

Undergraduate Research Conference



MENTORED
SCHOLARSHIP OF
UNDERGRADUATES AT
MANKATO

Welcome!

The First Annual Undergraduate Research Conference recognizes and celebrates undergraduate research and creative activities at Minnesota State University, Mankato. Our faculty are committed to undergraduate research and organizing this conference has revealed both the long and productive record of undergraduate research on campus and the many benefits that occur as the result of faculty mentoring undergraduate students. Students involved in these efforts have better retention rates, excel academically and are more competitive in the job market and graduate school admissions. This formal publication presents the abstracts of the student presentations on April 15 and 16, 1999. The conference features 29 oral presentations, 18 poster presentations and 3 performance-based/visual arts presentations from five campus colleges. Our congratulations to the students and their faculty members.



Richard R. Rush

President

Minnesota State University, Mankato

MENTORED **S**CHOLARSHIP OF **U**NDERGRADUATES AT **M**ANKATO

MESOAMERICAN INFLUENCE ON MISSISSIPPIAN CULTURES.

Allen R. McGregor, Anthropology

Paul F. Brown, Faculty Mentor

Much of the development of the cultures of the Mississippian Period has been attributed to the innovation of an intensive agriculture based upon corn, beans and squash, all of which were indigenous to Central America. The adoption of these practices could not have occurred without extensive trade and communication networks. They were likely to have been included among other ideas and physical elements that could still reside in, or be inferred from, the archaeological record. Correlation of a specific crop variety, trade good, stylistic treatment or other element over a broad number of sites, within the context of their relative geographic location and temporal occurrence, can help in relating the Mississippian cultures to their contemporaries in MesoAmerica.

COLOR CHUNKING DOES NOT ALTER HYPERMNESIA AND REMINISCENCE FOR A NOVEL NON-VERBAL MEMORY TASK IN HUMANS.

Dana L. Citrowske, Psychology
Robert W. Flint Jr., Faculty Mentor

The purpose of this study was to examine hypermnesia, reminiscence, and chunking for a novel non-verbal memory task in humans. To examine these psychological phenomena, a highly complex drawing was developed (Flint's Impossible Picture-FIP). In one version the entire drawing was in black and white, while a second version was color-coded so that identical components were of the same color. Forty-eight undergraduate students were randomly assigned to one of three groups. Groups 1 and 2 were asked to reproduce the FIP (color and B/W version, respectively). Group 3 reproduced the color version with specific instructions to note the color organization. Following this, training subjects in each group were asked to draw the FIP from memory on three separate trials. At the onset of trials 2 and 3, subjects were instructed to try to improve upon their previous performance. Results indicate that the accuracy and completeness of the drawings improved across trials and that significantly more items of the FIP were recalled, indicating the presence of both hypermnesia and reminiscence. In addition, there was no effect for color organization, suggesting that subjects did not chunk similar information together in order to improve performance.

LINGUISTIC DIFFERENCES IN MULTIPLE TELLINGS OF A STORY.

Rebecca Hubbling, Kelly Ritter, Amber Grams and Meghan Culey, Speech, Hearing, and Rehabilitation Services

Patricia Hargrove, Faculty Mentor

“Frog Where Are You,” a pictureless storybook, is frequently used to assess the language of children by Speech-Language Pathologists. The typical strategy involves having the children tell the story two times. The first telling is practice, and the second serves as the basis for the language analysis. The purpose of this research is to determine if there is a significant difference between the language samples produced in two readings.

Language samples from twelve children with a specific genetic syndrome have been elicited using the “Frog Where Are You?” protocol. This research will compare the first and second tellings of the story in a variety of linguistic behaviors, including Mean Length of Utterances, Mazing, and production of selected morphemes. The results have clinical applications and address the need to have multiple story tellings.

SEXUAL BEHAVIORS AND SEXUALLY TRANSMITTED DISEASES IN COLLEGE STUDENTS.

Kellee J. Meyer, Nicole S. Garbina,
Nancy A. Rigdon, Stacey A. Van Gelderen, and
Vanessa L. Woodcock, Nursing
Marcia Stevens, Faculty Mentor

Sexually transmitted diseases have become a widespread public health problem in the college student population. Approximately seventy-five percent of college students are sexually active. High numbers of these students are engaging in unprotected intercourse or using unreliable birth control methods that do not provide any protection from sexually transmitted diseases (STDs). Therefore, the purpose of this descriptive study is to investigate the relationship between self-reported sexual behaviors and the incidence of STDs among students at Minnesota State University, Mankato. The study will be conducted at three separate sites on campus during one week of the Spring, 1999 semester. A convenience sample of MSU students will be approached for participation in the study and will be asked to complete a thirty item questionnaire. The intent of the questionnaire is to gather data regarding self-reported history of sexual behaviors and incidence of STDs. Statistical analysis procedures appropriate to the level of data will be used to analyze the aggregate data.

PORTRAYAL OF TRADITIONAL AND NONTRADITIONAL FAMILY STRUCTURES IN CHILDREN'S BOOKS.

Laura A. Grabow, Psychology

Rosemary Krawczyk, Faculty Mentor

The purpose of this study was to examine the portrayals of families in children's books. Families of elementary school children received a book list with teacher suggested readings, distributed to serve as a guide when selecting children's reading material. Sixty children's books were analyzed for the portrayal of traditional and nontraditional families. It was hypothesized that the recommended children's literature did not reflect the variety of family households existing today. Results indicate a significant unequal representation of nontraditional family portrayals within the chosen books. Unexpectedly, there were no portrayals of a nontraditional family involving a biological parent with a stepparent.

EXAMINATION OF THE THERMAL RESISTANCE OF ENTEROCOCCUS FAECALIS AND ESCHERICHIA COLI AND THE POSSIBILITY OF HEAT RESISTANCE TRANSFER.

Melissa A. Harms, Biology

Dorothy Wrigley, Faculty Mentor

Pasteurization is the use of low heat to kill bacteria in foods. Because bacteria rarely exist as pure cultures in nature, it is feasible that a thermo-tolerant organism might affect the survival of a less thermally tolerant organism, thus limiting the effectiveness of pasteurization.

This study examines the effect of heat-resistant *Enterococcus faecalis* on heat-sensitive *Escherichia coli*. Preliminary tests determined the appropriate media for counting the surviving organisms in the mixed cultures. Then, the thermal resistance of *E.coli* and *E.faecalis* was measured by D-values and compared for single and mixed cultures. When the two bacteria were mixed and heated, no change in D-value was seen for *E.coli*. However, when the mixture was cultured for 2.5 hours prior to heating, the number of surviving *E.coli* increased. This leads to the preliminary conclusion that *E.faecalis* has a positive effect on the survival of *E.coli*.

SOFTWARE PROGRAMS AND THEIR IMPACT ON QUALITY CONTROL.

Teri R. Ryland and Laura C. Seys, Management
Claudia Pragman, Faculty Mentor

Within the last few years, computer systems have become essential to the success of almost any company. More specifically, this includes the area of operations management and the level of quality found throughout the process. How have software programs affected the quality control of the operation process? What constitutes a documented quality system? Multiple standards, such as ISO 9000, have been established for companies to use while measuring their plant against competitors' plants. The usage of these guidelines, in addition to implementing a quality management system, has caused many improvements throughout the operations and management industry. Every company may reach a higher level of quality in their own unique way. By studying a sample of these quality control systems and the environments in which they are used, one can gain an increased understanding of the impact software technology has had on operations.

METHODOLOGY FOR ASSESSING QUALITY SOFTWARE.

Teri R. Ryland, Mohammad A. Sajjad, and
Jarrett G. Sharp, Computer and Information Sciences
Michael Wells, Faculty Mentor

The increasing size and complexity of today's software development projects necessitates effective quality control. This paper evaluates three basic measures of structural quality: coupling, cohesion, and independent path testing. All three quality metrics were applied to a software engineering project. The coupling metric is used to measure modular data coupling and could be implemented as an automated procedure. The cohesion metric is computed by answering a series of specified questions and is used to measure the internal relationships within a module. The goal is to have each module perform one task. Independent path testing computes cyclometric complexity and is used to measure the level of usage for each module chosen. These metrics are used to assess the most critical modules of a software development project and improve overall software.

THE AMAZONS: WARRIOR WOMEN OF ANCIENT GREECE, MYTH OR REALITY?

Jennifer K. Taylor, Anthropology

Winifred Mitchell, Faculty Mentor

Matriarchal, strong, and warrior. These are all words used to describe the Amazons of Ancient Greece. The Greeks told many tales of the ancient Amazons. Herodotus was a firm believer in their existence, and yet the archeological evidence of their existence remains scant. In such a patriarchy of Ancient Greece, why is there a myth about a race of warrior women in ancient Asia Minor? Using mythological and archeological evidence and theory, this paper examines why and where the Amazons are represented in Greek myth, and contrasts the actual view of women in Ancient Greece to the alternate view of a warrior woman. Archeological evidence suggesting that the Amazons really existed is also reviewed to show that Amazons may have been migrants from Libya, present in Asia Minor prior to the arrival of the Greeks.

ATTITUDES TOWARD OBESITY, WEIGHT LOSS, AND WEIGHT LOSS RELAPSE.

Mollie Newhouse, Psychology

Barry J. Ries, Faculty Mentor

There is a great deal of research which suggests that the obese population is viewed more negatively than the non-obese population. There is a paucity of research, however, that evaluates attitudes toward successful and unsuccessful dieters. In this study participants were asked to read one of three scenarios. The first scenario described either a male or female obese character who did not attempt weight loss. The second scenario described a male or female character who was able to lose and maintain a 60 pound weight loss (successful dieter). The third scenario described a male or female character who lost and subsequently regained 60 pounds. After reading the scenarios, participants rated the character's attractiveness and self control. They also selected adjectives to describe the character utilizing the Adjective Checklist. It is anticipated that participants will rate the attractiveness and self control of the successful dieter group more favorably than the other groups. Similarly, it is expected that the participants will choose more positive adjectives to describe the successful dieter group than the other groups.

SHOPPING FOR CULTURE: ADVENTURES IN THE SUPERMARKET.

Wendy S. Munson, Anthropology
Winifred Mitchell, Faculty Mentor

Everybody goes to the supermarket, people from all careers, economic classes and ages. People shop for groceries regularly, often the same day of the week and time of day. They may even buy the same items each time, as if it were a weekly ritual. Additionally, most of us must buy our food, we do not produce it ourselves. In that, we give away some of our self-determination to those who market food. Most people have definite attitudes about grocery shopping, which shows up in their behaviors at the supermarket. The grocery store is an equalizer of people and a general sample of the population. It provides a good environment to experience culture in action and learn more about people. I used a supermarket to observe, follow and interview people. I compared my impressions of the meaning of their behavior with their ideas of themselves. This paper presents my conclusions.

ETHNOGRAPHIC OBSERVATIONS OF PERSONAL INTERACTION STYLES (THE FRONT DESK CHRONICLES)

Adam Kittelson, Cultural Anthropology

Winifred Mitchell, Faculty Mentor

Personal relationships among friends and family differ greatly from encounters among strangers. Aside from these differences, the level of responsibility and the position that each participant assumes in a conversation or relationship are important and have a varied affect on the interaction that takes place. Things such as vocabulary, tone, grammar, and etiquette are all taken into account.

The information desk at the Crawford Center residential halls at Minnesota State University, Mankato is a good example of a place where various types of interaction take place. Friends, strangers, and groups interact together in formal, informal, comical, and serious styles. All of these different aspects of communication are likely to occur in a typical day at the information desk. Observation and evaluation of the varied interactions that take place at the desk yield many conclusions about residential dormitory life and common interactions. Certain characteristics also affect how each individual encounter is handled.

DRIVING THE COMPETITION: AN ANALYSIS OF THE AUTOMOTIVE INDUSTRY.

Scott Schmidt and Keely Zwart, Business
Claudia Pragman, Faculty Mentor

As competition continues to grow, companies in the auto industry are taking steps to streamline their operations. Advances in technology, globalization of the market, and today's empowered consumers are forcing the major firms in the industry to speed up their operations, become more flexible, and place more of an emphasis on quality. A major key to improving the speed, flexibility, and quality of operations is recognition that Information Technology can provide a competitive advantage and can swiftly be integrated into the company's operations. The firms that fail to efficiently run their operations and use Information Technology, such as the Internet, will find that the competition continues to intensify, and their market share continues to shrink.

Y2K: PREPARING YOUR BUSINESS FOR TRANSITION.

Rachel A. Moldan and Brooke E. Bauleke, Management
Claudia Pragman, Faculty Mentor

As the year 2000 approaches, many businesses face great danger. The problem stems from early computer programmers who did not allow for computers to recognize the turn of the century and used two numbers instead of four to indicate the year. This is a worldwide problem that affects everyone, however our concentration is going to be on business operations. We have researched the many steps to take to ensure a company's survival during this transition. Companies need first to be aware of the problem, next take inventory and assess the problem, then correct and test, and finally implement the newly revised system. Hopefully with everyone's cooperation, we can ease into the new millennium without any complications.

GYPSY MOTH SURVEY.

Carrie Trytten, Environmental Science/Biology

Beth Proctor, Faculty Mentor

During the months of June, July, and August of 1998, this internship was completed through the Minnesota Department of Agriculture Agronomy and Plant Protection Division. The three months were spent conducting a Gypsy Moth trapping survey in an assigned region that included the counties of Jackson, Martin, Watonwan, the western 1/5 of Blue Earth, and the southern 1/4 of Cottonwood. The purpose of the survey was to track the migration of the Gypsy Moth, enabling the Department of Agriculture to determine what measures, if any, were needed to keep the population under control. Trappers canvassed their assigned area, setting over 500 pheromone traps on trees, such as oak, willow, basswood, and apple. After a period of time the trappers rechecked the traps for possible suspects. Trappers were expected to possess both good oral and written communication skills, be able to deal well with the public, have the ability to work in outdoor conditions, and be able to decipher maps. The record keeping was also the responsibility of the trapper. The data collected is being analyzed by the Minnesota Department of Agriculture

**E85 1999 CHEVROLET SILVERADO:
A CONVERSION BY MINNESOTA STATE
UNIVERSITY, MANKATO FOR THE "1999
ETHANOL VEHICLE CHALLENGE".**

Steve Mathison and Jesse Boyle, Automotive
Engineering Technology

Bruce Jones and Kirk Ready, Faculty Mentors

A student team from Minnesota State University, Mankato, Mankato's Automotive Engineering Technology program entered the "1999 Ethanol Vehicle Challenge." A 1999 Chevrolet Silverado was converted to run on E85 (85% ethanol, 15% gasoline). The competition consisted of emission, fuel economy, cold-start, and performance evaluation. The vehicle conversion involved all engine systems, with special emphasis placed on cold-start/derivability and engine performance. Laboratory and track testing led to the final design. The result was an integrated vehicle which successfully ran on E85, but which use was totally transparent to the customer. The presentation details the conversion and test results.

STRESS: A STUDY OF THE EFFECTS OF STRESS ON DIFFERENT AGE GROUPS.

Lacey A. Schulz and Erik Stenersen, Health Science
Bikash Nandy, Faculty Mentor

Stress is a condition that affects people of all ages. Although it is a universal condition, the source of stress and the degree to which it affects us differs with age. I will be researching the different “stressors” associated with each age group, and how they affect the people that experience them. To do this, I will break the population down into different age groups, and then have the subjects complete surveys. I will be using students from a high school, students from a college, and employees from a business. I will also do some research to see what other experimenters have come up with in the past. I expect to find that things such as “fitting in” and doing well in school will be common stressors associated with teens, while finishing school and finding a job will be common stressors among college students. Financial issues will probably be important issues in the middle ages, while retirement issues will be predominant in older individuals.

CORRELATIVE ANALYSIS OF LEADERSHIP: A FEMINIST STUDY OF THE PAST, AND PRAXIS FOR THE FUTURE.

Kristina (Tina) C. England, Women's Studies
Donna Langston, Faculty Mentor

Through analysis of past leaders and their leadership styles, I intend to make a correlation between unified community, positive recognition of disparate voices and definition of victory as the keys to successful leadership, feminist or otherwise. This calls into question the rigidity of hierarchical leadership and creates an awareness of "othering" as it exists in current systems. Pertinent points of exploration include: selecting effective leaders from the past to study; examining dynamic leadership (person and position) involving identifiable success and analyzing the position of said leader with or without a hierarchical framework. Ultimately this analysis will lead to the generation of a new model for leadership as well as the praxis of said model.

ANTHROPOLOGY, RACE, AND ETHNICITY IN THE CASE OF JAPAN.

Azumi Takeda, Anthropology

Paul Brown, Faculty Mentor

Concepts of race and ethnicity have been argued for a long time among anthropologists, biologists, and ethnologists. Those concepts were changed with historical and social backgrounds in Japan. However, the understanding of these concepts is not agreed among specialists themselves and the public reaction. This presentation focuses on abstract concepts, such as the race, ethnicity, and culture.

INFLUENCES OF THE MEDIA ON BODY SELF-IMAGE.

Marie E. Tutewohl, Psychology

Rosemary Krawczyk, Faculty Mentor

The media's portrayal of the perfect body comes into our lives through magazines, television, and movies.

Previous research has found that a person's body image suffers after viewing media images, but the reasons for this effect remain unknown. The purpose of this research is to examine the impact of a person's perceived similarity to the models portrayed in the media on a person's body image. Participants (N=60) will view fifteen photographs of attractive models who are found in popular magazines. The participants will then complete two short questionnaires to examine how they feel about their own bodies (Body Image Scale) and to find how similar they feel to those models they viewed (Perceived Similarity Scale). It is anticipated that participants who view same sex models will feel more negative about their own body image and that those who perceive themselves to be similar to the models will have a more negative self body image. It is anticipated that findings will be replicated across genders.

THE SPATIAL DEVELOPMENT OF PAINTING AND ITS RELATIONSHIP TO COLOR, LINE & FORM.

Jason J. Miller, Art

Brian Frink, Faculty Mentor

My proposal for the Undergraduate Research Conference is a presentation on the development of my art work at Minnesota State University, Mankato. This presentation will include slide images and an oral discussion of my paintings and drawings. Painting is constantly changing and is always surprising; it is an ambiguous entity. With each mark a question is asked. Painting allows for expression, initiates discussion and is _____ a continuous path on which to search for answers. Seeking meaning through visual problems is the driving force behind my work. As I paint, memories circulate through my thoughts, focus isn't on one specific event, there is a constant cycling of memories from the conscious to the subconscious and back again. Connections to the equivocal nature of memory are made through color changes. No one color dominates; colors interact and become one or separate entities, relying on each other for strength and support. Linear elements also play a critical role in my work. The interweaving of line is a metaphor for the flow and interaction of memory. The growth of these lines is exponential and, like memory, a single line becomes a multitude. These concepts will be discussed as they relate to the development of my work. This will be the framework of my oral and visual presentation to the University community.

INCREASING MOTIVATION AMONG PART-TIME WORKERS.

Desiree M. Schwarz, Pete G. Schwane,
Jonathan L. Wilcox, Lisa D. Breitenfeldt,
Terry J. McDaniel, Dustin Kroeger, Management
Brenda Flannery, Faculty Mentor

The part-time workforce is expected to keep growing at the same rate it has been over the past five years. Over 30% of employees in the retail, service, and dining industries are part-time workers. What incentives do part-time workers have to do their job well? Unlike full-time employees, part-time workers often have other priorities that come before their work. However, both require a comfortable work setting that fosters the highest levels of efficiency and productivity. How can managers meet the needs and motivate the part-time workforce?

Often, full-time workers are highly motivated because they derive satisfaction from their jobs, while part-time workers often look at their job as only work, simply a paycheck, or merely a stepping stone to their careers. Using techniques such as worker recognition, frequent feedback, incentives and bonuses, and personal contact, a manager can provide the motivation part-time employees need to do their job well. In the end, giving part-time employees a reason to feel excited about their work will produce a great resource of skill, energy, potential, and increased success for companies.

BODY LANGUAGE.

Matthew J. Bune, Social and Behavioral Sciences
Winifred Mitchell, Faculty Mentor

Before humans were able to form words and sentences, body language was utilized to help convey thoughts and ideas. The use of subtle gestures is a very significant part of normal communication. They are used in conjunction with spoken words to emphasize what the speaker is saying. Body language conveys the feeling or attitude of the speaker and can notify the audience if the speaker is sure of the words he/she is speaking. This paper reports on ethnographic observations of the role of body language in communications that take place in public places.

STATIC DIELECTRIC CONSTANTS OF $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$ AND $\text{HoBa}_2\text{Cu}_3\text{O}_{6+x}$

Ryan D Dorland, Physics

Youwen Xu and Steve Kipp, Faculty Mentors

The dielectric constant of a material yields important information about the physical properties and structures of the matter. By applying a uniform electric field to a dielectric material, we can measure the dielectric constant of the material. Samples of $\text{YBa}_2\text{Cu}_3\text{O}_7$ and $\text{HoBa}_2\text{Cu}_3\text{O}_7$ are reduced in argon to form $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$ and $\text{HoBa}_2\text{Cu}_3\text{O}_{6+x}$, where $0 < x < 0.40$. Both materials undergo a transition from metals to insulators as the oxygen content decreases in the samples. The static dielectric constants are measured for the reduced samples. By measuring several reduced sample dielectric constants, we determine a graphical relationship between the static dielectric constant and oxygen content of the materials.

CHILDREN'S TEACHER PREFERENCES BASED ON PHYSICAL APPEARANCE.

Ingrid A. Anderson, Psychology

Robert Flint, Faculty Mentor

The purpose of this study is to find out if children will make teacher preferences based on physical appearance. The researcher will examine the responses of both preschool and elementary school children. Each participant will be shown two sets of pictures, one female and one male set. In each set there will be a formally and a casually dressed model. The participant will then be asked questions to determine their teacher preference. Follow up questions will investigate why they selected that teacher. It is anticipated that the children will select the formally dressed female over the casually dressed female. Additionally, preferences will be shown for the casually dressed male when compared to the formally dressed male.

TO GATHER AROUND THE TELEVISION: COLLEGE STUDENTS RELEASING STRESS.

Andrea S. DeLaRosa, Anthropology
Winifred Mitchell, Faculty Mentor

College students across the country are known to have high levels of stress due to lack of sleep, test anxiety, and living expenses. As a result, the need to relieve this stress is vital for the continuation of a healthy life. Observations on a college campus can give one insight into the various ways students alleviate stress. Like many Americans, college students ritually gather around the television in hopes for some kind of entertainment. Through observations of this cultural phenomenon one can discover how college students come together and interact. The observations of students' interactions while watching a popular television program, "The Simpsons," is the focus of this study.

AN INVESTIGATION OF THE SOCIAL ACCEPTABILITY OF ADULTS EXHIBITING TIC DISORDERS.

Michelle Koch, Psychology

Barry Ries, Faculty Mentor

This study will investigate the social acceptability of individuals with varying frequencies of motor and vocal tics on a simulated job interview. The research goal is to determine the impact of frequency and tic type on social acceptability. Participants will be shown one of six videotapes of a male confederate role-playing a five-minute job interview. The variance between the videotapes will be the frequency of the tic (i.e., 0, 2, 6 per minute) and the type of tic (i.e., motor, vocal), but the content of the interview will remain stable. After the participants view the videotape, they will complete several questionnaires (i.e., Attractiveness and Speech Normalcy Scale, Attitudes Scale, Adjective Checklist, Tic Stimulus Videotape Questionnaire, Personal Reaction Inventory) based on how they think others would rate the person in the videotape. Previous research has indicated that this tactic is beneficial for helping eliminate social desirability. It is anticipated that vocal tics will be more socially accepted than motor tics. Also, it is predicted that high frequency tics will be less socially accepted than low frequency tics.

THE SILENT EPIDEMIC: THE IMPACTS OF HEPATITIS C IN THE UNITED STATES.

Anne E. Gerbensky and Joshua J. Kerber, Health Science

Bikash Nandy and Chuck Lewis, Faculty Mentors

Although its history can be traced back more than 50 years, the chronic liver disease Hepatitis C could not be identified until 1989. Since then it has been a silent killer, infecting more than 3.9 million people nationwide. Using modern and historical research, it is evident that the American public needs to become aware of what Hepatitis C is. By conducting random sample surveys of college students, we can formulate the steps that need to be taken on individual and societal levels to contain the virus.

OPTIMIZING AN ATOMIC ABSORPTION SPECTROPHOTOMETER FOR A FOOD INDUSTRY APPLICATION.

Brent Weisbrod, Environmental Science

Beth Proctor, Faculty Mentor

The atomic absorption spectrophotometer (AAS) is an instrument that measures the concentration of elements in solution by absorption or emission of different wavelengths of light that are element specific. As part of my internship with the LeSueur Cheese Company, I was to develop detailed procedures to operate the instrument and establish calibration curves for several elements including iron, magnesium and calcium.

I will discuss how I optimized the system and determined the calibration linear range for each element. I will also discuss how I developed, tested and modified the written SOP to operate the instrument safely.

RACING WITH THE SUN FROM D.C. TO FLORIDA: NORTHERN LIGHT V SOLAR VEHICLE PROJECT.

Aaron Wolff and Paul Heschke, Automotive Engineering Technology

Bruce Jones, Faculty Mentor

With the constantly changing emission laws placed on vehicles today, several automotive companies are looking into many different sources of power for future vehicles. One of these companies, General Motors, has focused on one particular source by putting on a competition in which several universities from throughout the country build and race their vehicles across the country using only one source of energy: solar power. Solar power is one of the relatively “unknown” power sources for transportation but with this competition, of which we have been a part every year, we may draw closer to making solar-powered vehicles ultimately more than just a dream, a reality.

FORENSIC ANTHROPOLOGY.

Anthony E. Hoyord and Pamela Gregor,
Anthropology
Paul Brown, Faculty Mentor

As the fields of criminalistics and forensic science continue to specialize, the need for individuals who are capable of interpreting physical evidence becomes more prevalent. Forensic Anthropology is concerned with post-mortem analysis of the skeletal system in an attempt to identify the factors which led to the death of an individual as well as characteristics which may aid in positively identifying subjects. Factors such as sex, age, stature, and cultural affiliation, as well as traumatic activity and pathological features, all contribute to the identification of the individual. This presentation will focus on the history of Forensic Anthropology as well as the processes which contribute to its success.

DETECTION OF $H\alpha$ STELLAR EMISSION.

Thomas Marks, Physics and Astronomy

Steve Kipp, Faculty Mentor

Stars consist of enormous masses of hydrogen and helium that generate energy through nuclear fusion. Stars vary in mass from O-type, 100 times as massive as the sun, to M dwarfs, only a fraction of the sun's mass. Newly formed M-dwarf stars tend to emit intense radiation at 6563\AA , called $H\alpha$ emission. We propose to search for young M-dwarf stars by taking advantage of the strong $H\alpha$ emission. Our immediate goal is to determine how faint a star can be observed with the CCD system at Andreas Observatory using two filters, one centered at $H\alpha$ and one decentered by 100\AA . Calculations of the limiting magnitude of our system will be compared with observatories.

PRODUCTION OF SYSTEMIN BINDING PROTEIN IN RESPONSE TO WOUNDING OF TOMATO PLANTS.

Gina M. Brandel, Chemistry and Geology
Theresa Salerno, Faculty Mentor

Systemin, the first peptide hormone to be isolated in plants, has been shown to be a primary signal of protease inhibitor induction by wounding. A 50-kDa systemin binding protein (SBP-50) has been shown to bind systemin *in vitro*; however, the precise function, mechanism and regulation of the binding protein remain unknown. To determine, in part, the role of SBP-50 in the wound response, relative SBP-50 concentrations were measured in wounded versus non-wounded tomato leaves. A polymer-two phase system of Dextran T500 and PEG 3350 was used to isolate the components of the tomato leaf plasma membranes. A biotinylated systemin derivative was incubated with the plasma membrane fraction to specifically bind SBP-50, and the two proteins were crosslinked. The membrane components were then separated by gel electrophoresis, and Western blotting was employed to detect the biotin label, and therefore any protein bound to systemin.

GLUCOSE-INDUCED ENHANCEMENT OF SPATIAL MEMORY IN HUMANS.

Adam Johnson and Aprajita Mohanty, Psychology
Robert Flint, Faculty Mentor

Glucose has repeatedly been shown to enhance learning and memory processes for a variety of tasks in humans and non-human animals. This study examined the effect of glucose on human spatial memory. Thirty-two young adults were randomly assigned to one of three treatment conditions (100mg/kg or 50g glucose or saccharine). Subjects consumed a lemon-flavored beverage containing the appropriate sweetener and were subsequently presented with 16 pictures arranged on a 4 x 4 grid. Following a 20-second study period the pictures were removed, shuffled and handed to the subject who attempted to place them in their appropriate location on the grid. Subjects received three consecutive trials and on recall trial 24-hrs later. Results indicated that subjects receiving 100mg/kg of glucose performed significantly better than controls. These findings are consistent with results from both human and non-human studies examining the effects of glucose on other forms of memory.

INDIVIDUALITY AND GEOMETRY: THE SELECTIVE ADVANTAGE OF KNOWING ONESELF.

Raazesh Sainudiin, Biology

Keith K. Klein, Faculty Mentor

Any model for Vegetative Incompatibility (VI) in Ascomycetes should explain why VI is selected and why such selection gives rise to immense variation. The determinate size of the reproductive structures, mycelial volume and surface constraints on reproductive success, the ability to transfer excess reproductive capacity, and the frequent encounters of clones of self and others have been employed in the proposed model to explain the selection for VI. By demonstrating the selective advantage for self-recognition, the model not only provides geometric and physiological parameters within which such selection operates, but it also explains the immense diversity observed in the VI phenotypes.

AN ESSAY ON CULTURAL IMPERIALISM AND THE LANGUAGE OF BLACK FOLK.

Rashad Muhammad Shabazz, Philosophy and
Political Science

Mecke Nagel, Faculty Mentor

The long standing debate revolving around language and culture has its roots firmly planted in the belief of “white is right.” This belief in cultural supremacy exists, not because whites feel they have superior language skills, but because whites believe they and their cultural practices are superior; subsequently making African descendents, Asian, and Mexicano-Latinos inferior to whites. This ideology has carried over and is seen in the debate over Ebonics (Black English). In my paper I intend to show that African Americans do not speak “bad English” rather their language and cultural practices are dubbed wrong because of cultural imperialism and white supremacy. Because the majority of African Americans do not embrace the language and cultural practice of the white majority their practices are viewed as “bad.” Furthermore, I intend to critique the contemporary status of language and forms of communication to show that “Black English” has a unique and specific linguistic formation.

MEMORY RECALL: THE ROLE OF VISUAL AIDS IN INSTRUCTIONS.

Theresa R. Spear and Brooke A. Zeisel, English
Kathleen Hurley, Faculty Mentor

Due to the lack of research that correlates memory recall with visual instructions, we have decided to investigate the theory that visuals (graphics, diagrams, etc.) aid in memory. This research study will examine the difference between memory recall in text-based instructions and visual/text based instructions. The subjects in this study will be college students between the ages of 19 and 29. The subjects will be separated into two groups. One group will have only written instructions while the other group will have written/visual instructions to complete a task. The groups will complete the task a second time without the use of instructions to assess recall. We will observe both groups and give surveys upon completion of the trial. The study will educate those in the technical writing field as well as assembly-based companies. The benefits of the research can inform technical writers and companies of memory recall advantages or disadvantages of including visual aids in instructions.

THE EFFECTS OF WOUNDING AND ETHYLENE ON CELLULAR FATTY ACID COMPOSITION OF AVENA SATIVA.

Judith J. Mayer and Dwight R. Stoll, Chemistry and Geology

James Rife, Faculty Mentor

Plant defense responses to wounding, pathogen attack, and environmental stresses often involve the production of various intermediates of the octadecanoid pathway, which are derived from the fatty acid linolenic acid. Ethylene is a plant hormone that has also been implicated in defense responses. The goal of this project has been to determine if wounding causes changes in the fatty acid composition of plants and to determine whether ethylene plays a role in this response. Controlled and wounded nine-day old *Avena sativa* (oats) plants were treated with ethylene, norbornadiene or silver thiosulfate. Norbornadiene and silver thiosulfate inhibit the action of endogenous ethylene. The oat leaves were harvested at 0, 1, 4, 8, and 22 hours following wounding and treatment. Lipids were then extracted from leaves and the lipids were fractionated using solid phase extraction. The methyl esters of the fatty acids in these fractions were prepared by transesterification with sulfuric acid in methanol. The resulting fatty acid methyl esters will be analyzed using gas chromatography with methyl heptadecanoate as an internal standard.

THE DETERMINATION OF A THRESHOLD LEVEL OF EXOGENOUS METHYL JASMONATE EFFECTING AN INCREASE IN PEROXIDASE ACTIVITY IN PROTOPLASTS OF AVENA SATIVA.

Dwight R. Stoll, Biology

Hyung Choe, Faculty Mentor

Methyl jasmonate plays a dual role in plant systems by participating in both developmental and defense mechanisms. Recent studies have shown that methyl jasmonate can specifically alter gene expression, while wounding and specific elicitors can cause a buildup of methyl jasmonate itself. Peroxidase enzymes are ubiquitous to all plant systems and have long been associated with plant stress and defense responses. The objective of this research was to establish a threshold concentration of methyl jasmonate effecting a maximum increase in peroxidase activity less than twenty-four hours after treatment. While previous experiments have explored the activity of methyl jasmonate on peroxidase activity using whole leaf tissue, we developed a system for testing peroxidase activity in oat protoplasts after isolation and subsequent treatment and incubation in a suitable culture media.

FEMALE OWNERSHIP OF THE BODY: THE AFRICAN AMERICAN SLAVE, WOMEN AND ISSUES OF TODAY.

Sarah Dziejewczynski, Women's Studies and History
Mecke Nagel, Faculty Mentor

Throughout history, females' bodies, reproduction and labor has not been entirely their own. A prime example of this is found in the lives and realities of the African American slave. Today, many issues such as abortion, access to birth control, and surrogate mothering are in debate. In order to better understand the differing positions that women take on these issues, it is imperative to consider the unique racial and ethnic histories of groups. Specifically, these histories must be looked at in relation to female ownership and control of her body.

WRESTLING WITH POLITICS: A MULTI-TIERED ANALYSIS OF JESSE VENTURA'S CAMPAIGN.

Seth-Michael Smith, Speech Communication
Daniel Cronn-Mills, Faculty Mentor

When former professional wrestler Jesse “The Body” Ventura began his quest for the governorship of Minnesota, most people wrote him off as a joke. Even after his victory, many people still related him more to his professional wrestling days than to his political prowess. In reality, there is a strong connection between the most popular form of programming on cable television and Minnesota’s new governor. By analyzing the rhetorical strategies behind professional wrestling, and drawing critical implications from the analysis, we can understand that the rhetoric of professional wrestling is applicable to many other aspects of society. Furthermore, we can extend the implications to understand how and why Jesse Ventura used many of the same tactics in his successful campaign.

Professional wrestling is gaining in social acceptance, and has immense popularity. The “sport” that many people write off as mind-numbing entertainment has many social implications, including many on Ventura’s campaign. Wrestling is slowly power slamming its way into society. If we “beef up” our knowledge, we can be ready.

THE TECHNOLOGICAL IMPACT OF QUALITY PRODUCTION MANAGEMENT IN THE TWENTIETH CENTURY.

Josh Hackbarth and Aaron Brixius, Management
Claudia Pragman, Faculty Mentor

The past century has witnessed a succession of technological advances in the assurance of quality in manufacturing firms. Continuing increases in the size and complexity of industrial firms has made technological improvement a necessity for business survival. Innovations in both products and processes have significantly raised quality standards and efficiency. The competitiveness of assuring quality in products has driven the modern corporation to meet the rising expectations of consumers. Upon examining the evolution of technological quality assurance processes over the last 100 years, one can observe the dramatic changes that have occurred in the manufacturing industry. This project will attempt to document the changes in equipment used to examine quality and explore future possibilities in the area of quality production management.

DENTITION AND DIET- A CHEMICAL ANALYSIS.

Dena L. Connors-Millard, Anthropology

Paul Brown, Faculty Mentor

One of the most difficult tasks in studying past cultures is determining the diet and health of the people. In archaeological sites one can often find clues to the diet, however the remains of food found generally do not give the whole picture. One way to discern the diet is by studying the teeth of the people. Teeth are almost completely inorganic, therefore they do not decompose as quickly as bones. In studying the chemical make up of teeth one can determine the mineral intake in the diet. This, in tandem with archaeological evidence, can give a better idea of the general diet and health of the people.

WHAT SOURCE OF MEDIA ARE ADULT AMERICANS ATTRACTED TO FOR THEIR DAILY NEWS AND WHAT ARE THE REASONS FOR THE ATTRACTION TO A PARTICULAR SOURCE?

Cynthia L. Davis and Ann M. Freier, English
Kathleen A. Hurley, Faculty Mentor

Most American adults depend on some source of daily news. Students at Minnesota State University, Mankato have a broad array of daily news sources available to them, such as the local and college newspapers, television, radio and online resources. We will examine student preferences for one type of news media over another. Our target group will be a convenience selection of students at MSU. This research will attempt to show a possible technology shift from traditional news resources (print and broadcast) to online resources. We will be distributing written questionnaires and conducting interviews asking what source of news media students use to get their daily news. We plan to show why this study may be significant to professionals in the news field for determining what they can do to attract more people to their news format. Those who would benefit from this research would be owners of newspapers and radio stations, advertisers, printers and students who are interested in entering the media as a career.

RECOMMENDATIONS FOR THE FUTURE OF MADISON LAKE.

Daniel D. Ehrke, Urban and Regional Studies
Perry Wood, H.R. Smith, and Cindy Miller, Faculty Mentors

Madison Lake is a small community located in the northeastern corner of Blue Earth County. The city is very unique in that it is very fortunate to have an abundance of recreational resources from its surrounding lakes. However, the city also faces many problems as it approaches the millennium. This research describes the existing issues that the area around Madison Lake is facing. It describes issues regarding recreation, main street revitalization, shoreline development, and growth. It also provides recommendations that can help the city plan for these issues.

A CRITICAL ANALYSIS OF THE DEFINITION OF THE WORD “NIGGER” IN MERRIAM WEBSTER.

Laurel Waldoch, International Relations
Daniel Cronn-Mills, Faculty Mentor

For the past 150 years, Merriam-Webster, America's leading dictionary publisher, has reported on the usage of words in the English language. Out of sheer curiosity, Delphine Abraham of Ypsilanti, Michigan decided to look up the definition of 'nigger' in the latest edition of Merriam-Webster. Abraham found the definition to be prejudiced and started a petition drive to force the dictionary to redefine the word or remove it altogether. Her movement has launched a national debate in the media and among civil rights organizations.

An analysis of Merriam-Webster's definition of 'nigger' is justified due to the historically controversial nature surrounding the word. Merriam-Webster's response to this petition could serve to alter the definition and ultimately the usage of 'nigger' and other ethnic slurs. It is important to take a closer look at the controversy surrounding Merriam-Webster's definition of 'nigger' by addressing the key question: Is the definition racist?

THE RELATIONSHIP BETWEEN TONE AND LEVEL OF UNDERSTANDING OF WRITTEN INSTRUCTIONS BY UNDERGRADUATE SORORITY WOMEN.

Karen J. Luepke, English

Kathleen A. Hurley, Faculty Mentor

While instructions have traditionally been written in a professional tone, it is possible that instructions may be better understood if written in a personal tone. Forty undergraduate sorority women of Minnesota State University, Mankato were asked to learn a variety of games. Twenty of the subjects were given instructions written in a personal tone, while the other half were given instructions written in a professional tone. The length of time and number of questions asked by the subjects were measured and recorded. Subjects were then asked to compare both sets of instructions (professional and personal). On a survey later completed by the subjects, the majority responded that they preferred, or would have preferred, the instructions written in a personal tone. Subjects using these instructions took less time and asked fewer questions than subject using the professional set of instructions. The usefulness of the results increases when they are applied to issues of greater concern such as medical research, advertisement and sales, and education.

THE NEO-PAGAN TREND IN AMERICA.

Kristin Doll, Anthropology

Paul Brown, Faculty Mentor

Neo-Pagan religions are some of the fastest growing branches of spirituality in America today, and yet few contemporary practitioners were raised with Neo-Pagan beliefs. Since Neo-Paganism generally involves a conscious decision to depart from traditions in which the individual is raised, this paper will focus on the cultural and personal factors that may affect a person's change of spiritual systems. This study analyzes this current trend by using data gathered from Neo-Pagans' self-reported motivations. Among the issues examined are subjects' religious upbringings, factors that caused them to move away from childhood belief systems, how they were introduced to Neo-Paganism, and what Neo-Paganism fulfills for them that their former religion did not.

KENNEDY CENTER AMERICAN COLLEGE THEATRE FESTIVAL ACTING COMPETITION.

Brian Flanagan, Stephen Kraus, Emily Harvey,
Mandy Marquardt, David Tacheny, Patti McGuire,
Colin Woolston, and Shannon Zeig, Theatre
Paul Hustoles, Faculty Mentor

Every year the Kennedy Center American College Theatre Festival sponsors a nationwide acting competition under the auspices of the Irene Ryan Foundation. Over 160 productions from 80 colleges and universities in KC/ACTF Region V (consisting of Minnesota, Iowa, Missouri, Kansas, Colorado, Nebraska, North Dakota and South Dakota) are entered. Each production is evaluated and the top two actors are nominated to participate, an honor all by itself. At the regional competition, this year held at Iowa State University in January, five Minnesota State University, Mankato students (four undergrads) made it to the Semi-Final round of 36-the most of any school in the eight state region. (Emily Harvey made it to the Final round as well.)

Each student is required to perform two selections, one with a partner. The pieces are designed to show the actor's versatility and expertise and can take no more than 5 minutes.

THE VOCAL RECITAL: PREPARATION AND PERFORMANCE.

Angela Braunwarth and Jennifer Fiedor, Music
Diana Moxness and Linda Duckett, Faculty Mentors

The vocal recital is the “crown jewel” of study in vocal music. The recital audience sees only a glimpse of the amount of preparation that is necessary for an actual performance. Our presenters will outline the steps in preparing and performing a vocal recital, using their own preparation for their senior recital as an example. Vocal examples from the presenters will help illustrate the path taken from selecting appropriate literature to the actual performance. Works by Mozart, Bizet, Strauss, and Irving Berlin will be featured and performed.

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Contact Wayne Quirk at 389-2321.

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