior to their intellectual or cognitive skills, a pattern not expected in most theoretical models. One area of reported strength is their social use of language. In this study, we explored the rate of interruptions in conversational speech by children with Williams syndrome and their gender and age matched peers. Spontaneous speech samples of six adolescents with Williams syndrome and six typically developing peers were analyzed. The rate of interruptions was calculated for each participant. For the participants with Williams syndrome, the mean percentage of their utterances that were interruptions was 0.86. For the typically developing peers, the mean was 2.97. The difference between the two groups was not statistically significant. The results suggest that adolescents with Williams syndrome resemble their age peers in this aspect of conversational speech. This has ramifications for clinical issues as well as the understanding of the relationship between language and cognition.

THE INTRODUCTION OF IRRELEVANT TOPICS IN SPONTANEOUS SPEECH BY CHILDREN WITH WILLIAM'S SYNDROME AND TYPICALLY DEVELOPING CHILDREN

Meggon Anderson (Speech, Hearing, and Rehabilitation Services)
Kayla Pudwill (Speech, Hearing, and Rehabilitation Services)
Katie Trefethren (Speech, Hearing, and Rehabilitation Services)
Patricia Hargrove, Faculty Mentor (Speech, Hearing, and Rehabilitation Services)

This project addressed the communication skills of speakers with Williams syndrome. Speakers with Williams syndrome are of interest to speech-language pathologists because of many puzzling features. Speakers with Williams syndrome "are noted for their well developed vocabulary, relatively complex and syntactically correct sentences, and their ability to spin a good tale. In contrast, their reasoning usually remains at a pre-operational or preschool level, and they typically have difficulty grasping cause-effect relations" (Semel & Rosner, 2003, p. 5).

This research focused on an area of communication called pragmatics which involves the social use of language. Specifically, we looked at the frequency of irrelevant topics produced in a conversation. Twelve participants, six with Williams syndrome and six typically developing peers, individually conversed with a graduate clinician on a topic of their interest. The conversations were analyzed for the frequency of irrelevant topics (an abrupt change in subject matter that has no relation to previous or present subject matter.)

The findings indicated that the participants with Williams syndrome exhibited significantly more introductions of irrelevant topics than their typically developing peers. This suggests that speakers with Williams syndrome may have more difficulty with conversation and pragmatics than expected.

DIABETES SCREENING AMONG UNINSURED AND UNDERINSURED PATIENTS USING RANDOM BLOOD GLUCOSE SAMPLES AS AN INDICATOR

Sara Hastings (Family Consumer Science)
Julie Boll (Family Consumer Science)
Sarah Klammer Kruse, Faculty Mentor (Family Consumer Science)

Diabetes is often referred to as a silent disease because patients may have few overt symptoms. Many patients who have Type 2 Diabetes may not be diagnosed for 7 to 10 years after the disease has begun. The purpose of this study was to assess the need for a routine screening process for diabetes among uninsured and underinsured patients in order to provide early intervention for glucose intolerance and diabetes. In a random blood glucose test the patient is not required to fast prior to the administration of the test. Glucose intolerance is defined as a fasting blood glucose test result in the range between 100 and 125 mg/dL or a non-fasting blood glucose test result between 140 and 199 mg/dL. If patients with glucose intolerance could be identified, intervention by diet and exercise may be able to delay the onset of diabetes. The outcome of this study will provide an indication of whether or not routine random blood glucose screening should be conducted on a regular basis at community health clinics.

THE AFFECTS OF QUANTITY AND QUALITY IN ADOLESCENT FRIENDSHIPS AND THE AFFECTS THEY HAVE ON ADULT QUALITY FRIENDSHIPS

Tina Coy (Psychology)
Kevin Filter, Faculty Mentor (Psychology)

This study investigates the ways in which friendships that are developed during adolescence can affect the quality of friendships as adults. This study investigated the differential effects of quantity and quality of adolescent friendships on adult friendships. Data were collected in questionnaire format. The questionnaire had three parts to it. One that addressed the quantity of friendships as an adolescent and the other two addressed the quality of friendships as both an adolescent and as an adult. The results will be discussed in terms of whether quantity or quality of adolescent friendships will better predict quality adult friendships. Results will also be discussed in terms of implications for researchers and practitioners.

PHOTOGRAPHIC REPRESENTATIONS OF THE GUANATJUATAN CULTURE OF MEXICO

Nicole Guerre (Art)
Todd Shanafelt, Faculty Mentor (Art)

There are many different cultures in Mexico. The average American is unaware of the variety of people found within Mexico. This series of photographs highlight aspects of the everyday life and surroundings found in the Guanajuatan area of Mexico. The photographic representations of the people, architecture and traditions focus on this unique and lively culture. This project shows how one area of Mexican culture provokes new perceptions of what it means to be Mexican.

SELF-REPORTED RATINGS OF SELF-ESTEEM AND FATHER-DAUGHTER RELATIONSHIP IN JUVENILE OFFENDING

Jacquelyn Wright (Psychology)
Roselyn K. Polk, Ph.D., Faculty Mentor (Psychology)

Research has shown that adolescents who perceive higher paternal involvement have closer relationships with their father. Also, adolescents who perceive their fathers as warm, loving and nurturing tend to exhibit higher self-esteem. Conversely, research has suggested that adolescents whose fathers are absent or neglectful are more likely to participate in delinquent behaviors. The expectation for this research was that positive evaluations of relationships between fathers and daughters would correspond with reduced participation in delinquent behaviors, while negative evaluations would correspond to reports of lower self-esteem and a greater likelihood of participating in delinquent activities. Results from 300 assessments of female college students indicated that father-daughter relationship and self-esteem may indeed be important factors in predicting the delinquent behavior of adolescent females.

HEMISPHERIC LATERALIZATION, GENDER DIFFERENCES IN THE PROCESSING OF RAPIDLY PRESENTED VISUAL INFORMATION

Sarah Winkelman (Psychology)
Robert Widner, Faculty Mentor (Psychology)

Dementia of the Alzheimer Type (DAT) is a chronic, progressive disorder that affects 4 million Americans with the number expected to increase several-fold as more people live longer. Differentiating cognitive declines that result from normal aging from declines associated with DAT is important for theoretical as well as practical reasons. The ability to differentiate cognitive declines allows for early detection and intervention; we know that the earlier the intervention the greater the likelihood of a positive outcome (e.g., Widner Adames, & Muller, 1997; Widner, Mueller, & Adames, 1997). Of particular relevance in the present study is the finding that DAT disrupts visual attention (e.g., difficulty in recognizing faces; Parasuraman, Greenwood, Haxby, & Grady, 1992). Widner and colleagues determined that there is an age-related difference in the processing of rapidly presented visual information (e.g., single letters presented at a rate of 90 ms.) with older adults (M age = 69) taking three times longer to identify such information relative to college students. In the present study we found that the right hemisphere plays a greater role in the processing of rapidly presented information for males than for females. On the other hand when we examined the contribution of the left hemisphere to the processing of rapidly presented information we found no gender difference. The present findings are of particular significance because we can now start to localize the neural structures that may be affected by AD early on in the disease; that is, we may have a way in which we can detect AD before we observe any behavioral changes as a function of the disease.

COLD START IMPROVEMENT OF AN E-85 POWERED TOYOTA PRIUS

Troy Loveland (Automotive Engineering Technology)
Brian Prom (Automotive Engineering Technology)
James Hawks (Automotive Engineering Technology)
Alex Taves (Automotive Engineering Technology)
Paul Sullivan, Faculty Mentor (Automotive Engineering Technology)

The project involved a team of four Minnesota State University, Mankato Automotive Engineering Technology students. The goal of the project was to make a 2003 Toyota Prius, running on E-85, start better in cold weather on a limited budget. Included in this presentation is a discussion of different options that were considered to make the Prius start better in cold weather, the option chosen, which was a fuel rail heater, production cost, methods used in manufacturing the heater, and testing the fuel rail heater.

Elizabeth Muellenbach and Jessica Beadell (P. Knoblich) *A Surgically Induced Low Aldosterone Rat Model*

Jolene Smith (M. Bentley) *Renal Vasculature Changes in SHR Rats*

Steven Sullivan (M. Hart) *Identification of Unique C-Terminus Binding Proteins of CP β1 and β2 Isoforms*

Noah Sutton (M. Hart) *Genetic Analysis of Interacting Proteins*

Robin Erickson, Cindy Sparrow, and Michelle Imes (B. Proctor) *Distribution of Macroinvertebrate Populations Between Pool and Riffle Areas at Four Locations*

T. J. Meyer and Andrew Globa (M. Bentley) *Liver Vascular Alterations in Rats Due to Tumors Caused by Simian Virus 40*

Masahiro Kakizaki (D. Wrigley) *Cellular Response in Earthworms to an Earthworm Pathogen*

Kelly Rock (T. Secott) *Effect of Oxygen Depletion and Conditioned Media on the Recovery of Dormant Mycobacterium Avium Subsp. Paratuberculosis in Culture*

Ian Lalich and Michelle Taylor (M. Bentley) *Microcomputed Tomographic Analysis of Renal Microvascular Structure in Aging Rats*

SURGICALLY INDUCED LOW ALDOSTERONE RAT MODEL

Elizabeth M. Muellenbach (Biological Sciences)
Jessica Beadell (Biological Sciences)
Penny Knoblich, Faculty Mentor (Biological Sciences)

The adrenal gland produces and secretes various hormones including aldosterone and corticosterone from the zona glomerulosa and zona fasiculata of the adrenal cortex, respectively. Corticosterone is important in the regulation of blood glucose, the ability to handle stress, and maintaining normal immune function. Aldosterone results in the retention of sodium and excretion of potassium causing water retention, a greater blood volume, and an increase in blood pressure (hypertension). Aldosterone's role in hypertension has previously been studied using receptor blocking agents or via complete adrenalectomy (removal of both adrenal glands). Complete adrenalectomy removes all hormones produced by the adrenal gland, and often results in death. This study compares two methods for producing a surgically induced low aldosterone model for the study of hypertension that preserves the function of the lower adrenal layers. Methods: Male spontaneous hypertensive rats (SHR) 10-19 weeks of age were randomly subjected to either a sham (incisions were made and closed) or experimental surgery, in which the right adrenal gland was removed and the outermost layer of the left adrenal gland was destroyed by freezing using two separate techniques. In the first technique, each section of the adrenal surface was frozen three times in succession until the entire gland was covered. The second technique involved freezing each section twice in succession until the entire gland was covered and the procedure was repeated a second time. Blood was drawn to be analyzed for aldosterone and corticosterone levels using radioimmunoassay (RIA) and enzyme-linked immunosorbent assay (ELISA), respectively.

RENAL VASCULATURE CHANGES IN SHR RATS

Jolene Smith (Biological Sciences)
Michael Bentley, Faculty Advisor (Biological Sciences)

Hypertension causes morphological and physiological changes to occur in renal vasculature. Some of these changes are that renal blood flow increases along with elevated afferent glomerular arteriolar resistance. The purpose of this study is to investigate morphology changes in the renal vasculature, using the scanning electron microscope (SEM). The renal vasculature of spontaneous hypertensive rats (SHR) was compared to that of control Wistar-Kyoto (WKY) rats. The rats were anesthetized, then the vasculature in the kidney was filled with Mercox resin. The kidneys were taken out and the tissue was digested leaving the plastic cast to be examined with SEM. Preliminary results have shown a decrease in the diameter of the afferent arteriole and a decrease in the diameter of the glomeruli in the SHR rats. It also appeared that the afferent arteriole length may be longer in the WKY rats. If these preliminary observations are true, then it can be concluded that these morphological changes in renal vasculature accompany the physiological changes that occur with hypertension.

IDENTIFICATION OF UNIQUE C-TERMINUS BINDING PROTEINS OF CP β1 AND β2 ISOFORMS

Steve Sullivan (Biological Sciences)
Marilyn Hart, Faculty Mentor (Biological Sciences)

Actin capping protein (CP), a heterodimer composed of α and β subunits, binds the barbed ends of actin filaments and regulates actin's specific binding affinities. Three isoforms of the β subunits (β1, β2, and β3), each encoded by the same gene, have been identified. Post transcriptional modification of the β subunit gene is responsible for variation in the C terminus of the protein. Although the N terminus of the CP β subunit is necessary for binding actin, the role of the variable C terminus remains undefined. Prior research, performed by the primary investigator of my studies, suggests that the β1 isoform of CP is necessary for attaching actin filaments to the Z-line of myocardium, and the β2 isoform organizes actin at the intercalated discs of myocardium. These findings suggest that CP is necessary for proper heart function and, accordingly, CP becomes a suspect in the causation of heart disease. We hypothesize that CP β1 and β2 interact with unique proteins at their C terminus and these interactions define their different roles in the organization of actin filaments in myocardium. Novel protein interactions with the β1 and β2 isoforms are currently being explored using Glutathione S-Transferase (GST) pulldown analysis. The gene encoding the β1 and β2 proteins has been inserted into the expression vector pGEX-1X, allowing the generation of GST-β1 and GST-β2 fusion proteins. The fusion protein is currently being used to bind proteins interacting with the C terminus of β subunits using GST as a means of isolation.

GENETIC ANALYSIS OF INTERACTING PROTEINS

Noah Sutton (Biological Sciences)
Marilyn Hart, Faculty Mentor (Biological Sciences)

Actin, a component of all eukaryotic cells, contributes to cell motility and shape. Actin capping protein (CP), associated with the actin cytoskeleton, is a heterodimer composed of alpha and beta subunits. The beta subunit has three isoforms: beta1 (β1), beta2 (β2), and beta3 (β3). These isoforms are produced from alternative splicing of one gene with 90% sequence identity. The region of divergence defines membership to each subfamily. Previous work in cardiac myocytes has shown that β1 cannot functionally replace β2 nor can β2 functionally replace β1. Furthermore, data suggests that the isoform specific functions are due to novel protein interactions. We have identified proteins that interact with each isoform via a yeast two-hybrid genetic screen. The screen utilized two specific components: a bait plasmid and a prey plasmid. We have generated bait constructs, confirmed their orientation and expression, and executed a large-scale genetic screen. 14 β1 and 213 β2 interacting constructs have been identified. The genetic interactions have been confirmed using both expression of beta-galactosidase and histidine synthesis. Additional preliminary characterization of the constructs will be presented.

MICROCOMPUTED TOMOGRAPHIC ANALYSIS OF RENAL MICROVASCULAR STRUCTURE IN AGING RATS

Ian Lalich (Biological Sciences)
Michelle Taylor (Biological Sciences)
Michael Bentley, Faculty Advisor (Biological Sciences)
Jane Reckelhoff, University of Mississippi (Department of Physiology and Biophysics)

Aging patterns of the kidney have been shown to be associated with the progressive decline in renal blood flow and glomerular filtration rate while plasma flow increases. The observed changes imply vascular alterations in the kidney. To evaluate the microvascular as the kidney ages, microcomputed tomography was utilized to obtain three-dimensional images of kidneys from 4 young Sprague-Dawley rats and 8 old Sprague-Dawley rats. The three-dimensional image data for the young and old Sprague-Dawley rat kidneys was then analyzed with the program ANALYZE 6.0. Quantitative analysis was performed, including measurements of glomerular diameter, glomerular density, vascular volume fraction, and total glomerular number. The diameters of the glomeruli were significantly larger in the old rat kidneys as compared to the young rat kidneys. Significantly fewer glomeruli were present in the older kidneys than in the younger kidneys. The decrease in number of glomeruli coupled with an increase in overall organ volume shows a significant decrease in the glomerular density for the old kidneys. The changes seen in the kidneys indicate that, as the kidney ages, nephron units disappear. The loss of nephron units initiates a shift in single nephron function, which suggests that the glomerular units within the nephron are undergoing a compensatory hypertrophy to counterweigh effect of the decreased number of functional units. The kidney analysis performed accounts for the increase in single nephron glomerular filtration rate and plasma flow increases, as well as the progressive decline in renal blood flow and glomerular filtration rate seen as the kidney ages.

Tuesday April 26 Presenters

8:30-10:00 A.M. **Session J** **CSU 284ABC**

History

Moderator: Larry Witherell

Ya Thao (L. Witherell) *The Irish Immigration*

Grady Hughes (L. Witherell) *The Irish Famine in a New Light*

Samantha Gallion (L. Witherell) *The Impact of British Politics on Irish Home Rule*

Justin Vossen (L. Witherell) *Disraeli, Gladstone, and the Reform Act of 1867*

Quinn Dauer (L. Witherell) *From Catholic Emancipation in 1829 to British Middle Class Emancipation in 1832?*

Michael Snell-Feikema (L. Witherell) *Popular Agitation and British Parliamentary Reform, 1866-1867*

THE IRISH IMMIGRATION

Ya Thao (History)
Larry Witherell, Faculty Mentor (History)

This research paper identified and examined the political and policy responses of the British government to the influx of Irish immigrants after the famine of the 1840s. The Irish potato famine of 1845-49 pushed a million of people out of Ireland and many into Britain. The problem for the immigrants was what form of government response and reception they experienced in terms of employment, housing, education and general welfare, which this project has answered. The research for this project was based on the parliamentary debates, *London Times* and other newspapers, autobiographies, diaries, and memoirs of political figures and immigrants, and secondary literature, including biographies, books, articles, and dissertations.

THE IRISH FAMINE IN A NEW LIGHT

Grady Hughes (History)
Larry Witherell, Faculty Mentor (History)

Many people throughout the past 150 years have written about the food crisis in Ireland and how horrible it was. It is true that nearly a million people perished during the famine years of 1845 - 1850. However, very few people have ever written or commented on the positive side effects of the famine. This project will discover the positive side effects of the Great Irish Potato Blight. This paper will include many different aspects of the famine and the aftereffects, including the diversification of the crop base in Ireland, health issues surrounding the famine, emigration from Ireland during and after the blight, population control following the famine, and the increase in the quality of life for both the survivors of the famine and those who moved abroad to escape the famine. The few works that have touched on this aspect have been very limited and concise. This project will bring the famine into a new light and will expose a side of this that is commonly ignored.

THE IMPACT OF BRITISH POLITICS ON IRISH HOME RULE

Samantha Gallion (History)
Larry Witherell, Faculty Mentor (History)

This paper examined the influence of Britain's political elite on the issue of Irish home rule from 1870 to 1886. In the early 1870s Irish political leaders, such as C.S. Parnell, began to set out a desire and argument for a form of local control known as "home rule." However, while the British political leadership remained opposed to any form of home rule, the general public had not yet formed an opinion. It was not until British politicians' manipulated public opinion to consider home rule as a threat to kingdom and empire that the public then began to express opposition to Parnell and his home rule campaign. Contrary to the traditional process of public opinion influencing the politicians and shaping public policy, this paper demonstrates how the politicians influenced and persuaded the public to oppose Irish home rule. Therefore British politicians used the product of their manipulation as justification to oppose home rule.

DISRAELI, GLADSTONE, AND THE REFORM ACT OF 1867

Justin Vossen (History)
Larry Witherell, Faculty Mentor (History)

This research project investigated the rivalry between William Gladstone and Benjamin Disraeli, and how that rivalry resulted in the Reform Act of 1867. The competition between these two over expansion of the franchise led to a more radical reform than expected. Gladstone, a converted Liberal, encouraged moderate changes like a reduction in the householder qualification from £ten to £seven. Disraeli, a moderate Conservative, embraced more expansive reform for political advancement rather than as an extension of the suffrage. It was Disraeli's hope that an enlarged electorate would vote Conservative as a reward for their new privilege. Although some historians give Disraeli credit for the second Reform bill, many connect Gladstone's initial attempts at reform with the bill's final shape. The Reform bill was created out of political infighting as opposed to popular opinion. An examination of the rivalry between Gladstone and Disraeli raises the question of what the bill would have looked like without these two politicians. This project used primary materials such as the parliamentary debates, the *London Times* newspaper, memoirs, and letters of public figures as well as secondary materials such as books, journals, and dissertations.

AMPLICHIP: DIAGNOSTIC TOOL OF THE FUTURE

Lindsey R. Thompson (Speech Communications)
James Dimock, Faculty Mentor (Speech Communications)

Adverse drug reactions, or ADRs, are the fourth leading cause of death in the United States according to Drug Discovery and Development of October 1, 2004, but new technology provides an opportunity to change that statistic. Personalized medicine has the huge potential to change the lives of millions of people with a testing device manufactured by Roche Diagnostics known as Amplichip. Amplichip is a simple blood-testing device that provides doctors with important information about how patients process medications. Heino von Prondzynski, CEO of Roche Diagnostics, says of Amplichip, "The use of this test takes a big step forward in making personalized medicine a reality and has the potential to improve patient outcomes." Testing with Amplichip will soon be a routine diagnostic procedure that will have impact on millions of people. In order to gain an understanding of Amplichip, how the device works, the benefits of Amplichip, and the technology's limitations will all be addressed in my presentation.

CAMPUS PAPER WASTE

Joshua E. Randall (Speech Communications)
James Dimock, Faculty Mentor (Speech Communications)

This fall at Minnesota State University, Mankato, a new program called MavPrint was introduced. You submit a document to be printed at a computer, the expense is deducted from your account, and then your document can be retrieved from any MavPRINT station. In years past printing has been free, but seeing how according to Bryan Schneider, the director of Technical Services at Minnesota State University, Mankato, from the year 2003 to the year 2004 the printing costs for the University rose 200%, they felt it was time to make a change. MSU students printed out over 4 million pages in 2003, when stacked that is enough paper to reach over 54 stories high, half of the height of the Sears Tower. Clearly, paper waste on campuses is a significant predicament. In order to understand the predicament that campuses are in the problem of paper waste, the causes of these problems and some solutions to solving these problems will be addressed in my presentation.

PRIVATIZATION AND COMMERCIALIZATION OF OUR NATIONAL PARKS

Elizabeth Drommerhausen (Speech Communications)
Leah White, Faculty Mentor (Speech Communications)

Teddy Roosevelt founded the forestry service in 1908 with the purpose of protecting our lands for our children and our children's children forever with their majestic beauty unchanged. However, in the last few years our National Parks are being turned into miniature towns with shopping malls and fast food joints. Our National Parks are part of our collective history. The care and maintenance of their beauty is something we must all take interest in. Using multiple newsprint sources I have taken a look at the destruction that is going on right this moment, and how our precious lands will never be the same again if we don't stop this.

MANUFACTURED FEAR, MEDIA MANIPULATION

Allyssa Woodford (Mass Communications)
Marshel Rossow (Mass Communications)

From universities to internet blogs, from Fox News to NPR, several reports suggest that the Bush Administration may have fabricated critical information that has become common — although perhaps inaccurate — knowledge of current events for Americans and thus gained for George W. Bush another four years in the White House. My study shows how consistent reminders of terrorism produced by the Bush Administration and then broadcast through the media, coupled with a lack of unbiased and accurate news coverage, may have convinced the nation to re-elect President Bush in 2004.

THE CORNEAL IMAGING SYSTEM

Matthew M. Collie (Speech Communications)
Brian Klosa, Faculty Mentor (Speech Communication)

The Corneal Imaging System is a revolutionary new technology that allows for the taking of a photograph of a human eye and "reversing" the scene to reveal the perspective of the photographed individual. This technology has the potential to revolutionize everything from computer technology to legal verification to scientific research but its applications also raise ethical questions as to how far humanity should go to "see" through another person eyes. By explaining how the Corneal Imaging System works, revealing examples of its use and highlighting some of its more revolutionary applications a better understanding of the Corneal Imaging System's potential and limitations will be brought to light.

ACADEMIA IS REALLY DIFFICULT: A READER'S THEATRE EXAMINING THE HARDSHIPS OF UNIVERSITY PROFESSORS

Emily Kofoed (Speech Communications)
Jamie Kunkel (Speech Communications)
Karie Menser (Speech Communications)
Cynthia Saba (Speech Communications)
Brian Klosa, Faculty Mentor (Speech Communications)

Reader's theatre is a unique and innovative form of group performance argument. Reader's theatre allows the performers to research craft and prepare a performance that focuses on a central theme. Emphasis is placed on how blocking, staging and interpretation of literature and other forms of scholarly research are able to flush out the tenets of the proposed argument. Utilizing various forms of published literature and research, the following reader's theatre attempts to explore the social, cultural and personal challenges that university professors encounter in the structured world of academia. The performance will clearly define academia and why students should be aware of the challenges that academia presents in their professors' lives.

English and History

Moderator: Humberto Loayza

Percy Eykyn (L. Witherell) *Contagious Diseases Acts and the Rise of British Political Feminism*

Dustin Schroepfer (L. Witherell) *Higher Education and the Industrial Revolution in England*

Chad Core (L. Witherell) *Evolution of British Response to the Wars of German Unification: Influences on British Policy (1860-1880)*

Nicholas Schumer (L. Witherell) *The British Opium War and Public Opinion*

Todd Anderson (G. Griffin) *Alternatives to Freedom: Black Communism from 1860s-1940s*

ALTERNATIVES TO FREEDOM: BLACK COMMUNISM FROM 1860s-1940s

Todd R. Anderson (English/Secondary Education)
Gwen Griffin, Faculty Mentor, (English Studies)

The core of my research addressed the societal, political, and economic effects that American legislation had upon a newly free Black population after the Civil War and up to the conclusion of World War II. Influential mandates in the 19th century included the Emancipation Proclamation, the 13th-15th Amendments, and Jim Crow segregation. Revolutionary actions of the 20th century were comprised of the Great Migration and improved living standards for Blacks in a progressive American society.

In addressing 19th century policies and 20th century movements, I highlighted both the White population's dismissive disposition toward these affairs and the universal resentment that Blacks had toward the "free" society that such decrees proclaimed. I presented the rise of two key alternatives — communism and separatism — that prominent Black leaders and activists, as well as Black literary figures in America, embraced during the mid 19th century and early 20th century, respectively. Through historical research, supported by examples from Black literature (both fiction and non-fiction), I described the impetuses for communism and separatism, their advocates and principles, and their influences and disillusionments within the Black population and general society. I concluded how these alternatives, though underestimated or ignored in American history, served to mold Black character, to forge a Black identity, and to perpetuate Black culture.

Biological Sciences and Chemistry

Moderator: Brad Cook

Rehan Malik (J. Rife) *Identification of Soybean Lipoxygenase Products by Gas Chromatography-Mass Spectroscopy (Gc-Ms)*

Rachel Burkard (M. Pomije) *The Study of Platinum Vapochromic Complexes*

Alex Blom (J. Thoemke) *Dissolved Organic Matter Characterization Using Fluorescence Spectroscopy and Singlet Oxygen Production Rate*

Derrek Skillings (R. Sorensen and T. Secott) *Investigation of a Possible Association between Waterfowl Deaths at Lake Onalaska and a Neorickettsiales-Like Organism*

Ross Behrends (B. Cook) *Phenolic Concentrations in Typha Angustifolia Growing in Three Wetland Communities*

IDENTIFICATION OF SOYBEAN LIPOXYGENASE PRODUCTS BY GAS CHROMATOGRAPHY-MASS SPECTROSCOPY (GC-MS)

Rehan Ahmad Malik (Biochemistry)
James Rife, Faculty Mentor (Chemistry & Geology)

Lipoxygenases (LOXs) are enzymes which catalyze peroxidation of polyunsaturated fatty acids containing at least one cis, cis 1-4 pentadiene moiety to form conjugated diene-hydroperoxides. Soybean seeds contain three LOX isoenzymes while at least five different isoenzymes are in the vegetative tissue. Lipoxygenases have been related to several functions i.e. plant growth, defense mechanisms against pathogens and pests, and lipid metabolism. Given the proposed roles of LOX isoenzymes and the presence of multiple LOX isoenzymes in soybean vegetative tissue, it is likely that individual isoenzymes play specific functions. Do the isoenzymes show differences in which products they form? The complete characterization and comparison of products can give clues about the physiological roles of specific isoenzymes. The basic goal of this project was to develop a GC-MS assay to determine the product formed by soybean LOX, and determine the preferred products formed by the different isoenzymes. In this research, linoleic acid and linolenic acid were used as substrates for LOX enzymes to analyze the primary reaction products of LOX in order to see which end of the 1- 4 pentadiene section is used in the reaction. The peroxidation of linoleic acid can take place either at Carbon atom 9 or the carbon atom 13 to form 9-hydroperoxylinoleic acid (9-HPOD) and 13-hydroperoxylinoleic acid (13 HPOD) respectively. Other reactants such as linolenic acid, which has three double bounds, can yield even more products. A GC-MS assay was developed and implemented for analysis of reaction products of LOX.

THE STUDY OF PLATINUM VAPOCHROMIC COMPLEXES

Rachel M. Burkard (Chemistry)
Marie K. Pomije, Faculty Mentor (Chemistry)

This presentation will discuss the preparation and characterization of a family of platinum-containing compounds. In an attempt to synthesize Pt(CN-2,6-CH3-C6H3)2(CN)2 from [Pt(CN-2,6-CH3-C6H3)4][Pt(CN)4] a salt containing the platinum monocation [Pt(CN-2,6-CH3-C6H3)3CN]+, was produced. These types of platinum compounds display vapochromic behavior by changing spectroscopic properties, such as color, upon sorbing volatile organic compound vapors. Thus, they have the potential to be used as environmental sensors.

DISSOLVED ORGANIC MATTER CHARACTERIZATION USING FLUORESCENCE SPECTROSCOPY AND SINGLET OXYGEN PRODUCTION RATE.

Alex J. Blom (Chemistry and Geology)
John D. Thoemke (Chemistry and Geology)

Singlet oxygen is an important reactive oxygen species in sunlit natural waters and plays a role in numerous chemical processes. In particular, singlet oxygen is an important oxidizer in the degradation of many organic pollutants, including pharmaceuticals, personal care products, and pesticides. The interaction of sunlight with the dissolved organic matter (DOM) prevalent in these waters results in singlet oxygen production. The character of dissolved organic matter varies by location. These variations are relevant in attempts to accurately model the transport and fate of pollutants and natural water components, and can affect the bioavailability of nutrient elements such as nitrogen and phosphorus. Characterizing the type of DOM present in surface waters using fluorescence spectroscopy is a potentially relevant method for predicting degradation kinetics of pollutants in the environment, and other processes induced by reactive oxygen species. Surface water samples were collected to fulfill a range of locations and conditions. Excitation-emission (EEM) fluorescence spectra were acquired for each sample and major spectral features noted. Photolysis experiments in natural sunlight were then performed using Furfuryl Alcohol as a singlet oxygen probe. Singlet oxygen production rates were then correlated to EEM data and trends observed.

INVESTIGATION OF A POSSIBLE ASSOCIATION BETWEEN WATERFOWL DEATHS AT LAKE ONALASKA AND A NEORICKETTSIALES-LIKE ORGANISM

Derek Skillings (Open Studies)
Robert Sorensen, Faculty Mentor (Biological Sciences)
Timothy Secott, Faculty Mentor (Biological Sciences)

American coots (Fulica americana) and diving ducks, including lesser scaup (Aythya affinis) and ring-necked ducks (Aythya collaris) have been dying in significant numbers on Lake Onalaska since 2001. Bird mortality is being attributed to parasitic infections from two intestinal trematodes, Cyathocotyle bushiensis and Sphaeridiotrema globulus. The birds begin dying in as little as two weeks of landing at this lake. Rapid mortality is not typically associated with trematode parasitism. Assuming these birds acquired their infections at Lake Onalaska, leads to the conclusion that our current understanding of the disease in this parasite-host system is lacking. Neorickettsiales are a group of pathogenic obligately-parasitic intracellular bacteria that are frequently linked to trematode infections involving invertebrate hosts. There is evidence of Neorickettsiales in Bithynia snails, which is also a necessary host to both trematode species, which suggests a possible link between Neorickettsiales and the unusual mortality in the system at Lake Onalaska. Any conservation management practices that can be applied towards curbing this wildlife epidemic will only start with a complete understanding of all the casual factors. Fluorescent-bound antibodies were used to search out Neorickettsiales antigens. Prepared tissue sections from infected trematode-infected birds were analyzed with fluorescent microscopy for the presence of Neorickettsiales-like organisms. At this time, results are inconclusive. Tests are continuing and better quality specimens are being obtained.

PHENOLIC CONCENTRATIONS IN TYPHA ANGUSTIFOLIA GROWING IN THREE WETLAND COMMUNITIES

Ross Behrends (Biological Sciences and Environmental Sciences)
Dr. Bradley Cook, Faculty Mentor (Biological Sciences)

After habitat destruction the affects of invasive species are the greatest threat to the existence of rare and endangered species. Many invasive species form monospecific stands and decrease biological diversity by reducing or eliminating competitors in previously diverse habitats. Many wetlands throughout North America are dominated by an exotic cattail, *Typha angustifolia*. Allelopathy, the chemical inhibition of one plant species by another is a mechanism of interference competition. Phenolics have been shown to be a major class of allelochemicals. The purpose of this study was to determine if concentrations of total soluble bulk phenolics (TSBP) in *T. angustifolia* are different when growing with other co-dominant wetland plants. We collected *T. angustifolia* plants from three different communities; 1) a monospecific stand of *T. angustifolia*, 2) *T. angustifolia* growing with *Sagittaria latifolia*, and 3) *T. angustifolia* growing with *Scirpus fluviatilis*. We measured concentration of TSBP for whole plants, leaves, stems and roots using a spectrophotometer. TSBP concentrations in whole plants and roots of *T. angustifolia* were greater when growing with *S. latifolia* than when *T. angustifolia* was growing alone or with *S. fluviatilis*. These results suggest that allelopathy may be a mechanism for the invasion of *T. angustifolia* in some wetland communities.

Erin King (B. Hoppie) *Bank Sloughing Contributions to Fluvial Suspended Sediment in the Blue Earth River, Blue Earth County, Minnesota*

William Gilles (B. Groh) *Utilization of Polythiophenol for the Efficient Removal of Triorganotin Residues from Organic Reaction Mixtures*

Kristi Krenz (M. Hadley and J. Bond) *Trans Fatty Acids in the Diets of Adults at Minnesota State University, Mankato*

Travis Vander Steen (M. Hadley and M. Visser) *Quantification of Malondialdehyde in Exercise Participants*

Heidi Bednar and Renae Haycraft (B. Hoppie, D. Swart, and T. Vorlicek) *Hydrogeochemical Characterization of Prairie du Chien Bedrock Aquifer*

Derek Langeslay (J. Rife) *Ferric Oxidation of Xylenol Orange as a Colorimetric Assay for Lipoxygenase Isoenzymes from Glycine Max*

Melanie Schimek (B. Hoppie) *Seasonal Dynamics of a High Arctic Lake, Lake Linné, Spitsbergen Island, Svalbard*

Ryan Miller (M. Hadley and M. Visser) *Effects of Vitamin E Supplementation on 8-Hydroxydeoxyguanosine Concentration in Urine of Non-Fit Exercising Individuals*

Elizabeth Smalley (Michigan State University - REU) *Polymer Brushes as Potential Supports for Protein Microarrays*

BANK SLOUGHING CONTRIBUTIONS TO FLUVIAL SUSPENDED SEDIMENT IN THE BLUE EARTH RIVER, BLUE EARTH COUNTY, MINNESOTA

Erin King (Chemistry and Geology)
Bryce Hoppie, Faculty Mentor (Chemistry and Geology)

The Minnesota River is a federally declared impaired river. One of the main causes of its impairment is the volume of entrained clay-sized suspended sediment it carries. The Blue Earth River is identified as the largest contributor of sediment to the Minnesota River. There are two sources of sediment in the Blue Earth River. One source is from run off of fields and public/private ditches. The other source is from slump failure (i.e., sloughing) of slopes along the Blue Earth River. Recent research indicates that up to 75% of the total suspended load may come from bank sloughing.

This research tested the sloughing theory by analyzing grain size distribution along a bank of the Blue Earth River near Vernon Center, Minnesota. Twelve samples weighing over 2 kg each were collected from vertical and horizontal transects across the exposed bank. Sieve and settling tube techniques were used to analyze grain size. Results were plotted on a panel of photographs, and proportions of clay were mapped spatially along the bank. Total clay content was calculated for each area. Preliminary results conclude that the bank is mostly sandy in composition. Total clay content for this bank is less than 15% of the total sediment. Thus, for the site, results indicate bank sloughing is a minor contributor of suspended sediment to the Blue Earth River (and ultimately the Minnesota River).

UTILIZATION OF POLYTHIOPHENOL FOR THE EFFICIENT REMOVAL OF TRIORGANOTIN RESIDUES FROM ORGANIC REACTION MIXTURES

William T. Gilles (Chemistry and Geology)
Brian Groh, Faculty Mentor (Chemistry and Geology)

Triorganotin compounds are useful synthetic reagents having numerous applications but limited appeal due to the difficulty of removing toxic triorganotin reaction by-products. An efficient removal method would greatly benefit both industry and research where these compounds are already emerging as vastly important reagents. In particular, triorganotins are used in the production of pharmaceuticals and agrichemicals. In model reaction studies, polythiophenol has been found to bind tri-n-butyltin chloride and bis-(tri-n-butyltin) oxide. Formation of a tin-sulfur bond between liquid triorganotin compounds and an insoluble polymer facilitated removal by simple filtration. Reaction progress and the removal of tin were monitored by gas chromatography and ^{1}H NMR. The process resulted in quantitative removal of tri-n-butyltin chloride and bis-(tri-n-butyltin) oxide from the model reaction system.

TRANS FATTY ACIDS IN THE DIETS OF ADULTS AT MINNESOTA STATE UNIVERSITY, MANKATO

Kristi Krenz (Family Consumer Science)
Mary Hadley, Faculty Mentor (Chemistry and Geology)
Joye Bond, Faculty Mentor (Family Consumer Science)

Research has shown man-made trans fatty acids to be hazardous to health in that they raise LDL cholesterol levels and decrease HDL cholesterol levels, increasing cardiovascular disease risk. There is a need for the establishment of safe and acceptable levels of trans fatty acids to help people make informed decisions on what should be included or avoided in their diets. The purpose of this undergraduate research project was to determine the level of trans fatty acids in the diets of adults on the Minnesota State University, Mankato campus. Diet records were collected from students and analyzed using the computer program, Food Processor. Average intakes for each person were calculated and compared to the reported average intake of the general population, 2.6-12.8 g/day to see where students on campus stood in regards to trans fatty acid intake.

QUANTIFICATION OF MALONDIALDEHYDE IN EXERCISE PARTICIPANTS

Travis Vander Steen (Chemistry and Geology)
Dr. Mary Hadley, Faculty Mentor (Chemistry and Geology)
Dr. Mary Visser, Faculty Mentor (Human Performance)

Malondialdehyde (MDA) is a byproduct of lipid peroxidation (LP) and its production in vivo should increase with exercise. Increased LP has been correlated with increased incidences of adverse physiological conditions such as heart disease. It may be beneficial for those who exercise regularly to increase their intake of the antioxidant vitamin E to decrease LP. This pilot experiment was conducted to determine if supplementation of vitamin E would decrease urinary MDA excretion in non-athletes who participate in a prescribed exercise regiment (IRB log 1973). Urine and dietary diet records were collected from the subjects, some received a daily vitamin E supplement. The urine was treated with thiobarbituric acid (TBA) and the resulting TBA-MDA complex was quantified using a high pressure liquid chromatography system. Although the number of subjects volunteering for this experiment was too small for any conclusions to be drawn, it appears that the subjects who received the vitamin E had reduced levels of MDA after 8 weeks of supplementation. To reach any conclusion the experiment must be repeated with more subjects.

HYDROGEOCHEMICAL CHARACTERIZATION OF PRAIRIE DU CHIEN BEDROCK AQUIFER

Heidi R. Bednar (Chemistry and Geology)
Renae Haycraft (Chemistry and Geology)
Bryce Hoppie, Faculty Mentor (Geology)
Daniel Swart, Faculty Mentor (Chemistry)
Trent Vorlicek, Faculty Mentor (Chemistry)

This research investigated the hydrogeochemistry of the Prairie du Chien confined bedrock aquifer in southeastern Minnesota. This bedrock aquifer has been found to be unusually enriched in organic matter, nitrogen (N)-family species, and phosphorous.

Our analysis has supported the suspicion that this aquifer is atypical. Loss on ignition (LOI) measurements suggest high organic matter at levels 15-fold greater than average. GC-MS results show the presence of long, straight chain organics; however, surface contaminants (e.g., pesticides and pharmaceuticals) are below detection. AAS results indicate normal levels of As and elevated levels of Cu. In addition, total phosphorus (P) falls in the range 500-800 ppb which is an order of magnitude greater than typical values. Dissolved oxygen levels are very low, (i.e. 0.1 ppm), indicating hypoxia, which is also suggested by the presence of reduced N-species (e.g., 2 ppm NH3). Measures of water quality such as alkalinity, hardness, pH, and conductivity are normal.

The observed abnormalities point to the same source: high levels of organic matter. Hypoxia as well as elevated P and N are likely due to the concentrated organic matter. The elevated organic matter content also facilitates the transport of copper and may indicate the presence of other metal species. Research will continue in the future, and focus on investigation of surface sources of organic matter, heavy metals, deep lateral transport, and any buried organic sources (e.g. peat layers).

FERRIC OXIDATION OF XYLENOL ORANGE AS A COLORIMETRIC ASSAY FOR LIPOXYGENASE ISOENZYMES FROM GLYCINE MAX

Derek Langeslay (Biochemistry)
James E. Rife, Faculty Mentor (Chemistry and Geology)

The focus of this study was to adapt the FOX method of Waslidge and Hayes (Anal. Biochem. 231, pp. 354-358, 1995) for assaying platelet lipoxygenase to make an assay for lipoxygenase isoenzymes from soybean (Glycine max.) The lipoxygenase enzyme is responsible for the formation of conjugated hydroperoxides from polyunsaturated fatty acids and molecular oxygen. Soybeans have multiple isoenzymes that catalyze this reaction. Three isoenzymes have been found in the seed while at least five different isoenzymes have been found in the vegetative tissue. Typical assays for lipoxygenase activity during enzyme purification have relied on monitoring the absorbance of the conjugated hydroperoxide at 230 nm. Such as assays have proven to be very time consuming. The FOX method allowed for batch assaying of multiple samples for lipoxygenase activity. The FOX method, or ferric oxidation of xylenol orange, took advantage of the fact that under low pH conditions, the hydroperoxides formed by the enzyme oxidize Fe^{2+} to Fe^{3+}. The resulting ferric ions then oxidized xylenol orange to form a stable blue product that had an absorbance at 589 nm. The Waslidge and Hayes method was modified and optimized to assay soybean lipoxygenase isoenzymes using a spectrophotometer. This modified assay will expedite future enzyme isolation and purification studies.

SEASONAL DYNAMICS OF A HIGH ARCTIC LAKE, LAKE LINNÉ, SPITSBERGEN ISLAND, SVALBARD

Melanie Schimek (Geography)
Bryce Hoppie, Faculty Mentor (Chemistry and Geology)

The purpose of this project is to characterize the physical processes in Lake Linné, Spitsbergen Island, Svalbard, that lead to heterogeneous water temperatures during the high arctic summer. When adequately defined, this lake can be used in studies of global warming effects in high arctic lakes.

We analyzed available atmospheric and lake temperature data for the period of July 31 through September 4, 2003. For July 31 through August 19, surface water temperatures increased from 4°C to 7°C, and then fell to 5.8°C at the end of the observational period. This trend corresponds to concomitant air temperature changes. The increase lags shortly behind warm southerly weather while the cooling trend follows weak northerly winds. Anomalies in water temperature trends correspond to an unsettled time of variable wind azimuth. Thermal stratification in shallow water is lost during periods of strong southerly wind in response to an upwelling event.

Our observations indicate that air temperature is the dominant control on water temperature at shelf and open water sites through ten meters of water depth. However, strong southerly winds can cause vertical and horizontal changes in water temperature through upwelling, and lateral displacement of surface water. Thus, our single-season data indicate that lake water temperatures are proxies of atmospheric temperature although strong winds perturb the system.

EFFECTS OF VITAMIN E SUPPLEMENTATION ON 8-HYDROXYDEOXYGUANOSINE CONCENTRATION IN URINE OF NON-FIT EXERCISING INDIVIDUALS

Ryan Miller (Biochemistry)
Dr. Mary Hadley, Faculty Mentor (Chemistry and Geology)
Dr. Mary F. Visser (Human Performance)

The concentration of oxygen is elevated in the body during exercise leading to increased levels of reactive oxygen species and thus, lipid peroxidation. This pilot study was designed to determine if athletes should be exceeding the adult recommended daily allowance, 15mg, of vitamin E intake to prevent damage due to increased levels of ROS (Reactive Oxygen Species). This pilot study helped gain knowledge of the effects of vitamin E supplementation on the urinary excretion of 8-hydroxydeoxyguanosine (8-OHdG) during times of physical fitness activity. 8-OHdG is a product of DNA molecules reacting with free oxygen radicals, and is a sign of oxidative damage. Vitamin E contains a hydroxyl group, which donates an electron to free radicals, preventing them from damaging the body. This experiment was used to determine if 8-hydroxydeoxyguanosine levels were decreased by vitamin E, providing cause for further experimental analysis. Subjects, half of whom consumed 400 IU of vitamin E daily, participated in a low level fitness program and kept twenty-four hour food intake records. Levels of 8-OHdG were quantified in the subjects urines by high performance liquid chromatography before and after the fitness program is complete. This pilot study should be completed again as a result of lack of participation. Too few subjects completed the required criteria to form a statistically meaningful conclusion.

POLYMER BRUSHES AS POTENTIAL SUPPORTS FOR PROTEIN MICROARRAYS

Elizabeth A. Smalley (Department of Chemistry and Geology)
Merlin L. Bruening and Matthew D. Miller, Faculty Mentors (Department of Chemistry, Michigan State University, East Lansing, MI 48824)

Protein microarrays can be used to track protein interactions with DNA, lipids, antibodies, and other proteins. Applications include functional and pathway determinations and disease screening. This research aims at controlling the density of poly(2-hydroxylethyl methacrylate) (PHEMA) brushes brushes to tailor these surfaces for optimal attachment (amount and activity) of protein microarrays. The terminal hydroxyl group of PHEMA was derivatized to immobilize proteins on the polymer brushes through amide bond formation. Derivatization of PHEMA was accomplished by reaction with succinic anhydride followed by activation with N-hydroxysuccinimide and this process was monitored by reflectance FTIR spectroscopy and ellipsometry. A fluorescent antibody was attached to an immobilized protein, and the protein-antibody interaction was monitored with a microarray scanner. Low-density PHEMA brushes showed a higher immobilization than denser films.

Kern Storo (T. Secott) *The Application of Polymerase Chain Reaction Testing to Identify the Potential Association of Neorickettsiae in Migratory Waterfowl Deaths at Lake Onalaska*

Sonja Christensen and Bradley Behrens (B. McMillan) *The Effects of Mowing on Populations of Small Mammals at Swan Lake Wildlife Management Area, Minnesota*

Stephanie Fasen, Susan Hendley, and Tim Pham (R. Bates) *Designing an Articulation-Agreement Database for the College of Science, Engineering and Technology Advising Center*

Mohammed Omar (M. Hart) *Morphological Characterization of Transgenic Murine Myocardium*

Robert Johnson (T. Secott) *Preliminary Characterization of Mycobacterium Paratuberculosis Cell Entry Protein*

Irina Pototskaya (D. Wrigley) *Effects of Stress During Sporulation on the Germination Rate of Spores*

Brittney Harthaus (M. Hart) *Characterization of Functional Abnormalities in Hearts of Transenic Mice Expressing Forms of Actin Capping Protein Defective in Attracting Thin Filaments to Z Lines*

Christopher Buyarski (C. Ruhland) *Decomposition of a Native Grass Species in the Antartic Tundra*

THE APPLICATION OF POLYMERASE CHAIN REACTION TESTING TO IDENTIFY THE POTENTIAL ASSOCIATION OF NEORICKETTSIAE IN MIGRATORY WATERFOWL DEATHS AT LAKE ONALASKA

Kern M Storo (Biological Sciences)
Timothy Secott, Faculty Mentor (Biological Sciences)

In the Upper Mississippi River National Refuge at Lake Onalaska, Wisconsin, there has been a significant number of waterfowl (scaup and coot) dying off each of the last two years. A large number of trematodes have been found in the intestines of these birds. Because the rate at which these birds are dying is inconsistent with observed infections, it is possible that another pathogen may be involved. Others have found that Neorickettsia like organism (NRO) in Bithynia snails, which play a critical role in the life cycle of the trematode species isolated from the dead waterfowl at Lake Onalaska. We attempted to identify NRO genetic elements in DNA extracted from duck and trematode tissues. Using polymerase chain reaction designed to amplify 16S rDNA from Rickettsiales, we have thus far identified two samples as suspect for NRO. Continued PCR testing of the samples collected as well as DNA sequencing of amplified products from suspect tissue may yield a determination of whether or not NRO can be implicated in this outbreak of disease.

THE EFFECTS OF MOWING ON POPULATIONS OF SMALL MAMMALS AT SWAN LAKE WILDLIFE MANAGEMENT AREA, MINNESOTA

Sonja A. Christensen (Biological Sciences)
Brad M. Behrens (Biological Sciences)
Brock R. McMillan, Faculty Mentor (Biological Sciences)

Mowing or haying is a common land management practice in the Great Plains region. However, little is know about the effects of mowing on small mammal populations. Therefore, an experiment was designed to examine the effects of mowing on populations of small mammals at the Swan Lake Wildlife Management Area. A trapping grid comprised of 91 stations (13 stations x 7 stations) was established to sample contiguous mowed and unmowed habitat. Two large Sherman live traps were placed at each station. Traps were checked daily for five consecutive days. Species, sex, and weight were recorded for each animal that was captured. A G-test was used to statistically determine if populations were distributed randomly between the habitats at the study area. Six species of small mammals were captured. In decreasing order of abundance, the species were the northern short-tailed shrew (*Blarina brevicauda*; N =25), masked shrew (*Sorex cinereus*; $N = 10$), white-footed mouse (*Peromyscus leucopus*; $N = 6$), meadow vole (*Microtus pennsylvanicus*; N = 2) house mouse (*Mus musculus*; $N = 2$), and ermine (*Mustella erminea*; $N = 1$). There were no differences within or among populations between the two habitats examined. The results from this study are contrary to similar studies in other regions of the Great Plains. The inconsistencies are likely a result of the small scale and small sample sizes in the current study.

DESIGNING AN ARTICULATION-AGREEMENT DATABASE FOR THE COLLEGE OF SCIENCE AND ENGINEERING AND TECHNOLOGY ADVISING CENTER

Stephanie Fasen (Electrical and Computer Engineering and Technology)
Susan Hendley (English)
Tim Pham (Computer and Information Sciences)
Rebecca Bates, Faculty Mentor (Computer and Information Sciences)

During their academic careers, some college students transfer to different universities. To allow students to transfer seamlessly to other colleges, advisors at Minnesota universities create articulation agreements that list the classes that transfer between two universities. To use these documents, students and advisors must search through binders to find the correct articulation agreement and then manually review it. This is a time-consuming process for both students and advisors.

To make this information more accessible, we created a web-based database that instantly produces a list of equivalent classes for majors offered at Minnesota State University, Mankato (MSU) and other Minnesota universities. We designed the system for majors in the College of Science and Engineering and Technology (CSET); however, the system can be expanded to include all MSU majors. To design this system, we used a rapid application development strategy that emphasized using prototypes to develop and to refine the system's functions and user interfaces.

The primary users include CSET advisors, MSU faculty advisors, and transfer students. For advisors, the database provides fast access to data, and a reliable, centralized location to store the articulation agreements. These features allow advisors to spend less time searching for information, and more time working with students. Transfer students also benefit because they can access up-to-date articulation agreements at their convenience.

MORPHOLOGICAL CHARACTERIZATION OF TRANSGENIC MURINE MYOCARDIUM

Mohammed Omar (Biological Sciences)
M.C. Hart, Faculty Mentor (Biological Sciences)

Capping protein (CP) is a heterodimer made up of both alpha and beta subunits. In striated muscle, CP binds to the barbed end of the actin filament at the Z-line, directing and maintaining the proper organization of the thin filament in the sarcomere. Vertebrates have three alpha ($\alpha1$, $\alpha2$, $\alpha3$) and three beta isoforms ($\beta1$, $\beta2$, $\beta3$). In previous studies, transgenic mice were generated that replace the $\beta1$ isoform of CP (the specific isoform of the sarcomere) with the $\beta2$ isoform of CP (the non-sarcomeric isoform) using the cardiac-specific promoter of the α-myosin heavy chain (α-MyHC) gene. The purpose of my research is to characterize the structural abnormalities in transgenic murine myocardium expressing forms of CP defective in attaching thin filaments to Z lines. Transgenic and wild-type mice, approximately one year old, were sacrificed, heart to body weight ratios determined and gross cardiac morphology assessed. The hearts were fixed in 10% buffered formaldehyde, dehydrated thru a graded series of ethanol washes and embedded in paraffin. Thin sections of the paraffin embedded tissue were prepared using a microtome and collected onto gelatin coated slides. The tissue sections were stained with hematoxylin and eosin, visualized by transmission brightfield microscopy and the digitized images captured using a cooled ccd camera and image acquisition software. Preliminary results will be presented.

PRELIMINARY CHARACTERIZATION OF MYCOBACTERIUM PARATUBERCULOSIS CELL ENTRY PROTEIN.

Robert Johnson (Biological Sciences)
Timothy E. Secott, Faculty Mentor (Biological Sciences)

Johne's disease which is caused by *mycobacterium paratuberculosis* (mpt) is an incurable, untreatable disease which afflicts domestic cattle, causing significant losses for the cattle industry. Elucidation of the mechanisms of pathogenesis employed by (mpt) is necessary to develop a viable means to eradicate this disease. Although research shows that the Fibronectin attachment protein (FAP) plays a pivotal role in the ability of (mpt) to invade host cells, it is evident that other factors need to be considered. Mycobacterium cell entry proteins (mce1) have been proposed as invasion factors used by mycobacterium tuberculosis, and similar genetic elements have been identified in (mpt). We have cloned this element and will present it's sequence in comparison with other pathogenic mycobacterium. Biometric algorithms will be used to predict the secondary structure of the *mce* product and its location in/on the cell. Lastly we plan to fuse *mce* with a indicator gene (*phoA*) to attempt to determine the membrane topology of the *mce* product.

EFFECTS OF STRESS DURING SPORULATION ON THE GERMINATION RATE OF SPORES

Irina Pototskaya (Food Science Technology)
Dorothy Wrigley, Faculty Mentor (Biological Sciences)

Bacillus cereus is a spore forming bacterium that can cause food-borne disease. It is very important to control this bacterium in food in order to prevent disease and spoilage. Control is difficult because of the ability of the organisms to make endospores which are more resistant to treatments to eliminate bacteria than the vegetative cells. This study is examining the effects of stress during spore formation on the germination of the endospores. It is hypothesized that stress during formation may enhance the resistance of the endospores to various treatments used to control its growth such as nisin addition and heat treatments. Nisin is a biopreservative. Spores were formed under stress of temperature shift, presence of sub-lethal concentrations of nisin, and pH differences. To date the data has shown that sub-lethal nisin stress does affect the germination slightly. In addition, I have confirmed research that indicates that *B. cereus* will not form spores at pH 4. Additional data will be presented.

CHARACTERIZATION OF FUNCTIONAL ABNORMALITIES IN HEARTS OF TRANSENIC MICE EXPRESSING FORMS OF ACTIN CAPPING PROTEIN DEFECTIVE IN ATTRACTING THIN FILAMENTS TO Z LINES

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In striated muscle, the barbed ends of thin filaments are attached to Z lines. Biochemical and cell biological studies suggests that actin capping protein (CP) mediates this attachment by binding the barbed ends of the actin filaments. Defective interaction between CP and the actin thin filaments causes major structural defects in sarcomere organization and leads to cardiac hypertrophy and lethality. The goal of this research is to understand how the defects in the attachment of thin filaments to Z-lines affects the function of the heart. In preliminary studies in the laboratory of Dr. Marilyn Hart, blood pressure was measured in transgenic and wild type mice using an indirect tail pressure assay. The transgenic mice had a lower systolic pressure and an increased heart rate compared to wild type mice. In our present study, we have confirmed and expanded these preliminary results using electrocardiogram (ECG) and direct pressure measurements. Briefly, wildtype and transgenic mice, approximately six months of age, were anesthetized, ECG measurements determined, followed by cardiac catherization to analyze blood pressure directly. After these studies, the mice were allowed to stabilize for thirty minutes and a final ECG recorded. Indirect measurements were compared to direct measurements and an accuracy value calculated.

DECOMPOSITION OF A NATIVE GRASS SPECIES IN THE ANTARCTIC TUNDRA

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We examined the decomposition of a native grass species (*Deschampsia antarctica*) using size-selective litter bags in the Antarctic tundra. Litter bags were constructed of either 0.12 cm (small) or 1.2 cm (large) nylon mesh and placed on Bonaparte Point (64o46'S; 64o03'W) on Anvers Island along the western Antarctic Peninsula for approximately one year. Small litter bags excluded native herbivore invertebrates while large bags allowed invertebrates to access the plant material. We measured lignin, alpha-cellulose, holo-cellulose and total soluble carbohydrate and lipid concentrations of this material as well as changes in total organic carbon and nitrogen. Cellulose and lignin concentrations were high averaging 60 and 14.5% respectively, of the total dry weight of the plant material. Concentrations of soluble carbohydrates and fats averaged less than 1 and 5% respectively, suggesting rapid loss of these materials due to leaching. Decomposition rates averaged 58% for both small and large litter bags and did not significantly differ between mesh sizes. Our results suggest that invertebrate herbivores do not play a significant role in decomposition of the native grass species. In addition, decomposition of plant material was significantly greater in this wet maritime climate relative to drier inland areas of the Antarctic continent.

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