4-11-2000

Student Research Colloquium 2000

St. Cloud State University

ST. CLOUD STATE UNIVERSITY

STUDENT RESEARCH COLLOQUIUM 2000

TUESDAY, APRIL 11, 2000

ATWOOD CENTER, UPPER LEVEL

10:30 A.M. - 4:00 P.M.

ST. CLOUD STATE UNIVERSITY

A tradition of excellence and opportunity

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Acknowledgements

The Third Annual St. Cloud State University Student Research Colloquium was organized by the Student Research Colloquium 2000 Planning Committee. The members of the committee include:

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Peiyi Zhao, Department of Mathematics

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The committee would like to give special recognition to the following people:

- Juan Cabanela for designing and maintaining the colloquium's web site.
- Karen Wenz for designing and helping with the database for proceedings.
- Richard Brundage, Jennifer Kolden and Don Neu for organizing the poster session and the featured speaker session.
- Marie Novak, University Communications for the design of the colloquium's materials.
- Marcus Webster, St. John's University, for coordinating the student presenters at St. John's University and College of St. Benedict.
- Leslie Valdes for compiling the proceedings.
- The colloquium would not have been possible without the support and assistance from the College of Science and Engineering Applied Research Center, the College of Social Sciences Dean's Office, the Office of Sponsored Programs, and the Department of Psychology's office. In particular, the committee would like to recognize the work of: Meghan Bidne, Lori Korte, Michaela Meyer, Tom Stutsman, Tim Weller, and Mary Williams.

Schedule of Events

Time	Event	Location in Atwood Memorial Center
Oral Presentations		
10:30 to 11:00	Registration and Set Up	Atwood Center Upper Level
11:00 to 12:40	Paper Sessions	
	A	Glacier North, 2nd floor
	B	Glacier South, 2nd floor
	C	North Voyageurs, 2nd floor
	D	South Voyageurs, 2nd floor
	E	Lewis and Clark, 2nd floor
	F	Ballroom A, 2nd floor
	G	Ballroom B, 2nd floor
	H	Ballroom C, 2nd floor
	I	St. Croix, 1st floor
	J	Mississippi, 1st floor
Featured Speaker: Janis Tweedy Janis Tweedy earned her Bachelor's Degree in Chemistry from Smith College, Northampton, Massachusetts. She started at the Bureau Criminal Apprehension (BCA) Laboratory in 1970. She has been in the Blood and Urine, Alcohol, Firearms and Toolmarks, and Questioned Document Sections. Ms. Tweedy is currently the supervisor of the criminalistics Group (Latent Prints, Documents, Firearms and Forensic Photography.		
1:00 to 2:00	Science in the Forensic Laboratory	Little Theatre, 1st floor
Poster Presentations		
12:30 to 2:00	Registration and Set Up	Atwood Center Upper Level
2:00 to 3:30	Poster Session	Main Ballroom, 2nd floor

Program

Session A — Location: Glacier North, 2nd floor

Moderated by Annette Wilson, Office of the President, SCSU

Time	Program Index	Author(s)	Presentation Title
11:00	A1	Molly Borg, Jessica Fena & Todd Senger	Composing Annual Reports for Simulated Student Companies
11:20	A2	Carol Lewis	Nursing Homes and Public Policy: The Good, The Bad and The Ugly
11:40	A3	Katy Moren, Christine Lauer, Jessica Schmoll & Shannon Schmidt	Utilization of Nursing Research by Senior Nursing Students
12:00	A4	Kevin Clancy, Kim Therres & Lia Veenendaal	Demystifying China: A Video for International Education

Session B — Location: Glacier South, 2nd floor

Moderated by Lin Holder, Academic Affairs, SCSU

Time	Program Index	Author(s)	Presentation Title
11:00	B1	Lori Korte	The Connection Between Gender and Memory: Is Negative Priming Attenuated?
11:20	B2	Katryn Diedrich & Marylin Ospina	Facial Asymmetry, Attractiveness and The Handicap Principle
11:40	B3	Naeko Naganuma	Refusals Produced by Japanese Learners of English
12:00	B4	Kristin Keller, Travis Ersling, Suhardy Suhardy, Ming Tan & Mitch Wacker	Internet Auctions
12:20	B5	Guy Rice & Frank Zamudio	GUI OS Design/Implementation

Session C — Location: North Voyageurs, 2nd floor

Moderated by Dick Andzenge, Department of Criminal Justice, SCSU

Time	Program Index	Author(s)	Presentation Title
11:00	C1	Amy Nord	Cyberstalking: A New Crime and A New Challenge for Law Enforcement
11:20	C2	Johanna Steffan, Stacy Werner & Alissa Verschaetse	Just Think About It: Wetterling Foundation Safety Video
11:40	C3	Justin Wedeking	SCSU Campus Safety: Findings of the Spring SCSU Survey
12:00	C4	Jim Mounts	Sports Stadium Issues: Findings for the 1999 Fall SCSU Survey

Session D — Location: South Voyageurs, 2nd floor

Moderated by Lee Bird, Student Life and Development, SCSU

Time	Program Index	Author(s)	Presentation Title
11:00	D1	Michael Kakuk	Modified Lifetimes of "Elementary Particles" in Dense Media
11:20	D2	Theron Blount	Dynamical Features of Heavy Quarkonium
11:40	D3	Jason Hohenstein, Cedar Decker, & Greg Larson	Robust Addition of Copper to a Molten Ductile Iron Stream
12:00	D4	Tim Jackson	The Synthesis of Monatomic Lanthanide Doped Glass by the Sol-Gel Process
12:20	D5	Christine Russell	An Example of Photochemical Induced Heterolytic Bond-Cleavage in Platinum II Ace

Session E — Location: Lewis and Clark, 2nd floor

Moderated by Carolyn Williams, College of Social Sciences, SCSU

Time	Program Index	Author(s)	Presentation Title
11:00	E1	Marcel Goldschen	Spatial Heterodyne Spectroscopy Data Analysis Techniques
11:20	E2	David Novak	Isentropic Analysis of Ahead and Behind Inverted Trough Storms
11:40	E3	Jason Otkin	The Convective Influence on High-Frequency Gravity Wave Variability
12:00	E4	Andrea Tollison	The Light Curve of Comet Hale-Bopp

Session F — Location: Ballroom A, 2nd floor

Moderated by Heidi Howell Farrah, University Honors Program, SCSU

Time	Program Index	Author(s)	Presentation Title
11:00	F1	Deborah Saad	Creating Life on the Page for the Stage: Playwriting
11:20	F2	Brian Tiemann	Living the Life of a Theater Director: Working With High School Students
11:40	F3	Bethany Urban	Cycles of Horror: John Webster's Use of Character Dissipation and Violence
12:00	F4	Kevin Bitterman	The Luney Life of a Theater Intern at Theatre de la Jeune Lune
12:20	F5	Christine Grossman	In Search of the Eighteenth-Century Man of Science

Session G — Location: Ballroom B, 2nd floor

Moderated by Diana Burlison, Administrative Affairs, SCSU

Time	Program Index	Author(s)	Presentation Title
11:00	G3	Jessica Zack	Early Hearing Detection and Intervention (EHDI)
11:20	G1	Ang Jeffrey & Looi Kim Thean	Voice Recognition Control Car
11:40	G2	Joshua Muonio & Tracy Beil	Prothetic Vacuum Pump Design and Socket Pressure Measurement

Session H — Location: Ballroom C, 2nd floor

Moderated by Heidi Howell Farrah, University Honors Program, SCSU

Time	Program Index	Author(s)	Presentation Title
11:00	H1	Kris Garber, Aleisha Fellegy & Sandie Simon	Fungal Succession on Dead Oak Trees in Central Minnesota
11:20	H2	Michelle Edwins	Purification & Structure Determination of an Antifungal Compound
11:40	H3	Matthew Tinguely	A Mutation in the Collagenic Tail Subunit Gene (COLQ) of Endplate AchE
12:00	H4	Renee Samuelson	The Determination of Rat Transamidinase Gene Structure
12:20	H5	Daniel Sloper	Isolation & Characterization of Bacillus cereus Flagellar Proteins

Session I — Location: St. Croix, 1st floor

Moderated by Peiyi Zhao, Department of Mathematics, SCSU

Time	Program Index	Author(s)	Presentation Title
11:00	I1	Esther Widiasih	An Exploration in Symbolic Dynamics: The Golden Mean Shift & the Silver Mean Shift Side by Side
11:20	I2	Richard Theis & Eric Kramer	Computer Generated Vector Shapes
11:40	I3	James Nelson	College Football Rankings Using Markov Chain Models
12:00	I4	Kristopher Glesener	Applying Machine Learning Algorithms to Othello

Session J — Location: Mississippi, 1st floor

Moderated by Gerianne Klug, Women's Studies, SCSU

Time	Program Index	Author(s)	Presentation Title
11:00	J1	Meghan Carley	A Student's Guide to STD Testing in the St. Cloud Area
11:20	J2	Stephen Norton	The Disintegration of Gender Within *Aliens*
11:40	J3	Egon Ozer	Gender & Estrogen Effect on GHRH Responses to NMDA in Rats
12:00	J4	Lupita Saucedo	Mexican-American Poetry/Writing

Featured Speaker — Location: Little Theatre, 1st floor

Introduced by Suzanne Williams, President of St. Cloud State University

Time	Program Index	Author	Presentation Title
1:00	K1	Janis Tweedy	Science in the Forensic Laboratory

Session L — Location: Atwood Ballroom, 2nd floor

Time	Program Index	Author(s)	Presentation Title
2:00	L1	Tariq Amin, Abbas Bangee & Omer Al-Eisa	Motion Control Using DSP
2:00	L2	Michael Rasmussen	Error Analysis of Video Method in Estimating Jump Height
2:00	L3	Keith Lovegren, John Rottman & Michael Young	Wireless Remote Access Control and Monitoring System
2:00	L4	Chun-Fan Lung, Andy Fredin & Brandon Bartz	Voice Activated Computer
2:00	L5	Mark Mccutcheon, Kimberly Schueller & Ashiqur Rahman	Lightning Feed
2:00	L6	Esther Widiasih	An Exploration in Symbolic Dynamics: The Golden Mean Shift and the Silver Mean Shift Side by Side
2:00	L7	John Oberly, Josh Svoboda & Michael Anderson	DSP Siren
2:00	L8	Patrick Krekelberg, Jared Momose, & Josh Simonson	Aural Shape Shifter
2:00	L9	Kellie Rhinerson, Mae Petrangelo, Nicole Stewart, Jessica Zack, Kay Ivers, Kari Lehmkuhl, Carrie Laven, Elisa Roiko, Kelly Davidson, Cindy Bowman, Amy Magnuson, Katherine Rono & Tammy Uecker	Duties of 46 Speech-Language Pathologists: An Interview and Observational Study
2:00	L10	Nicole Storkamp	Creative Ways to Bring Women of History into Elementary Classrooms & Much More!
2:00	L11	Judith Peters & Alicia Spychala	Theoretical Investigation of Sulfinyl Radical Reactions
2:00	L12	John Hein	Drug Distribution: A Guided Inquiry Laboratory Experiment in Coupled Equilibria
2:00	L13	Kimberly Munter	El Nino's Influence on Midwestern Winters
2:00	L14	Bryan Meade	Efficient Purification of Cellular Retinol Binding Protein II
2:00	L15	Laura Kriz	Elder Abuse in Institutional Settings
2:00	L16	Kris Bolster & Brandeu Weis	Integrating a Specialized Production Cell into an Automated Assembly Line

Session L Location: Atwood Ballroom, 2nd floor

Time	Program Index	Author(s)	Presentation Title
2:00	L17	Patrick Ness	Effect of Childhood Attachment to Fathers and Adult Intimate Relationships
2:00	L18	Scott McMillan	Error Analysis Of Impulse Method In Estimating CMJ Height
2:00	L19	Eric Fenstad	Ribose Administration at Rest: Effect on Metabolic Parameters
2:00	L20	Tom Stutsman	Education Majors' Evaluation Bias of Minority Students' Essays.
2:00	L21	Karl Malmberg	Thoughts of Optimists and Pessimists as related to Hypothetical Dating Situations
2:00	L22	Tracy Beil & Joshua Muonio	Prothetic Vacuum Pump Design and Socket Pressure Measurement
2:00	L23	Catherine Davidson	Gender Differences in Relation to Self-Esteem and Body Image
2:00	L24	Wayne Board	Error Analysis of Flight Time in Estimating Jump Height
2:00	L25	Blaine Thomas	A Climatology of Lightning in the Northern Plains
2:00	L26	Jon Gayken, E. Ozer & O. S. Gazal	Effect of Age and Time of Day on Thyroxine and Cortisol Levels in Dairy Goats
2:00	L27	Angela Goldenstein & Chimene Valley	Strap Tensioner Project
2:00	L28	Kristi Chupurdia & Angela Frelich	A Long-term Perspective of Adult Fitness Testing
2:00	L29	Scott Ficek & Eric Fenstad	Performance Testing of NCAA Division I Women Ice Hockey Players
2:00	L30	Patricia Stang	Content Analysis of Gender Perceptoins in Birthday Cards
2:00	L31	Daniel Ferraro & Adam Westman	Synthesis of Phosphino Ruthenium Hydride Complexes
2:00	L32	Ryan Hansen	DNA Repair Defects of Saccharomyces Cerevisiae Deleted of the RAD27 Gene
2:00	L33	Marcel Goldshen, Laura Lockwood & Andrew Matt	Stellar Spectral Analysis
2:00	L34	Steven McGreevy	Aeromycological Spore Loads at Newly Activated Compost Sites
2:00	L35	Valerie Meyer, Elizabeth Heins, Joseph Matel & Kari Recker	The Hydration Effects of Preloading Gatorade vs. Water During Exercise
2:00	L36	Claire Hill	The Dragonflies of Stearns County: Analysis of Parasitism Rates by Water Mites
2:00	L37	Jason Bartos	The Political Personality of Patrick J. Buchanan
2:00	L38	Sarah Reed	Fiber-Optic Spectroscopy of Jupiter
2:00	L39	Cortlan Strom	Variable Stars
2:00	L40	Jon Kauhane, Ben Weber & Gary Hillukka	On Board Diagnostic
2:00	L41	Eric Green	LFC Heights for Tomadic vs. Non-Tomadic Supercell Thunderstorms in the Northern Plains
2:00	L42	Daphne Dokter	Noise: A ZINE for Voices

Abstracts

Composing Annual Reports for Simulated Student Companies
Molly Borg, Jessica Fena and Todd Senger
Sponsor: Jamie Partridge, Virginia Arthur, Wendy Klepetar
College of St. Benedict, Management

The Organizational Leadership Program (OLP) is a yearlong experiential learning program for senior management majors at the College of St. Benedict and St. John's University. The Board of Directors (Management faculty) selects six Chief Executive Officers. The remaining students are divided into six companies, focusing in one of four functional areas: finance, human resources, marketing, and operations. The companies compete in a computer simulation each quarter for a period of four simulated years. Each company is then responsible for presenting a series of reports to the Board of Directors including annual reports, marketing plans, business plans, strategic goal status, and any other significant information. The annual report given by the company presents the highlighted activities of the previous year and gives a series of timely and measurable future goals. We will discuss the research in each functional area that goes into compiling the information for our annual reports.

Presentation Index: A1

Nursing Homes and Public Policy: The Good, The Bad and The Ugly
Carol Lewis
Sponsor: Phyllis Greenberg
St. Cloud State University, Community Studies/Gerontology

Nursing homes are a very regulated industry. This study shows the perspective on regulation from the vantage points of nursing home administrators, policy specialists and an ombudsman. The focus of the study is to evaluate current goals of the State of Minnesota in reducing the number of nursing home beds and the creation of alternatives in conjunction with demographic data. This data suggests the "oldest old," those 85 and older, is the fastest growing segment of the population, and is traditionally the group most in need of nursing home care. This presents a possible crisis unless viable alternatives are developed and/or the moratorium on new beds is removed. Interviewees address these concerns and their vision of the future of long-term care in Minnesota.

Presentation Index: A2

Utilization of Nursing Research by Senior Nursing Students
Katy Moren, Christine Lauer, Jessica Schmoll and Shannon Schmidt
Sponsor: Joyce Simones
College of St. Benedict, Nursing

Research should not be viewed as a "frill" but as a necessary component of nursing practice. Research is not a strange difficult process that only clinicians and managers cite when they are revamping policies and procedures. The use of research should be included as part of every nurse's interventions to improve the quality of care for their patients. How do nurses learn the importance of basing their practice on research? This process should begin as a nursing student. As seniors in this baccalaureate nursing program, students are required to actually implement research regularly during their rotations at their hospital clinicals and at their community based clinicals. It is the expectation that these students will continue to value the importance of nursing research in their practice as Registered Nurses, critique current research and continue to implement research into their plan of care for their patients. Each week students seek appropriate nursing research for their patients from various nursing journals. During their clinicals, they implement the research as a component of their plan of care. During weekly postconferences, all the students discuss their research and analyze the effectiveness as interventions. During this research presentation, senior nursing students will discuss how they actually implemented nursing research in their care of their patients and evaluate the effect of their research.

Presentation Index: A3

Demystifying China: A Video for International Education
Kevin Clancy, Kim Therres and Lia Veenendaal
Sponsor: Joan Steck
St. John's University, Communication

China has long captured the imagination of the West. Nonetheless, our images of China tend to be cloaked in stereotypes, mystery, and misunderstanding. In such a way, it is a difficult task to accurately present the experience of the "Middle Kingdom" to the Westerner. Consequently, students who participate in the international education program are often weary of applying to China. When confronted with the prospect of studying abroad in Asia, many students reply, "Why China?!" Nonetheless, the students who do choose China come back to campus thoroughly appreciating the experience. So the question remains, How can one bridge this gap? How can one take the experience and excitement of China and communicate it to prospective students? These questions reside at the heart of this video project. The goal of this video is to communicate the experience of a "foreign" land to the American college student. Consequently, this goal directed the structure of the video. The video follows the 1998 St. John's/St. Benedict China group through their adventure. Rather than an "ominous" narrator, the story is told through the experience of four students on the trip. The students' narratives are interwoven to create this thirty-minute video. The video begins with their initial choice to study in China and concludes with re-entry shock and final reflections on the program. Video clips, pictures, and music are used to compliment the students' narrative. However, this is more than a story of the 1998 China trip. Rather, this particular group's experience is used as a general vehicle for exploring the trip. China is a complex country, and yet all students who travel to China cherish the lessons learned from the complexity. The purpose of this video is to encourage curious students to embrace the complexity of the trip – and moreover to give a face to this complexity. The hope is that students will transition from saying, "Why China?" to "China – why not!"

Presentation Index: A4

The Connection Between Gender and Memory: Is Negative Priming Attenuated?
Lori Korte
Sponsor: Marlene DeVoe, Leslie Valdes
St. Cloud State University, Psychology

Negative priming results when a response is required for a stimulus that was previously unattended (Milliken, Merikle, Joorden, & Seiffert, 1998). With a method similar to Milliken et al.'s (1998), this study sought to replicate negative priming. It was also hypothesized that negative priming would be attenuated during trials where the stimuli were the same gender-type as the participant's gender. Psychology undergraduates were presented with a briefly flashed letter string (33 ms) followed by another letter string that required a lexical decision. The words were either stereotypically associated with a gender or were neutral. Negative priming was not found, and instead a decrease in reaction time occurred during trials that repeated the same letter string. Consequently the interaction of gender-type stimuli and participant gender could not be examined since the hypothesis rested on the occurrence of negative priming. Future work should be done to replicate previous findings of negative priming.

Presentation Index: B1

Facial Asymmetry, Attractiveness and The Handicap Principle
Katryn Diedrich and Marylin Ospina
Sponsor: Linda Mealey
College of St. Benedict, Psychology

Facial symmetry has often been correlated to high ratings of attractiveness. In the current study we delve into the relationship between symmetry, attractiveness and self manipulated variables-specifically, the part in one's hair, and the placing of tattoos and body piercings. We hypothesized from the handicap theory that individuals with high facial symmetry handicap that symmetry by consciously or unconsciously parting their hair asymmetrically or using asymmetric placement of a tattoo or piercing. We expect the facially symmetric individuals can afford to advertise their symmetry by showing off asymmetric tattoos and piercing. Conversely, those with asymmetrical faces will attempt to gain symmetry with symmetrical hair parts, tattoos and piercings. We tested the hypothesis using ratings of pictures from old yearbooks and from trade magazines on tattoos and piercings, in addition to using pictures of monozygotic twins which had been rated and calibrated for symmetry and attractiveness in a previous study.

Presentation Index: B2

Refusals Produced by Japanese Learners of English
Naeko Naganuma
Sponsor: Russell Arent
St. Cloud State University, English

People tend to face difficulties in communicating cross-culturally because of many factors, such as language and cultural differences, This study focused on refusals produced by Japanese learners of English while staying in the United States. The researcher interviewed 20 Japanese students in order to investigate the following three main points: 1) what kinds of situations they face when refusing anything; 2) how valid they perceived the given questionnaire situations developed by Hudson et al. (1995); and 3) how the existence of an opting-out choice, which is defined by Bonikowska as "the speaker's decision not to perform a speech act" (1988), affected the results by Japanese students. Interviews with native speakers of English were also done to compare their responses with ones by Japanese students.

Presentation Index: B3

Internet Auctions
Kristin Keller, Travis Ersling, Suhardy Suhardy, Ming Tan and Mitch Wacker
Sponsor: Wenyu Dou
St. Cloud State University, Marketing
Online auctions have become increasingly popular in the past year and have attracted a variety of users. This paper compares the top four online auction sites – eBay, Amazon, Go!, and Yahoo(as of November 1999) in five key areas. Each area has several topics of comparison creating an easy to read table of information with specific descriptions of those topics in relation to each auction site in the comparison. These areas include:

- ease of use (download speed, search and sort capabilities, costs to list and purchase, personalization tools, registration policies, and uniformity throughout the site)
- customer confidence (guarantees, verification of listings, number of registered users, privacy and security of purchases, and return policies)
- on-site resources (FAQ, product descriptions and illustrations, and directions for buying and listing)
- relationship services (customer service, purchases and delivery options, and recovery policies)
- information (advertising and marketing efforts, continuous improvement efforts, and depth and breath of product offerings)

After the analysis, eBay is stands as the clear leader and carries the highest recommendation of this study. Its positive image in the market, high ratings in Bizrate.com and Gomez.com, positive word of mouth and reputation among users, and established time in the market give it clear advantages over up and coming competitors. Brand recognition, high customer awareness, and financial assets give eBay the leverage they need to accomplish future growth and turn around the weaknesses of the organization and the threats posed by the external environment.

Presentation Index: B4

GUI OS Design/Implementation
Frank Zamudio and Guy Rice
Sponsor: Nathan Brahma
St. Cloud State University, Computer Science

The authors will present their work so far on implementing a graphical user interface for the Minix operating system. Focus will be on how well-designed application programming interfaces encourage well-designed user interfaces (and conversely, how ugly and difficult to use programs are often found on a systems with poor GUI APIs, which we believe is no coincidence). Examples of good and bad API design in several other operating systems & graphical toolkits (including MacOS, Windows, MFC, X Windows, Qt, and Java) will be shown, along with demonstrations of how these design decisions impact the typical application program written under these systems. Also to be discussed (time permitting): hardware interfacing issues and how choices of appropriate level of abstraction impact speed and easy of use, some of the good and the bad decisions behind the standard human interface of most modern GUI systems (i.e. where MacOS went wrong and the mistakes others copied), and some ways the Internet is impacting user-interface design.

Presentation Index: B5

Cyberstalking: A New Crime and A New Challenge for Law Enforcement
Amy Nord
Sponsor: John Campbell
St. Cloud State University, Criminal Justice

At any given time there are over 35,000 million people logged on to the internet. In a behavior called cyberstalking, it is estimated that over 63,000 of these people are using the internet to stalk over 474,000 victims. There are three types of cyberstalking behavior: on-line stalking that stays on-line, on-line stalking that ventures off-line and using the internet to impersonate victims or obtain personal information about victims. Law enforcement is prohibited from acting on cyberstalking behavior because there are few laws designating cyberstalking as criminal behavior. In addition, law enforcement officers often lack training, equipment and resources needed to identify cyberstalkers.

Presentation Index: C1

Just Think About It: Wetterling Foundation Safety Video
Johanna Steffan, Stacy Werner and Alissa Verschaetse
Sponsor: Joan Steck
St. John's University, Communication

We plan on presenting our video "Just Think About it!", which is geared at middle school aged kids on issues of child abduction, sexual molestation, common lures, and internet safety. The video was produced for the Jacob Wetterling Foundation as a tool for their speaker bureau that discusses these important issues throughout the schools in the area. It is about 12 minutes long.

Presentation Index: C2

SCSU Campus Safety: Findings of the Spring SCSU Survey
Justin Wedeking
Sponsor: Steve Frank
St. Cloud State University, Political Science

During April 4-11, 1999, the SCSU Survey performed a survey of SCSU Students. The SCSU Survey is an ongoing survey research arm of the Social Science Research Institute in the College of Social Sciences at SCSU. One of the main topics in the survey was campus safety. There was a total of ten questions asked about different aspects of safety on campus. They included the students general views of safety while on campus, rating of our Public Safety department, ratings of some of the services offered by the department of Public Safety, the emergency call box system, the 911 calling issue on campus where 9-911 must be dialed, and any areas on campus in which a person might be afraid to walk alone at night. Overall, the campus was found to be a safe campus, but there were some mixed results when the numbers were broken down by gender. The survey consisted of 468 completed surveys of then currently enrolled students who lived in Minnesota. The sample error is approximately plus/minus 4.6% at the 95% level of confidence.

Presentation Index: C3

Sports Stadium Issues: Findings for the 1999 Fall SCSU Survey
Jim Mounts
Sponsor: Steve Frank
St. Cloud State University, Political Science

In the fall of 1999, the SCSU Survey performed a survey of Minnesota residents. SCSU Survey does research in the College of Social Sciences at SCSU. One of the topics of the survey dealt with Minnesotan's views about sports and public funding for sports stadiums. Three questions were asked in the survey about this topic. First, a question was asked to see which team Minnesotans would most like to see stay in Minnesota. Next, a question was asked to see if they supported allowing Hennepin County residents to vote for a county sales tax to pay for a third of the cost of building a new Twins stadium in Minneapolis. Finally, if they were opposed to the preceding question, they were asked why they oppose it. Overall, the research showed that Minnesotan's opinions about sports and public funding hasn't changed since past surveys. The Vikings remain the team they would like to keep the most. Also, they are opposed to allowing a vote in Hennepin County, and they don't like taxes that are needed for professional sports.

Presentation Index: C4

Modified Lifetimes of "Elementary Particles" in Dense Media
Michael Kakuk
Sponsor: Kevin Haglin
St. Cloud State University, Physics, Astronomy and Engineering Science

Experiments being performed at particle accelerators around the world involve colliding large nuclei. These reactions last roughly a trillionth of a trillionth of a second and they occupy a trillionth of a trillionth of a trillionth of a centimeter cubed. The collision can be understood indirectly by measuring the several hundred particles that are created in a typical experiment. One of the characteristics of particles involved in this complicated system is a particle's lifetime. Most subatomic particles decay into lighter particles given enough time. The lifetime of a particle is the average time from its creation to decay. The lifetime of a particle can be affected by the density of the medium. If many particles occupy a certain volume, then their interactions with each other will change lifetimes. Because a typical collision creates so many particles in such a small space, the lifetimes of these particles change. This change must be understood if the details of the system are to be correctly inferred from the measured particles. Specifically, a general equation for modeling the change in lifetimes was used to numerically analyze a specific case involving rhea mesons in a dense pionic medium. Rho mesons and pions are subatomic particles copiously produced in collisions of heavy nuclei.

Presentation Index: D1

Dynamical Features of Heavy Quarkonium
Theron Blount
Sponsor: Kevin Haglin
St. Cloud State University, Physics, Astronomy and Engineering Science

High energy nuclear collisions create a hot and dense, short lived system of subatomic particles. The J/psi particle is comprised of a heavy charmed quark plus its antiquark and is consequently three times more massive than a proton. Since it decays into electromagnetic particles, it provides valuable information on the space and time development of the larger nuclear system. When J/psi collides with other, more abundant particles, an absorption reaction occurs, and it is effectively converted into a different species of particle. Modeling the rate of these individual conversions is critical in determining the overall production of J/psi from a typical nuclear collision. First, we must understand the dissociation cross section and population density for each type of light particle. We use them to compute a probability for conversion, and ultimately, a rate for J/psi conversions. The larger goal of the project is to better understand observable properties of hot and dense matter which holds promise for future developments in high energy nuclear physics. Numerical results will be presented and discussed.

Presentation Index: D2

Robust Addition of Copper to a Molten Ductile Iron Stream
Jason Hohenstein, Cedar Decker, and Greg Larson
Sponsor: Stephen Covey
St. Cloud State University, Manufacturing and Engineering

Grede Foundries Inc., a local producer of ductile iron castings primarily used in the automotive industry, sponsored a project that invited our team of manufacturing engineering students to explore possible alternatives to add copper to the iron stream on one of their two current production lines. The purpose of this copper addition is to promote a microstructure that is pearlitic in lieu of the ferritic which would be present if the metal lacked the copper addition. The reason that a pearlitic microstructure is desired is for its improved hardness characteristics. The research was focused on a controlled process that will robustly add an addition of copper, varying with furnace concentration and pouring times, to a ductile iron stream. The driving force for this type of controlled process is flexibility in the manner in which parts can be made through the line. The research looked at three different candidates for this addition: pneumatic feed of an atomized copper powder, vibratory feed of a recycled copper wire chop, and a volumetric feed of a recycled copper wire chop. The results of this research were evaluated on a basis of cost, accuracy of addition, precision of addition, ability to control, and feasibility of mounting the machine on-line with the current production line. The research shows that loss-of-weight screw type feeder will be the best mechanism for his application and was recommended to Grede Foundries Inc. for implementation on their BMD production line.

Presentation Index: D3

The Synthesis of Monatomic Lanthanide Doped Glass by the Sol-Gel Process
Tim Jackson
Sponsor: Don Neu
St. Cloud State University, Chemistry

Within the last thirty years the sol-gel process has been found to make glass. It involves the polymerization of a silicon alkoxide to make glass. This process has been used to produce lasers and other optical materials by doping the glass with a rare earth element (lanthanide). This route produces glass with lanthanide atoms dispersed throughout the matrix. This random dispersion causes low quantum yields and larger emissive bandwidths, both of which retract from the optical performance of the glass. To prevent dispersion, this research has aimed at chemically reacting a lanthanide alkoxide with a silicon alkoxide to create monatomic lanthanide doped glass. A number of gels and glasses have been produced by this scheme. These materials have been analyzed by various chemical methods in an attempt to discover if the lanthanide alkoxide has reacted with the silicon alkoxide or if the lanthanide is simply dispersed within the glass

Presentation Index: D4

An Example of Photochemical Induced Heterolytic Bond-Cleavage in Platinum II Ace
Christie Russell
Sponsor: Richard Lavallee
St. Cloud State University, Chemistry

This research involves an investigation of [Pt(acac)(CH3CN)2][CH3SO3] (acac= acetylacetonate anion), an example of a metal acetylacetonate complex. Historically, metal acetylacetonate complexes have been observed to undergo homolytic bond cleavage of one platinum-oxygen bond upon absorption of ultraviolet or visible light. Recent studies have indicated that the ultraviolet photolysis of Pt(acac)2, in acetonitrile containing methylsulfonic acid, yields heterolytic bond cleavage products. Therefore, we have undertaken a complete photochemical investigation of [Pt(acac)(CH3CN)2][CH3SO3] in order to characterize this closely related complex. General photochemical principles, procedures, and results of our investigation to date will be discussed.

Presentation Index: D5

Spatial Heterodyne Spectroscopy Data Analysis Techniques
Marcel Goldschen
Sponsor: John Harlander
St. Cloud State University, Department of Physics, Astronomy & Engineering Science

In support of our program to develop instrumentation for remote sensing of the earth's atmosphere we are testing Spatial Heterodyne Spectroscopy data analysis techniques for sensitivity to expected deviations from ideal instrument performance. As a first step in this process we have developed a method for comparing ideal to distorted spectra. Using high-resolution spectra obtained from the National Solar Observatory on Kitt Peak we have generated a synthetic ideal instrument output. This instrument output is processed to produce an ideal spectrum. Distortions can be included in the modeled instrument output, processed, and the result compared to the ideal spectrum. This technique can be a guide to instrument design by putting limits on the allowable deviations from ideal instrument performance.

Presentation Index: E1

Isentropic Analysis of Ahead and Behind Inverted Trough Storms
David Novak
Sponsor: Bob Weisman
St. Cloud State University, Earth Sciences

Composite isentropic analysis of Ahead and Behind case inverted trough storms was completed. This analysis confirmed that -significant lift is present in the ahead quadrant of the Ahead case and behind quadrant of the Behind case. This correlated well with the precipitation patterns observed in each case. Stronger and more spatially concentrated isentropic lift was observed in the Ahead case than the Behind case in the lower levels. However, significant confluence was found in the behind quadrant of the Behind case, while absent in the ahead quadrant of the Ahead case. This is evidence that the Ahead cases are dominated by isentropic lift in the lower levels, while the Behind cases have forcing from both isentropic lift and frontogenesis. Conclusive evidence of jet forcing was found in the Ahead composite case, while a direct link to the jet's influence could not be established with confidence in the Behind composite case.

Presentation Index: E2

Convective Influence on High-Frequency Gravity Wave Variability
Jason Otkin
Sponsor: Tony Hansen
St. Cloud State University, Earth Sciences

Wind observations from the 50 MHz wind profiler at White Sands, NM have been used to develop a relationship between enhanced high frequency gravity wave variability in the upper troposphere and lower stratosphere with occurrences of deep convection. To develop this relationship, vertical profiles of the average vertical velocity variance were developed for various intensities of observed convection. As will be shown, there is a pronounced enhancement of this variance through the entire vertical profile during occurrences of deep convection when compared to non-convective hours. Due to the diurnal nature of convection, a diurnal cycle of enhanced variability could also be expected. Thus, in order to isolate the enhancement due to deep convection, profiles of the vertical velocity variance were developed for the peak convective hours. These profiles show that enhanced variability is closely related to the occurrence of deep convection and is not determined solely by the diurnal cycle.

Presentation Index: E3

The Light Curve of Comet Hale-Bopp
Andrea Tollison
Sponsor: Maria Womack
St. Cloud State University, Physics, Astronomy & Engineering Science

When a comet comes near enough to the sun to develop a coma, one of the things scientists measure is the apparent magnitude of the comet. The apparent magnitude is how bright the comet looks at visible wavelengths to people observing it from earth. In this project I corrected the apparent magnitude data of Comet Hale-Bopp for the comet's intrinsic brightness. I plotted several graphs of the data each graph representing a different stage in the correction process and compared them to make some conclusions about the activity of the comet as it traveled around the sun. My final light curve for Comet Hale-Bopp shows that there were no major outbursts of the comet during its journey.

Presentation Index: E4

Creating Life on the Page for the Stage: Playwriting
Deborah Saad
Sponsor: Kaarin Johnston
St. John's University, Theater

As a senior theater major at the College of Saint Benedict, I chose to work toward graduating with All-College Honors by writing an original play for my senior honors thesis. My play, A Reading from the Letters of Paula, tells the story of Paula, who travels around searching for answers to questions she canât define. We learn of her explorations through letters written back and forth. The process of playwriting included research on subject matter (i.e. locations visited, historical topics mentioned) as well as exploring details, such as the meaning of specific character names (i.e. Stacey comes from Anastasia, meaning ãto rise againä). The work to create my play challenged me to justify my decisions regarding choice of plot, creation of character, and the meaning communicated to the audience. The project will conclude with a public reading where audience members will share reactions to the play.

Presentation Index: F1

Living the Life of a Theater Director: Working With High School Students
Brian Tiemann
Sponsor: Kaarin Johnston
St. John's University, Theater

Directing a theatrical production is a process of combining one's knowledge of the various aspects of theater, thereby being able to articulate and demonstrate those aspects onto the stage. A successful director has sufficient knowledge not only of specific activities such as stage blocking and fundamental acting, but also an awareness and ability to understand technical staging and costuming demands as well. The process of directing for both high school and middle school students takes directing in a different route than professional theater. A director with young students essentially becomes a teacher of theater, one who needs to be aware of the need to teach the various aspects of theater to the students who are a part of the production. Educational theater needs to reflect a positive value for the both the participants and audience

Presentation Index: F2

Cycles of Horror: John Webster's Use of Character Dissipation and Violence
Bethany Urban
Sponsor: Andrew Vorder Bruegge
St. Cloud State University, Theatre

The paper examines the use of dissipation and violence in Webster's *The Duchess of Malfi*. The dissipation is the process of becoming obsessed with a passion such as rank, lust, or greed. The dissipation draws closer and closer to an inevitable action. This action is the character violence. This violence is projected as physical or psychological aggression. Webster uses this tactic to show the degenerate condition of the Jacobean society, a society devoid of the values of stoicism. Webster's use of stoicism builds upon Senecan philosophy. Seneca focused on the individual without providing a stoic core to his dramas. Webster explores the world as a whole, and he provides a stoic center to anchor the action (embodied here in the character of the Duchess). Webster's characters are personifications of particular vices rather than characters of great psychological complexity. Webster's characters travel through cycles of dissipation and violence. The path of dissipation circles outward to acts of violence. Characters repeat the cycle, ultimately terminating in disastrous and/or catastrophic destruction. This model helps actors to follow the path of Webster's characters. Deep psychological analysis, then, is not necessary in the case of this play but rather a trust in Webster to let all the pieces of a performance add up to a whole.

Presentation Index: F3

The Luney Life of a Theater Intern at Theatre de la Jeune Lune
Kevin Bitterman
Sponsor: Kaarin Johnston
St. John's University, Theater

In response to a recent internship with the Theatre de la Jeune Lune, Kevin Bitterman discusses the rehearsal process used by the Jeune Lune artistic company. Founded in 1978 by four graduates of the École Jacques Lecoq (Two Parisians and two Minneapolis natives), the Theatre de la Jeune Lune views the theater as a collaborate endeavor that is enriched through a unique creative process. Together, the company has generated national and international attention because of its commitment to finding the "new" in the "old" through the exploration of improvisation, inventive physicality and imagination. The Theatre de la Jeune Lune's rehearsals of *The Government Inspector* serve as Kevin's experiential background. The presentation focuses on how the company's commitment to collaboration is reflected in their work and how it liberates creativity in the minds and bodies of artists.

Presentation Index: F4

In Search of the Eighteenth-Century Man of Science
Christine Grossman
Sponsor: Sharon Cogdill
St. Cloud State University, College of Fine Arts and Humanities

In the mid-eighteenth century, the construction of the "Man of Science" was in flux. Would this person be a Renaissance man, knowing a bit about a lot of things, and conversant in them all? That image does not fit with a large information pool, if specialized knowledge is required for certification in a particular study. Could the Man of Science be a compartmentalized specialist? This might present the beginnings of one dimension of The Modem Man; instead of fulfilling earlier @pochs'visions of the well- educated, Modernity offers such an information dump that to be master of one field is to reject knowledge of another. John Armstrong presents one clear example of such juxtaposition in his poem on good health maintenance habits, "The Art of Preserving Health". Less obscurely, John Dryden also used poetical means to celebrate the scientific in his piece, "To my Honoured Friend, Dr. Charleton, on his learned and useful Works; and more particularly this of STONE-HENGE, by him Restored to the True Founders", an earlier poem of the Restoration period. The mere existence of these texts demonstrates a desire to express scientific knowledge in figurative terms. Thus, only a through an examination of qualities of eighteenth- century Men of Science can any conclusion about his characteristics be drawn.

Presentation Index: F5

Early Hearing Detection and Intervention (EHDI)
Jessica Zack
Sponsor: Aparna Rao
St. Cloud State University, Communication Disorders

The goal of this presentation is to review quality assurance indicators for a model EHDI program in central Minnesota. The EHDI program was implemented at St. Cloud Hospital in December 1998. Currently, St. Cloud Hospital is the largest birthing hospital in the state with an EHDI program. Approximately 2,500 births occur annually. The goals of EHDI are to screen all babies before hospital discharge, diagnose a hearing loss by three months of age, and provide intervention before six months of age. Quality assurance measures are proposed to monitor statistics that determine the success of the program. Quality assurance indicators are used to track tests, outcomes and screeners. Data collected from January 1999 through December 1999 will be analyzed. Technology choices, quality assurance indicators, problems, and solutions will be discussed for this program. Implications regarding referrals and early interventions will be addressed.

Presentation Index: G1

Voice Recognition Control Car
Ang Jeffrey and Looi Kim Thean
Sponsor: Peter George
St. Cloud State University, Electrical Engineering

To implement remote voice recognition hardware that will recognize the word commands to control a model car without manual intervention. Unlike the contemporary radio control car of today, where manual control is used, in this design, voice commands will be used to control the model car. The voice recognition hardware will be incorporated into the remote control unit that comes with the model car. Typical commands such as forward, left, right, stop and auto cruise will be implemented. Sensors will be installed to avoid collisions and voice control of head light beams. Our major goal is to utilize voice command to control the radio car. Our design is not meant for toys only but is also applicable to wheel

Presentation Index: G2

Prothetic Vacuum Pump Design and Socket Pressure Measurement
Joshua Muonio and Tracy Beil
Sponsor: Steve Covey, Glenn Street
St. Cloud State University, Manufacturing and Engineering and Biomechanics

For many amputees, daily limb volume loss creates problems with high-pressure points, fit of the socket and failure of the liner. TEC Interface Systems of Waite Park, MN has developed a vacuum-assisted socket that seems to allow below-knee amputees to maintain normal limb volume throughout the day. Maintaining normal limb volume allows the socket to be total surface weight bearing. For volume to be lost in the original socket setup but not when using the vacuum-assisted socket, it has been hypothesized that this might be due to differences in pressures applied to the limb. The intent of this investigation is to see if any differences in pressure can be detected between the two socket conditions. A urethane liner was instrumented with the pressure sensors embedded within its walls. Measurements were taken during walking, weighted and unweighted conditions while wearing the normal socket system and the vacuum-assisted socket. Initial results show that peak pressures in both conditions are similar. Testing continues in an attempt to document pressure differences during the swing phase of walking. While these pressure differences are under investigation TEC has begun work on the development of a mechanically activated vacuum pump. This pump will be easily adaptable to current prosthetic systems and will draw a vacuum in the socket system during amputee gait. A pneumatic spring is built into the pump, acting both as shock absorber and return spring. Lowering production costs while maintaining a strength great enough to withstand impact forces from vigorous athletic activity and minimizing weight and size are some of the design challenges. Three unique prototypes have been developed and are either in the process of or have been tested by amputees. A fourth prototype is being developed. Finite element analysis will be used to predict maximum loading forces allowed by the pump and improve current pump design.

Presentation Index: G3

Fungal Succession on Dead Oak Trees in Central Minnesota
Kris Garber, Aleisha Fellegy and Sandie Simon
Sponsor: Sandra Turner
St. Cloud State University, Biology

The first purpose of this research was to determine the most common mushroom-producing fungi species that grow on dead oak trees in Central Minnesota during the fall of 1999. The second purpose was to discover evidence to support the existence of fungal succession. The oak trees were divided into three decomposition categories depending on the amount o bark that existed on their trunks. The mushrooms that were found on the three categories were identified and the most common mushroom species were determined. After the association of the fungal species with the three decomposition categories was analyzed, it was determined that their presence was related to a specific phase of the decomposition of the oak tree. This shows that the fungal community inhabiting a tree changes as the decomposition level of the tree changes over time. This is evidence to support the existence of fungal succession.

Presentation Index: H1

Purification and Structure Determination of an Antifungal Compound
Michelle Edwins
Sponsor: Kate Graham
College of St. Benedict, Chemistry

Endophytic fungi grow in the living tissue of plants. These fungi appear to be a logical source of antifungal compounds. They seem to confer immunity from fungal pathogens on their hosts. Also, fungi are known to produce wide varieties of secondary metabolites. Finding novel antifungal agents is increasingly important as patients with compromised immune systems are more susceptible to Candida infectinos. KG77, an endophytic fungus of the Basidiomycete family, was isolated from Selaginilla arenicola, and inhibited the growth of Candida albicans A72, 406, wisconsin and C. kruzei in plug assays. Biorationale allowed identification of KG77 as a source of potential antifungal drugs. Isoloation o the antifungal compound produced by KG77 was developed using standard disc-diffusion bioassy-guided fractionation. The purification method involved extraction with ethyl acetate, a sephadex LH-20 column chromatography and reverse phase HPLC. Purification will continue with further HPLC. The structure will then be determined using available methods.

Presentation Index: H2

A Mutation in the Collagenic Tail Subunit Gene (COLQ) of Endplate AChE
Matthew Tinguely
Sponsor: Michael Reagan
St. John's University, Biology

Congentital Myasthenic Syndrome (CMS) is genetic neuromuscular disease, which compromises the safety margin of neuromuscular transmission by one or more mechanisms. CMS may arise from pre-synaptic defects by improper packing of Acetylcholine (ACh) quanta, synaptic defects from mutations in the AChhydrolyzing enzyme acetylcholinesterase (AChE), or post-synaptic problems such as a defective or lack of an ACh receptor (AChR). While mutations of AChR that affect channel protein kinetics by either increasing or decreasing the synaptic response to ACh are the most common, recent findings on the COLQ gene, which encodes for the collagen tail of AChE have revealed insights into the enzyme's role in CMS and into the mechanism of AChE's anchoring to the basal lamina. Just last year our lab successfully cloned the COLQ cDNA revealing its sequence and mapped the gene to a single chromosomal locus at 3p25 via FISH. Protein studies illustrate four important ColQ domains: a proline-rich domain, collagenic triple helix domain, two heparan sulfate proteoglycan domains, and a C-terminal region. COLQ gene isolation using PCR and sequence analysis of a three year old patient revealed a Gly to Stop mutation at position 371 in the 15th exon. This Q371X mutation causes a truncation in the C-terminal region of ColQ which compromises triple helix formation of the collagen tail. The lack of triple helical tail formation jeopardizes the normal positively charged amino acid ring in the helical tail which is thought to interact with the surrounding negatively charged heparan sulfate of the basal lamina and help anchor the molecule. Because the Q371X mutation inhibits the helix formation and subsequently disrupts the positively charged binding domain, a lack of AChE was expected and indeed observed in the basal lamina by electron microscopy.

Presentation Index: H3

The Determination of Rat Transamidinase Gene Structure
Renee Samuelson
Sponsor: Denise McGuire
St. Cloud State University, Biology

Creatine monophosphate acts as an energy reservoir in skeletal muscle tissue. By transferring its phosphate to ADP, ATP is created and can be used to power muscle contraction. L-arginine: glycine amidinotransferase (transamidinase) is the enzyme which catalyzes the rate-limiting step in creatine monophosphate synthesis. The goal of this study is to determine the arrangement of introns (intervening sequences) and exons (coding sequences) in the transamidinase gene. This structural arrangement will provide information regarding the regulation of the gene and the creatine monophosphate synthesis pathway. The techniques primarily used in this investigation include the polymerase chain reaction (PCR), agarose gel electrophoresis, and rat genomic DNA library analysis. Small segments of the transamidinase gene have been amplified using PCR. The sizes of these fragments have been compared to fragments of known size to determine if introns are present in that segment of the gene. Preliminary results indicate that there may be one large intron located in the central region of the gene. Rat genomic DNA library analysis is being performed in an attempt to confirm this hypothesis.

Presentation Index: H4

Isolation and Characterization of Bacillus cereus Flagellar Proteins
Daniel Sloper
Sponsor: Denise McGuire
St. Cloud State University, Biology

Isolation and characterization of bacterial flagellum has been performed on the bacterium Bacillus cereus. This process involved the isolation of the flagellum from the bacterium. This was done by shearing the flagellum off in a blender. Initial purification of the flagellum from any cellular debris was done via several high speed centrifugations. Further purification of the flagellum was done by running the sample through a cesium chloride gradient. Electron microscopy showed pure flagella samples, with minimal vesical contamination. The flagellum was then broken down into their constituent proteins via sodium dodecylsulfate-polyacrylamide gel electrophoresis (SDS-PAGE) and high performance liquid chromatography (HPLC). HPLC estimated concentrations of the eluted samples were 20-30 mg for peak one, 30-50 mg for peak two, 10-20 mg for peak three, and 5-15 mg for the fourth and final peak. The results of the SDS-PAGE reported four proteins at molecular weights of 47,800, 43,600, 29,500, 20,400 daltons. This concurred with the HPLC results that eluted four peaks between the times of 0-16 minutes, which would seem to be in the same size range as the SDS-PAGE results. These data would support established average of size and composition of bacterial flagellum already sequenced.

Presentation Index: H5

An Exploration in Symbolic Dynamics: The Golden Mean Shift and the Silver Mean Shift Side by Side
Esther Widiasih
Sponsor: Danrun Huang
St. Cloud State University, Mathematics

Symbolic Dynamics is a tool to study general dynamical systems and is a rapidly growing field in mathematics. To investigate a dynamical system, symbolic dynamics employs infinite sequence of symbols that represent a space. These sequences of symbols, or shifts, constitute the building blocks of symbolic dynamics. One of the well- studied shifts is the shift of finite type. The Golden Mean Shift is a famous example of this shift. Interestingly, this shift is embedded with connections to the well-known Fibonacci sequence, i.e. a sequence of integers 1,1,2,3,5,8,13,... in which $F_n=F_{n-1}+F_{n-2}$. Its cousin, the Silver Mean Shift, is constructed similarly with connections to the less- known Padovan sequence, a sequence of integers 1,1,1,2,2,3,4,5,7,9... where $P_n=P_{n-2}+P_{n-3}$ discovered by Richard Padovan. We will explore in depth the dynamical differences between the two shifts and how their names reflect their properties.

Presentation Index: I1, L6

Computer Generated Vector Shapes
Richard Theis and Eric Kramer
Sponsor: Dale Buske
St. Cloud State University, Mathematics

Computer Generated Vector Shapes based on Structured Query Language Database Searches. Tony's Pizza Service needed fast, efficient, and easy-to-use computer software that could query databases and generate pie graphs. The pie graphs are to be used by their sales persons to help influence store managers to purchase more Tony's Pizza products. Software was created using Macromedia Director 7.02, SQL statements, and Open Database Connectivity Drivers. To increase the software's speed and efficiency the pie graphs were dynamically drawn with vector shapes. Each individual piece of the pie graph is a separate vector shape that is created by plotting a combination of points and tangent vectors much like Bezier curves. Macromedia Director provides little documentation regarding these shapes, some calculus is used to understand how to create the desired images.

Presentation Index: I2

College Football Rankings Using Markov Chain Models
James Nelson
Sponsor: David Robinson
St. Cloud State University, Statistics

A new method is proposed for ranking sports teams or individuals based on results from pairwise competitions. The method uses the Markov Chain steady state distribution derived from an NxN transition matrix of probabilities. The computationally-intensive method is applied to the 1999 NCAA Division I College Football season, to determine a ranking of the top 25 teams in the nation. To obtain the data needed for the Matrix, the probability of a winning is determined for each team in each game. This probability is the chance that a particular team would win if the same game was replayed. The Markov chain then allows for all 115 Division I teams to be related to each other despite the fact they did not each play one another. When the Markov Chain reaches its steady state, the rankings of the teams are easily obtained.

Presentation Index: I3

Applying Machine Learning Algorithms to Othello
Kristopher Glesener
Sponsor: J. Andrew Holey
St. John's University, Computer Science

The goal of this project was to apply machine learning algorithms to the board game othello. We were interested specifically in algorithms that are similar to human cognitive processes, and are general enough to apply to other problems. We used eight genetic algorithms to develop eight slightly different othello strategies. Each genetic algorithm was run for 500 generations (2.5 million games) to develop board position values for one of the eight strategies. Each strategy was then tested against the other seven strategies, as well as other computer players and human players, all with varying degrees of skill. The results show that most of the strategies play at the level of a beginning player, with the best strategies on par with a slightly experienced player. We also implemented a reinforcement learning algorithm in order to improve on the weaknesses of the genetic algorithm. This strategy worked by storing many of the board configurations the computer encountered while playing othello, as well as the results of the games in which those configurations were found. This enabled the computer to refer to past experiences when choosing a move. We are currently collecting data on this strategy and will present results at the colloquium.

Presentation Index: I4

A Student's Guide to STD Testing in the St. Cloud Area
Meghan Carley
Sponsor: Gerianne Klug
St. Cloud State University, Women's Studies

This brochure was created for the Women's Center at St. Cloud State University as a project for Introduction to Women's Studies, course 201 instructed by Gerianne Klug. This brochure has explored options for students in search of STD testing in the St. Cloud area. This brochure explored options that were both convenient and affordable for students. These options included three separate facilities, their locations, phone numbers, times of business, and costs of services. The brochure has also included additional information about STD's such as: symptoms of STD's, what can happen when STD's are left untreated, and reasons to get tested for STD's. There was also a section on who may be at risk and therefore want to get tested for STD's. A final aspect of the brochure was a section on resources available to anyone who has been the victim of a sexual assault. The brochure is currently being used by the Women's Center at St. Cloud State University.

Presentation Index: J1

The Disintegration of Gender Within *Aliens*
Stephen Norton
Sponsor: Wendy Sterba
St. John's University, Modern and Classical Languages

In *Aliens*, James Cameron creates a gender-neutral hero through the main character of Ripley by hybridizing traditional ideas of femininity and masculinity. My research on this film applies theories from Donna Haraway's *Simians, Cyborgs, and Women*, in which she writes, "Gender, race, or class consciousness is an achievement forced on us by the terrible historical experience of the contradictory social realities of patriarchy, colonialism, and capitalism." Cameron undermines these socially created roles and joins them in Ripley in order to form what Haraway would call a cyborg, "a creature in a post-gender world." In *Aliens* Ripley often exhibits masculine traits by making command decisions in violent and dangerous situations; at other times she is very feminine, especially in the maternal relationship that she develops with the orphaned character of Newt. By merging these different personalities into one person, I believe Cameron is commenting on the gender inadequacies that exist within society.

Presentation Index: J2

Gender and Estrogen Effect on GHRH Responses to NMDA in Rats
Egon Ozer
Sponsor: Oladele Gazal
St. Cloud State University, Biology

Previously it has been shown that the neuroexcitatory amino acid, N-methyl-D-aspartate (NMDA) increases systemic growth hormone secretion in mammals. Growth hormone secretion is regulated by hypothalamic growth hormone-releasing hormone (GHRH) and somatostatin. The objective of the present study was to determine the difference in the effect of both gender (male vs. female) and ovarian estradiol-17b status in females on GHRH secretion from hypothalamic fragments in response to NMDA stimulation. Age-matched, intact male (n=4) and female rats, weighing 250-300g at the time of the study, were used. Female rats were either ovariectomized (OVEX; n=4) or OVEX and fitted with a 7-mm estradiol-17b implant (OVEX+E; n=4) two weeks prior to the experiment. Hypothalamic fragments were perifused in a superfusion apparatus with artificial cerebrospinal fluid (aCSF) during Period 1, 75mM NMDA dissolved in aCSF during Period 2, 150mM NMDA in aCSF during Period 3, and 56mM KCl during Period 4. Basal GHRH secretion was significantly higher ($p<0.0001$) in males (22±1.5 pg/mg protein) than OVEX rats (15±1.4 pg/mg protein) which in turn was significantly higher than in OVEX+E rats (5±1.5 pg/mg protein). In all three groups, NMDA at the low dose (Period 2) had no significant effect on basal GHRH secretion. However, at the high dose (Period 3), NMDA significantly increased ($p<0.05$) GHRH secretion in male, but not in OVEX or OVEX+E rats. Application of a depolarizing dose of KCl (Period 4) caused significant increases ($p<0.0001$) in all rat groups. These results suggest that the response of the hypothalamic GHRH secretory system to NMDA stimulation may be sexually dimorphic in rats, but that steroidal state has no significant effect on this response in females.

Presentation Index: J3

Mexican-American Poetry/Writing

Lupita Saucedo

Sponsor: Tom Stachowski, Bill Meissner

St. Cloud State University, Information Media, English

The performance is based on Mexican-American writing which consists of three to four minute short poetry pieces which present brief images of Mexican and American theme. There are also two brief short stories which are read to the public. The two short stories have been tentatively titled "Bring me your tired" and "Bring me your poor...." The first story deals with Mexico and the second story deals with the concept of home. Images of my community, history, and heritage will be displayed to coincide with the stories and poetry. The emphasis of the presentation is to focus on the various bi-cultural elements that exist in being raised in the U.S. as a Mexican Indian child in an American world.

The following is a list of the titles and topics of the poetry to be included in the performance:

Title	Topic
"Apa"	Assimilation
"Street Child"	Poverty
"Wrinkles"	Age/Abuse
"Trophy Heels"	Domestic Violence
"Jobita"	Sheperdess
"Canela Queen"	Spanglish
"Good Morning Little One"	Racism
"No Wonder"	Drugs
"America"	Immigration
"Fina"	Mexico
"Giselle"	Palm tree trimmer
"Yaya"	Old Age
"Good Little Wife"	Domestic Violence
"Tomboy"	Childhood Love
Untitled	Fireflies

Presentation Index: J4

Motion Control Using DSP

Tariq Amin, Abbas Bangee and Omer Al-Eisa

Sponsor: Jiecai Luo

St. Cloud State University, Electrical Engineering

Automated motors are widely used in today's industry to perform sophisticated tasks. Motion control systems are very reliable to achieve quality products and higher productivity. In the field of automation, most of the human works have been replaced with the use of industrial robots and other automated machinery. These applications of motion control technologies and servo motors are highly expandable area of Mechatronics Engineering where an electrical system is used to control a mechanical system. In this project, we are designing and implementing a servomotor control system to practically realize this.

Presentation Index: L1

Error Analysis of Video Method in Estimating Jump Height
Michael Rasmussen
Sponsor: Glenn Street
St. Cloud State University, Health, Physical Education and Sports Science

The goal of this project was to identify errors associated with estimating vertical jump height (JH) from video. Error sources include: changed body position, takeoff identification, center of mass (CM) models, and digitizing. Jump height from video was determined from displacement of the CM. The CM height at takeoff was determined between the last field of ground contact and first field of flight. Averaging CM height between fields at 60 Hz resulted in up to a 6.7% error in JH. Cameras operating at 120, 240, or 500 Hz could result in errors up to 3.4, 1.7, and 0.8%, respectively for the average JH of 0.35 meters. Jump height accuracy only differed by 0.9% between models. Digitizing error was 0.08%. Identifying takeoff was the major source of error. A camera speed of 500 Hz is needed for a < 1% error. Errors in digitizing, body positioning,

Presentation Index: L2

Wireless Remote Access Control and Monitoring System
Keith Lovegren, John Rottman and Michael Young
Sponsor: Sura Lekhakul
St. Cloud State University, Electrical Engineering

The purpose of our project is to design and construct a system that will provide door access control using card readers and door status monitoring of a remote location via a bi-directional radio frequency (RF) communication link. This system will provide a solution for access control systems that monitor storage buildings located remotely where standard wire communications is impractical.

Presentation Index: L3

Voice Activated Computer
Chun-Fan Lung, Andy Fredin and Brandon Bartz
Sponsor: Peter George
St. Cloud State University, Electrical Engineering

Voice Automation is one of the latest technologies that is rapidly growing in today's industry. Some of the recent advancements include: numerous speech recognition software packages for word processing, home automation systems (such as Bill Gates home is entirely computerized and voice activated), and also voice activated telephones. The use of computers is becoming more and more predominant in today's society, so to integrate voice activation with the operation of a computer would be of great use to many people. This would be a valuable design for people that are physically handicapped. The time of talking to your computer is in the not so distant future. Our design project will implement the technology of voice recognition and interface with the computer, to develop the voice activated computer.

Presentation Index: L4

Lightning Feed
Mark Mccutcheon, Kimberly Schueller and Ashiqur Rahman
Sponsor: Joseph Marks
St. Cloud State University, Electrical Engineering

The development of this project includes building a digital prototype of a patented sound activated paintball loader. The sound triggering activation comes from the shot of the paintball gun. The sound activation ensures a faster load of paintballs into a gun in comparison to other loaders currently on the market. The digital prototype is to be built by the end of this semester. The final semester will be spent adding features to the loader. These features will include a shot counter, battery tester, chronograph, and countdown timer. An LCD (Liquid Crystal Device) will be mounted on the loader to display the results of these features.

Presentation Index: L5

DSP Siren
John Oberly, Josh Svoboda & Michael Anderson
Sponsor: Bruce Ellis
St. Cloud State University, Electrical Engineering

The DSP Siren is a digital siren for emergency vehicles, compliant with Society of Automotive Engineers (SAE) specifications for sirens. The DSP Siren digitally generates several different sounds using a digital signal processor. The processor converts the digital signal to an analog signal for speaker output using a coder/decoder (codec). The program that accomplishes this is loaded from an EPROM and generates the sirens using a sine approximation routine. A computer can control the DSP Siren through an RS-232 link. The DSP Siren outputs sirens through high-powered speakers using a high-powered amplifier.

Presentation Index: L7

Aural Shape Shifter
Patrick Krekelberg, Jared Momose, and Josh Simonson
Sponsor: Bruce Ellis
St. Cloud State University, Electrical Engineering

Objective: To design, simulate, build, and demonstrate a multifunctional audio signal processor for preamplifier-level modifications or post-processing Abstract High-Level Requirements. The processor must be able to be programmed with a PC via a serial interface. It should perform audio effects as well as noise suppression functions. Software shall either be written in assembler or C. The processor will perform algorithmic filter effects such as distortion, reverb, or delay as well as post-processing noise filtering. The computer connected to the processor shall have real-time algorithm editing capabilities via custom software with unique code. Parts Availability The core of the audio processor is the Analog Devices ADSP-2181 16=bit Digital Signal Processor. The Analog Devices AD1849 Stereo Codec will perform compression and decompression for the audio signal, anolog-digital conversion as well as digital-analog conversion. A byte EPROM will provide external boot memory to the device via the ADSP-2181 Byte DMA bus.

Presentation Index: L8

Duties of 46 Speech-Language Pathologists: An Interview and Observational Study

Kellie Rhinerson, Mae Petrangelo, Nicole Stewart, Jessica Zack, Kay Ivers, Kari Lehmkuhl, Carrie Laven, Elisa Roiko, Kelly Davidson, Cindy Bowman, Amy Magnuson, Katherine Rono & Tammy Uecker
Sponsor: Margery Whites, Ph.D.
St. Cloud State University, Communication Disorders

Speech language pathology is a new and dynamic profession, perhaps resulting in a vague definition of the roles and duties of the speech language pathologist (SLP). Previous research has failed to clearly outline the job duties of SLPs. Forty-six SLPs were interviewed and directly observed by members of a graduate research class. There was a wide range of responses to the questions regarding background information, job information, task-related questions, and questions about the profession. Results of direct observation indicated that SLPs are spending a large amount of time in direct therapy (48%), and spending a considerable amount of time (31%) on related activities such as preparing for therapy, attending staff meetings, meetings with teachers, and case manager duties. The present study provides a glimpse into the important roles and responsibilities of SLPs on the job and opens up an avenue for future investigation of job duties and professional issues.

Presentation Index: L9

Creative Ways to Bring Women of History into Elementary Classrooms & Much More!

Nicole Storkamp
Sponsor: Gerianne Klug
St. Cloud State University, Women's Studies

This originated as a project in the class called Introduction to Women Studies 201 at St. Cloud State University. Curriculum for a second grade class at Clearview Elementary was developed and presented. This curriculum was designed to help students develop self-respect, sharing skills and respect for others. The curriculum included games, stories, songs and group discussions on women in history, sex roles, disabilities, and racial equality. One example of a game developed for this curriculum was a famous women-symbol matching game that helped the students remember why these women were so important. A book on disabilities, Mama Zooms by Jane Cowen-Fletcher, was incorporated into this curriculum followed by a group discussion about disabilities and being different. Many activities were created from songs and stories off the CD, *Free To Be You And Me*, by Thomas Marlo. This curriculum is fun, educational and can be modified to include grades k-4.

Presentation Index: L10

Theoretical Investigation of Sulfinyl Radical Reactions
Judith Peters and Alicia Spychala
Sponsor: Daniel Gregory
St. Cloud State University, Chemistry

Sulfinyl radicals have been proposed as important intermediates in both atmospheric chemistry and the chemistry of biological systems. The self coupling reaction of several substituted phenyl sulfinyl radicals have been investigated using laser flash photolysis. Although several authors have estimated the rate constants for the self-termination reaction under various conditions, the mechanism for this reaction has not been resolved. There are three paths the sulfinyl radical might follow in the initial dimerization. However, these intermediates are not stable enough to be observed spectroscopically. Therefore, the focus of this study is to characterize the sulfinyl radical intermediates computationally in order to understand the role these species play in the dimerization of sulfinyl radicals. Analysis of the energetics of all potential intermediates formed by the sulfinyl radical will be reported and discussed in this presentation.

Presentation Index: L11

Drug Distribution: A Guided Inquiry Laboratory Experiment in Coupled Equilibria
John Hein
Sponsor: Michael Jeannot
St. Cloud State University, Chemistry

What does a runny nose have to do with equilibria constants? More than you may think. The antihistamine diphenhydramine, known as Benadryl, is commonly used to relieve the symptoms of allergies such as itching, sneezing, runny nose, and watery eyes. Diphenhydramine in single doses is absorbed quickly from the gastrointestinal tract. Its coupled acid dissociation equilibrium and aqueous-organic distribution equilibrium determine to a large extent how the drug is distributed in the body and its onset of action. A simple and inexpensive experiment for the study of simultaneous homogeneous and heterogeneous equilibria using gas chromatography is described here. This experiment provides students with an opportunity to study the distribution of a drug in a two-phase system by measuring the concentrations of two chemical species and predicting the others by considering charge-balance, mass balance, and equilibrium constant expressions. Furthermore, the acid-dissociation constant and aqueous-organic distribution coefficient can be calculated. This experiment is suitable for use in a classroom laboratory because it represents a simplified model for something experienced in daily life, namely drug distribution in the human body. Through this experiment students can also gain valuable experience in the important analytical techniques of gas chromatography and pH measurement

Presentation Index: L12

El Nino's Influence on Midwestern Winters
Kimberly Munter
Sponsor: Anthony Hansen
St. Cloud State University, Earth Sciences

The severity of a Midwest winter is greatly dependent on the long-range flow pattern. Various global forcing mechanisms may alter the flow pattern, causing great variability in the type of winter the Midwest experiences. Deviation from a "normal" winter is particularly noted during El Nino and La Nina winters. Although the relationship between the sea surface temperature (SST) oscillation and Midwestern meteorological features has been accepted, the strength of the correlation for the middle and upper troposphere has not been determined. Data from a Midwest network of stations (International Falls, MN, St. Cloud, MN, Bismarck, ND, and Green Bay, WI) is analyzed in order to determine if a positive statistical relationship exists between these stations and the SST oscillation. The results indicate that the variation in SST does affect the Midwest, but in varying degrees. Both El Nino and La Nina winters show a deviation from "normal" winters in the lower and upper troposphere, with the greatest influence in the month of January. The winters of El Nino show warmer than average temperatures and higher geopotential height values. The Midwest's response to La Nina is weaker, but the response is generally colder than average.

Presentation Index: L13

Efficient Purification of Cellular Retinol Binding Protein II
Bryan Meade
Sponsor: Nathan Winter
St. Cloud State University, Chemistry

The purpose of the project is to alter the protein cellular retinal binding protein II (CRBP II) in order to make it easier to purify. The gene for CRBPII will be amplified using the Polymerase Chain Reaction. After amplification, the CRBPII coding DNA will be digested and ligated into a similarly digested plasmid vector that will code for a poly-Histidine sequence. After ligation, a strain of E. coli will be transformed with the newly developed plasmid through the classical calcium chloride and heat shock treatment. The bacteria will then be used to express CRBPII with the poly-Histidine leader sequence attached to it. This will allow for easy purification of the CRBPII through the use of the polar side chains of the Histidines. The modified CRBPII can then be isolated and purified by metal chromotography.

Presentation Index: L14

Elder Abuse in Institutional Settings
Laura Kriz
Sponsors: Zoa Rockenstein, Leslie Valdes
St. Cloud State University, Psychology

Elder abuse is a prevalent problem in today's society. It has been estimated that between one million and two million elderly American people experience some form of elder abuse each year. I did an internship at St. Benedict's Senior Center. I was in the Therapeutic Recreation department on the 2nd floor. I will discuss my experiences from my internship and findings from the literature as they relate to elder abuse.

Presentation Index: L15

Integrating a Specialized Production Cell into an Automated Assembly Line
Kris Bolster and Brandeu Weis
Sponsor: Youpeng Zong
St. Cloud State University, Manufacturing and Engineering

Analysis and design was performed at Frigidaire Home Products, St. Cloud, Minnesota to integrate a specialized production cell into an existing upright-freezer assembly line. The main objectives were to increase productivity to meet production requirements and provide fluid manufacturing of the commercial R22CW/F22CW units. To achieve maximum efficiency and productivity, a motorized conveyor system was recommended to replace the existing non-motorized conveyor system in the upright-freezer assembly line. This new system will allow the R22CW/F22CW units to be produced one to two days a month in a batch- run manner, while meeting production requirements and maintaining the required 33-second cycle time. Results from the engineering analysis indicate savings of approximately 26 minutes in production time per unit and potential savings of approximately $600,000 per year in employment.

Presentation Index: L16

Effect of Childhood Attachment to Fathers and Adult Intimate Relationships
Patrick Ness
Sponsor: Marlene DeVoe
St. Cloud State University, Psychology

A wide range of factors influence formation of an adult intimate relationship patterns. It is believed that nature and quality of intimate relationships in adulthood are in part a result of childhood attachment to one's parents, particularly the opposite-sex parent (Hazan & Shaver, 1987). This research identifies the role that childhood attachment patterns play in the makeup of intimate relationships in adulthood.

Presentation Index: L17

Error Analysis Of Impulse Method In Estimating CMJ Height
Scott McMillan
Sponsor: Glenn Street
St. Cloud State University, Health, Physical Education and Sports Science

Today, most researchers use the impulse method (IMP) to estimate counter-movement jump (CMJ) height because it is less time consuming than traditional video methods and less prone to error than the flight time method. The purpose of this study was to examine all potential sources of errors with IMP and to suggest ways to minimize or eliminate them. Nine college-age males performed two CMJ on a force platform. Body weight was measured before each jump with the force platform. All jumps and body weight were measured for three seconds. The unfiltered vertical ground reaction force (VGRF) was sampled at 400O Hz during the first jump. Seven VGRF channels were sampled at 1OOO Hz during the second jump. These channels were the VGRF unfiltered and low-pass filtered at cutoff frequencies of 2290, 345, 78, 18, 11 and 6 Hz. Takeoff velocity was estimated by integrating the net vertical force acting on the subject from the start of the three second sampling period until takeoff. Takeoff was identified as the instant before the VGRF dropped below the unloaded force platform baseline. This baseline was the average VGRF during flight. Jump height was determined from the takeoff velocity. Jump height was underestimated by 2, 17 and 32% with low-pass filter cutoff frequencies of 18, 11 and 6 Hz, respectively. Jump height was underestimated by 2, 4 and 7% at sampling rates of 400, 200 and 1OO Hz, respectively, compared with 400OHz. Random error in jump height was 2% when body weight was sampled for <0.5 s. The largest source of error in estimating jump height with IMP is inaccurate determination of takeoff. This error can be minimized (<1%) by setting the cutoff frequency of the low-pass filter >2OHz and sampling the VGRF >40OHz. Random error can be reduced by sampling body weight for at least 0.5 s.

Presentation Index: L18

Ribose Administration at Rest: Effect on Metabolic Parameters
Eric Fenstad
Sponsor: John Seifert
St. Cloud State University, Health, Physical Education and Sports Science

Ribose may benefit endurance athletes by increasing the rate of adenosine triphosphate (ATP) resynthesis following strenuous exercise. Research on its hypoglycemic effect is inconclusive. The purpose of this study was to determine the effects of ingested D-ribose (RIB) on metabolic parameters at rest as it relates to carbohydrate metabolism. Following a 12-hour post-prandial fast, two groups of subjects, 20-30 year olds (Y, n = 6) and 40-50 year olds (0, n = 4), ingested 0, 2, 5, I Og RIB in 250 ml of water in a blinded counterbalanced manner (washout period 6.1 + 2.8 d). Blood samples were collected at 0, 15, 30, 45, 60, and 120 min post-ingestion and analyzed for glucose (BG) and lactic acid (LA). Oxygen uptake and RER were determined via indirect open circuit spirometry at 0, 15, 45, and 75 min post-ingestion to estimate carbohydrate oxidation rates (COXR). The dependent variables were subjected to a 3-factor repeated-measures ANOVA. Tukey HSD post hoc tests were administered to differentiate means ((X =.05). BG was higher in 0 (3.57 + 0.07) than Y (3.05 + 0.06) (P = 0.001). The lOg dose was significantly different than the 2g dose at 45 min and 60 min and the Og dose at 45 min for BG (P = 0.000). Over time, BG at 0 min was different from 45 min and 120 min for the I Og treatment (P = 0.000). Within the lOg treatment for BG, 45 min and 60 min were different from 120 min (P 0.000). Significant differences in LA were observed for 0 min and 120 min in 0. At 60 min and 120 min, Y had higher LA than 0 (P < 0.001). No differences between treatments or groups were observed for COXR. The 2g and 5g dose of RIB appears to maintain BG for both Y and 0. Therefore, modest ribose supplementation may aid in ATP recovery without provoking a hypoglycemic response or increase in glycolytic activity.

Presentation Index: L19

Education Majors' Evaluation Bias of Minority Students' Essays.
Tom Stutsman
Sponsor: Chris Jazwinski
St. Cloud State University, Psychology

Research from the last 50 years (Good, 1981, Holliday, 1985, and Rosenthal & Jacobson, 1968.) shows that some teachers give lower grades to minority students for comparable work. There are many explanations as to why some teachers assign lower grades to minority students. One explanation for this bias is that the teacher is prejudiced towards minorities, and views minority students' work as lower quality solely because of their race. Another explanation is that the teacher can set up a self-fulfilling prophecy. The teacher encourages minority students less often, and expects less of them than of white students. The minority students adopt the teacher's attitudes, and perform in accordance with them (i.e. poorly). In my experiment, I presented the participants (St. Cloud State University students), with two essays accompanied by pictures of either African-American or white children. The participants rated the essays for quality (organization, grammar, vocabulary), and rated the intellectual ability of the student. Intellectual ability was measured by selected questions from the Scale for Behavioral Characteristics of Superior Students (Renzulli, Hartman, & Callahan, 1971), which is used to nominate students to gifted programs. It was expected that participants would rate the essays of African-American students less favorably. Teachers who hold a bias against minority students' essays may create a racially biased learning environment in the classroom. If this bias does exist, it must be identified, addressed, and eliminated before prospective teachers are licensed to teach.

Presentation Index: L20

Thoughts of Optimists and Pessimists as related to Hypothetical Dating Situations
Karl Malmberg
Sponsor: Marlene DeVoe
St. Cloud State University, Psychology

An experiment investigated the relationship between participants' self rating as a pessimist or an optimist and subsequent performance on a self-descriptive thoughts questionnaire. After exposure to either a positive or negative dating scenario, the questionnaire, that is based on the Beck Depression Inventory (1961) and the UCLA Loneliness Scale (1980), was administered. It was hypothesized that those participants self-rated as pessimistic would tend to self-describe more negatively regardless of which scenario they were assigned. In contrast, those self-rated as optimistic would be the reverse. This would be congruent with cognitive set theory of Burns (1985) upon which this study was based; that certain attitudes predispose one to experience less intimacy and more loneliness and depression. A discussion of the results is included.

Presentation Index: L21

Prothetic Vacuum Pump Design and Socket Pressure Measurement
Tracy Beil and Joshua Muonio
Sponsor: Steve Covey, Glenn Street
St. Cloud State University, Manufacturing and Engineering and Biomechanics

For many amputees, daily limb volume loss creates problems with high-pressure points, fit of the socket and failure of the liner. TEC Interface Systems of Waite Park, MN has developed a vacuum-assisted socket that seems to allow below-knee amputees to maintain normal limb volume throughout the day. Maintaining normal limb volume allows the socket to be total surface weight bearing. For volume to be lost in the original socket setup but not when using the vacuum-assisted socket, it has been hypothesized that this might be due to differences in pressures applied to the limb. The intent of this investigation is to see if any differences in pressure can be detected between the two socket conditions. A urethane liner was instrumented with the pressure sensors embedded within its walls. Measurements were taken during walking, weighted and unweighted conditions while wearing the normal socket system and the vacuum-assisted socket. Initial results show that peak pressures in both conditions are similar. Testing continues in an attempt to document pressure differences during the swing phase of walking. While these pressure differences are under investigation TEC has begun work on the development of a mechanically activated vacuum pump. This pump will be easily adaptable to current prosthetic systems and will draw a vacuum in the socket system during amputee gait. A pneumatic spring is built into the pump, acting both as shock absorber and return spring. Lowering production costs while maintaining a strength great enough to withstand impact forces from vigorous athletic activity and minimizing weight and size are some of the design challenges. Three unique prototypes have been developed and are either in the process of or have been tested by amputees. A fourth prototype is being developed. Finite element analysis will be used to predict maximum loading forces allowed by the pump and improve current pump design.

Presentation Index: L22

Gender Differences in Relation to Self-Esteem and Body Image
Catherine Davidson
Sponsor: Marlene DeVoe
St. Cloud State University, Psychology

Research has found that females score lower on self-esteem surveys after viewing ideal body physiques (Thorton & Maurice, 1997). In a study involving 31 participants (24 females and 7 males) the relationship between the media, body image and self-esteem was examined. Participants viewed pictures of either neutral or ideal body images and were then asked to complete the Coopersmith self-esteem inventory. Statistical results were interpreted using an ANOVA. Findings show no relationship between viewing ideal body images and lower self-esteem scores for either males or females.

Presentation Index: L23

Error Analysis of Flight Time in Estimating Jump Height
Wayne Board
Sponsor: Glenn Street
St. Cloud State University, Health, Physical Education and Sports Science

A common method of determining counter-movement jump (CMJ) height is to measure flight time (FT) using a force plate because of its relative ease and quickness. The purpose of this project was to examine all potential sources of error involved with using FT method. Each CMJ was sampled for three seconds. The unfiltered VGRF was sampled at 4000 HZ and compared against sampling rates of 2000, 1000, 500, 250, 125, and 5 HZ for two of the jumps. The last two jumps were sampled at 1000 HZ and processed using a low-pass filter. Joint Angles were determined using video analysis system. Predominate sources of error in FT method are 1) sampling rate, 2) cutoff frequency, and 3) a difference in body position at takeoff and landing.

Presentation Index: L24

A Climatology of Lightning in the Northern Plains
Blaine Thomas
Sponsor: Robert Weisman
St. Cloud State University, Earth Sciences

A climatology of cloud-to-ground lightning in the Northern Plains region has been constructed to find geographical regions and time periods favorable for thunderstorms. Data from the National Lightning Detection Network for the period January 1989 to August 1999 have been analyzed for spatial and temporal distribution of total flashes, positive flashes, and the percentage of flashes that lower positive charge to ground. The total number of flashes generally decreased from south to north, an indication of strong latitudinal influence on thunderstorm activity. The majority of total flashes occurred in the summer season with a minimum in the winter season. The monthly distribution of percent positive flashes revealed a maximum in the winter season and a minimum in the summer season. The hourly distribution of total flashes showed a broad maximum from early evening to local midnight. This maximum is likely attributed to thunderstorm activity associated with diurnal heating and mesoscale convective systems. The spatial distribution of total flashes indicated the possible influence of local topographical features on thunderstorm enhancement or decay.

Presentation Index: L25

Effect of Age and Time of Day on Thyroxine and Cortisol Levels in Dairy Goats
Jon Gayken, E. Ozer & O. S. Gazal
Sponsor: Gazal Ogazal
St. Cloud State University, Biology

Many studies have documented the diurnal rhythm of cortisol secretion, but there is little agreement as to the age of onset of this rhythm. Also, the secretion of thyroxine, a key hormone involved in regulating the basal metabolic rate (BMR) in mammals has been reported to vary depending on a number of factors including sex and age. The primary objectives of this experiment were to study the effect of age, time of day, and bodyweight on blood thyroxine and cortisol levels in Alpine Goats. Ten Alpine dairy goats, consisting of five prepubertal (avg. age, 4.2 ± .1 months, metabolic body size, 11 ± 0.2 kg) and five mature does (avg. age 26 ± 1.3 months; metabolic body size, 17 ± 0.3 Kg) were bled by jugular venipuncture twice daily (AM vs. PM) for five days. Plasma thyroxine and cortisol were measured using radioimmunoassay. Mature does had significantly greater ($p<.001$) plasma thyroxine than prepubertal goats (60 ± 1.1 vs. 38 ±2.3 ng/mL) but plasma cortisol concentrations were not significantly different (6.5 ± 0.9 vs. 7.4 ± 0.6 ng/mL; $p>.05$). Among prepubertal and mature does, time of day had no effect on thyroxine secretion but tended to significantly affect cortisol concentration in mature ($p=0.08$) but not in prepubertal goats. Day of sampling significantly affected plasma cortisol in both groups of goats. However, the effect was more pronounced in prepubertal goats. Significant correlations ($p<.0001$) were obtained between age and metabolic body size. These data suggest that the onset of rhythmicity in cortisol

Presentation Index: L26

Strap Tensioner Project
Angela Goldenstein and Chimene Valley
Sponsor: Youpeng Zong
St. Cloud State University, Manufacturing and Engineering

The primary objective of this project was to design a powered hand toot to tighten the straps in the assembly of Creative Memories Scrapbooks in order to alleviate the strain experienced by the bookmakers who are currently tightening the straps manually. This strain, which is mostly centered in the hand and wrist areas, can lead to injuries such as Carpal Tunnel Syndrome. Many designs were evaluated and a pneumatic hand tool was selected due to its many benefits. A pneumatic tool is a tool that is powered by compressed air. The tool has been ergonomically designed to fit the hands of the bookmakers and to simplify the tightening of the straps. A specialized mechanical grip has been designed to grasp the straps in the assembly of the scrapbooks. This mechanical grip uses a wedging action to fin--nly grip each strap. Computer aided drawings have been generated for the hand tool including the mechanical grip. Multiple vendors are producing the various components of this pneumatic hand tool. Some of the major components of the tool include the air cylinder, the tool casing, and the gripping system. The air cylinder is responsible for the tightening action by pulling the strap along a straight line. The tool casing protects the bookmakers from the moving parts of the tool and also guides the gripping system. Through the use of this tool, this company will benefit by decreasing the number of injuries experienced by the bookmakers. In addition, the bookmakers will have increased comfort while assembling the scrapbooks.

Presentation Index: L27

A Long-term Perspective of Adult Fitness Testing
Kristi Chupurdia and Angela Frelich
Sponsor: John Seifert
St. Cloud State University, Health, Physical Education and Sports Science

The goal of this perspective was to examine the cardiorespiratory fitness of a collection of male participants from the Adult Fitness Program (AFP). Twenty males (age 50 ± 5 yr) were consistent yearly participants in the testing program from 1977-1999. Eighty percent exercised regularly (3 or more times a week). Among these subjects, those that exercised more than 30 minutes per session had an average body fat percentage of 17.2%. Subjects exercising 30 minutes or less had 18.9%. The yearly mean maximal oxygen consumption varied from 40.18 5.84 ml 02/kglniin to 46.21 ± 5.58 ml 02/kg/rnin. These values placed the subjects in the good to high fitness category. The subjects maintained a total cholesterol level of 203 ± 18 mg/dL across the 22 years with only 30% of the subjects on cholesterol reducing medication.

Presentation Index: L28

Performance Testing of NCAA Division I Women Ice Hockey Players
Scott Ficek and Eric Fenstad
Sponsor: John Seifert
St. Cloud State University, Health, Physical Education and Sports Science

The goal of this study was to obtain a physiological profile of a recruited Division I Women's Ice Hockey Team (N=17) using traditional off-ice tests, and a newly developed on-ice test. The traditional off-ice tests included a 20-sec Wingate, vertical jump, Cooper 12-min run, and "T" (agility) test. On-ice tests included the blueline to blueline speed test, and the Seifert and McMillan test for forwards (SM-F)(n=1 1) and defensemen (SM-D)(n=6). The SM-F consisted of forward skating, a right and left power turn, right and left cross- over turns, stopping, and accelerating. The SM-D included acceleration into forward and backward skating, a pivot, and 12 stops and starts. Average team results (+/- SD) for Predicted V02max was 38.7 (4.4) ml/kg/niin, body composition was 22.1 (4. 1) %, vertical jump was 15 (2.2) inches, time for "T"-test completion was 12.2 (0.5) sec, peak power was 8.8 (1.0) W/kg, mean power was 7.6 (0.7) W/kg, and fatigue index was 26.5 (7.0) %. The average on-ice speed test was completed in 2.0 (0. 1) sec, SM-F was completed in 52.5 (2. 1) sec. The SM-F correlated with peak power, mean power, and speed (R2=.217,.45,.74). The best subset regression identified "T"-test, speed, and mean power as the best predictors for SM-F (R2=.81). The SM-D correlated with peak power and mean power (R2=.34,.87). The best subset regression demonstrated peak power, mean power, and "T"-test as best predictors for SM-D (R2=.90). The SM-F and SM-D appear to provide researchers with an acceptable on-ice test for assessing skating abilities on collegiate women ice hockey players.

Presentation Index: L29

Content Analysis of Gender Perceptions in Birthday Cards
Patricia Stang
Sponsor: Martin Andrews
St. John's University, Psychology

A content analysis was conducted, which examined gender perceptions found in the color, images, and messages of birthday cards for children. Cards for males (N = 20) and for females (N = 21) were randomly selected from two types of stores catering to those with higher and lower amounts of income. The cards were coded for number of words, style of message, aggressive and non-aggressive images, and color of front cover, words, and envelope. A Mann-Whitney test showed significant results for gender differences in only images, color of front cover, and style for cards. Another series of Mann-Whitney tests showed differences for types of stores for only color of words. The study supports previous research in this field about gender labeling. The study was based on an exploratory study by Bridges (1993) and provided more evidence on gender perceptions.

Presentation Index: L30

Synthesis of Phosphino Ruthenium Hydride Complexes
Daniel Ferraro and Adam Westman
Sponsor: Chris Schaller
St. John's University, Chemistry

The synthesis of metal-alkyl-hydride complexes have been under investigation due to their properties as hydrogenation catalystsi. The goal of this research project is to create a series of complexes, which follow the structure Ru(PMe3)4(H)X, where X is an alkyl group. Complexes that follow this formula have been seen to act as hydrogenation catalysts in the past; however, few have been synthesized with great efficiency. Previously, synthetic routes for the complex Ru(PMe3)4OAc(H) were developed and the procedure for purifying the compound is now being explored. This complex is expected to be a starting material for metal-alkyl-hydride synthesis reactions, via simple Grinard reactions. The complex was successfully synthesized through three different pathways, each posing a different type of challenge for the purification of the product. Currently, a method is being developed which involves the conversion of Ru(PPh3)3OAc(H)ii to Ru(PMe3)4OAc(H). The crude product from this reaction is then separated on an alumina column treated with sodium acetate. Once a spectroscopically pure complex is obtained, we hope to react the Ru(PMe3)4OAc(H) complex with a variety of Grinard reagents to synthesize a collection of compounds that follow the general formula of Ru(PMe3)4(H)X, where X is an alkyl substituent. Kinetic studies involving the beta elimination of the alkyl group, using low temperature NMR, will be performed on these complexes after they have been successfully synthesized.

Presentation Index: L31

DNA Repair Defects of Saccharomyces Cerevisiae Deleted of the RAD27 Gene

Ryan Hansen
St. John's University
Sponsor: Michael Reagan
St. John's University, Biology

Saccharomyces cerevisiae strains SX46 (wild type) and SX46rad27 were subjected to methanesulfonic acid methyl ester (MMS), 1-methyl-1-nitrosourea (MNU), methanesulfonic acid ethyl ester (EMS), or 1-ethyl-1-nitrosourea (ENU) to test the sensitivity of the mutant strain to a variety of different types of DNA damage. MMS and MNU methylate primarily at the N-7 position of guanine and the N-3 position of adenine, EMS ethylates primarily at the N-7 position of guanine, and ENU ethylates primarily on the phosphodiester backbone. We find that the mutant strain is sensitive to all of these alkylating agents. The Rad27 gene of Saccharomyces cerevisiae is thought to be involved in DNA base excision repair and these results indicate that this DNA repair pathway is important in the repair of all of these types of DNA damage.

Presentation Index: L32

Stellar Spectral Analysis

Marcel Goldshen, Laura Lockwood and Andrew Matt
Sponsor: Maria Womack
St. Cloud State University, Physics, Astronomy & Engineering Science

We performed ground-based spectroscopy using the St. Cloud State University observatory 10 inch telescope with fiber optic spectrograph and SBIG ST-6 CCD camera. All data was taken in St. Cloud, MN between January and April, 2000. We observed the stars Rigel, a class B8 star, Sirius, a class A1 star, and Betelgeuse, a class M1-2 star. Stellar composition of all three stars were obtained by comparing their major spectral features to known spectra from gas discharge lamps. We will discuss the comparison of our data with models of excitation and ionization of hydrogen gas in each of our three stars.

Presentation Index: L33

Aeromycological Spore Loads at Newly Activated Compost Sites
Steven McGreevy
Sponsor: Stephen Saupe
St. John's University, Biology

Composting facilities, because of the decompositional processes that occur there, are generally associated with the presence of aeromycology in the form of abundant spore loads. We monitored the spore loads present at a newly activated composting facility (Mississippi Topsoils, Inc.; Cold Spring, MN) before and after its activation during October and November of 1999. Petri were arrayed on the windward side of the compost site and exposed for a range of time periods. The exposed petri dishes were incubated for 24 hours and the number and type of colony-forming-units (CFUs) were recorded. The spore load data was also compared to weather data taken from the Minnesota Climatology Working Groups St. Cloud station in order to make connections between climate and spore loads. We found that the total number of CFUs decreased after activation and that there is a direct relationship between temperature/wind speed and magnitude of a spore load. The cause of the decrease in CFUs could possibly be related to the decrease in the seasonal temperature.

Presentation Index: L34

The Hydration Effects of Preloading Gatorade vs. Water During Exercise
Valerie Meyer, Elizabeth Heins, Joseph Matel and Kari Recker
Sponsor: Marcus Webster
St. John's University, Biology

The Gatorade® Company claims that sports drinks are a better hydrator than water. The purpose of our experiment was to explore whether this claim was accurate. After pre-exercise hydration of 1000 mL of water or Gatorade" we collected urine at half-hour increments for 2.5 hours. The volume of urine was recorded and the rate of urine production was calculated. Urinalysis was performed to measure osmolality using an osmometer, and pH was found using a pH meter. Using z tests with a 5% level of significance, we compared the averages of our data from both beverages and found no significant differences. These results are similar to those found in other studies stating that there is no significant difference between the hydration qualities of Gatorade® and water for exercise under one hour.

Presentation Index: L35

The Dragonflies of Stearns County: Analysis of Parasitism Rates by Water Mites
Claire Hill
Sponsor: James Poff
College of St. Benedict, Biology

Adult Odonata are known to be parasitized by larval water mites of the genus Arrenurus, which consume considerable amounts of body fluids from their hosts. Heavy mite infestation can result in localized loss of epidermis, which leads to desiccation and enfeebles the host. Research indicates that certain species of Odonata, particularly members of the family Gomphidae, seem to be less subject to parasitism by Arrenurus, though the reasons for this are not yet known. A survey of parasitism on the species of Anisoptera (Odonata) at the campus of Saint John's University (Collegeville, MN) was conducted from June 1999 to August 1999. The results of the survey indicate that species of the family Libellulidae were most visibly affected by water mites in both the parasitism rate of adults and the average parasite count. No parasites were observed on any members of the families Aeshnidae or Gomphidae, and only one instance of parasitism was noted in the family Corduliidae. Arrenurus were found on most species of Libellulidae, with overall parasitism rate of 36% for adult Libellulidae. Typical parasite counts for this family were an average of 52 mites per host (Celithemis eponina) and 62 mites per host (Pachydiplax longipennis). The average parasite load decreased as the dragonfly hosts matured from the teneral stage. The results also suggest a seasonality in the mite parasitism, with overall parasitism rates

Presentation Index: L36

The Political Personality of Patrick J. Buchanan
Jason Bartos
Sponsor: Aubrey Immelman
St. John's University, Psychology

An indirect assessment of the political personality of Patrick Buchanan, Reform Party contender in the U.S. presidential election of 2000, was completed from the conceptual perspective of Theodore Millon. Information concerning Pat Buchanan was collected from biographical sources in the public domain, and synthesized into a personality profile using the second edition of the Millon Inventory of Diagnostic Criteria (MIDC), which yields 34 normal and maladaptive personality classifications congruent with Axis II of DSM-IV. The personality profile yielded by the MIDC was analyzed on the basis of interpretive guidelines provided in the MIDC and Millon Index of Personality Styles manuals. Buchanan's primary personality patterns were found to be Dominant/controlling and Conscientious/dutiful. His major personality-based strengths with reference to his presidential campaign are strong political skills in the areas of persuasiveness and social dominance. Buchanan's personality-based limitations are closed-mindedness and unwillingness to compromise.

Presentation Index: L37

Fiber-Optic Spectroscopy of Jupiter
Sarah Reed
Sponsor: Maria Womack
St. Cloud State University, Physics, Astronomy & Engineering Science

At the St. Cloud State Observatory, I set up a system which I used to obtain spectra of Jupiter. The system consists of a Meade LX200 10-inch telescope, a Santa Barbara Instruments Group (SBIG) ST-6 CCD (charge-coupled device) camera, and a fiber-optic spectrograph constructed by Nick Glumac and Joe Sivo (Rutgers University). Before I could begin taking images, I needed to fit the components of the system together with various adapters, achieve the proper focus by manipulating the spectrograph's focusing lens and translation stage, and determine a wavelength-pixel relationship by analyzing how spectra of a neon source lamp reacted to grating variations. Once the preliminary work was done, I mapped the entire optical wavelength band and acquired the corresponding two-dimensional spectra of Jupiter. I used the Image Reduction and Analysis Facility (IRAF) software packages to sum the spectra across all the fiber-optic cables. I then applied a wavelength calibration and identified major features in Jupiter's atmosphere. I will display and discuss the data I have obtained.

Presentation Index: L38

Variable Stars
Cortlan Strom
Sponsor: Maria Womack
St. Cloud State University, Physics, Astronomy & Engineering Science

The purpose of this project is to determine the periodic luminosity of two variable stars from observations. The two variable stars observed are Delta Cephei and Beta Persei (Algol), which are different types of variable stars. Algol is an eclipsing binary and Delta Cep is a pulsating binary. For this project I used my naked eye and 7x35 binoculars to observe these stars. I complied a list of data that includes Universal date and time, Julian date, apparent magnitude, observing conditions and instruments used to do the observing. Using these data, I plotted the apparent magnitude versus time elapsed and orbital phase in order to measure the period.

Presentation Index: L39

On Board Diagnostic

Jon Kauhane, Ben Weber and Gary Hillukka

Sponsor: Peter George

St. Cloud State University, Electrical Engineering

This project contains development of an on board diagnostic system. The on board diagnostic system allows the user to monitor a vehicle's function through a personal computer (PC) and keep a running log of vehicle sensor data. This project is broken up into four parts. First interfacing the vehicle's Electronic Control Module (ECM) to the PC. Next creating the software to display the vehicle's sensor information on the PC. Third consisted of interfacing the microcontroller to the ECM module. Finally creating software to read the data stored into the microcontroller. This project is also expandable to control various systems on the vehicle and the ability to add other sensors not currently installed on the car.

*Note: The project design is for ECM's that use a 8192 baud transmission rate.

Presentation Index: L40

LFC Heights for Tomadic vs. Non-Tomadic Supercell Thunderstorms in the Northern Plains

Eric Green

Sponsor: Robert Weisman

St. Cloud State University, Earth Science

Supercell thunderstorms produce large hail and frequent tornado occurrences. Tomadogenesis in supercell thunderstorms is truly a difficult event to forecast. Seventy-One soundings were examined after being pre-determined to be representative inflow samples of supercell thunderstorm environments. An attempt to classic a parameter derived from the soundings as being tornadic or non-tornadic is made. That parameter is the height of the Level of Free Convection (LFC). The LFC height is the height at which an air parcel, originating in the boundary layer, develop positive buoyancy which carries it upward even in the absence of farther lifting. The hypothesized correlation between lower LFC heights and tornado occurrence would intuitively be that tornadic supercells would have a relatively lower LFC height than nontordadic supercells. This is because the acceleration a parcel undergoes from being buoyantly unstable would begin closer to the ground, suggesting enhancement of the stretching processes near the ground. Results for the soundings from the Northern Plains will be presented.

Presentation Index: L41

Noise: A ZINE for Voices
Daphne Dokter
Sponsor: Gerianne Klug
St. Cloud State University, Women's Studies

A ZINE, short for magazine, is a publication created by grassroots individuals as an outlet for voices to make some Noise. The purpose of this ZINE is to initiate enlightenment about injustice and oppression (including but not limited to sexism, racism classism, homophobia, heterosexism, ableism, ageism, etc.) for the purpose of personal and community change. Nothing in this ZINE is edited, meaning it is not censored. This publication is an outlet for voices to be heard and includes many adult themes and some adult language. Please keep this in mind when it comes to younger, possibly unprepared minds. The writings are by students, graduate students, and other persons interested who had something to say. In this first issues there are poems, narrative or otherwise, essays, quotes, and statements covering topics of feminism and female issues such as body image, health, abortion, and expectations; as well as commercialism and classism.

Presentation Index: L42