

Center of Excellence

for Faculty and Undergraduate Student Research Collaboration

**Proceedings of the 13th Annual
University of Wisconsin-Eau Claire
Student Research Day
April 25 and 26, 2005**

Office of Research and Sponsored Programs
UNIVERSITY *of* WISCONSIN-EAU CLAIRE



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The UW-Eau Claire Student Research Day is supported by funds from the UW-Eau Claire Foundation. Grants supporting Faculty/Student Research Collaborations are made possible through funds provided by the Undergraduate Initiative of the University of Wisconsin System, the UW-Eau Claire Foundation, the University of Wisconsin-Eau Claire, and undergraduate student differential tuition.

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Schedule of Events

Monday April 25, 2005

<i>Time</i>	<i>Event</i>	<i>Location</i>
7:00 - 9:30 am	Students Set Up Posters	Council Fire Room
9:00 - 9:30 am	Judges Orientation	Alumni Room
9:30 am - 3:00 pm	Judging	Council Fire Room
Noon - 1:00 pm	Judges Luncheon	Alumni Room
Noon - 5:00 pm	Poster Session Open to University Community	Council Fire Room
4:00 - 5:00 pm	Student Research Day Reception	Tamarack Room
4:15 pm	Announcement of UW-Eau Claire Student Research Day Awards and Kell Container Corporation Collaborative Research Scholarship	Tamarack Room

Tuesday April 26, 2005

<i>Time</i>	<i>Event</i>	<i>Location</i>
8:00 am - Noon	Poster Session Open to University Community	Council Fire Room
Noon - 1:00 pm	Students Remove Posters	Council Fire Room

Arts and Humanities

Art and Design

Jane-Marie Ovanin (9)

Faculty Advisor/Collaborator: **Michael Christopherson**

Continuing the Craft: Contemporary Metal Boxes

My project, *Continuing the Craft: Contemporary Metal Boxes*, incorporated the interviewing of 20th century metalsmithing artists, from throughout the US and Canada, with the designing and fabricating of my own metal boxes. In the first part of my project, I interviewed contemporary metalsmithing artists through written correspondence, and I discovered the reasons and concepts behind why each artist made metal boxes. After I compiled the artists' responses, I wrote a paper that incorporated their ideas within a synthesis of my own reasons for continuing the craft of making metal boxes. The latter section of my project, which included making my own metal boxes, was greatly enhanced through my participation in a two-week long metalsmithing course at Penland School of Crafts in North Carolina. This experience not only added to my knowledge of metalsmithing techniques, but it also submerged me in an environment of craft that does not exist at UW-Eau Claire.

Samantha Siker (190)

Faculty Advisor/Collaborator: **Steven Terwilliger**

Redefining Space: Exploring Installation as an Artform

Industrial sites and buildings in the downtown area in the Eau Claire community often go unnoticed and are often overlooked as potential sites for artistic uses. The project titled "Redefining Space: Exploring Installation as an Artform" incorporates both design and research aspects. I have become deeply interested in the art of installation—a dynamic constructed environment created by the artist. These installations included light projections and digitized videos projected on the exterior and interior of specific locations in the downtown area. These on-site multimedia presentations call attention to these unnoticed areas as well as instill an interest in examining these environments as a site for a work of art.

Sara L. Stone (188)

Faculty Advisor/Collaborator: **Karen O'Day**

The Importance of Direction: Pre-Columbian Gold Crocodile Pendants

The project included field research in San Jose, Costa Rica. The Museum of Gold, The Museum of Jade, and The National Museum provided the platform for our goal of locating the suspension holes of over 25 gold crocodile pendants. Few museum catalogs provide more than one photographed view of said pendants, and rarely are the pendants positioned to draw attention to suspension holes. The ancient Pre-Columbian peoples had specific beliefs concerning direction which shaped their existence between the "upper world" and the "underworld." Crocodiles were an important part of their beliefs, as they were often portrayed as providing a link for humans between the two worlds. Our research focused on the meaning of wearing gold pendants, the meaning of wearing a crocodile gold pendant, the meaning of the direction the crocodile was facing when suspended, and the Pre-Columbian cosmological significance it supplied. The illustrations portray the correct way one would have worn each pendant based on the suspension holes.

English

Heather Hanewall (34)

Faculty Advisor/Collaborator: **Carmen Manning**

Is That Writing Project Engaging? A Study of Writing Assignments in the Eau Claire Public Schools

What is authentic intellectual work? How do authentic activities serve to more fully engage students in learning? This study seeks to explore the various understandings of authenticity outlined in the literature on writing instruction and assessment. Then using criteria for authentic intellectual work and engaged literacy activities, we look at writing assignments from one high school and explore the use of authentic and intellectually challenging activities over the course of one year.

Daniel Hardy (40)

Faculty Advisor/Collaborator: **Gloria Hochstein**

Akatonbo: The Story of the Red Dragonfly

This story was written last semester and was published in the Fall '04 NOTA issue. Dan Hardy will be reading it in its entirety at a Fiction session of the Sigma Tau Delta national convention. The story starts with a large amount of red dragonflies emerging from a

pond. A child sees them and wonders why there are so many. The father then explains that there was a great war many years ago, and that the dragonflies are the soldiers 'reborn' to the world again. The inspiration for this story came from a song learned while studying Japanese, and also an experience with his father in childhood. It is a simple story, but deals with the respect and gratitude of the sacrifices of others. When asked why he did not include more of the 'battle' that is mentioned in the story the reason is quite simple—the point of the story is more about the understanding between a father and a son, and the sharing of important history, than of something 'flashy and bloody.'

Andrew Kerbel (33)

Faculty Advisor/Collaborator: **Gloria Hochstein**

Coffee Confections

In the creative non-fiction piece "Coffee Confections" I explore the topics of family, love, and loss through the Ponzo Illusion. I compare an elderly man's oral history—his life and love loss—as he sits at the counter in a restaurant, and a memoir of one of my own love experiences, to the classroom and lecture about the systematic orbit of the moon. This piece weaves in and out of multiple time frames and narration in order to show the universality of such experiences and nature's movements.

Bobby Kuechenmeister (39)

Faculty Advisor/Collaborator: **Joel Pace**

Superman's America: Audience, Reception, and President Lex

Mr. Kuechenmeister's research historically contextualizes Superman comics of the late 20th century with special attention to audience, reception, and politics. The study examines how the 2000 presidential election and the post-9/11 world are reflected in the comics' depiction of Superman's arch nemesis Lex Luthor as representative of the United States waging war against global and universal threats.

Foreign Languages

Anna Baker (13)

Faculty Advisor/Collaborator: **Analisa De Grave**

Latin American Ecology: Cultural Practices, Hope and Destruction

As development and industrialization increases and population continues to expand around the globe, the countries of Latin America face a growing array of grave environmental challenges. Problems such as the degradation of water, air, and land quality and the loss of biodiversity affect not only the very populated capital cities of these countries, but their country-sides, crop land, mountains, streams, and coasts. This student/faculty research collaboration has sought to examine a broad spectrum of cultural responses to this multifaceted and interdisciplinary issue. Through the lens of cultural expression, we have discovered many examples of hope and ground-breaking efforts to prevent further destruction within Latin America. We have also examined an array of solidarity networks that reach out to Latin America and extend from it. The work of many individuals and organizations dedicated to protecting Latin America's environment and creating sustainable solutions to confront humankind's destructive trends has inspired us to uphold the integrity of their expression by creating an anthology of primary sources of both hope and destruction. These take the form of poetry, performance art, essays, news articles, as well as websites, databases, and educational tools created by non-profit organizations and international coalitions.

Megan Gooch (14)

Faculty Advisor/Collaborator: **Carter Smith**

Representing Terrorism in Contemporary Basque Literature

During the past forty years, one of the most pressing domestic problems in Spain has been the existence of the violent terrorist group Euskadi ta Askatasuna (ETA). Originally formed as a response to Franco-era repression and known for lobbying for an independent Basque Country, ETA has remained active into the twenty-first century and continues to be a topic of much debate within Spain and around the world as part of a more general dialogue about terrorism. As terrorism becomes, increasingly, a more commonplace and important theme in the world today, literature has emerged as one way to study this phenomenon. The purpose of this research is to examine the representation of terrorism and the terrorist figure in contemporary Spanish fiction. The novels studied are by Basque authors and address the issue of ETA terrorism in the Basque Country, Spain. Common themes to be found that underline the representation of terrorism in these books include Freud's 'melancholia' and Benedict Anderson's concept of 'imagined communities.' This research will examine the use of themes such as these in Basque literature and how the authors utilize these concepts to comment on the reality of nationalism and the existence of terrorism in Spain.

Rebecca Hall (35)Faculty Advisor/Collaborator: **Johannes Strohschank***Schlegelmilch House Krohnke Diary*

A Diary of an Early German Immigrant to Wisconsin: Emigrant of Schleswig-Holstein in northern Germany, Johann Krohnke kept a diary of daily activities throughout his pioneer life in New Holstein and Sheboygan from 1848-1893. The task to transcribe Krohnke's original manuscript is part of a project to publish an edited, extended, and commentated version of the diary as a testimony to the trials and labors of German immigrants in the wilderness of Wisconsin.

Becky Olson (36)Faculty Advisor/Collaborator: **Kelly Wonder***Effective Practices for Incorporating Common Reading*

It is increasingly becoming a common practice in Intensive English Programs to incorporate common reading texts at all levels of proficiency. Instructors believe this is a rewarding and motivating technique for language learning; frequently, instructors apply various techniques for teaching common reading texts. These techniques may be received well or poorly by the students which definitely affects learning. This study seeks to investigate which techniques prove most useful at all levels of proficiency with diverse teachers. Specifically, this study considered which techniques were most effective for maximum language learning and cognitive development. Effective practices for incorporating common reading texts will be a qualitative study to determine the effectiveness of common reading texts. Through this study, we will be gather materials from instructors and students participating in UW-Eau Claire's intensive English language program. Instructors will record their observations as to which activities related to the common reading worked, which activities did not, how they knew, and any other insights they can offer.

History

Quintin P. Baldwin, Kathryn R. Bodelson, Rita R. Brunkow, Travis G. Coulson, Whitney B. Dawe-Crahen, Melisa M. Erwin, Jonathan C. Gaulke, Nicole C. Griensewic, Davin Haukebo-Bol, Marcus C. Larsen, Joshua J. Molnar, Cassidy J. Robinson, Grigorios Saliaras, Jesse J. Toppins, and Timothy J. Upward (11)

Faculty Advisor/Collaborator: **Jim Oberly***The Population History of Eau Claire, 1860-2000*

This yearlong capstone class has written a book-length study in sixteen chapters of the demographic history of the City of Eau Claire. The students and their instructor began their work by consulting with staff at the Chippewa Valley Museum and at the City of Eau Claire's Planning Department. The students selected their topics, located primary sources on the city's population history, including but not limited to the decennial census, and then wrote and defended their chapters. The resulting work is valuable to everyone interested in the history, present, and future of Eau Claire.

Melissa Holmen and Joshua J. Molnar (10)Faculty Advisor/Collaborator: **Jim Oberly** and **Rick St. Germaine***Researching the History of Phoenix Point Park*

Student researchers Melissa Holmen and Josh Molnar worked with faculty mentors St. Germaine and Oberly and with Chippewa Valley Museum Director Susan McLeod in researching and writing the text and photos for public markers and monuments for the new "Phoenix Park." The park is a project of the Eau Claire Department of Parks and Recreation and is located at the confluence of the Eau Claire and Chippewa Rivers in downtown Eau Claire, adjacent to the new RCU headquarters building. The research team of Holmen, Molnar, St. Germaine, Oberly, and McLeod worked with Phil Johnson of the Department of Parks and Recreation to complete the work during the summer of 2004 in anticipation of final approval of funding by the Eau Claire City Council. In addition to preparing the text for markers and monuments that will be seen by thousands of visitors, the team prepared additional text and photos for the Phoenix Park website, to be maintained by the Department of Parks and Recreation.

Juli Pitzer (16)Faculty Advisor/Collaborator: **Jason Tetzloff***Glitz & Glam: The Movie Palace Legacy in Eau Claire, Wisconsin*

Recent research conducted in the small city of Eau Claire, showed that there were over twenty-two thriving motion picture houses from the late 1880s until now. Throughout the Roaring Twenties movie houses were designed as 'palaces' filled with the newest technological innovations and aesthetically pleasing architecture. This strong heritage in entertainment and motion pictures revealed Eau Claire followed this popular trend nationwide. The two movie palaces were the Wisconsin Theatre and the State Theatre. These

theatres were followed through the shift from silent to talking films and black-and-white film to Technicolor. Modern conveniences also focused on marketing visits to the movies as an event for the entire family. These two theatres were significant in Eau Claire because they set the standards for future theatre house design. However, they still remain the most elaborate theatres ever built in the city. The legacy of movie palaces was short-lived throughout the country, but during its momentous peak they were a marvel to each city in which it was bestowed.

Josh W. White (15)

Faculty Advisor/Collaborator: **Matthew Waters**

Changing Greek Kingship: 1200-700 BC

Homer's Iliad and Odyssey purportedly portray the ancient Mycenaean world circa 1200 BC, but how accurate are these descriptions? Over 400 years separate the 'historic' Trojan War and Homer's literary versions, and over these years Greek society changed greatly. Analyzing literary and archaeological evidence for this transitional period (i.e., the so-called Dark Age, circa 1200-800) it is possible to paint a vague picture of its leader class. Looking at Homer's descriptions of kings and recent archaeological evidence I will try to gain a better understanding of what time period his kings represent. Also, using Odysseus as a case study, I plan to demonstrate what it was to be a king in Homer's time, and how that had changed over from the Mycenaean period to Homer's time.

Music and Theatre Arts

David Whitman (186)

Faculty Advisor/Collaborator: **Jeffery Crowell**

The Musicianship of Joe Morello

The intent of this project was to discover and preserve information regarding Joe Morello the person as well as his technical approach to drumming, with special emphasis being placed on a technique developed by 19th and early 20th century percussionist Billy Gladstone. This technique has had a profound effect on the field of percussion but has become almost entirely forgotten in modern percussion education. Joe Morello was a student of Gladstone and exists not only as a living legend but as one of the last links to this technique. He is one of history's most prominent figures in percussion. This research project has involved meeting and discussing with Joe for many hours about these techniques. The presentation includes articles that will be submitted for publication, a small handbook that will be disseminated to percussion students, video, and audio.

Philosophy and Religious Studies

Lisa J. Pinney (12)

Faculty Advisor/Collaborator: **Charlene P. E. Burns**

Gender, God-Image, and War

The goal of this project was to explore possible correlation between gender-associated God images and view on war. Background research into theories on gender/god-image and gender/war led to development of the research tool, a sixty-item questionnaire. The questions fell into three categories: demographic information (eleven questions), god-image questions (thirty-three questions), and war-opinion questions (sixteen questions). The questionnaire was administered to 221 students enrolled in two General Education survey classes at the University of Wisconsin-Eau Claire during fall semester 2004. Analysis of data revealed that although the overwhelming majority of the sample population report association of male gender to the divine, there are interestingly (low level) correlations among gendered attributes and attitudes toward aspects of warfare.

Behavioral and Social Sciences

Communication and Journalism

Kristi Koller (64)

Faculty Advisor/Collaborator: **Won Yong Jang**

Information and Political Engagement: A Structural Equations Framework

Researchers in social science are concerned about the potential future of the American democracy and the decline in the quality of democratic citizenship as well as political participation. In addition to political apathy and low voter turnout, they are not willing to involve in politically related activities including attending town meetings related to community and working with political candidates. While political participation among all age groups has been declining, American young people have become less informed, less

interested, and less involved in the civic and political realms or voting over the past few decades. Many studies indicate that these problems of political apathy and cynicism are particularly serious among young people today. They are less interested in public issues than any previous generation. They normally participated less than older adults in the civic engagement. This study focuses on information effects for exploring the state of youth political participation. It may help explain why young people are consistently less interested in political participation and also provide a heuristic model for improvement. Using structural equation modeling, this study tests whether the relationship between media and political participation is direct or mediated by political discussion and to detect how such a mediating process might operate.

Jody Whitsitt (57)

Faculty Advisor/Collaborator: **Michael Dorsher**

The Ethics of Undercover Reporting

The practice of undercover reporting raises many ethical questions. Sometimes, reporters say they cannot obtain the truth without going undercover. However, the use of deception to gather information erodes credibility. This is the dilemma that was raised in a case involving a North Carolina news station and their investigation of a local assisted living facility. A reporter entered the establishment and filmed patients without their consent. When the broadcast aired, the owners of the nursing home sued the news station for trespassing, claiming the reporter had no permission to enter. The patients at the nursing home claimed that their privacy was invaded, saying they were filmed without their permission and that the reporter had read their private medical records. Using the Potter Box, a model for ethical decision-making, I will examine the dilemma, values, principles, and loyalties involved in this case. After considering all aspects, I will ultimately construct and present an ethical policy on undercover reporting.

Jody Whitsitt (58)

Faculty Advisor/Collaborator: **Edward Frederick**

Senior Needs Study

The baby boomer generation is on the verge of retirement, and organizations that serve senior citizens need to prepare for this new group of retirees. In order to aid the L. E. Phillips Senior Center in serving these community members, I distributed a questionnaire to its members using a random sample. Participants answered questions regarding their lifestyle choices at present and their satisfaction with the center. The random sample was chosen using a combination of a systematic and a cluster sampling method. By studying the results of the survey, the L. E. Phillips Senior Center will be able to adjust their programs to enhance the quality of life for their members. The questionnaire results could be useful to other organizations in the Eau Claire community that work primarily with senior citizens.

Economics

Victoria Udalova (37)

Faculty Advisor/Collaborator: **Wayne Carroll**

Economic Status of the Hmong in the U.S.: Evidence from the 2000 Census

This project involves preliminary analysis of detailed data from the 2000 U.S. Census, with a focus on the economic status of Hmong households. In the first stage of this research we carefully examined how the Hmong ethnic group should be defined using U.S. Census Data. As a result of our work we wrote an article, "Who is Hmong? Questions and Evidence from the U.S. Census," that we submitted for publication. We then calculated descriptive summary statistics (such as median household incomes and median educational attainment) that allow comparisons with other recent immigrant groups and with the status of the Hmong in 1990. This lays the groundwork for a closer look later at the process of assimilation for the Hmong in the U.S. The data we used in this project are the 5% PUMS, which include information on a wide variety of variables for a 5% sample from the 2000 Census. The entire dataset includes observations on about fifteen million individuals, of which about 7,500 are Hmong.

Steven Wessling (60)

Faculty Advisor/Collaborator: **Eric Jamelske**

A Contingent Valuation Study of the Willingness-to-Pay for the Switch to Automated Collection of Solid Waste with Single Stream Recycling in Madison, Wisconsin

Many communities have switched to automated collection of solid waste and single stream recycling in the last several years. We use a contingent valuation survey to estimate the willingness-to-pay (WTP) for the combined switch to automated collection of solid

waste with single stream recycling in Madison, WI. Respondents were first asked if they would vote in favor of this change at no additional cost to them. Those that answered yes were then asked an initial discrete WTP referendum question followed by a second WTP question resulting in a dichotomous choice with follow-up format. We analyze the initial vote question and the first WTP question separately and then include the follow-up WTP question in our analysis. We generally find a positive WTP for this program change, but we have not settled on a preferred calculation of the mean WTP as of yet. After selecting our WTP measure, we will then perform a benefit-cost analysis of this program change.

Foreign Languages

Tracy Wiltzius (38)

Faculty Advisor/Collaborator: **Juan Carlos Chaves**

An Investigation of the Hispanic Population's Success Path in the United States of America: Yesterday and Today

The estimated Hispanic population of the United States is 39.9 million, making people of Hispanic origin that nation's largest race or ethnic minority. Hispanics constitute 13.7% of the nation's total population. It is because of this effective population growth that we have decided to research further into this trend; in order to understand the course that the Hispanic population has traveled and where they are today in American society. This project was designed so that as a student I could learn about the research process and collaborating information with Juan Carlos Chaves to grasp the full concept of statistics with cultural significance. The research involves the Hispanic population, culture, and various components that are important to their development in the United States over the course of the past generation and today. Key concepts we present are the different aspects of success that includes social class, occupations, poverty-rate, education, population growth, and limitations they must face in our American society that restricts their opportunities of success. We have used statistical and analytical information for the findings based on data from both Hispanic and American culture. For more than 200 years, the nation has succeeded in weaving the foreign-born into the fabric of the US society, incorporating strands of new cultures along the way. With their huge numbers, Hispanics are adding all kinds of new influences: a bilingual society, new consumer market, new economic needs, newly structured job market, and awareness of the various Hispanic cultural traditions.

Geography and Anthropology

Nathaniel Beaver and Jenifer Bode (137)

Faculty Advisor/Collaborator: **Brady Foust** and **Lisa Theo**

Bush v. Kerry: Dallas Texas Showdown 2004

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of Dallas, Texas. Both voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Nathaniel Beaver, Jenifer Bode, Jennifer DeVries, Abigail Ofori-Amoah, Devon Disrude, Steven Kruger, Barbara Featherly, Linda Snider, Scott Formolo, Guy-Roman L'Esperance, Christopher Hendren, Lynn Hilgendorf, Michael Jolitz, Brigham Leslie, Michael LeMoine, Philip Vandenberg, Kellen Lange, Susan Rauterkus, Amber Smith, James Strong, Britta J. Suppes, and Jacob Brzeskiewicz (116)

Faculty Advisor/Collaborator: **Brady Foust** and **Lisa Theo**

Cartographic Analysis of the 2004 Presidential Election

This project examines the results of the 2004 Presidential Election through the use of Hartnett Boxes. This cartographic technique is easy to visualize but difficult to implement in a Geographic Information System. We have developed a multi-software technique that provides for a fast, efficient generation of Hartnett Boxes. Hartnett Boxes display bi-variate data in a form that visualizes the structure of the relationship between the two variables. In this case, it is the percent of the total vote received by each candidate. If each candidate received 50% of the vote in a county, the Hartnett Box will be square. As the percentage for a candidate increases, the box elongates in that candidate's direction and shrinks in the direction of the other. In addition, other cartographic and statistical tools are used to analyze the 2004 Election including income, education, race/ethnicity, church attendance, and distance to coast. Finally, the same technique is applied at a different scale (voting precincts) in the San Francisco Bay area and further checked with on-the-ground field observation.

Jenifer Bode (150)Faculty Advisor/Collaborator: **Harry M. Jol***In Search of a Missing Child: A Geophysical (GPR) Investigation of a Cemetery*

Due to both natural processes and anthropogenic changes, burials within the landscape can, in a short period of time, become very difficult to recognize on the surface. If a burial is not marked (e.g. mound, headstone) or properly recorded (e.g. sexton) and the surface expression is no longer apparent, it becomes difficult to locate the burial so that the site can be properly protected. Ground penetrating radar (GPR) provides a non-invasive and nondestructive geophysical tool that allows one to survey and image the shallow subsurface. In west central Wisconsin in the 1950s, a young child was buried in an unmarked and unrecorded grave within St. Rose Cemetery in Cadott, Wisconsin. Initial site investigation included a visual inspection for depressions and comparison of marked graves to the sexton report. Burials with markers and burials without markers but recorded on the sexton's map were found, however two burials were found that were not noted on the sexton's records and also had no marker or surface expression. GPR provides a non-invasive tool to locate unmarked and unrecorded burials allowing proper protection, or in this case, finality for an uncertain family.

Jennifer DeVries and Abigail Ofori-Amoah (140)Faculty Advisor/Collaborator: **Lisa Theo and Brady Foust***Cartographic Analysis of the 2004 Presidential Election in New Orleans (LA)*

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of New Orleans. Both voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Barbara Featherly, Jennifer Immich, Emily Szajna, Lisa Davis, Hannah Lott, and Tina Spielmann (149)Faculty Advisor/Collaborator: **Lisa Theo***Spatial Differences in Women's Progress and Prosperity in Wisconsin: The Lieutenant Governor's Wisconsin Women Equals Prosperity Initiative*

Despite leading the nation in women's rights earlier last century, Wisconsin women have not advanced as quickly as many of their counterparts in other states. There has been some progress. As a state we have our very first elected woman lieutenant governor, and she is determined to improve the status of Wisconsin women. Based on research conducted by the Institute for Women's Policy Research (IWPR), Lieutenant Governor Lawton is using the Status of Wisconsin Women Report (IWPR, 2002) as a starting point for policy initiatives. Four task forces were formed addressing the issues of: 1) Leadership and Political Participation, 2) Health, Safety and Well Being, 3) Educational Achievement, and 4) Economic Sufficiency. In collaboration with a research team from the University of Wisconsin-Madison's LaFollette Institute for Public Affairs, UW-Eau Claire student researchers collected all necessary data, entered the data into a statistical software package, analyzed the data, and created maps using Geographic Information Systems (GIS). The student researchers then analyzed the maps to determine spatial anomalies not apparent in the statistical analyses. This research was used by local, regional, and state leaders at the March 2005 Wisconsin Women Equals Prosperity Convention to initiate policy initiatives.

Barbara Featherly and Susan Rauterkus (161)Faculty Advisor/Collaborator: **Sean Hartnett***Hunting for Undeveloped Shoreline in Northern Wisconsin*

This project involved the identification of undeveloped shoreline in four northern Wisconsin counties and the tracking of ownership for these tracts of land. Students first worked on identifying undeveloped shoreline through the inspection of high-resolution aerial photography. Undeveloped shoreline was then digitized to produce accurate GIS files of this data. The second stage of this project involved the determination of owners for each land tract which contained undeveloped shoreline. This part of the research varied greatly between counties as each county has a different method of organizing their land records. The final product of this project is a baseline map of undeveloped shoreline in 2005, and a list of potential land holdings for acquisition by the Western Wisconsin Land Trust.

Barbara Featherly and Linda Snider (138)

Faculty Advisor/Collaborator: **Lisa Theo** and **Brady Foust**

Cartographic Analysis of the 2004 Presidential Election in Alabama

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of Birmingham. Both voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Scott Formolo and Guy-Roman L'Esperance (139)

Faculty Advisor/Collaborator: **Brady Foust** and **Lisa Theo**

Cartographic Analysis of 2004 Presidential Election in Atlanta, Georgia

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of Atlanta, Georgia. Both voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Jennifer Freeland (160)

Faculty Advisor/Collaborator: **Douglas Faulkner**, **Robert Barth**, and **Garry Running**

Reconstructing the Precontact Chippewa River Valley: Landscape Reconstruction Using GIS and GLO Township Surveys

The patterning of archaeological sites across the landscape provides valuable information about how past cultures perceived and utilized their environment. To be of any informational value, however, the settlement patterns must be related to the environment as it was when these cultures existed. Due to extensive modification associated with European settlement, the current landscape of the Chippewa River Valley bears little resemblance to that used by past American Indian cultures. As such, it is a poor baseline for understanding precontact settlement in the region. To provide a better context for interpreting site locations, GIS was used to assemble data from General Land Office (GLO) surveys conducted in the 1840s. A multi-layered map was constructed, incorporating such environmental components as vegetation, stream patterns, and wetlands. The preliminary results of this project, presented here, indicate that such maps will be invaluable for reconstructing the precontact landscape of the Chippewa Valley and providing insight in past American Indian lifeways.

Bryan Frenz and Devon Disrude (153)

Faculty Advisor/Collaborator: **Timothy Bawden**

The Hinterlands of Professional Football in the United States

Geographers have studied patterns in sports for over three decades, largely beginning with John Rooney's 1969 pioneering article "Up from the mines and out from the prairies: Some geographical implications of football in the United States." Rooney argued at the time, that "fan loyalties are probably among the strongest of human attachments, and their regional boundaries are well documented and functionally organized via major sports radio and television networks." Since that time, media technology and professional sports in general have been dramatically transformed, which, in turn, has likely had an impact on the regional boundaries of the fan base of professional teams. This poster examines geographic patterns associated with professional football League in the United States. In particular, we first illustrate how the NFL has expanded and evolved geographically during the past 30 years and discuss the ways in which media technology and media coverage has changed during that time. Second, we examine the size and location of teams' fan base. Our data set comes from a 2002 online ESPN survey in which 40,000 respondents were asked a variety of sports-related questions including their favorite teams. The data were collected at the zip code level, allowing for fine scale analysis, and transferred to a GIS for further spatial analysis. Third, through a multiple regression analysis we identified several factors that help explain the size of a team's fan base including city, size, age of the franchise, and media coverage.

Christopher Hendren, Vanessa Helland, Brad Bannach, Derek Pirkl, and Lynn Hilgendorf (103)

Faculty Advisor/Collaborator: **Lisa Theo**

Spatial Analysis of Segregation in Metropolitan Statistical Areas across the United States

Segregation (both racial and ethnic) is a significant challenge in many US cities. This project is a detailed examination of the spatial variation of segregation of Caucasian, African-American, Hispanic, and Asian-American populations of major metropolitan statistical areas (MSA). First, all variables will be mapped for Boston, Miami, Milwaukee, Minneapolis/St. Paul, Phoenix, Portland, and San Diego to determine the spatial patterns. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the patterns of segregation using variables such as income, education levels, religious factors, etc. This analysis: 1) determines the statistical relationship between patterns of segregation and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Lynn Hilgendorf and Christopher Hendren (127)

Faculty Advisor/Collaborator: **Lisa Theo** and **Brady Foust**

Cartographic Analysis of the 2004 Presidential Election in St. Paul, Minnesota

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of St. Paul. Both voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Michael Jolitz and Brigham Leslie (114)

Faculty Advisor/Collaborator: **Brady Foust** and **Lisa Theo**

Cartographic Analysis of the 2004 Presidential Election in Pittsburgh, Pennsylvania

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of Pittsburgh. Both voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Sarah Knabel (151)

Faculty Advisor/Collaborator: **Douglas Faulkner**

Integration of CAD and GIS: Modeled Changes in Pervious/Impervious Surfaces and the Affects on Surface Runoff at the University of Wisconsin-Eau Claire

The integration of CAD and geographical/spatial software products is a growing geographic field. The combination of software products addresses the shortfalls of each while examining the built environment and its interaction with the natural environment. CAD software strengths are modeling the built environment and GIS software strengths are displaying, categorizing, and analyzing objects in models. The combination of these products allows for analysis of space/land use over a time continuum, including past, present, and future. The University of Wisconsin-Eau Claire's campus development is the focus of this research project. Space was divided into pervious (e.g. vegetation) and impervious (e.g. roofs, parking lots, sidewalks, streets) categories. The change between pervious and impervious surfaces since the university's creation in 1916 to the present was collected, tabulated, and modeled. Also modeled and analyzed were the changes proposed under the campus development plan. Surface water runoff volumes were compiled using a weighted composite value based from the SCS-CN method. Analysis of the results include a discussion of the effects on water runoff volume over time and water quality based on the requirements created by the Stormwater Discharge Monitoring Program recently signed with the City of Eau Claire.

Steven Kruger and Devon Disrude (128)

Faculty Advisor/Collaborator: **Lisa Theo** and **Brady Foust**

Cartographic Analysis of the 2004 Presidential Election in Denver (Colorado)

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of Denver, Colorado. Both

voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Kellen Lange and Susan Rauterkus (125)

Faculty Advisor/Collaborator: **Brady Foust** and **Lisa Theo**

Cartographic Analysis of the 2004 Presidential Election in Cleveland, Ohio

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of Cleveland, Ohio. Both voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Michael LeMoine and Renee Rollman (154)

Faculty Advisor/Collaborator: **Timothy Bawden**

The Cultural Atlas of Wisconsin: A Prototype

This poster displays a sample of the work that has been done in an ongoing research effort to produce the Cultural Atlas of Wisconsin. The Cultural Map of Wisconsin, upon which the atlas is based, was published in 1996 by the University of Wisconsin Press and drew national attention and acclaim. In general, the map displays 1,200 important cultural and historical places in the state with 400 descriptive text blocks and 800 icons identified in an accompanying booklet. The Cultural Atlas includes greater coverage of these places along with graphics, such as maps, tables, and historic photographs. The Atlas is organized into six individual chapters, representing six regions in the state: the Northwoods, the Driftless Area, the South Central region, the Eastern Ridges and Lowlands, the Southeast, and the Central Plains. The initial goal of the project was to produce a companion guide to the Cultural Map of Wisconsin, but in the summer of 2003 the University of Wisconsin Press agreed to publish it as a stand-alone cultural atlas.

Michael LeMoine and Philip Vandenberg (113)

Faculty Advisor/Collaborator: **Brady Foust** and **Lisa Theo**

Cartographic Analysis of the 2004 Presidential Election in Charlotte, North Carolina

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of Charlotte. Both voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

MariAnn Pietz and Vanessa Helland (187)

Faculty Advisor/Collaborator: **Ingolf Vogeler**

Human-Environmental Interactions in Films

Our goal is to compare and contrast the geography of two films. We will demonstrate the importance of setting to the plots' effectiveness with a focus on site and situation including all human-environmental relationships. Physical: climate, terrain and soil; human: religion, and language. The sources are the films, *The Field*, set in Ireland and *The Sheltering Sky*, Morocco. Our poster uses maps and photos to illustrate physical features and why it would not be possible to switch the settings for each of these films. Narrative will describe the impact of this and the human interactions with the plot and the physical environment. The two very different cultures and settings are reflected by the geography, and the cultural impact is demonstrated in the foreign personalities in the films.

Michele R. Shaw (152)Faculty Advisor/Collaborator: **Zoltan Grossman***Native American Sustainable Agriculture in Wisconsin*

The poster is a product of a faculty/student collaborative project examining tribal sustainable agricultural projects in Wisconsin. The introduction will provide an overview of Native sustainable agriculture on the national scale, centered on Native Food Summit held in September 2004 in Milwaukee. The poster will also focus on two Wisconsin case studies that represent the growing relationship between sustainable agriculture, American Indian history and culture, and a healthier diet (based on the reintroduction of traditional foods) to counteract diabetes and poor nutrition. The Oneida Nation has farm operations on its reservation near Green Bay that include production, processing and retail divisions, and also uses the production of traditional white flint as a tool for cultural education and community building. The Ho-Chunk Nation has a bison restoration project on a reclaimed farm near Muscoda, on the Wisconsin River, as one part of a larger effort to reintroduce buffalo to Native lands and use gaming proceeds for sustainable economic development. The Summer Research Experience for Undergraduates (SREU) project will provide two chapters (writing and photos) for a new book on Wisconsin sustainable agriculture, titled "Renewing Rural Wisconsin," to be published by the Institute for Agriculture and Trade Policy in Minneapolis.

Craig G. Sternberg (189)Faculty Advisor/Collaborator: **Harry M. Jol** and **Douglas Faulkner***Saw Mill History on Half Moon Lake, Eau Claire, WI*

Half Moon Lake is an entrenched oxbow lake that has played a significant role in the history of Eau Claire, Wisconsin. From the mid 1800s, the lake was a center for much of the logging industry in Eau Claire, which included a canal and subsurface flume connecting the Chippewa River to Half Moon Lake. For approximately 75 years the lake was used as a log reservoir for four (at times five) major sawmills that were located around the lake or associated canal. Initial mill operations began in 1857 with the last mill closing in 1926. On average, each mill on Half Moon Lake annually produced between 12-30 million board feet. Half Moon Lake contributed greatly to the economic welfare of Eau Claire for almost three-fourths of a century but throughout this time period organic wastes from the mills were directly deposited into Half Moon Lake, which has resulted in the present-day environmental problems (e.g. algae blooms, weed growth). Based on a historical literature search, discussions with local residents, and using tools such ground penetrating radar (GPR) and global positioning systems (GPS), the project initiates a better understanding of the lacustrine deposits (e.g. thickness of sediment).

James Strong and Amber Smith (126)Faculty Advisor/Collaborator: **Lisa Theo** and **Brady Foust***Cartographic Analysis of the 2004 Presidential Election in Chicago, IL*

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of Chicago. Both voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Britta J. Suppes (104)Faculty Advisor/Collaborator: **Brady Foust***The Spatial Distribution of Boundary Waters Canoe Area Wilderness Visitors*

The Boundary Waters Canoe Area Wilderness (BWCAW) in northern Minnesota is a widely used wilderness area for many different forms of recreation year-round: canoeing, kayaking, fishing, camping, hiking, and motor boating. Thousands of people from around the country visit the BWCAW each year to partake in these many activities. This project uses thematic mapping to analyze the spatial distribution of BWCAW users across the conterminous United States. Records acquired from the U. S. Forest Service containing data on the total number of visitors for the year 2004 identifies Minnesota residents using the BWCAW the most out of any other state in the country. The spatial distribution of the visitors within this region is displayed on additional maps using the number of BWCAW users from state zip codes. The zip code data in Minnesota is compared to the variables of median age and median household income within the state for analysis. The data from this project has been calculated in Microsoft Excel and added to ArcMap to create the presented visual representations. The result of this project is aimed to identify information and patterns of the BWCAW users within Minnesota.

Britta J. Suppes and Jacob Brzeskiewicz (115)

Faculty Advisor/Collaborator: **Brady Foust** and **Lisa Theo**

Cartographic Analysis of the 2004 Presidential Election in Philadelphia, PA

This project is a detailed examination of the spatial variation of the presidential vote in the election of 2004. The problem is considered at two scales: 1) at the state level using county data; and 2) at the individual precinct level for the city of Philadelphia. Both voter intensity (turnout) and vote (# and percentage for each candidate) are examined. First, all variables are mapped at appropriate scales to visually examine the spatial patterns of each variable. Such patterns suggest further research vectors. Next, correlation and regression analysis are applied to the voting patterns using variables such as income, education levels, urban/suburban mix, and religious factors. This analysis: 1) determines the statistical relationship between voting patterns and these variables, and 2) highlights anomalies that suggest more complex relationships and further research.

Jennifer Thornburg (159)

Faculty Advisor/Collaborator: **Robert Barth**

X-ray Fluorescence Analysis of Pipestone from Barron County, Wisconsin

Capable of being carved when freshly quarried, pipestone was used over a long period of time in the manufacture of pipes and ornamental objects by American Indians. Because of its importance to past cultures, the pipestone from the Blue Hills in Barron County has been studied by a variety of analytical techniques. The primary objective of this analysis has been to identify chemical and mineralogical characteristics that would enable artifacts made from Barron County pipestone to be distinguished from artifacts made from pipestones found in other areas. In contrast to these earlier studies, the goal of this investigation is to determine if it is potentially possible to trace pipestone artifacts not only to Barron County, but also to specific outcrops and quarries within the Blue Hills. Multiple samples were collected from three locations and their chemical composition was analyzed by X-ray fluorescence. The geochemistry of the three locations was then compared. The results of this comparison indicate that it is possible to distinguish between pipestones from different outcrops and quarries on the basis of their trace elements.

Louise Woletz-Hinz (157)

Faculty Advisor/Collaborator: **Jill Smith**

Motherhood and the Liminal Phase

The purpose of this study was to fill a gap in the body of research pertaining to the rite of passage of motherhood. There was little, if any, work concerning the liminal phase of pregnancy and motherhood. We were especially interested in the differences that are found between generations that are caused by cultural change. The research interviews were conducted over a year-long period. The subjects consisted of women who gave birth to and raised their children in the Chippewa Valley. The women were selected from three age-groups, starting with the cohort group of the research assistant. The age-ranges were 20-30, 45-55, and 70-80. Three women were interviewed from each age-range. Several conclusions were reached as a result of these interviews. One conclusion was that the rate of breastfeeding has steadily increased, most likely as a result of studies that showed benefits of breastfeeding for both mother and child. We believe that the method of feeding has an important impact on the role of women as mothers. Another hypothesis we had was that there was an increase in workload due to a transition from a disease model of pregnancy to a normal, biological function model. Our research findings support this hypothesis.

History/Geography and Anthropology

Jennifer Immich (158)

Faculty Advisor/Collaborator: **Robert Barth** and **Thomas Miller**

Archaeological Faunal Analysis and Black Death

Academics have generally identified the Black Death of the 14th century as the bubonic plague. Some historians and scientists now assume other diseases, predominately anthrax, as the actual cause. The inability to identify the biological agent of the Black Death through the historical record is due to the similar symptoms and transmission patterns of bubonic plague and anthrax in humans. Each disease, however, utilizes different animal carriers. The black rat is the primary carrier of the bubonic plague, whereas cattle and sheep both carry anthrax. To further the investigation of the biological identity of the Black Death, archaeological faunal evidence beginning in 1347, the date of entry into England, is analyzed. Through tracking increases and decreases of faunal remains for the above species during outbreaks, it may be possible to isolate the biological agent of the Black Death in England. The specific target of this research is the epidemic's entry point into southern England, modern-day Hampshire. The results will determine if faunal analysis is a potentially productive approach to determining the true identity of the Black Death.

Human Development Center

Katie A. Ley, Tessa Root, Krista Bowman, and Katie Schultz (129)

Faculty Advisor/Collaborator: **William Frankenberger**

Psychiatric Diagnoses and Concomitant Drug Treatment in Specialized Child Populations

The purpose of this study is to determine the types of psychiatric disorders and the corresponding medications prescribed to children enrolled in Early Childhood Special Education Programs. Data from the study will be used to determine the number of psychiatric diagnoses associated with children enrolled in Early Childhood Special Education Programs, specific medication(s) prescribed for children with psychological diagnoses, the number of children receiving multiple medications for their diagnoses, possible adverse drug interactions among children receiving multiple psychiatric medications, as well as the attitudes of teachers with regard to the use of psychiatric medication(s) in children enrolled in Early Childhood Special Education Programs. The data was collected via a survey disseminated to five hundred Early Childhood Special Education teachers in Wisconsin, Minnesota, and Iowa.

Katie A. Ley, Tessa Root, Krista Bowman, and Katie Schultz (112)

Faculty Advisor/Collaborator: **William Frankenberger and La Vonne Cornell-Swanson**

Use of Psychiatric Medications for Treatment of Elementary Level Children in Schools

The purpose of the study was to determine the types of psychiatric disorders and the corresponding medications prescribed to children enrolled in first and second grades. Data from the study was used to determine the proportion of children in first and second grades identified with single and multiple psychiatric disorders, the proportion of children treated with single and multiple psychiatric medications, possible adverse drug interactions for children receiving combinations of medications for their psychiatric disorders, as well as assess the attitudes of teachers concerning the use of psychiatric medications to treat elementary level children. The data was collected via a survey disseminated to five hundred elementary level teachers in public schools in Iowa, Minnesota, and Wisconsin.

Political Science

Adam Hinz (63)

Faculty Advisor/Collaborator: **Justin W. Patchin**

Cyber Bullying: An Exploration of Electronic Aggression

Over the past two decades, social science and education research has documented the numerous detrimental effects of bullying. The recently identified relationship between bullying and acts of extreme school violence prompted a vast array of studies concerned with traditional bullying. However, since the advent of the Internet and other mobile communication devices, bullying now occurs not just on the schoolyard, but in the digital realm of today's technological society. Due to the pervasive and prolonged use of such technology by children both in and out of school, their victimization potential increases dramatically beyond the schoolyard. The present study focuses on two forms of aggression capable of electronic transmission—verbal and psychological. While researchers have just begun to explore electronic harassment, very few have explored the electronic extension of bullying. The present study empirically documents the extent to which cyber bullying occurs, and develops a profile of cyber bullies and their victims. Present findings have application in determining how bullies and victims interact in the fast-growing society of electronic communication. Such electronic interactions are compared to those of traditional schoolyard bullies and victims in terms of frequency and effect.

Steven Kerbaugh (59)

Faculty Advisor/Collaborator: **Geoff Peterson**

Public Opinion of the Imperial Presidency

A common theme in political science research surrounding the balance of power in federal governance is that the president has become more powerful at the expense of congressional power. This has led scholars to label the executive office as “imperial.” We examine scholarly research surrounding this phenomenon and undertake an examination of the general public's views on the relative balance of power in Washington.

Psychology

Jill A. Becker and Lindsay Matteson (111)

Faculty Advisor/Collaborator: **Catya von Károlyi**

An Analysis of the Interactions between Speed-Accuracy Trade Offs for Identifying Possible Figures Presented in the Left- versus the Right-Visual Half Field: Are There Gender Differences?

A review of the literature revealed a hemispheric preference for processing local versus global features. The right hemisphere primarily mediates processing global figures, whereas the left hemisphere primarily mediates processing local figures. The impossible figures

task, a global task, requires participants to determine as quickly and as accurately as possible whether a figure is impossible (i.e., not able to exist in three-dimensional space) or possible (i.e., able to exist in three-dimensional space). On a visual-half field presentation of the Impossible Figures Task, males revealed a significant speed-accuracy trade off (i.e., slower response times associated with higher accuracy rates) when figures were presented to the left hemisphere (right visual half field), but not when figures were presented to the right hemisphere (left visual half field). Females, in this study however, revealed no such result, although there was a near significant trend for a speed-accuracy trade off when figures were presented to the right hemisphere (left visual half field) but not when figures were presented to the left hemisphere (right visual half field). Here we present the results of our analysis of gender differences in hemispheric preference for processing possible figures in the right versus the left visual half field.

Amanda C. Besner, Kelli B. Capocasa, Christine S. Benedict, and Heather A. Petersen (130)

Faculty Advisor/Collaborator: **Kevin P. Klatt**

Teaching Vocal Imitation to Children with Autism

Children diagnosed with autism have developmental delays in communication, play, and social skills. Poor communication skills are most problematic because they are necessary for learning many social and play skills. Therefore, developing communication skills, especially verbal competence, is extremely important. Teaching verbal skills to nonverbal children requires first teaching the child to imitate vocal sounds. In this study, vocal imitation was taught to two young children using a discrete trial procedure. Three nonverbal children ages 2.5, 2.5, and 4 were taught to imitate various combinations of vowels and consonants. Results show an increase in vocal imitation.

Livy Chang and Marla Wojtanowicz (105)

Faculty Advisor/Collaborator: **Allen H. Keniston**

Basic Tenets of Psychology Students' Beliefs about Psychology from the First to the Fourth Year

Robert Watson's "psychological prescriptions" provide a useful tool for describing students' orientations toward their discipline. Data from 300 students indicate little change in orientation to the field from first through fourth years in the major, some impact of a history of psychology course, and weak associations with their faculty's perspectives.

Britta Fiksdal, Amanda Bever, Lindsay Matteson, Sarah Richling, Sara Weinkauff, and Wayne Chen (131)

Faculty Advisor/Collaborator: **Kevin P. Klatt**

Providing Behavioral Intervention for a Young Child with PDD at the University of Wisconsin-Eau Claire Campus Autism Program

Behavioral intervention has proven to be effective in teaching young children with Pervasive Developmental Disorder (PDD). The University of Wisconsin-Eau Claire's Campus Autism Program (CAP) works with children with PDD. The purpose of this case study is to document the progress of a three-year-old child who has been diagnosed with pervasive developmental disorder (not otherwise specified). When first enrolled in the CAP the child had limited language skills and was behind typically developing peers. The child has attended the Campus Autism Program and received behavioral intervention approximately four hours a week for the past seven months. Results show that he has learned many new skills over this period of time.

Britta Fiksdal and Sarah Richling (132)

Faculty Advisor/Collaborator: **Kevin P. Klatt**

Providing Intense Behavioral Intervention for a Pre-school Child with Autism

Behavioral intervention has proven to be effective in teaching young children with autism. The University of Wisconsin-Eau Claire's Campus Autism Program (CAP) serves young children recently diagnosed with Pervasive Development Disorders. This case study reviews the progress of the first child enrolled at CAP 2.5 years ago. When the child was first enrolled at the Campus Autism Program, he was severely delayed in language skills (no expressive and little receptive skills). The child attended the Campus Autism Program for about four months and has since received 35 hours per week in his home setting. Results indicate much improvement in language skills and dramatic increases in IQ and other standardized test scores.

Bernard D. Kuechler (108)

Faculty Advisor/Collaborator: **Blaine Peden**

Use of Box and Arrow Diagrams to Represent Causal Models in Intro Psych Text

Textbooks are a major tool in the education of students at all levels. Various kinds of research explore how textbooks can best assist students in learning about difficult topics. One major topic concerns the use of different kinds of graphics. Peden and Hausmann (2000) found that data graphs in psychology textbooks were mainly line and bar graphs and also suggested that teachers must ensure students understand these graphs. Textbooks, however, contain other kinds of graphics. The current study reports a content analysis of introductory psychology textbooks for the presence of Box and Arrow Diagrams (BNADs). The goal is to discover whether

BNADs are used to display causal models (i.e., cause-and-effect relationships) or other information. We expect our results to reveal a need for explicit and perhaps specialized emphasis regarding the teaching of causal relationships and the interpretation of causal BNADs. This report will extend a preliminary study which examined 10 introductory psychology textbooks for BNADs. The preliminary results supported the hypothesis that more intellectually stringent textbooks as rated by Griggs (1999) had a higher percentage of Causal BNADs. The preliminary study also suggested that few BNADs in textbooks illustrate either feedback loops or strength indicators.

Eric J. Lee, Justine J. Majeres, Robin L. Panske, Luke A. Howard, and Rebecca L. Ringersma (87)

Faculty Advisor/Collaborator: **Lori A. Bica**

Effect of Questionnaire Format on College Students' Reported Beliefs about Eight Core Issues of Personality

A trend toward relativistic thinking occurs during the college years (Perry, 1970). Younger students tend to divide information, values, and authority into right and wrong, and good and bad, whereas older students are willing to give up the possibility of absolute truth in favor of multiple truths, each relative to its context. We investigated this developmental trend in relation to students' beliefs about eight core issues of personality and whether questionnaire format would affect responses. Participants (N=200) completed one questionnaire that contained 16-items, two questions for each of the eight personality issues. For example, the internal-external issue was measured with: "I actively control my own personality" and "My personality is largely determined by factors outside of my control." The second questionnaire used wording identical to the first, but contained one question for each issue presented as a dichotomy ("...factors outside my control" as the right pole and "...actively control my own personality" as the left pole). Younger students are expected to demonstrate greater dualistic thinking about the issues than older students. Within this general trend, participants across all four years who complete the dichotomous measure are expected to demonstrate greater dualistic thinking than students who complete the non-dichotomous measure.

Wendy Lyman (134)

Faculty Advisor/Collaborator: **K. Renee Norman and Kevin P. Klatt**

The Effects of a Token Reinforcement System on Teaching Social Skills to a Child with Autism in a Natural Preschool Classroom Setting

Children diagnosed with autism have difficulty engaging in appropriate social behaviors. A lack of social skills becomes more prominent as the child enters school and is expected to interact with peers. The purpose of this study was to teach social skills to a young girl about to enter kindergarten. In this study, a fixed-ratio token reinforcement system was used to increase two social skill behaviors of a five-year-old child with autism in a natural preschool classroom setting. A multiple-baseline design was used across two target behaviors: verbal conversation initiations to peers and eye contact while initiating to peers or adults during a free play period of the classroom day. Results are pending.

Emily J. Mack-Olson, Jill A. Becker, Valerie A. Jonjak, Natalie R. Koffarnus, Justine J. Majeres, Regina A. Carroll, Tracy A. Schweiner, Thomas W. Hahn, Katie J. Keller, Sarah J. Weis, Andrew J. Kwilas, Nalee Xiong, Jacquelyn L. Petroni, Tiffany R. Domaszek, Lindsay A. Johnson, and Emily Wiechmann (136)

Faculty Advisor/Collaborator: **David Jewett**

Factors that Affect "Satiating" in a Model of "Hunger"

Obesity is a leading preventable cause of death among humans. We developed a preclinical model of "hunger" to help identify potential treatments for obesity. In a choice procedure, subjects were trained to discriminate between the stimulus effects produced by 22 hours food restriction (e.g., "hunger") and two hours food restriction (e.g., "satiating"). Previously, subjects that were food restricted for 22 hours and received 20 minutes food access prior to testing emitted "satiating" responses while sucrose and saccharin consumption did not produce this effect. Caloric and volume intake following sucrose availability was often equal to or greater than volume consumed and calories obtained from food. Given that food consumption worked quickly, but sucrose and saccharin consumption did not alter the "hunger" responses led to the further examination of the relations between consumption and reports of "hunger." In this study we seek to determine differences between the effects of solid foods and liquids. Sucrose and saccharin solutions were made available for one hour before testing to determine if the quality of the substance affected reports of "satiating." A more refined characterization of this preclinical model of "hunger" may be useful for obesity medication development.

Justine J. Majeres, Rebecca L. Ringersma, Luke A. Howard, Eric J. Lee, and Robin L. Panske (88)

Faculty Advisor/Collaborator: **Lori A. Bica**

Effect of the Personality Trait "Openness" on Developmental Trends in College Students' Thinking about Eight Core Issues of Personality

A trend from dualistic to relativistic thinking occurs during the college years (Perry, 1970). That is, younger college students have a greater tendency to divide information, values, and authority into right and wrong, good and bad, and we and they, whereas students

in the later years of college view knowledge as embedded in a framework of thought. Older students are willing to give up the possibility of absolute truth in favor of multiple truths, each relative to its context. We investigated this developmental trend in relation to undergraduate students' beliefs about eight core issues of personality (e.g., conscious-unconscious). Also investigated was the personality trait "openness" in relation to the aforementioned trend. Individuals high on this trait are imaginative, creative, original, and curious (McCrae & Costa, 1990). Participants (N=200) completed two measures, the NEO-Five Factor Inventory-Revised (Costa & McCrae, 1992) and a measure investigating beliefs about eight core issues of personality. As a general developmental trend, older students are expected to demonstrate greater relativistic thinking about the core issues than younger students. Within this general trend, participants across all four years of college who score higher on "openness" are expected to demonstrate greater relativistic thinking than students with lower scores.

Lindsay Matteson and Danielle Becker (83)

Faculty Advisor/Collaborator: **April Bleske-Rechek** and **Catya von Károlyi**

Sex, Sexual Strategy, and Over-Excitabilities Among Young Adults

In this study we investigate sex differences among UW-Eau Claire students in sexual attitudes and effort devoted to the pursuit of a long-term versus short-term mating strategy. In the context of examining sex differences in mating strategy, we explore the impact of specific question phrasing on individuals' response. In this study, we also investigate the power of specific over-excitabilities to predict unrestricted sexual behavior and unrestricted attitudes toward casual sex. Students complete a questionnaire that includes the Over-Excitabilities Questionnaire II (OEQ-II), the Sociosexual Orientation Inventory (SOI), and a variety of relationship and sexual history questions. Our results will focus on our examination of three questions: (1) Do young men and women at UW-Eau Claire differ in their sexual strategy?, (2) Does alternate phrasing of questions focusing on effort devoted to long-term mating evoke a sex difference in response?, and (3) Do over-excitabilities predict unrestricted sexual behavior among young men and women?

Josiah P. Peebles IV (106)

Faculty Advisor/Collaborator: **Allen H. Keniston**

Pour the Foundation, Build the House: The Integration of the History of Psychology as Essential to Intellectual Development in a Liberal Education

Contemporary theories of intellectual development and perspectives on the place of history in the psychology major suggest that the course is ideally suited as an integrative capstone to the major. At the same time, however, many theorists fail to appreciate the notion that the history of psychology also provides opportunities to teach contents, skills, and applications of psychology that facilitate the integration of knowledge. This research describes the importance of incorporating history vigorously throughout the curriculum, for a liberal education relies on the dialectical interplay of history and intellectual development: history, it is argued, provides context, depth, and background to otherwise seemingly disconnected ideas and actions and leads to more extensive knowledge, understanding, and critical insight—thus, to intellectual development; intellectual development, in turn, leads to a greater appreciation for, acceptance of, and interest in history, thus perpetuating the dialectal cycle of growth and development characteristic of liberal education.

Karin Rasmussen and Julie Ackerlund (155)

Faculty Advisor/Collaborator: **Gregory Madden**

Motivation . . . How Much Is It Worth?

The influence of unearned reinforcers needs to be analyzed to determine their effect on motivation to work. The present study analyzed motivation to work as a function of amount of work required in four pigeons. Motivation to work was measured by the amount of completed ratio schedules. The pigeon's willingness to work for food pellets was assessed in Baseline 1, and average amount of food pellets received was calculated. Once responding stabilized, Treatment 1 condition was implemented. The pigeons could work for any amount of food up to their average amount obtained in Baseline 1. The number of responses required to receive food was increased incrementally using a progressive-ratio schedule throughout the study. Once the pigeons deemed the response demand too high responding stopped. Unearned pellets were delivered after four different delay periods. In this condition motivation to work decreased. The subjects returned to baseline; motivation to work increased. Once responding stabilized, Treatment 2 condition began. This condition was the same as Treatment condition 1; variability in weight was accounted for by maintaining all subjects at a weight within 15 grams of Baseline 2 weights. Results indicate that providing the subjects with unearned pellets decreased their motivation to work; however, this phase of research is ongoing.

Karin Rasmussen, Nicole Berning, and Julie Ackerlund (109)

Faculty Advisor/Collaborator: **Blaine Peden**

The Effects of Antidepressant Advertisements on College Student's Self-Perception and Recommendations

Previous research indicates that antidepressant medication advertisements created by pharmaceutical companies have a significant impact on self-reported depressive symptoms and feelings in college students (Frankenberger, et al., 2004). College students who viewed pharmaceutical companies' antidepressant medication advertisements were significantly more likely to a) view themselves as depressed or as exhibiting symptoms of depression, and b) recommend depression medications for themselves and/or their friends. The current study is being conducted to determine whether providing participants with scientific information regarding the side effects of antidepressant medications will influence their perceptions of self-depression, as well as their willingness to recommend antidepressant medication to their friends. The implications of this study are important in a variety of areas. Pharmaceutical companies provide a large amount of information via advertisements, and it is important to understand the impact of the information they disseminate. Determining if an intervention is effective in counteracting the depressive effects of pharmaceutical ads is an important step in providing the best and most ethical information to the public.

Mark Remiker and Katie A. Ley (84)

Faculty Advisor/Collaborator: **April Bleske-Rechek**

On the Effects of Reading Erotic Literature: Manipulation of Men's and Women's Emotional and Sexual Relationship Satisfaction

Research on contrast effects has documented various intriguing findings. Exposure to centerfolds, for example, has been shown to lower men's attraction to their partner. Evolutionary logic suggests that stimuli that highlight another couple's emotional connection may be detrimental to women's perceptions of their mateship. As part of this study, men and women read one of two literature excerpts detailing a sexual encounter between a committed couple. One excerpt depicted a high degree of sexual novelty in the relationship, and the other a high degree of emotional intimacy. We thus tested the hypothesis that men's sexual relationship satisfaction is more influenced than is women's by stimuli that highlight sexual novelty, and the hypothesis that women's emotional relationship satisfaction is more influenced by stimuli that emphasize emotional intimacy. Our results implicate a need for research on the effects of media consumption on people's relationship commitment and satisfaction.

John Smethells, Eric Ewan, Wayne Chen, and Travis Smith (156)

Faculty Advisor/Collaborator: **Gregory Madden**

Economic Demand for Food and Fat: Quantitative Predictors of Relative Reinforcer Efficacy

Reinforcer efficacy is a theoretical concept that integrates the behavior maintaining properties of a reinforcer into different experimental conditions. For instance, the efficacy of a reinforcer can be determined by obtaining the amount of decline in consumption of a good over a given range of price increases. The price at which there is a greater percentage decrease in consumption than increase in price is considered the point of elastic demand, and all values prior to this are deemed inelastic. Bickel et al. (2000) have suggested that this point of elasticity provides the value from which one can determine the reinforcing efficacy of a good. Additionally, Bickel et al. (2000) states that comparing these demand curves can also determine preference of one commodity over another at specific prices. An example is that food consumption may be greater than water consumption at lower prices while water consumption may be greater than food consumption at higher prices, and thus the demand curves may be predictive of a preference reversal. Traditional methodologies for obtaining these demand curves of a good include both break points on progressive ratio schedules and peak rates of responding on single schedules. Previous research has primarily used human participants who worked for luxury goods such as cigarettes and money; however, the present study uses necessary goods that are partially substitutable for one another to try to predict preferences at different prices. This experiment used a within-subjects design with six albino rats that were maintained in a partially-closed economy.

Travis Smith and Tim Warren (110)

Faculty Advisor/Collaborator: **Blaine Peden**

Guilt by Association: Roommate Bias Based on Parental Background and Effects of Sex

Children raised by homosexual parents are no more likely to be homosexual than if they are raised by heterosexual parents; nevertheless, children of homosexual parents are stigmatized by the association with their homosexual parents. We studied student perceptions of prospective roommates. Our primary independent variable was the parents portrayed in a written scenario as a heterosexual couple, a lesbian couple, or a gay couple. We measured various aspects of acceptance and social stereotypes of the prospective roommate based on the parent sexual orientation. We found that children of gay parents were less accepted than children of either heterosexual or lesbian parents. The ratings of stereotypes were greater for prospective roommates of both types of homosexual parents compared to heterosexual parents. Overall female participants were more accepting than male participants, regardless of the type of parents. This study provides evidence that could be used by future researchers to explore the controversial issue of social acceptance of gay adoptions.

Chelsey Sutton, Karin Rasmussen, and Valori Berends (135)

Faculty Advisor/Collaborator: **Gregory Madden**

Process Improvement in a Clinic Setting: An Application of OBM

Research clearly indicates that the appropriate conveyance of expectations and goals is a necessary factor in the ability of an organization to perform at its highest level. The current study analyzed the influence of standardized forms and feedback on the improvements in work output, speed, and accuracy in a medical clinic setting. The goal of the study was to increase the speed with which lab orders were processed relative to the time in which they were ordered. The use of standardized lab order forms as well as regular feedback on progress made was utilized to determine their effects on the accuracy and speed of lab request processing. The effects of the intervention were evaluated using a multiple-baseline design across departments.

Meghan Swanson (107)

Faculty Advisor/Collaborator: **Blaine Peden**

Undergraduate Teaching Assistants and Ethics

Keith-Spiegel et al. (2001) noted that graduate teaching assistants (GTAs) “occupy an ambiguously delineated territory within higher education” (p. 133) because they are neither “just students” nor “independent educators.” In such cases of ethically ambiguous role boundaries, there is a genuine concern regarding the potential for various kinds of ethical infractions by GTAs. Many of the same concerns and issues also apply to undergraduate teaching assistants (UTAs). To date, the only study that examined the ethical sensitivities of UTAs (Scannell, 2000) was limited, the sample size was small, and the data unavailable for reanalysis. The study will collect (a) demographic information about students serving as UTAs, (b) evaluate their ethical training both in the sense of having taken ethics courses as well as receiving ethical instruction with regard to TAing, (c) assess their interest in the ethics of practice, research and teaching, and (d) compare and contrast self-reported versus actual knowledge about ethical dilemmas confronting UTAs (after Branstetter & Handelsman, 2000; Keith-Spiegel, et al., 2001). In addition, the study will employ the critical incident technique (Fly, van Bark, Weinman, Kitchener, & Lang, 1997; Goodyear, Crego, & Johnston, 1992).

Meghan Swanson, Mark Remiker, Nicole Zeug, and Andrew Rohloff (85)

Faculty Advisor/Collaborator: **April Bleske-Rechek**

Happy Babies Make Men More Attractive: Evidence for Female Preferences for Parentally-Investing Men

The logic of Parental Investment Theory implicates adaptations in women devoted to the assessment of males’ willingness to invest in offspring and adaptations in men designed to detect women’s fertility status and seek sexual variety. In keeping with this logic, La Cerra (1994) found that young women perceived a male stranger interacting with a child as more attractive than a male stranger ignoring a child, whereas men rated a female stranger as attractive regardless of context. In two studies, each with a different set of stimulus photos of a male and female pre-rated as slightly-to-moderately attractive, we replicated La Cerra’s original research findings. Further, we extended her research by (1) utilizing a between-subjects rather than within-subjects design and (2) investigating potential moderators of sensitivity to cues of parental investment, including sociosexual orientation and egalitarian sex-role attitudes.

Nalee Xiong and Carla Lagorio (86)

Faculty Advisor/Collaborator: **April Bleske-Rechek**

Responding to a Hypothetical Extra-Pair Involvement: Sex Differences in the Nomination of Cues of Sexual Infidelity

In a novel test of the hypothesis that men’s jealousy more than women’s focuses on signals of sexual (vs. emotional) infidelity, we asked 158 young adults to list pieces of evidence that would lead them to believe that their partner was involved with someone else. The nature of the extra-pair involvement was intentionally ambiguous, under the expectation that if men more than women focus on cues of sexual infidelity, then men should be more likely than women to nominate sexual cues as evidence of extra-pair involvement. As predicted, men’s first cue involved explicit sexual evidence (e.g., catching her having sex with someone else, finding used condoms) more frequently than did women’s. Further, despite that men nominated fewer cues, on average, than did women, a greater proportion of men’s cues referenced sexual behavior. Because this study did not rely on the forced choice method, the findings provide original support for the existence of an evolved sexual jealousy adaptation in men.

Nicole Zeug, Julie Ackerlund, Sara Czekalski, Britta Fiksdal, and Amanda Bever (133)

Faculty Advisor/Collaborator: **Kevin P. Klatt**

Comparing Constant Time Delay and Simultaneous Prompting Procedures on Skill Acquisition for Children with Autism

Teaching communication, play, social and academic skills to children often involves using procedures to transfer stimulus control from the teacher’s prompt to the discriminative stimulus. A constant time delay procedure has been successfully used to transfer stimulus control in many studies. More recently, a simultaneous prompting procedure has been demonstrated to successfully transfer

stimulus control, but in many cases with fewer trials, sessions, training time to criterion and errors than the constant time delay procedure. The purpose of this on-going study is to investigate whether differences exist in using these two procedures when teaching skills to young children diagnosed with autism. Preliminary results have shown little difference between the two procedures.

Sociology

Nicholas B. Harberg (81)

Faculty Advisor/Collaborator: **Jeff S. Erger**

"I Better Get Out of Bill's Chair": Enforcement of Formal and Informal Rules at a Coffee Shop

This research tests the theoretical connection between power and knowledge and how they play a critical role in rule enforcement. Michel Foucault's theories on punishment are applied to the setting of a coffee shop through observation and text analysis. The goal is to see how, through the process of social control, customers learn the rules of the coffee shop and how they will then begin to enforce the rules on themselves and others. Analysis shows that Foucault's ideas of the Panopticon, Dangerousness, Examination, and Punishment manifest in the coffee shop and are internalized by the customers on a symbolic level. There are extremely high levels of social control being used in a setting that is viewed as removed from traditional ideas of a controlling atmosphere. Through the control of workers by management to the control of the customers, social control is exerted at all levels of the coffee shop.

Amanda E. Matzek (82)

Faculty Advisor/Collaborator: **J. Kenneth Davidson, Sr. and Nelwyn B. Moore**

Sexual Involvement and Sexual Risk-Taking among College Women

This study assessed the differences, if any, in the sexual attitudes and behaviors and the level of sexual risk-taking between a sample of 400 undergraduate, never-married women from a southwestern state university and 626 undergraduate, never-married women from a Midwestern state university. Data suggested that, overall, women from the southwestern state university were more likely to be sexual risk-takers than Midwestern state university women. Significant differences were found with regard to ever had sexual intercourse, age at first intercourse, and had oral-genital sex. Risk-taking sexual behaviors found to be significant included more lifetime sexual partners, being less likely to use contraception, and more likely to have contracted an STD. Few significant differences were found for the attitudinal variables. The investigation was specific to denoting sexual risk-taking differences that would further the understanding of the college female's sexuality.

Student Development and Diversity

Lindsey Nelson and Jason Grebe (61)

Faculty Advisor/Collaborator: **Jodi M. Thesing-Ritter**

Preventing and Reducing High-Risk Drinking Among College Student: A National Scan

As University students it was apparent that there was a problem among college students who engaged in high-risk drinking. After identifying the problem on our campus we researched the extent of high-risk drinking among college students of other universities comparable to UW-Eau Claire's population size. Research consisted of identifying the problem, identifying the target population, and data which supported the increase in high-risk drinking. Further research consisted of existing grants that would potentially fund a program geared toward preventing and reducing the high-risk drinking among college students. Research conclusions and data contributed to a task force formed to create and establish a program to prevent and reduce high-risk drinking among college students specifically at UW-Eau Claire.

Women's Studies/Psychology

Rebecca D. Hix (62)

Faculty Advisor/Collaborator: **Susan C. Turell**

Perceptions of Mutuality of Abuse within Same-Sex Relationships

Same-sex relationship abuse has been studied more frequently over the past decade due to the rising awareness of such behavior. Questions remain regarding perceptions of mutuality of abuse within same-sex relationships. Both the service providers and the victim/survivors within the Lesbian/Gay/Bisexual/Transgender (LGBT) community have been assumed to have difficulty discerning blame and responsibility when the couples are of the same sex. Data was collected from over 400 UW-Eau Claire students to examine and compare perceptions of mutuality of the abuse in both same sex and other sex partnerships. Analysis of the data will include how participant gender and sexual orientation impacts perceptions of mutuality of abuse. Participant characteristics will be evaluated, and a discussion of the findings will be included.

Accounting and Finance

Bruce Flinn (169)

Faculty Advisor/Collaborator: **Lucretia Mattson**

Credit Card Debt among College Students

For this research project, we are trying to determine the extent of credit card debt for college students at UW-Eau Claire. We want to know the reasons that people have such levels of debt and the effects that this might have on their grades in school because they possibly have to work more. We are trying to determine if it is because they are unable to obtain any more financial aid or student loans and if it is their final option, or if it is just due to students having a lack of knowledge about other sources of help to pay for things in college. Also with this, if students know the ramifications of poor credit ratings in the future. From this, we are trying to find out if it would be helpful to have a financial education class offered and/or required to make students more aware of what the results of their actions now can be. We also would like to find out if some people would benefit from access to more financial aid/student loans to help them through college.

Nicole Matenaer (163)

Faculty Advisor/Collaborator: **Susan Haugen**

Identity Theft Awareness and Prevention

The Identity Theft project is designed to assess what students at UW-Eau Claire know about identity theft, how it occurs, and what they need to do to protect their financial and personal information. One of the goals of the project is to raise students' awareness about how easy it is for someone (even family members) to steal their identity via "phishing" e-mails, phony Web pages, and other fraudulent schemes. Students also need to understand the short and long-term affects of having their identity stolen and how they can mitigate the risks associated with identity theft. Based on the survey results, a learning module will be developed that could be incorporated into one or more courses that would expose all students on campus to the identity theft problem and how they can protect themselves.

Jered Schmudlach (162)

Faculty Advisor/Collaborator: **Mehdi Sheikholeslami**

Do Large Forecast Errors Signal Earnings Overstatement?

According to a recent survey by Huron Consulting Group, a record number of companies announced downward revisions earnings due to accounting errors in 2001 and 2002. Prior research shows that analysts' earnings forecasts reflect true earnings. Thus, an observed large analyst forecast error may signal earnings overstatement. Our results confirm this hypothesis.

Adult Health Nursing

Michelle Erickson, Adrienne Sween, Kristin Olsen, Rana Dickson, Amy Wells, and Emily Bastian (119)

Faculty Advisor/Collaborator: **Rita Sperstad**

Transformed Self: Meaning from Cultural Care

Human care is strongly established as the essence of nursing. Leininger (1991) is well known for her theory and work committed to the relationship between human care and the diversity of culture. In response to Leininger's work, professional nursing organizations have mandated the importance of cultural factors in determining human health, health related behaviors, and the integration of the cultural dimension into nursing education (American Nurses' Association 1991, American Academy of Nursing 1992, American Nurses' Association 1996, American Academy of Nursing 1995). Trends of the 21st century such as increased immigration, communication, and changes in population demand an even greater need for cultural competence by nurses in providing holistic care. Although nursing curricula has done much work to integrate culture into education, there is still a lack of evidence that cultural education in nursing increases cultural sensitivity and understanding (Meleis, Isenberg, Loerner, Lacey & Stern, 1995, Eliason & Raheim 2000). Critics suggest that the didactic or experiential methods of cultural education in nursing fail to advance beyond differentiation of the self from the 'other' (Duffy 2001). Duffy proposes that transformation of the self is imperative to the development of cultural sensitivity. This can be accomplished using Mezirow & Associates' (1990) critical methodology, namely 'thoughtful action with reflection' (Duffy). This presentation summarizes the transformative education process used in a directed study course* with senior nursing students focused on cultural care. The course includes a week-long immersion clinical experience at a free standing birthcenter in Weslaco, TX, ten miles from the border of Mexico. Students and faculty participate in the holistic care

of women and families during pregnancy, labor and birth, home visits after birth, and clinic well-baby exams. Ninety percent of the clients cared for are of Mexican descent, only speak Spanish, and live below the poverty level. Following the clinical experience, the group meets every two weeks during the semester to critically discuss selected topics with assigned readings and pointed application questions from the clinical experience. Discussion summaries are written by the designated discussion leader. Another facet of the course involves a group research project describing how childbirth is portrayed in American media. At the end of the course, each student and the faculty member independently completes a creative critical reflection exercise and shares this within a group seminar. Final group analysis includes the creation of a scholarly work that reflects the collaborative transformed learning within the context of Campinha-Bacote's model of cultural competence (1999). *Funding for the Directed study was provided by University of Wisconsin-Eau Claire Differential Tuition.

Audrey M. Pearce and Penny Every (120)

Faculty Advisor/Collaborator: **Robin Beeman, Joan Stehle Werner, and Ruth Tanyi**

Spiritual Well-Being, Psychosocial Adjustment to Illness, and Self-Perceived Health in Women with End-Stage Renal Disease Receiving Hemodialysis Treatment: Phase II

The purpose of the current project (Phase II) was to continue a study focusing on exploration of spirituality, psychosocial adjustment, and self-perceived health in women with renal disease currently receiving hemodialysis. Phase I of this study was originally completed by R. Tanyi and J. Werner. IRB approval was received for this second phase from UW-Eau Claire IRB, Nursing review committee, and Marshfield Clinic in the fall of 2004. This phase is being conducted to add at least 40 more women to the sample size to help further clarify findings. Methodology for this continuing study is the same as in Phase I of the study (descriptive-correlational using survey methodology), with addition of the new site. Instruments include the PAIS (Psychosocial Adjustment to Illness Scale), SWB (Spiritual Well-Being Scale), DSE (Daily Spiritual Experiences Scale) and the "Your Health and Illness" Scale designed by the researchers. Several women on dialysis have been approached, informed, and invited to participate. To date, however, data from only three additional participants have been gathered. The researchers are exploring several possible reasons for the seemingly high refusal rate, including the very lengthy and complicated consent form required by the Marshfield Clinic IRB. Efforts will, however, continue, as this study is important since end-stage renal disease (ESRD) is a debilitating and progressive disease that affects thousands of women in America. The surviving women must adjust to many major physiological, psychosocial, and relational problems. Investigation of the role of self-perceived health and spirituality as a resource for adjustment to illness in women with end-stage renal disease on dialysis, once collected, may yield results that assist health care professionals in strengthening resources necessary.

American Indian Studies

Tammy Goss (166)

Faculty Advisor/Collaborator: **Lawrence Martin**

Adult Learners of Ojibwe at University of Wisconsin-Eau Claire

Adult Learners of Ojibwe at University of Wisconsin-Eau Claire attempted to establish the study skills, habits, and techniques of successful learners of Ojibwe at the university setting. The primary target was to establish if group projects and team learning resulted in a more successful student of Ojibwe. This study showed that successful students did have a large set of learning skills and good study habits. They also participated frequently in group meetings to help them learn, retain, and retrieve words in the Ojibwe language.

Communication and Journalism

Bob Bourgeois (145)

Faculty Advisor/Collaborator: **W. Robert Sampson**

Communication Analysis of the Altoona High School WINGS Program

For our capstone project, our group is looking at parent-teacher communication—specifically communication satisfaction—involved in the Winning Initiatives for Ninth Grade Students (WINGS) program at Altoona High School. On the parent end, we are interested in satisfaction in amount and content of information received, if meeting times are convenient, if there are modes of communication that are over- or under-utilized, if there is a process feedback component, if the communication environment is productive, and whether the parent feels like a participative, integral member of the WINGS team. Similar constructs will be assessed on the teacher end, as well as satisfaction of inter-teacher communication. A communication satisfaction survey based on Prof. W. Robert Sampson's Communication Satisfaction Questionnaire will be utilized, as well as interviews and one other qualitative measure. The research will be primarily descriptive with the intent of supplying Altoona School District with data not previously available.

Dana Dillon, Ellen Hatfield, and Jen Lawton (168)

Faculty Advisor/Collaborator: **W. Robert Sampson**

Assessment of Learning Styles for a Ninth Grade Class

Examine 9th grade teaching styles to determine which VAK (visual, auditory and kinesthetic) style is most often taught/implemented in classes. Find discrepancies, if any, between styles taught and the style in which 9th grade students learn best. Offer suggestions to current and future teachers on how to enhance their lesson plans accordingly.

Jason Ortner, Elizabeth DuChateau, and Sarah Hafeman (193)

Faculty Advisor/Collaborator: **W. Robert Sampson**

Communication Analysis of the Eau Claire Humane Association

Our focal area for this study will look at the current communication modes within the Eau Claire Humane Society. We will also evaluate their usefulness between full-time staff and volunteers. By evaluating the humane society's communication modes we hope to organize and structure the volunteer program, so that a future volunteer coordinator will have specific direction and a base to work from.

Rebecca Prokash, Rebecca Szmania, Jericho Jurewicz, and Quinn Watson (146)

Faculty Advisor/Collaborator: **W. Robert Sampson**

Communication Analysis of The Boys & Girls Club of The Greater Chippewa Valley

We have teamed with The Boys & Girls Club of the Greater Chippewa Valley in an effort to evaluate community awareness about the club and its services. The focal area of our study will pertain to the external communication between the club and the community. We will examine the community's knowledge of the organization, as well as their opinions and perceptions of the services offered. The purpose of conducting such research is to evaluate the quality and effectiveness of the marketing to the prospective audience of The Boys & Girls Club.

Katie Prusila, Laura Ryan, and Laura Vogt (147)

Faculty Advisor/Collaborator: **W. Robert Sampson**

Communication Analysis of Lutheran Social Services

We have decided to analyze the non-profit organization Lutheran Social Services. They offer a wide range of services, but we have decided to focus specifically on the program for Adult Family Homes. We are interested in the communication between the supervisors and subordinates and want to ensure that the flow is effective. We have determined a variety of factors that would be relevant to the analysis and expansion of their organizational development. Due to a somewhat chaotic structure of management we believe that employees are somewhat uncertain as to their exact role within the organization as a whole. Their positions and responsibilities are not clearly defined as the organization is constantly changing and rapidly seeing an increase in turnover rates and absenteeism. Besides analyzing the underlying area of turnover and absenteeism of the employees, we want to identify how satisfied they are within their job; this could certainly be another indicator of the confusion regarding organizational responsibilities and roles. Organizational values that are congruent with employees' values have been shown to increase employee satisfaction, commitment, and performance outcomes. We have decided to utilize surveys, the critical incident technique, and interviews to help us research the communication effectiveness within their program.

Clara Schafer, Claire Tarpey, Valori Berends, and Sarah Anderson (148)

Faculty Advisor/Collaborator: **W. Robert Sampson**

Communication Analysis of Family-Owned Supermarkets

This research was conducted in the interest of improving inter-company communication between Gordy's County Markets in Lake Wissota and Chippewa Falls. Survey, interview, and critical incident technique were used to analyze aspects of communication within and between the two grocery stores. Measures used included the Communication Satisfaction Questionnaire (CSQ) and Johari's Window.

Crystal Schmidt, Emily Ascher, Bob Bourgeois, and Kristi Koller (167)

Faculty Advisor/Collaborator: **W. Robert Sampson**

Parent-Teacher Communication within WINGS

For our capstone project, our group is looking at parent-teacher communication—specifically communication satisfaction—involved in the Winning Initiatives for Ninth Grade Students (WINGS) program at Altoona High School. On the parent end, we are interested in satisfaction in amount and content of information received, if meeting times are convenient, if there are modes of communication that

are over- or under-utilized, if there is a process feedback component, if the communication environment is productive, and whether the parent feels like a participative, integral member of the WINGS team. Similar constructs will be assessed on the teacher end, as well as satisfaction of inter-teacher communication. A communication satisfaction survey based on Prof. W. Robert Sampson's Communication Satisfaction Questionnaire will be utilized, as well as interviews and one other qualitative measure. The research will be primarily descriptive with the intent of supplying Altoona School District with data not previously available.

Communication Sciences and Disorders

Sara E. Halada (141)

Faculty Advisor/Collaborator: **Kristine Retherford**

Language Sample Analysis: A Comparison of Two Procedures

This study investigated the effectiveness of two language sample analysis procedures for determining if a child is evidencing language impairment. Bricker's (1993) Assessment, Evaluation, and Programming System for Infants and Children (AEPS) and Retherford's (2000) Structural Analysis were analyzed. Results and implications of the study will be discussed.

Sara E. Halada and Jason D. Bennett (142)

Faculty Advisor/Collaborator: **Kristine Retherford**

Applying Knowledge of Grammatical Structures: A Survey of Students

The purpose of this study was to obtain a sample of grammatical knowledge from the average college student and to compare these data to data obtained from first- and second-year Communication Disorders' majors at the University of Wisconsin-Eau Claire. Results and implications of the study will be discussed.

Curriculum and Instruction

Amy Buehner (173)

Faculty Advisor/Collaborator: **Deb Pattee**

Urban Teaching: Middle School Methods in Milwaukee

This research project was conducted to determine the benefits of urban teaching for students with limited exposure to diversity. Issues of White privilege, racism, and political and economic disparities were researched and studied. We planned a summer course in the Milwaukee Public Schools to help students become acquainted with prevalent urban issues and learn effective teaching skills. Students accepted in the Teacher Education Program have the opportunity to spend two weeks working with teachers in Milwaukee this May. We discovered that urban districts lose almost half of newly hired teachers within the first five years of service (National Commission on Teaching and America's Future, 2003), and for this reason know students need to be better equipped to handle urban issues. Offering C&I 317: Middle Level Methods and Curriculum in Milwaukee is especially important because, according to the National Education Association, kindergarten through twelfth grade teachers are predominantly White, middle-class women from rural and suburban areas; teachers in urban environments are often unaware of dominant forces affecting students' lives because they have not been exposed to these issues. Finally, we discovered sociocultural awareness, strong interpersonal skills, risk taking, self-understanding, and perceived efficacy are the essential attributes of an urban teacher.

Erin Quinlan (172)

Faculty Advisor/Collaborator: **Michael Kolis**

Where Does Collaborative Leadership Begin?

This research project identified what compelled students to take certain "leaderful actions," as stated in our project proposal. We also looked at the data to see what type of skills and knowledge were needed to take these actions. We concluded that an effective collaborative leader has good dispositions and that this becomes the most important factor in leadership. We also found that one must have the drive and willingness to help others in order to be a collaborative leader.

Hannah E. Stander and Jenna Bemis (171)

Faculty Advisor/Collaborator: **Robin Umber**

Benefits and Challenges of Tutoring Adolescent Students

This study focused on university students serving as tutors for students at a community-based agency during this academic year. This was the first year for this project that is not part of a course. Data was gathered through questionnaires and interviews with the tutors. The study sought to gather information about what students found to be benefits and challenges of serving as a tutors for

adolescent students and to determine what was being done with tutors to support their work and personal and professional growth during the project. After all data has been gathered and analyzed, comparisons will be made with benefits discussed in other service-learning studies of students directly involved with service-learning through a class and those doing service-learning in another context. Currently, analysis of the views of tutors during this semester has not yet been completed. Based on the data analyzed for last semester, issues of support for tutors when the service-learning that is not part of a course will be one area of discussion, and the benefits to college students when working with a community-based program will be another.

English/Mathematics

Rebecca Hutchinson, Danielle Aanenson, and Lindsay Duwell (124)

Faculty Advisor/Collaborator: **Ruth Cronje** and **Marc Goulet**

Regional Research and Evidence-Based Healthcare Practice in the Countries of Eastern Europe and the Former Soviet Union

The viability of research programs in Eastern Europe and countries of the former Soviet Union (EE/FSU) affects the scope and quality of the evidence available to clinicians and their willingness to integrate this evidence into their practice. Problems with access to and applicability of research being conducted in developed countries may also play a role in the willingness of clinicians in EE/FSU countries to practice EBM. In this study, the attitudes of clinicians throughout 13 EE/FSU countries toward regional and developed-world research were surveyed using an online instrument. We found that although attitudes toward EBM and the accessibility of scientific evidence were generally positive in EE/FSU respondents, these attitudes conflicted with their ratings of the quality of research being conducted in their regions and the applicability of the research being conducted in developed countries. We also noted evidence of a lack of commitment to and/or understanding of international methodological standards among EE/FSU clinician respondents. While clinician attitudes toward EBM do not appear to be barriers to integration of scientific evidence in medical decision-making, the successful diffusion of EBM in clinical practice will require investment in local research infrastructures to produce high-quality, context-sensitive evidence.

Family Health Nursing

Sarah Gieschen and Jeannine Slaughter (117)

Faculty Advisor/Collaborator: **Susan D. Moch**

Communication and Coping in Families Dealing with Breast Cancer: Toward Implementation into Practice

The purpose of this study was to describe family coping and couple communication patterns within couples dealing with breast cancer. A literature review was conducted and a selected number of interviews from a larger study of couples dealing with breast cancer were analyzed. The larger study incorporated 37 audio-taped interviews from a study to evaluate experience-guided intervention after breast cancer. Through this study, the myths of family coping and communication with breast cancer were used as an outline in analyzing literature and qualitative data. The myths were identified by Dr. Francis Lewis, a leading researcher in breast cancer and families. The goal of publishing the myths was to get research into practice (Lewis, 2004). Since implementation into practice is essential to nursing, this study was designed to promote implementation by supporting or not supporting the myths suggested by Lewis. Through this study, literature and data were analyzed by placing all literature and data from selected subjects within each myth category. The subjects were selected on the basis of the degree to which interviewees discussed coping and communication. The information was then summarized to determine the extent to which the literature and data supported or did not support the myths identified by Dr. Lewis. The summarization is currently in process. Since the goal of this study is incorporating research into practice, the plan is to share the information at research conferences and to publish an article in a nursing student journal that focuses on research into practice. The research will also be shared in at least two oncology nursing practice areas in Eau Claire.

Jamie Shidell and Amy Greene (118)

Faculty Advisor/Collaborator: **Janice Berry**

Appraisal of Student and RN Partnered Clinicals

This is the continuation of a project to evaluate the nursing student learning and satisfaction within an RN partnered clinical experience, FMHN: Children and Families with Health Deviations, a clinical nursing course at UW-Eau Claire–Marshfield Satellite Nursing Program. The student surveys are again reviewed with the added clinical data and RN partners surveys were also evaluated. Literature supports the use of a one-on-one clinical partnering experience to improve application of theory to practice in a “safe environment” under the guidance of the RN partner, while giving the student increased responsibility and independence (Daigle, 2001). Based on a Likert scale of 1-4, with 4 being “Strongly Agree” and 1 being “Strongly Disagree,” student satisfaction and perception of meeting objectives were assessed. The fall 2002 class did not use the partnering model. The survey averages were higher for the fall 2003 class, and again results were even higher for the fall 2004 class, in both “Achievement of Objectives” and “Satisfaction.” Achievement of objectives scored .8 - .6 higher than the original survey in 2002, and .2 - .5 higher than the 2003 survey.

Satisfaction scored 1.5 - .5 higher than the initial survey in 2002, and .5 – 0 higher than the 2003 survey. Quantitative data supported the partnering experience as more autonomous and effective learning environment.

Management and Marketing

Kristin Mirkes (165)

Faculty Advisor/Collaborator: **Rama Yelkur** and **Chuck Tomkovick**

Sweet Sixteen: A Longitudinal Study of Super Bowl Advertising Effectiveness during 1989-2004

The first Super Bowl face-off was housed at Memorial Coliseum in Los Angeles, California in 1967. Slowly, the event has transformed from merely a test of physical strength and dominance on the field to a day encompassing similar match-ups between advertising's top contenders, gaining tremendous media attention in the process. Approximately 65% of those who viewed the 2003 Super Bowl were as interested in the commercials as the game, while 20% admitted the advertising to be a bigger draw according to a study performed by Knowledge Networks (Ebenkamp, 2003). Advertisements appearing during a Super Bowl broadcast contain an element and level of likeability unparalleled to ordinary primetime and daily spots. With the cost of a 30-second ad averaging \$2.4 million or \$80,000 per second in 2005 (Sutel, 2005), studies are warranted to investigate the use of the Super Bowl as a media vehicle. Modeling after Tomkovick, Yelkur, and Christians (2001), the purpose of this study is to use a comprehensive model to test the impact of specific variables: length of a commercial, humor, product category (food versus non-food), animals, and sex appeal on ad likeability as a cue of ad effectiveness. Sixteen years of data, from 1989 to 2004, consisting of 778 Super Bowl commercials are coded and analyzed.

Amanda Sutherland and Brett Welter (164)

Faculty Advisor/Collaborator: **Chuck Tomkovick** and **Rama Yelkur**

Marketing and the Movies: What Drives U. S. Box Office Revenue

Super Bowl advertising is the most expensive television media time. In 2005, the cost of the ads was \$2.4 million for 30 seconds of air time. Surprisingly, very little is known about the effectiveness of these ads. According to Yelkur, Tomkovick, and Traczyk (2004), one segment appears to be effective. This study demonstrated that Super Bowl movie ads are positively linked with subsequent U. S. Box Office success. The purpose of our research is to further test this linkage. Super Bowl ads promoting upcoming movies are believed to positively influence U. S. Box Office movie attendance. Our research sample included over 200 local high school students and approximately 400 UW-Eau Claire college students in February, 2005. A day-after-recall research design was employed to measure the residual impact the Super Bowl ads had on viewers. In both sets of data collected, significant results were found. On a self-reported basis, as confirmed by T-tests, respondents who saw movie trailers for upcoming movies during the Super Bowl telecasts indicated they were more likely to attend these movies in the theaters than did the respondents who did not see the advertisements in the telecasts. Our study concludes with a discussion and implications for marketing professionals.

Music and Theatre Arts

Nathan Abuan, Joshua Andrew, Kristin Bar, and Amy Buehner (170)

Faculty Advisor/Collaborator: **Gary Don** and **Vanissa Murphy**

Improving Aural Skills Instruction for Local Public School Music Students

The goal of this project is to assess the current state of aural skills instruction in local public school music programs. The student researchers created a survey and a mailing list of local public school music teachers. The survey asks the teachers whether they currently incorporate aural skills activities into their classes, and whether they would be willing to include more aural skills training in their classes. Approximately 40% of the teachers on the list completed the survey and sent it back. The students entered the results into an SPSS file. Jessica Holm of TLTD created tables and charts from the file that show a statistical breakdown of the results by grade levels (Elementary, Middle School, High School) and classes taught (Chorus, Band, Orchestra, and General Music). The students will analyze the data, report their conclusions, and suggest possible directions for future research.

Psychology

Hannah Jones, Alison Ongna, and Sarah Shonyo (174)

Faculty Advisor/Collaborator: **Catya von Károlyi**

Field Trip Measure: Teacher Feedback Form (FTM-T). A Community-University Collaboration with the Children's Museum Of Eau Claire

The Children's Museum of Eau Claire (CMEC) is developing field trip programs for young children. To help CMEC evaluate their current programs and develop future programs that meet the needs of local educators, we agreed to participate in a community-university collaboration—the development of the Field Trip Measure: Teacher Feedback Form. The measure evaluates teacher

expectations and perceptions of the field trip experience, as well as their perceptions of their students' experiences and learning. In order to properly construct the survey, we reviewed literature pertaining to survey construction, museum learning, field trip methods, existing measures, and effective school-museum collaborations. We also studied state and district requirements and standards. Here we report on the result of this process. Our measure has three teacher forms: pre-, during- and post-visit, intended to collect teacher ratings, comments, and suggestions about the following components: past field trip experiences, resources that the museum might provide to enhance the museum experience, special programs and activities, the purpose of the visit, suggestions for future activities and programs. The Field Trip Measure should help inform the CMEC efforts to support the mission of our local school district and provide a forum for constructive feedback.

Katie A. Ley and Emily E. Hynek (175)

Faculty Advisor/Collaborator: **Beverly Dretzke**

Using Microsoft Excel in Introductory Statistics

Students learn how to use Microsoft Excel for statistical analyses in the introductory statistics course required of psychology majors and minors. This is a one-semester course with a typical semester enrollment of 120 students and a typical class size of 30. The majority of the students are sophomores. Excel is used to construct frequency distribution tables, graphs, and correlation matrices, to obtain descriptive statistics, and to carry out one-sample t-tests, paired-sample t-tests, independent samples t-tests, one-way ANOVA, and regression analyses. Instructional emphasis is placed on interpretation of output, including p-values and critical values for one- and two-tailed tests. Students completed questionnaires on their use of Excel in the introductory statistics course. A majority indicated that it was fairly easy for them to learn statistical applications of Excel. A majority also indicated that they thought using Excel helped them learn statistical concepts.

Public Health Professions

Abigail Howard (123)

Faculty Advisor/Collaborator: **Jennifer Johs-Artisensi**

Investigating the Use of Health Plan Incentives to Motivate Health Behavior Change

Almost half of premature American deaths are attributable to unhealthy behaviors such as smoking, poor eating habits, and a lack of activity, and these risks also account for nearly 70% of all healthcare spending (Center for the Advancement of Health, 2000). This partnership-driven applied research initiative focuses on investigating what type of incentives health plans could offer consumers to motivate them to engage in healthier behavioral choices, ultimately leading to improved health outcomes and lower health care costs. The current study is focused on the preliminary steps necessary to accomplish this, including conducting an advanced literature search, development of a research advisory steering committee made up of university, healthcare, and community representatives, and the use of consumer focus groups to generate feedback to be used in development of a survey tool for broader use across the Chippewa Valley. These efforts, designed to engage a partnership between the university and the healthcare community, hold great potential for increasing the health status of Chippewa Valley residents while reigning in spiraling health care costs across Western Wisconsin.

Stefanie H. Ojibway (144)

Faculty Advisor/Collaborator: **Doug Olson**

Leadership for Quality: Today and Tomorrow

The purpose of this project was to identify successful quality practices and systems in the health and aging services field. This served to advance a quality management agenda critical to the delivery of quality care and service to the residents and clients of residential facilities. The American Health Care Association (AHCA) instituted a quality award recognition program eight years ago to encourage organization driven initiatives to move quality to a new level within the field. The Quality Award program has been successful but has not leveraged the collective information and learnings of the various participating organizations. Through the analyzation of the practices of American Health Care Association Step II Baldrige Quality Award recipients, common themes were identified regarding the effective implementation of their quality programs. This research serves to contribute to the advancement of effective 'best practices' in the health and aging services field.

Hilary Pascarella, Jodi Acton, Megan Fitzgerald, Christina Ann Gamaldi, Andrea Halleen, Heather Litzkow, Lucas Schubert, and Sara Williamson (121)

Faculty Advisor/Collaborator: **Jennifer Johs-Artisensi**

Resident Relocation: Following Residents and Families

This study is the second phase of a larger project designed to identify best practices that can be utilized to minimize negative outcomes and enhance resident outcomes when residents must be relocated from one nursing home to another. The current study

involved researchers interviewing the recently relocated residents and/or their guardians/family members in an effort to explore resident outcomes following nursing home relocation as well as examine the resident and/or families' perception of the relocation process. We have gained a better understanding of resident need and preference to achieve satisfactory relocation of nursing home residents and helped validate many of the suggested best practices for resident relocation. Facility closures are a widespread problem across the state of Wisconsin, especially in the Milwaukee area, where nursing home closures have been more frequent in recent years. Evidence-based recommendations to improve relocation practices will make a positive contribution to the literature and the citizens of Wisconsin. The long-term goal of this project is to identify more specifically what the most current best practices for resident relocation in the state of Wisconsin have been and how those practices have impacted outcomes, followed by a dissemination of information, recommendations for best practices and potential legislative changes in policy.

Erin Paschke (143)

Faculty Advisor/Collaborator: **Lee Anna Rasar**

Assessment of Communication, On-Task Behavior, and Preference for Music or Playtime in Children with Autism

Research suggests that music therapy is effective with children with autism. However, specific and clearly defined procedures and demonstrations of music's efficacy in a controlled study with this population are severely lacking in the literature. The purpose of this study was to replicate a pilot study implemented in New York in 2003, thereby creating more validity and reliability for the results that strongly indicated music therapy was effective in increasing the communication skills of children with autism. Four children with autism participated in 10 sessions over the course of five weeks. Twice weekly the researcher conducted a one-to-one 30-minute session with each participant. Each session was divided into two 15-minute sections, one consisting of music time and one consisting of play time. The two variables (either music time or play time) were randomly drawn from a hat before each session and then counterbalanced so that over the course of five weeks the number of times music time was first and play time was first were equal. Both preferred instruments and toys (as assessed in session one) were made available in the treatment room for the participant to see. The researcher encouraged music if music time was first, and vice versa. If the participant presented up to three requests for the activity that was not being done, the researcher stopped redirecting to the designated task and instead granted the request of the child and offered the requested activity. If the child requested an activity or item longer than five seconds, the request was also granted, despite which variable the researcher was trying to conduct. All sessions were videotaped and reviewed by the researcher and two trained research assistants privately and at separate, individual times. This study yielded significant results in favor of music time over play time to increase communication in children with autism. Of 40 sessions across the four participants, on-task and requesting behavior were greater during music time than during play time on 38 occasions. This study confirmed that music interventions increase communication and on-task behavior while decreasing off-task behaviors in children with autism. It is hoped that, through the revelation of therapeutic changes from the observed baseline, this study will help to provide support and to justify the inclusion of music therapy services for children with autism in New York and benefit other programs as well.

Public Health Professions/Nursing Systems

Laura Weiss (122)

Faculty Advisor/Collaborator: **Doug Olson** and **Mary Zwygart-Stauffacher**

Director of Nursing in Long-Term Care

The goal of our research project, "A Survey of Directors of Nursing in Long-Term Care," is to gather information about the role of the Director of Nursing (DON) in nursing homes. Long-term care facilities are extremely challenged with a seemingly endless list of pressures: changing consumer preferences, staffing shortages, and financial constraints. With difficulties such as these, an excellent leadership team is needed for the nursing home. One of the key ingredients for this team is the DON. Over the years, the definition and role functions of the DON has become broader to include greater authority, responsibility, and range of control. A survey instrument was created to assess the present roles and responsibilities of this position. The survey was distributed to all DONs in Wisconsin and Minnesota nursing homes. There were 460 respondents with a response rate of 56%. The survey results were analyzed using quantitative and qualitative measures. To be highlighted in this publication is the importance of time success and its relation to satisfaction. The number one factor related to satisfaction is resident and family relations. Rather than implying the new definition and roles of this position, our survey goes in depth to describe what is going on inside the walls of a long-term care facility regarding the pivotal role of the Director of Nursing.

Natural and Physical Sciences

Biology

America Balsis, Timothy Hell, Johanna Lanter, and Elizabeth Oberg (192)

Faculty Advisor/Collaborator: **Wilson Taylor**

*Microscopic Analysis of the Parasite *Amblosoma suwaense* from Freshwater Snails*

The scanning and transmission electron microscopes (SEM and TEM, respectively) allow detailed analysis of both the external and internal structure of biological systems. *Amblosoma* is a genus of parasitic trematodes (round worms) that use freshwater snails as intermediate hosts; definitive hosts can be any vertebrate. One member of this genus, *A. suwaense*, inhabits waterways in Wisconsin. The members of this genus differ from other parasitic trematodes in not forming protective cysts. This led previous researchers to examine the surface structure (tegument) using electron microscopy, but internal anatomy has yet to be examined. This analysis will include: additional observation of the tegument; the oral sucker and ventral sucker (acetabulum); the genital atrium; and the overall internal organization.

Michael Fell, Kristyn Grzelak, Amanda Hoffelder, Beth Ryan, Kathleen Miller, and Deb Freund (25)

Faculty Advisor/Collaborator: **Tali Lee and Evan Weiher**

The Effects of Fungicide and Fertilizer on Mycorrhizal Root Colonization and Plant Diversity during Prairie Restoration: Results from Year One

Mycorrhizal fungi form symbiotic relationships with plants, and this could have an impact on community assembly. The experiment was done on 8.1-ha (20 acres) of land in Eau Claire County, Wisconsin, which was divided into 45 plots each with four sub-plots containing three sample plots. Fungicide (18 mg chlorothalonil m⁻² yr⁻¹) was applied to reduce the levels of fungi, while nitrogen (15 g N m⁻²yr⁻¹ as NH₄NO₃) was applied to see if the availability of nutrients had an affect; a combination of the two was also applied. Root samples were analyzed for mycorrhizal colonization by washing the soil off of the root samples and staining them with trypan blue. The roots were then analyzed microscopically on Petri dishes with 1-cm squares carved into them. The data collected were analyzed using two-way ANOVA. The results did not show any significant difference in mean fungal colonization rate in plots treated with fungicide, fertilizer, or both; there was also no significant interaction found between them. Mean colonization was approximately 16% of root length. The lack of treatment effects are not troubling however, as similar results were seen by Hartnett and Wilson (1999) who found no significant effects until the second year.

Deanna Freidel and Catherine Pohl (3)

Faculty Advisor/Collaborator: **Sasha Showsh**

*Analysis of *Enterococcus faecalis* Isolate Containing Pheromone-responsive Plasmids Encoding Vancomycin Resistance and Bacteriocin Production*

Enterococcus faecalis 368 is a clinical isolate that is resistant to vancomycin (Vm^r), gentamicin (Gm^r), streptomycin (Sm^r), tetracycline (Tc^r), erythromycin (Em^r), and kanamycin (Km^r), and produces a bacteriocin. The strain was of particular interest because of its ability to transfer the Vm^r trait in response to pheromone signaling. The data indicate that strain 368 contains at least two different conjugative plasmids. One plasmid, designated pAM368, codes for VanA-type resistance and a response to the cAM373 pheromone. The other plasmid designated pAM369 codes for Em^rGm^rKm^r, bacteriocin production, and a response to cCF10 pheromone. Both Tc^r and Sm^r traits are chromosomally located. Plasmid analyses suggest that pAM368 and pAM369 have sizes of approximately 107kb and 93kb respectively. During filter-matings with *E. faecalis* FA2-2, Tc^r transfer was detected at 10⁻⁶, Em^r, Gm^r or Km^r was detected at 10⁻¹, and Vm^r and Sm^r were detected at 10⁻³ transconjugants/recipient. Em^rGm^rKm^r transconjugants (sensitive to other antibiotics) produced bacteriocin and responded to the sex-pheromone cCF10. Analysis of the bacteriocin demonstrates that it is an extracellular protein with a molecular weight of 66KDa. It is heat labile, exhibiting bacteriostatic activity against *E. faecalis* (non-producer strain) over a wide pH range (pH= 6-11).

Emily Hockman (27)

Faculty Advisor/Collaborator: **Tali Lee**

*Regeneration Response of *Quercus sillospoidalis* to Prescribed Burning at Cedar Creek Natural History Area*

Oak Savannah habitat in the Midwest has virtually been eliminated from its pre-settlement areas. Prescribed burning at Cedar Creek Natural History Area in Blaine, MN has been used since 1964 to recreate natural oak savannahs but has met limited success. This study was part of many designed to determine what is happening in the burn units and specifically studied pine oak (*Quercus sillospoidalis*) sprout regeneration dynamics after a major fire. The research field was burned in 2003 and is on a ten year cycle. We used three 250-foot transects, each with six data points. The diameter and height of all burned adult oaks and new saplings within a

two-meter radius of each point were recorded along with light availability and the percent cover of *Corylus Americana*, a competitor for sunlight. Higher concentrations of *Corylus* caused new sprouts to grow taller and decrease their basal diameter, but did not influence the number or sprouts. Average total new sprouts volume equaled less than 10% than that of dead saplings. This suggests that at the next burn the oaks will not have increased in volume enough to withstand the fire and will re-sprout. The samples in this group represent those less frequently burned, so none of the fields in the prescribed burn experiment will ever grow enough to withstand a fire. Fire disturbance alone therefore does not appear to work for savannah regeneration, and other actions need to be taken to restore this natural habitat.

Sarah Ivory (24)

Faculty Advisor/Collaborator: **Joseph Rohrer**

Floristic Inventory of Guettinger Woods, Eau Claire County, Wisconsin

Guettinger Woods and Wildlife Area is located in Eau Claire County, straddling state highway 37, about 12 miles southwest of downtown Eau Claire. Previously property of the Guettinger family, this 123-acre parcel was donated to Eau Claire County with the express instruction that it be preserved and utilized to benefit research and education. This project was undertaken at the behest of Eau Claire County officials with the intent of inventorying the flora and evaluating what use the land may have educationally or recreationally to the community. Visits to the area began in early May and continued into September. Using a hand-held GPS unit we mapped the pre-existing trails. Core samples from trees revealed that the oldest oaks were about 150 years old, but due to continued logging and other disturbance there are many young trees less than 20 years of age. We identified 195 species of vascular plants and 24 bryophytes. Eight-five voucher specimens were collected, pressed, dried, labeled and deposited in the UW-Eau Claire herbarium. The species found are those typical of the prairie restoration, oak forest, and successional birch forest communities; no unusual or state-listed threatened and endangered species were seen.

Jim Kasper (2)

Faculty Advisor/Collaborator: **Daniel Janik**

Nonphotic Circadian Clock Resetting is Attenuated by a Beta-Adrenergic Antagonist

Previous work has shown that the beta-adrenergic antagonist propranolol reduces circadian clock resetting induced by light-to-dark transitions. In the present study we tested the generality of this effect by administering propranolol (intraperitoneal injections of 10-20 mg/kg) to hamsters subjected to virtually all known nonphotic resetting agents. Propranolol significantly reduced resetting induced by novel wheel exposure, gentle handling, and administration of the serotonin 1-A agonist, 8-OH-DPAT. In the case of novel wheel exposure where the amount of running in the wheel is highly correlated with the amount of clock resetting, propranolol reduced the amount of resetting without reducing the amount of running. These results suggest that beta-adrenergic transmission is a critical component of nonphotic clock resetting.

Sara Mickelson (22)

Faculty Advisor/Collaborator: **Julie Anderson**

Isolation of Regulators of Oxidative Stress Induced Apoptosis in Yeast

Apoptosis or programmed cell death has been linked to the pathogenesis of many human diseases characterized by uncontrolled cell accumulations or loss including cancer, autoimmune diseases, neurodegenerative diseases, and AIDS. In addition, apoptosis may contribute to the general decline of physiological function associated with aging. Some elements of the apoptotic pathway are conserved in yeast and animals and are therefore, part of a basic, evolutionarily old mechanism. Study of these mechanisms in yeast may be useful to trace the roots of apoptosis and solve some of the problems and apparent disagreements inherent in the current models of apoptosis. Research from a number of groups suggests that oxidative stress plays a major role in yeast apoptosis. The long-term goal of this project is to identify the genetic mechanism that connects the reactive oxidative stress signaling pathway to the apoptosis regulatory machinery in yeast. A genetic screen was designed to isolate yeast mutants dependent on an apoptosis inhibitor for survival under oxidative stress. The results of initial experiments to test conditions for this genetic screen will be described.

Megan O'Brien (23)

Faculty Advisor/Collaborator: **Julie Anderson** and **Joseph Rohrer**

Revealing the Ancestry of Three Native American Plum Species through Gene Cloning

Recent research in the Rohrer plant systematics lab has focused on using nucleotide sequences from several genes to analyze relationships among the fourteen species of plums (*Prunus* sect. *Prunocerasus*, Rosaceae) native to North America. Although the majority of specimens yielded clean, unambiguous sequences when the direct products of PCR amplification were analyzed by an automated DNA sequencer, specimens of three species produced messy, overlapping sequences of more than one allele. To solve this problem we have collaborated with the Anderson lab and cloned two genes for these 20 specimens, allowing us to separate the two or

more alleles of each gene so that each allele can be sequenced individually. Our results show that creek plum (*Prunus rivularis*) is a hybrid between *P. angustifolia* and *P. hortulana/murrayana*. Specimens of wild goose plum (*P. munsoniana*) form a cluster of hybrids having *P. angustifolia* as one parent and either *P. americana*, *P. hortulana/murrayana*, or *P. mexicana* as the other parent. Wild American plum (*P. americana*), widely distributed across eastern North America, is nearly homozygous for one gene analyzed, whereas for the second gene three of four specimens examined had two quite different alleles. We are still trying to interpret these results.

Mike Orysen, Justin Frey, and Nick Cartwright (1)

Faculty Advisor/Collaborator: **Daniel Janik**

Beta-Adrenergic Mediation of Circadian Resetting Induced by Light-to-Dark Transitions

Syrian hamsters held in continuous light exhibit circadian phase advances of about 2.5 hr after an abrupt transition to constant darkness in the middle of the subjective day. The transition induces little locomotor activity in the subsequent 3 hr, a period during which locomotion and waking are thought to be important in inducing phase shifts. We tested the hypothesis that adrenergic stimulation associated with arousal mediates the phase shifting effect of the transition. Systemic administration of the beta-adrenergic antagonist, propranolol (0.1-10mg/kg), which readily crosses the blood-brain barrier, caused a dose-dependent attenuation of phase shifts with a reduction of about 50% at the highest dose. There was no effect of propranolol on locomotion or waking in the 3 hr after the light-to-dark transition. Nadolol, a peripherally-acting beta-adrenergic antagonist, had no effect on phase shifts at doses up to 20mg/kg. The results support the hypothesis that central-adrenergic receptors mediate at least part of the phase-shifting effect of light-to-dark transitions. Furthermore, blockade of beta-adrenergic transmission does not appear to exert its attenuating effect on phase shifts by reducing locomotion.

Jessica Spears (21)

Faculty Advisor/Collaborator: **Sasha Showsh**

Determining the Required Sequence for Mobilization of Tn916 in Bacillus subtilis

Tn916 is a 18kb conjugative transposon. It can transfer between different genera and mobilize plasmids that otherwise are non-transferable. Recent evidence indicates that Tn916 may also transform chromosomal genes via a cell fusion event resulting in homologous recombination of the chromosomes. Our research aims to elucidate a mechanism by which Tn916 mobilizes plasmids and chromosomal genes. We have constructed a *Bacillus subtilis* strain that has Tn916 and the plasmid pAM401. Our data indicates that Tn916 does not mobilize pAM401. By adding fragments of the chromosomes to pAM401, we should be able to determine if the Tn916 mobilization of DNA is sequence specific or if it proceeds by the fusion event. This project focuses on identifying these sequences.

Jodi Swanson (46)

Faculty Advisor/Collaborator: **Paula Kleintjes**

Dine and Dash: Lytta sayi Deflower Stands of Lupinus perennis, the Sole Larval Host Plant of the Federally Endangered Karner Blue Butterfly Lycaeides melissa samuelis

We have observed localized feeding aggregations of *Lytta sayi* (Coleoptera: Meloidae) on *Lupinus perennis* occupied by the federally endangered Karner blue butterfly *Lycaeides melissa samuelis* (Lepidoptera: Lycaenidae). We monitored a *L. sayi* aggregation and Karner blue butterfly behavior within a 1,020m² stand of lupine. Absolute counts of *L. sayi* were performed throughout the aggregation. Activity budgets of butterflies were conducted before and during the beetle aggregation. Visual estimates were made of lupine cover. Karner oviposition was monitored through locality of larval feeding damage. An aggregation of *L. sayi* formed and dispersed within 11 days. Three beetles were observed on day 1 with a maximum of 951 beetles by day 7. Over this period, the beetles ate 100% of the lupine flowers, 2% of lupine seeds, and no lupine leaves. In comparisons of Karner blue activity before and during the beetle aggregation, Karner males spent significantly less time on *P. simplex* and significantly more time flying during the beetle aggregation. Second flight Karner larval feeding damage was abundant throughout the site with the exception of the area that contained the most consistent concentration of *L. sayi* throughout the aggregation.

Dustin VanOverbeke (47)

Faculty Advisor/Collaborator: **Paula Kleintjes**

Is Potentilla fruticosa a Nectar Plant for Butterflies?

Little documentation exists to confirm that butterflies use the woody shrub *Potentilla fruticosa* (shrubby cinquefoil) as a nectar plant, and reviews by other Lepidopterists have cast doubt as to whether the plant provides nectar. During the summer of 2004, we observed 59 individual butterflies belonging to 11 species nectaring on *P. fruticosa* in the Jemez Mountains, New Mexico. Butterflies spent 53% of total observed nectaring time on *P. fruticosa* while it composed 26% of total blooming forb availability (out of 17 species). Analysis (anthrone method) of *P. fruticosa* nectar samples indicated presence of carbohydrates. There were significantly more carbohydrates (i.e., nectar) in flowers (n=68) excluded from nectivores (26.83±1.35 µg/2ml) vs. available (n=63) to nectivores

(6.71±1.40 µg/2ml), and carbohydrate levels were significantly higher later in the sampling season (two-way ANOVA with repeated measures, $p < 0.05$).

Emily Watts (191)

Faculty Advisor/Collaborator: **Wilson Taylor**

Perfecting the Cut: Can the Sharpest Object on Earth Get any Sharper?

The transmission electron microscope (TEM) is a useful tool in a number of scientific fields. This microscope is able to view ultrathin sections of specimens at higher magnification and resolution than possible by conventional microscopy. The precision/functionality of this instrument, however, relies upon the thinness and quality of section it analyzes. In our quest to find better and more consistent methods for obtaining high quality sections, we will be investigating the different methods and “tricks of the trade” of making glass knives. The LKB 7800 Knifemaker will be used to produce knives and to explore “insider tricks” and/or EM mythology. These experiments will be done in the hope of discovering a better method to produce sharper, more consistent blades. Specifically, break time, glass cleanliness, glass age, blade contact with foreign objects, and a couple other questionable practices will be assessed by means of physical appearance under both a light microscope and a scanning electron microscope (SEM, which is used to look at the surfaces of objects); specimen sectioning will also be employed. Results will be analyzed by both physical characteristics as well as statistics. The best knifemaking method will be revealed, and some common practices will be scrutinized and assessed.

Andy Welch and Will Stout (45)

Faculty Advisor/Collaborator: **David Lonzarich**

*Age-Dependent Shifts in the Alarm Response of Creek Chub (*Semotilus atromaculatus*)*

Many freshwater fishes possess specialized epidermal alarm substance cells, which when ruptured by a predator release endogenous chemicals into the surrounding water. Until recently these chemicals were thought to serve an alarm function for nearby prey; it is now recognized that they can also attract predators. The creek chub (*Semotilus atromaculatus*) is one of the most common species in streams of North America. As a member of the cyprinid family, creek chub are known to possess alarm substance cells. However, unlike most cyprinids, creek chub is both prey and predator during its life. As juveniles, they are prey because of their small size; as they grow they become too large for gape limited predators. During this transition they also will show a strong diet shift, away from invertebrates and towards fish. In this study, we tested the response of juvenile and adult chub to alarm substances. Our goal was to determine whether the alarm response in chub is age-dependent. Experiments were performed using fish collected from Little Niagara Creek on the UW-Eau Claire campus. Although other studies have examined the age-specificity of the alarm response in fish, this is the first to have looked for such behaviors in a cyprinid species.

Kally Worm (26)

Faculty Advisor/Collaborator: **Tali Lee**

Variation in Plant Photosynthetic and Biomass Responses to Species Richness, CO₂, and N; Role of Unique Functional Attributes

The objective of this study was to evaluate the response of species from different functional groups to species richness, atmospheric CO₂ concentration, and increased soil N in terms of biomass, leaf-level photosynthesis, and related traits. We hypothesized that species performance in multi-species plots depends on their functional attributes and the length of time interacting with co-occurring species. We measured leaf net photosynthetic rates and biomass production across six years for *Lupinus perennis* (N-fixer), *Andropogon gerardii* (C4 grass), *Bromus inermis* (C3 grass), and *Achillea millefolium* (forb) grown in monoculture and 16-species mixtures. *Bromus* and *Achillea* showed lower leaf photosynthetic rates in 16-species mixtures compared to in monoculture consistently across all years. *Lupinus* photosynthesis in 16-species mixtures was initially 56% higher than for plants in monoculture. This stimulation declined until year six when photosynthetic rates in 16-species plots were 9% lower. *Andropogon* initially had 65% lower photosynthetic rates when grown in monoculture compared to 16-species plots. This difference declined until photosynthetic rates were no different between monocultures and 16-species plots. Biomass and leaf nitrogen data further elucidates mechanisms involved in species responses to interspecific interactions. Models have suggested a fluctuating cycle in the dynamics of communities, but it remains unclear how the role of species with unique functional attributes may change under elevated CO₂ and altered N conditions.

Biology/Chemistry

Catherine Pohl and Nick Cartwright (4)

Faculty Advisor/Collaborator: **Sasha Showsh** and **Marcia Miller-Rodeberg**

Isolation of Novel Azo Dye-Degrading Bacteria

Increasing environmental concern about the appearance of color in wastewater generated from textile and paper companies has made the bio-treatment of dyeing effluents increasingly attractive to the industry. Azo dyes are reactive effluents and are generally

considered to be recalcitrant against biodegradation. Azo dyes are characterized by the presence of one or more azo groups (-N=N-). Current methods for removing azo dyes are physiochemical techniques, such as absorption, chemical oxidation, photodegradation, or membrane-filtration; they are all expensive and unfeasible. Removal of dye compounds from wastewater is an important issue for dye manufacturers. Most of the microorganisms that have been shown to degrade azo dyes are anaerobic fungi and bacteria. We have isolated several aerobic bacteria that are able to degrade the azo dye mordant yellow XII at concentration. One of the isolates has been characterized as an endospore forming Gram-positive bacterium. This particular isolate is capable of degrading 300?g dye/ml. We are currently in the process of identifying the byproducts of mordant yellow XII metabolism by this isolate as well as isolating the gene/s responsible for the metabolism of azo dye.

Biology/Geography and Anthropology

Steven Kruger (48)

Faculty Advisor/Collaborator: **Evan Weiher** and **Douglas Faulkner**

A Time Series Vegetation Analysis of Tiffany Bottoms Wildlife Refuge

The Tiffany Bottoms, located along the lower Chippewa River in west-central Wisconsin, is a complex area of bottomland. It contains fairly large tracts of well drained land, but it is mostly poorly drained with numerous wetlands, sloughs, and small lakes. This effects the vegetation which includes prairies, savannahs, marshes, woodlands, and forests. A biologically diverse place, there is concern that open water areas are becoming more extensive, resulting in habitat variation for species such as the endangered eastern massauga rattlesnake. The objective of this research is to identify changes in vegetation cover and any correlative changes in the extent of open water. To do this, we obtained seven sets of digital aerial photographs of the area dating from 1939 to 2001, which was rectified and georeferenced in ArcMap. In addition, we obtained digital orthophotos from the USGS that were created from photos taken in 1992. Using these photos as base maps in ArcMap, we digitized and quantified the areal extent of the vegetative landscape, producing a time series of vegetation change for the area. Our work clearly documents that prairie and savannah landscapes expanded as open water declined in extent from the late 1930s through the 1950, and then, after the mid 1960s, woodlands and marshes became more prevalent as open water progressively expanded.

Chemistry

Daniel Bates and Jennifer Hennig (6)

Faculty Advisor/Collaborator: **Michael J. Carney**

The Effect of Coordination Geometry on Catalyst Structure and Performance

We previously demonstrated that triaza-ligated (NNN) chromium complexes possessing facial (fac) coordination geometries displayed 40-50 times higher polymerization activity than their meridional (mer) counterparts. Recently, we have extended this work to include other predominantly mer-coordinating tridentate ligands and have examined the impact of these ligands on catalyst structure and performance. Our results will focus on chromium and vanadium complexes ligated by triaza (NNN) and aminebis(phosphine) (PNP) ligands; the ligands enforce mer structures by virtue of their planar coordination geometries. X-ray structural data will be presented along with results from preliminary polymerization tests.

Elizabeth Brown (19)

Faculty Advisor/Collaborator: **Stephen Drucker**

Electronic Spectroscopy of 2-Cyclohexen-1-one

The cavity ringdown spectrum of 2-cyclohexenone vapor has been recorded in the vicinity of the S₀-S₁ origin band, which is at 26 089.1 cm⁻¹. Several low-frequency fundamentals and overtones have been observed using this very sensitive technique which allows detection of very weak bands ("hot bands") originating in vibrationally excited levels of the ground state. The inversion of the six-membered ring was observed at 99.0 cm⁻¹ in the ground state and 122.2 cm⁻¹ in the S₁ state. The barrier to the inversion potential in the ground state was found to be 1900 cm⁻¹, which is very different from previously reported values of 935 and 3379 cm⁻¹. Determination of the S₁ inversion potential is in progress. Further assignments of S₀-S₁ as well as S₀-T₂ vibronic bands are also in progress. The assignment process is aided by observation of isotope shifts in the spectra of a trideuterated derivative.

Damon Campbell and Vinay Rao (29)

Faculty Advisor/Collaborator: **Scott C. Hartsel** and **Alan Dispirito** (Iowa State University)

Methanobactin, a Novel System of Copper Acquisition

Methanobactin (mb) is a recently discovered protein-like cofactor utilized by the metanotrophs (methane-eating bacteria) for copper acquisition and possibly enhancing methane oxidation rates. Though able to bind to many metals, copper(II) is bound preferentially to the extent that it will displace all other metals. After being bound it is reduced to copper(I). Associated with the binding of copper

is the change of mb's absorption spectrum. We have identified the absorption bands associated with the different copper-binding groups in mb. Of significant interest to us is the monitoring of the rates and stoichiometry with which copper binds and the subsequent changes in protein stability and conformation. Exposure to light causes the general breakdown of specific functional groups in the copper-free form of mb. When copper is bound to mb, however, it can withstand long intense exposure to light. Additionally, the copper-bound form of mb resists breakdown due to heat compared to the unbound form of mb. Having a better understanding of this protein and its bound/unbound forms may help in future determinations of novel systems of cellular acquisitions of materials necessary for life.

Audrey Eigner and Elizabeth Smith (17)

Faculty Advisor/Collaborator: **James Phillips**

Structural Properties of CH₃CN-SO₂: Computations, Matrix IR Spectra, and Bulk Reactivity

We are conducting an extensive experimental and theoretical study of the complex formed from acetonitrile and sulfur dioxide: CH₃CN-SO₂. Density functional calculations indicate that this complex is quite weakly bonded, as the N-S distance is 3.008 Å at the B3LYP/6-311+G** level. Furthermore, bulk reactivity studies show no evidence of a stable, isolatable complex, even at temperatures as low as -77°C. However, a noticeable amount of heat is released when SO₂ (g) is added to liquid CH₃CN. Computations also indicate the vibrational bands of the SO₂ subunit are shifted only slightly by the formation of this weak complex, and this is consistent with what we have observed in IR spectra of argon matrices seeded with CH₃CN and SO₂ at 10K. In addition to a set of bands very near those of free the SO₂, we also observe a peak at 2340 cm⁻¹, shifted roughly 60 cm⁻¹ from the C-N stretch in free CH₃CN. This shift is consistent with those observed for other complexes of this type. As of yet, we see no evidence that this complex undergoes any sort of medium-induced structural changes akin to those observed for the related complex CH₃CN-BF₃.

B. J. Huettl (20)

Faculty Advisor/Collaborator: **Alan J. Gengenbach**

An Alternative Method for Porphyrin Bromination

The catalytic properties of metalloporphyrins are improved by bromination or chlorination at the beta-positions. As part of a research program concerning the synthesis of catalysts for azo dye degradation, a literature method for the halogenation of aromatic amines was used in the bromination of nickel tetraphenylporphyrin (NiTPP). The reaction was easily monitored by UV-visible spectroscopy and clean conversion to octabromotetraphenylporphyrin was verified by NMR. A variety of metalloporphyrins were brominated using slight modifications of the method. The successes and failures of the method will be reported along with detailed experimental conditions and yields.

Christopher Knutson (8)

Faculty Advisor/Collaborator: **James Phillips**

IR Spectrum of CH₃CN-BF₃ in Solid Nitrogen: Implications for Matrix Effects on Structure and Bonding

The structure and bonding of CH₃CN-BF₃ has been shown to be remarkably sensitive to chemical environment, as demonstrated via large differences between gas and crystal phase structures, as well as substantial shifts of vibrational bands across several media. Recently, we have observed 4 IR bands of CH₃CN-BF₃ in a nitrogen matrix at approximately 10K. For the parent isotopomer (CH₃CN-¹¹B¹⁸F₃) we have observed the CN stretch at 2367cm⁻¹, the BF₃ symmetric bend (or "umbrella mode") at 617 cm⁻¹, the BF asymmetric stretching mode at 1235cm⁻¹, and the BF symmetric stretching mode at 834 cm⁻¹. All are shifted markedly from both those measured for the pure solid as well as those calculated for the two minimum energy gas phase structures. They are even shifted somewhat from those measured in solid argon, implying that solid N₂ has a significantly greater stabilizing effect on in this complex than argon, in spite of the fact that they are both inert, non-polar media. The range of structural changes that occur throughout these various media will be discussed.

Robyn L. Laskowski (32)

Faculty Advisor/Collaborator: **David E. Lewis**

Towards Fluorescent Carbohydrate Derivatives for the Amadori Reaction

The most commonly used derivatization methods for the visualization of primary amines by fluorescence microscopy rely on the use of fluorescent acylating agents that convert the amine to the corresponding amide. While this is often a satisfactory method for derivatization, it does have the net effect of reducing the net positive charge on the amine under biological conditions by one unit, because the amino group is typically protonated under biological conditions, while the amide is not. As an alternative for labeling amines whose free amine group is essential for biological activity, the Amadori reaction has attracted our attention. This rearrangement, in which an aldose reacts with a amine to give a 1-deoxy-1-alkylaminoketose, has the advantages of being carried out under extremely mild conditions and of preserving the amine group in the product. We will report progress towards preparing a new

series of carbohydrate derivatives, carrying the 4-amino-1,8-naphthalimide fluorophore, with potential for labeling biologically important amines.

Kristy A. McNitt and Grant J. Sormunen (31)

Faculty Advisor/Collaborator: **David E. Lewis**

New Robust Fluorescent Probes for Fluorescence Microscopy

The 4-amino-1,8-naphthalimide fluorophore is a particularly useful probe for fluorescence microscopy of live cells. We have now prepared several new probes for subcellular targets, based on this ring system. Thus, we have successfully prepared new fluorescent probes for labeling lysosomes, mitochondria, high-cholesterol membrane microdomains, and Golgi apparatus. These new probes have the common features of low toxicity, which allows their use in live cells and resistance to photobleaching. The synthesis and photophysical properties of these new probes will be presented.

Beverly Piggott, Miranda Lange, and Anthonia Arikawe (5)

Faculty Advisor/Collaborator: **Marcia Miller-Rodeberg**

Kinetic Studies of Azo Dye Oxidation by Peroxidase Enzymes

Azo Dyes are a class of compounds used extensively in the textile, printing, and paper making industries. Because azo dyes are recalcitrant to natural degradation, they visibly contaminate waterways and industrial waste streams for extended periods of time. One possible method for remediation of these pollutants is through the use of peroxidases. Peroxidases are promiscuous heme enzymes that catalyze the oxidation of hydrogen peroxide into water. Azo dyes are oxidized by several different peroxidases, but with exceedingly low turnover numbers relative to standard peroxidase substrates. The objective of this research project is to elucidate the chemical mechanism of azo dye oxidation as catalyzed by peroxidases. The results of steady state and transient kinetic studies of the oxidation of specific azo dyes by three peroxidase enzymes, namely horseradish peroxidase, cytochrome c peroxidase, and *B. fuscum* catalase/peroxidase, a novel bacterial enzyme, will be presented.

Don Rogness and Paul Riedel (43)

Faculty Advisor/Collaborator: **Kurt N. Wiegel**

Synthesis of Highly-Conjugated Styryl Derivatives through Palladium-Based Coupling Reactions

A series of new monomers have been synthesized containing highly conjugated hydrocarbon segments. These monomers have been synthesized through Suzuki palladium based coupling reactions using (4-vinylphenyl) boronic acid. From these reactions, ter- and quaterphenyl divinyl species have been synthesized as well as two naphthyl derivatives. These have been synthesized in good yields and are easily purified. These molecules will be used as comonomers in chain growth polymers, included into siloxanes through hydrosilylation reactions and further polymerizations. The extended conjugation of these molecules could produce an interesting fluorescence effect under both long and short UV light.

Don Rogness, Paul Riedel, and Larry David (44)

Faculty Advisor/Collaborator: **Kurt N. Wiegel**

Supramolecular Liquid Crystalline Polymers Based on Functionalized Azopyridines

A series of azopyridine-based supramolecular polymers have been synthesized. These polymers are made with differing lengths of ethyleneglycoxy spacer groups. These polymers display characteristic liquid crystalline phases and also show a modulation of the liquid crystalline to crystal transition in the cooling cycle. Similar results were observed in our laboratories with supramolecular networks. The azo functionalities in these molecules will be photoirradiated with UV light to induce an e to z transition and alter the molecular shape from a calamitic to a banana shape.

Lori Scardino, Damon Campbell, and Kavita Sachdeva (30)

Faculty Advisor/Collaborator: **Scott C. Hartsel** and **David E. Lewis**

Seeing the Unseen: The First Instant Probes for Visualizing Cell Trafficking

One of the principal problems with studying cholesterol trafficking and liquid-ordered cholesterol-rich microdomains in real time is the lack of probes for these domains. Current visualization methods range from fluorescence of the highly toxic and fade-prone cholesterol binding agent Filipin to complicated, time consuming and membrane impermeant protein labeling methods using cholera toxin B (CTB) subunit. The cholera toxin kits in particular may create an artificial clustering by antibody crosslinking, which may not reflect the plasticity of these domains. We have developed a new probe, InstantLipo Sep-1, which has many advantages over current methods. Used in concentrations of 200 nM or less, it accumulates in bright punctate domains, which colocalize with CTB. Another new probe, InstantGolgi McN-1, has been shown to stain the Golgi apparatus as well as other cholesterol-rich domains. It can be used at concentrations of 150 nM or less and colocalizes with known Golgi markers. Both probes have purple/blue excitation, green

emission, large Stoke's shifts, high quantum yields and exhibit very little self-quenching. They are highly fluorescent, non-cytotoxic, and, rapidly taken up by cells. InstantLipo Sep-1 and InstantGolgi McN-1 have the potential to be used for high-throughput screening of cholesterol lowering drugs, as well for other diagnostic purposes.

Peter Shafe and Joe Wendtland (18)

Faculty Advisor/Collaborator: **Marc McEllistrem**

Effects of Ethylene on the Chemistry of Hydrogen on Si(001)

The reaction of hydrogen with crystalline silicon surfaces continues to puzzle scientists. Based on a wide variety of measurements, the predicted reactivity should be quite high, but the measured reactivity is more than 1 billion times less reactive than predicted. One possible explanation that has been recently proposed by others is that the presence of hydrogen (or other molecules) on the surface should enable more hydrogen to react; that is, the reaction should be autocatalytic. We have studied what influence small amounts of ethylene have on the reactivity of the Si(001) surface with hydrogen. Oddly, our results suggest the exact opposite: the ethylene *reduces* the reactivity.

Andrew Wagner (42)

Faculty Advisor/Collaborator: **Robert Eierman**

Quantitative Analysis Lab Project Project

The Quantitative Analysis Lab Project Project is an attempt to determine which student behaviors during a laboratory project help or hinder their performance on the project. At the end of each of two units, students were given a laboratory problem, which they solved in small groups, using the skills and knowledge that they had learned during the past unit. The students were then given two or three lab periods to solve the problem and the quantitative issues involved. The students were observed as they attempted to solve the problem to see how often they exhibited a series of selected behaviors. In addition, the notes students wrote during the projects were collected and students responded to a survey after each project, in which they answered questions about their behavior during the lab project. Performance was assessed by reviewing the student project lab reports. The data was analyzed to determine if there was a correlation between cooperative, planning and experiment execution behaviors and the ability of the students to successfully solve problems.

John P. Wrass and Christopher C. Knutson (7)

Faculty Advisor/Collaborator: **James Phillips**

Condensed Phase Effects on the Structure and Bonding of Halo-acetonitrile-BF₃ Complexes: Implications for Matrix Effects on FCH₂CN-BF₃

Nitrile donor - boron trifluoride complexes are now well known for their remarkable structural chemistry. Specifically, most structures suggest that the donor-acceptor bonds in these complexes are intermediate between bonding and non-bonding interactions. Furthermore, large differences have been observed between the gas and solid state structures. We have prepared several halo-acetonitrile-BF₃ complexes, and their crystal structures all have B-N distances around 1.65 Å, much like solid state CH₃CN-BF₃. We have conducted an extensive computational study of these complexes, and their structures differ dramatically from the measured solid-state structures, with changes in B-N distances approaching 0.8Å. Consequently, the measured vibrational frequencies for the solid complexes differ distinctly from the computed frequencies. Just recently, we have obtained FT-IR spectra of matrix-isolated F-CH₂CN-BF₃ and found that these frequencies differ markedly from both gas and crystal phase data, implicating a major structural effect.

Computer Science

Chris Andringa (78)

Faculty Advisor/Collaborator: **Michael Wick**

Developing a Program Visualization Tool Using Aspect-Oriented Programming

Our research project was to design and develop a software visualization tool. Software development frequently involves the modification of existing code that was not designed or implemented by the current developer. Modifying existing code, which is referred to as code maintenance, is a difficult task made even more difficult by the intangible nature of software. We set out to use a relatively new approach to computer programming, called aspect-oriented programming, to develop a generic visualization tool that could be used by maintenance engineers to help model and understand the internal operations of existing software systems. The system uses the abstract concept that a computer runs what is called a "stack" and all programs can be depicted as this stack. The user can specify what parts of their program to display as well as view what is contained within each element of the stack, thus allowing the engineer the ability to make sure their program runs in the correct order and with the correct information.

Russell Bayuk (77)Faculty Advisor/Collaborator: **Steven Ratering***Robot Navigation Algorithm Efficiency in an Unknown Environment to an Unknown Destination*

Artificial intelligence needs to keep pace with the advancing robot technology. Robots' versatility is increasing but so is the complicated control system of the robot. With robot technology progressively advancing, robots functionality becomes increasingly useful. Autonomous robots may be used to explore unknown environments and transmit data back to an entity that may find it useful. It is difficult to discern the smartest navigation choices for a robot to make if it does not know where it is going. Many different algorithms can be used for robot navigation. To be able to test the efficiency of algorithms against each other we created a program. This program has the ability to create random rooms with many different configurations. These configurations consist of room size, percentage of walls, configuration of walls, and different goal positions. The program will randomly create rooms of all different configurations and run each algorithm on each room. The amount of moves, turns, and walls bumped will be logged for analysis and comparison. The analysis will yield the efficiency of the algorithms after weights are applied. There will be one weight for each movement type logged. Our program determines the most efficient algorithm for all types of robots.

Michael LeMay (79)Faculty Advisor/Collaborator: **Jack Tan***Side-Channel Attack and Defense Techniques for Acoustic Emissions from Computing Machinery*

Many powerful techniques have been developed to capture information about the operation of a computer without directly interacting with the machine. The information usually targeted during these side-channel attacks includes the instructions being executed and the image on the CRT. Electromagnetic and thermal radiation are two sources of information that we often tapped using existing techniques to determine this information. However, acoustic emissions from computer equipment can also serve as another, largely untapped source of information. Initial research in this area has resulted in basic techniques to capture and analyze these emissions. However, no structured analysis of these signals has been released until now. We hope structured analysis will lead to the development of new techniques for differentiating between noise and useful information and for determining which types of instructions are being executed on a computer's processor. It is our objective to both create practical processing systems to analyze acoustic emissions as well as techniques to protect that information from discovery, depending on the situation.

Lindsey Lepisko (65)Faculty Advisor/Collaborator: **Daniel Stevenson***An Eclipse Plug-in for Automating the Generation of Unit Tests*

Over the last few years, unit testing code has become an important skill in Computer Science. Not only can this type of testing increase the quality of the resulting code, but it can also speed up its development type. Tools, such as JUnit, have recently become available to help in this cause. However, while testing simple code segments using standard JUnit methodology can be fairly straightforward, things are not as trivial as the complexity of the code increases. Thus, we have developed a new methodology for writing these test cases. Along with this methodology we need a tool to help automate the creation of the testing code. We present an Eclipse plug-in tool that achieves this goal.

Kinnell Tackett (80)Faculty Advisor/Collaborator: **Jack Tan***Power Efficient, Multi-level, and Ad Hoc Wireless Network Security and Routing*

Current designs of Ad hoc networks do not provide a high level of security and power-aware routing. Most view the network topology as one level where each node is able to communicate with every other node without having to travel between subnets. These designs are energy and processing power inefficient while creating massive network congestion. This paper proposes a secure energy-efficient routing model using a hybrid network with three types of nodes: master, gateway, and plain, each with specific responsibilities. We divide the network into subnets where each subnet has one master node which controls the subnet, zero or more gateway nodes which belong to two or more subnets, and a number of plain nodes. A Key Authority (KA) is used to control and distribute the encryption keys for each subnet and node. The KA provides keys to network nodes, to subnets (for subnet communication), and to every node of the network (for network wide communication). This reduces the energy and time taken to build route tables.

Jason Vorpahl (66)Faculty Advisor/Collaborator: **Paul J. Wagner***Expanding and Redesigning an Open Source Database Benchmark System*

Database benchmark systems allow users to judge the performance of a particular database management system (DBMS) such as Oracle, SQL Server, or MySQL on various hardware platforms. The Open Source Database Benchmark project (OSDB) was created to provide a free and open-source implementation of a standard benchmarking suite, and has included benchmark tools for the open source PostgreSQL and MySQL DBMSs, but no commercial DBMSs. A recent research project in the computer science department at UW-Eau Claire developed a prototype OSDB tool for the Oracle DBMS, and discovered several issues related to the integration of a large commercial DBMS such as Oracle with the open source OSDB framework. This project has continued that work in two major areas. First, we have finished the development of a single-user benchmarking tool for the Oracle DBMS that conforms to the specifications of the Open Source Database Benchmark project. Second, based on the issues previously discovered, we have developed a new generalized and extensible framework for the OSDB benchmarking system that makes use of software design patterns to provide a more stable and flexible architecture for the project. We plan to contribute both results to the OSDB project.

Geography and Anthropology

Jeremy Treague (52)Faculty Advisor/Collaborator: **Harry M. Jol***Searching for Buried Lewis and Clark Sites: Geophysical Investigations along the Washington and Oregon Coast*

Lewis and Clark, legendary explorers of the western US, spent the winter of 1805 along the SW Washington and NW Oregon coastline. During their stay, they visited, mapped, and described several locations. Many of the sites now lay buried beneath the subsurface due to coastal and aeolian geomorphic changes that have taken place along the coast since Lewis and Clark's visit. Results from the subsurface investigations at historic Lewis and Clark sites will be presented. Field research including the use of ground penetrating radar (GPR), coring, and other field methods was carried out at several formerly mapped sites. GPR profiles collected along the coastal dunes reveal parallel to sub-parallel, continuous to semi-continuous reflection patterns, which are interpreted as vertically accreting coastal sand dunes. A distinct channel-form reflection pattern noted on the GPR is interpreted as a historic river outlet originally mapped by Lewis and Clark. The research coincides with the 200-year anniversary of the Lewis and Clark Expedition and seeks to provide a better understanding of the geomorphic changes along the coast (both shoreline progradation and dune aggradation), which have resulted in a dramatically different landscape from that in which Lewis and Clark mapped two hundred years ago.

Jeremy Treague (69)Faculty Advisor/Collaborator: **Harry M. Jol***Three-Dimensional Subsurface GPR Visualization for an Archaeological Site (Qumran, Israel) and a Geomorphic Site (Michigan)*

To better understand archaeological and geomorphic sites, ground penetrating radar (GPR) has become a popular non-invasive, non-destructive and time-efficient method for subsurface data collection. Increasingly, three-dimensional (3D) GPR datasets have been collected because their results significantly enhance the ability to view, analyze, and interpret the subsurface features. At Qumran, Israel, site of the Dead Sea Scroll discoveries, Tomb #1000 was surveyed to investigate the possibility of a deeper burial. The site (3m x 4m) was gridded, and GPR data was collected. The resulting 3D visualization convinced archaeologists to initiate an excavation that resulted in the discovery of a full human skeleton and artifacts. The position of the burial chamber suggests that an important religious figure was buried here. Rockwell Pit is located in south-central Michigan. Its hummocky terrain, composed of boulder gravel buried by a supraglacial melt-out/flow till, has been described as a product of subglacial meltwater processes. GPR data (20m x ~30m grid) was collected at the site. Interpretation of the 3D GPR data (20m x ~30m grid) collected on site reveals that the hummocks are large-scale, subglacially-deposited, fluvial bedforms. The results agree with previous suggestions that subglacial meltwater processes have played an important role in the evolution of the subglacial environment beneath the Saginaw Lobe in Michigan.

Kin-Yan Wong (49)Faculty Advisor/Collaborator: **Douglas Faulkner***Changing Hydrography in the Tiffany Bottoms of West-Central Wisconsin*

The Tiffany Bottoms, located along the lower Chippewa River in west-central Wisconsin, is a complex area of bottomland. It contains fairly large tracts of well drained land, but it is mostly poorly drained with numerous wetlands, sloughs, and small lakes. A biologically diverse place, there is concern that open water areas are becoming more extensive, resulting in habitat loss for species such as the endangered eastern massauga rattlesnake. The objective of this research is to determine whether open water in Tiffany is, in fact, increasing. To do this, we obtained seven sets of digital aerial photographs of the area dating from 1939 to 2001, which we rectified

and georeferenced in ArcMap. In addition, we obtained digital orthophotos from the USGS that were created from photos taken in 1992. Using these photos as base maps in ArcMap, we digitized and quantified the areal extent of sloughs and lakes, producing a time series of hydrographic change for the area. Preliminary results of this research, based on our analysis of five sets of photographs, were presented at last year's annual meeting. Our analysis of three additional sets of photos adds detail to—and confirms—those preliminary results. Specifically, our work now clearly documents that open water declined in extent from the late 1930s through the 1950s, and then, after the mid 1960s, open water increased and remained stable after the early 1990s. Thus, Tiffany today contains much more open water than it did 40 years ago, although it contains no more now than in the late 1930s.

Geography and Anthropology/Geology

Mark Nelson (50)

Faculty Advisor/Collaborator: **Garry Running** and **Karen Havholm**

Dunes, Forests, and People during the Late-Holocene: Evidence from Buried Podzolic Soils in the Crepeele Dune Field, Southwestern Manitoba

The Crepeele Dune Field (CDF) is one of 18 late-Holocene parabolic dune fields in the Glacial Lake Hind Basin. Previous Study of Cultural Adaptations within the Prairie Ecozone (SCAPE) research shows that such localities are characterized by greater geomorphic and ecological complexity than the Canadian prairie region as a whole and were, therefore, important loci of pre-contact human activity. The purpose of this research is to determine the extent to which forest communities (oak savanna and aspen parkland), that dominate the CDF today, were a part of that ecological complexity throughout the late-Holocene. Ten buried soil profiles were described in the walls of archaeological excavation units, their position and orientation relative to parabolic dunes were mapped using GPS and ArcView, and a POD indexes, a proxy for degree of podzolization, was determined for each. Podzol morphology is consistent with soil formation under forest vegetation. POD indexes range from 0 (no podzol morphology) to 4, a range consistent with the age and texture of the parent material. Seven of the buried soil profiles observed exhibit podzolic morphology (Ah-E-Bw horizonation). Soils with POD indexes of 2-4 are clustered near dunes and are usually associated with cultural materials. Non podzol soils are found in low landscape positions near the water table or high on dunes where wind erosion is frequent. The presence of buried podzolic soil profiles strongly suggests forest communities were present within the CDF throughout the late-Holocene and that forest-related resources were an important factor in attracting humans to the CDF.

Geology

Cale Anger (70)

Faculty Advisor/Collaborator: **Katherine Grote**

Geostatistical Prediction of Soil Texture from Soil Water Content Estimates

Accurate characterization of soil texture is important for many activities, including agriculture, construction, and maintenance of buildings or transportation infrastructure, environmental remediation, and land use optimization. Traditional methods of soil texture measurement are expensive and time-consuming, so soil texture is often inadequately characterized. This project investigates a new technique for soil texture characterization by determining whether predictive relationships exist between the statistical moments of soil water content and soil texture. Recent advances in geophysical methods have provided a technique (ground penetrating radar) for obtaining rapid, high-resolution measurements of water content, so these measurements can now be collected quickly over large areas. If soil water content can then be used to determine soil texture, geophysical mapping could be used to estimate both of these important parameters. This research investigates the relationship between the mean and standard deviation of water content with the average percent sand, silt, and clay using data collected from a heterogenous field site and seeks to determine the optimal sample size to create predictive empirical relationships between these parameters. The relationship between the correlation length of water content and soil texture is also being investigated.

Scott Formolo (98)

Faculty Advisor/Collaborator: **Phillip Ihinger**

Sector Zoning in Hydrothermal Apatite Crystals

Apatite is a common accessory mineral found in nearly every geologic environment. In a preliminary study, we used infrared (IR) spectroscopy to show that concentrations of a variety of hydrogen-bearing species vary within single apatite crystals and across different mineral specimens. We noted that apatite crystals grown in hydrothermal environments are likely candidates for hosting sector zones, which can potentially reveal quantitative information regarding the growth evolution of the crystals (including duration and morphologic evolution). Here, we present a detailed micro-IR study of a single apatite crystal from the classic hydrothermal ore deposit at Cerro de Mercado, Mexico. Our high resolution mapping of individual wafers of the crystal reveal six distinct zones with alternating high and low concentrations of impurities, reflecting growth on two crystallographically distinguishable rhombohedral faces (analogous to the r- and z- rhombohedral growth faces in hydrothermal quartz crystals).

Lisa Grosvold (99)Faculty Advisor/Collaborator: **Phillip Ihinger***Thermal History of Hydrothermal Quartz Crystals: Insights from Micro-IR Spectroscopy*

Hydrothermal quartz crystals from the natural environment contain systematic variations in defect abundances. Using high-resolution FTIR, our group has shown that natural quartz crystals are composed of six sector zones characterized by distinct concentrations of hydrous species, including AIOH, HOH, and LiOH (Ihinger & Zink, 2000). The sector zones are regions within the crystal that correspond to crystallization on the six rhombohedral growth faces. Using micro-IR on samples from Mexico, China, and Brazil, we present measurements that define classic diffusion profiles (with decreasing abundance in impurities toward the six prism faces) superimposed upon otherwise homogeneous concentrations within individual sectors. In all crystals, LiOH exhibits greater diffusive loss compared to HOH, which in turn exhibits greater diffusive loss than AIOH, demonstrating relative mobility in the order LiOH > HOH > AIOH. Analyses from successively younger regions of crystals document progressively lesser diffusive loss, suggesting that diffusion occurs as the crystals are still growing. With accurate knowledge of the temperature dependence of the diffusivity of hydrous species, our measurements may constrain quantitatively crystal growth rates and the temperature evolution of hydrothermal systems.

Emily Hauser (96)Faculty Advisor/Collaborator: **J. Brian Mahoney** and **Robert Hooper***Magmatic Evolution of the Whitesail Lake Map Area British Columbia*

The Whitesail Lake map area, west central British Columbia, occupies the boundary between the Coast Plutonic Complex to the west and the Stikinia Terrane, a Jurassic-Cretaceous volcanic-sedimentary succession to the east. The eastern portion of the map area is underlain by middle Jurassic Hazelton Group, and the western portion contains imbricate thrust stacks of early Cretaceous Monarch assemblage. The rocks are intruded by a number of intermediate to felsic plutons that increase in abundance to the west. This project examines spatial and temporal trends within the plutonic suites to constrain the magmatic evolution of the region. Geological mapping documents seven compositionally distinct plutonic suites, produced during five magmatic episodes during Jurassic and Cretaceous time. Magmatism began about 181 Ma with the emplacement of hornblende diorite of the Howe Lake suite. These rocks were intruded by hornblende biotite granite of the Trapper pluton at 177.4 Ma. Late Jurassic magmatism (ca 150 Ma) is represented by biotite hornblende granodiorite-quartz diorite of the Stick Pass suite. A protracted Late Cretaceous-Paleogene (ca 86-62 Ma) magmatic event produced three mutually cross-cutting plutonic suites, including the Fougner (hornblende-biotite tonalite-granodiorite) Big Snow (biotite granite) and Four Mile (two-mica granite) suites. Widespread Eocene magmatism produced numerous hornblende-biotite granite bodies throughout the area. Further geochemical and petrographic analysis will constrain spatial and temporal magmatic patterns.

Morgan J. Herrick (73)Faculty Advisor/Collaborator: **Lori D. Snyder**, **J. Brian Mahoney** and **Robert G. Anderson** and **Vicki McNicoll** (Geological Survey of Canada)*Magmatic Characterization of the Warm Spring Mountain Pluton, Northwestern British Columbia*

The Lower to Middle Jurassic Hazelton volcanic arc in northwestern British Columbia hosts numerous base and precious metal deposits including the well-known Eskay Creek gold deposit. This project focuses on the subvolcanic plutons of the Hazelton arc in the Iskut River Map Area (NTS 104B). Examination of plutonic field relationships, petrology, geochemistry, and geochronology will help to better understand the relationship of magmatism to mineralization as well as the tectonic processes operating during the Middle Jurassic. Field work during the summer of 2004 focused on the Warm Spring Mountain pluton and an associated dyke swarm. The predominate phase of the pluton is a medium-grained, equigranular Hornblende-Biotite-Quartz monzodiorite, with localized chlorite and/or epidote alteration, and up to 2% 2-10 cm mafic xenoliths. The dykes trend East-Northeast and are dominantly hornblende plagioclase porphyritic andesite. Geochronology of the Warm Spring and Middle Mountain plutons yields dates of 178 ± 2 Ma and 176.5 ± 3 Ma respectively. This age suggests that these plutons are coeval with the Hazelton group volcanic rocks which host mineralization. Additional petrographic, geochemical, and geochronological data will allow for further constraints on the petrogenetic evolution of the Hazelton arc.

Joshua W. Kinsman (71)Faculty Advisor/Collaborator: **Kent Syverson** and **Eugene W. Domack** (Hamilton College)*Preliminary Till Provenance Study in the Robertson Island/Cape Marsh Region, East Coast Antarctic Peninsula*

Gilbert and others (2003) propose that the Greenpeace Trough, Antarctic Peninsula, was scoured subglacially during the Last Glacial Maximum as an ice stream flowed northeastward across the inner shelf. As the ice sheet thinned, the high Seal Nunataks area west of Robertson Island became a barrier that diverted flow from the Antarctic Peninsula to the southeast across the shelf and Greenpeace Trough. Bedrock lithologies vary in the region. Thinly bedded siltstones exist at Cape Marsh on Robertson Island. To the west, the

Seal Nunataks contain olivine-rich basalt. Farther west, rocks of the eastern Antarctic Peninsula contain granitoid intrusive rocks and basalt-andesite-rhyolite assemblages. Marine siltstone and shale are located on the eastern side of the peninsula and also within the Greenpeace Trough. Glacial till samples were collected from the eastern edge of Robertson Island at Cape Marsh. Sieving was performed to obtain the greater-than-63 micron sand and gravel fractions. To determine till provenance, the lead author will analyze the till samples. A binocular microscope will be used to identify and count shale, feldspar, quartz, mafic and felsic igneous, and metamorphic rock grains. The authors predict that the youngest till on Cape Marsh should have more variable, distal lithologies than older till.

Christopher A. Kohel (95)

Faculty Advisor/Collaborator: **Phillip Ihinger** and **J. Brian Mahoney**

Geology and Geochemistry of the Sagebrush Creek Stock: Constraints on the Timing of Late Cretaceous Magmatism and Deformation in the Rocky Mountain Foreland

The Sagebrush Creek Stock is one of several satellite plutons associated with the Boulder batholith of southwestern Montana. The timing, composition, and distribution of magmas related to the batholith are difficult to place within a tectonic framework. In particular, their relation to the Late Cretaceous foreland fold-and-thrust belt of the North American Cordillera has been the subject of considerable debate: was the batholith transported within the thrust blocks, or were the east-vergent thrusts driven by uplift and slumping of Paleozoic rocks over a lubricated melt-ridden middle crust? The Sagebrush Creek Stock, located just east of the main batholith, intrudes a syncline associated with the Devil's Fence Anticlinorium. We present here a detailed field and geochemical study of the ~1 sq. km stock to show that the satellite was tilted after crystallization. Numerous resistant felsic dikes are found with increasing concentration toward the western edge of the stock. The eastern edge of the stock contains a mafic cumulate, where crystals settled on the magma chamber floor. Our observations suggest that the original igneous stratigraphy was tilted top toward the west, which is conformable with the folded Paleozoic rocks. With geochronology, we can establish a maximum age of the regional deformation.

David Mans (72)

Faculty Advisor/Collaborator: **Kent Syverson**

Deglaciation History of the China Lake Area, South-Central Maine, Based on Glaciomarine Sediments and Newly Obtained C-14 Ages

The China Lake 7.5' quadrangle, south-central Maine, was glaciated by the late Wisconsinan Laurentide Ice Sheet. The area experienced late-glacial marine submergence and has marine sediments exposed well above present sea level. The stratigraphic succession of sediments in the study area includes till, eskers, submarine fans, deltas, glaciomarine silt and clay, and subaerial outwash. At the top of the Presumpscot Fm., in-situ shell fossils were collected. Two new radiocarbon ages (uncorrected for the marine-reservoir effect) have been obtained: Palermo site, 11,980+/-230 yrs BP, GX# 31328, *Mytilus edulis*, elev. 73 to 76 m; and E. Vassalboro site, 13,400+/-70 yrs BP, GX# 31329, *Portlandia arctica*, elev. 58 to 63 m. Marine sediment is present at elevations up to at least 90 m a.s.l. in the quadrangle, and this represents a minimum elevation for late-glacial sea level in the China Lake area. The Meadow Brook delta has a surface elevation of approximately 96 to 98 m, but the topset-forset contact was not visible. Deglaciation of the study area occurred by approx. 13,400 C-14 yrs BP (E. Vassalboro site). This age correlates well with published deglaciation isochrons (Retelle and Weddle, 2001; Borns and others, 2004).

Joseph Nawikas (75)

Faculty Advisor/Collaborator: **J. Brian Mahoney**

Geologic Evolution of the Tacoma Park 7.5 Minute Quadrangle, SW Montana

Precambrian and Phanerozoic strata of southwestern Montana have been complexly folded and faulted during the Cretaceous-Paleogene Sevier orogeny, and intruded by the Late Cretaceous Boulder Batholith and associated satellite plutons. A detailed understanding of the regional stratigraphy is required prior to attempting to unravel the structural complexities of the Tacoma Park 7.5 minute quadrangle. This study presents a lithologic and petrographic analysis of the stratigraphy of the Boulder Mountains region of southwestern Montana. Generalized Precambrian and Phanerozoic stratigraphy (oldest to youngest)

	Formation	Lithology
Precambrian	Belt Supergroup	Argillite, quartzite
Cambrian	Flathead Fm. (^a f)	Sandstone (quartzite)
	Wolsey Fm. (^a w)	Fissile micaceous Shale
	Meagher Fm. (^a m)	Mottled limestone
	Park Fm. (^a p)	Fissile shale
	Pilgrim Fm. (^a pi)	Gray oolitic mottled limestone

Devonian	Dry Creek Fm. (d)	Shale & calcareous sandstone
	Jefferson Fm. (Dj)	Grey dolomite
	Three Forks Fm. (Dt)	Fissile shale
Mississippian	Lodgepole Fm. (Mml)	Thin bedded fossiliferous limestone
	Mission Canyon Fm. (Mmm)	Massive fossiliferous limestone
Mississippian	Amsden Fm. (Ma)	Red shale
Pennsylvanian	Quadrant Fm. (Pq)	Quartz arenite
	Phosphoria Fm. (Pp)	Chert, argillite
Jurassic	Ellis Fm. (Je)	Lithic sandstone
	Morrison Fm. (Jm)	Fine-grained sandstone and shale
Cretaceous	Kootenai Fm. (Kk)	Lithic sandstone
	Elkhorn Mountain Volcanics (Kem)	Undifferentiated volcanics

A thorough understanding of the lateral and vertical stratigraphy will permit identification of stratigraphic offsets created by folding, faulting and magmatic activity. Future detailed mapping (summer '05) and assessment of relationships between magmatism and regional deformation will permit an accurate reconstruction of the regional geologic history.

Kali Pace-Graczyk (76)

Faculty Advisor/Collaborator: **J. Brian Mahoney**

Fracture Orientations and Closed Depressions in St. Croix County, Wisconsin: Effects of Karst Landscapes in Hydrology

St. Croix County in Western Wisconsin has experienced hydrological problems from contamination of groundwater. Regional groundwater flow is not fully understood; subsurface stratigraphic inhomogeneities have frustrated groundwater modeling efforts. Accurate characterization of groundwater flow requires an understanding of subsurface stratigraphic and structural controls on groundwater movement. St. Croix County is underlain by an 80-140m thick succession of essentially flay lying Pz sedimentary rocks, including fine to coarse grained clastic sedimentary rocks. These are overlain by a 20-60m thick dolomitic succession with well-developed karst features. Unconsolidated sediments of varying thicknesses cover the county. Analysis of topographic maps and aerial photographs was combined with a structural analysis of fracture systems to constrain the genesis and distribution of closed depressions throughout the county. The county can be divided into three regions: those where the control of closed depressions is based on bedrock characteristics and regional fracture networks, those developed as a result of glacial processes, and those for which no direct control is apparent. The northwest portion of the county contains the greatest number and largest closed depressions, which are glacially related and control the local topography. Depressions formed from bedrock (collapsed karst features) parallel stream drainages, are much smaller in size and located in the southeastern part of the county. Closed depressions in the central portion of the county do not seem to fit either end member.

Suzanne Reed and Adam R. Kjos (74)

Faculty Advisor/Collaborator: **Lori D. Snyder** and **J. Brian Mahoney**

Representative Stratigraphic Section of Lower-Middle Jurassic Hazelton Arc Volcanics of British Columbia

Volcanic and subvolcanic rocks of the Hazelton Group in northwestern British Columbia host many base and precious metal deposits, including the world-class Eskay Creek gold deposit. The economic potential of the Hazelton Group has led to a need for a better understanding of its volcanogenic and petrochemical evolution. This study focuses on documenting a stratigraphic section assumed to cover much of the Lower to Middle Jurassic Hazelton Group in the John Peaks map sheet (NTS 104B/9), near the Eskay Creek mine. Fieldwork in summer 2004 consisted of detailed description, mapping and sample collection for petrography, geochemistry, and geochronology. The section consists of a basal plutonic-rich cobble conglomerate overlain by subfeldspathic volcanoclastic sandstone and siltstone with lesser carbonate. These rocks are overlain by a very thick succession of felsic volcanic conglomerate and breccia. The top of the section is a sequence of pillowed basalt flows intercalated with laminated siliceous siltstone and mudstone. Based on field observations, lithology and regional stratigraphy, much of the stratigraphic section in this study is interpreted to be deposited in a marginal marine basin at or near sea level. Further stratigraphic and geochemical examination of correlative units will help constrain the timing and evolution of arc volcanism and mineralization.

James M. Watkins (93)

Faculty Advisor/Collaborator: **Phillip Ihinger**

Geochemistry of Tertiary Magmas from the Black Hills Magmatic Province: Comparisons with the Central Montana Alkaline Province and Tectonic Implications

The Black Hills of South Dakota represent the easternmost center of magmatism and deformation associated with the uplift of the Rocky Mountains. As such, understanding their origin is central to reconstructing the plate tectonic evolution of the western margin of North America. We present results from a comprehensive field and geochemical study of Black Hills magmas. Our results

demonstrate that their source is predominantly that of the sub-continental lithosphere. In particular, a strong depletion in the high field strength elements Nb and Ta suggest that they are derived from a source enriched in fluids evolved from dehydrating slabs above subduction zones. This signature is also seen in K-rich magmas from the Central Montana Alkalic Province, located ~ 400 km to the west. Radiogenic isotopic analyses of our samples can be used to further investigate ancient enrichment events and constrain the timing and location of convergent margins as the North American craton was constructed.

James M. Watkins and Breck Johnson (94)

Faculty Advisor/Collaborator: **Phillip Ihinger**

Reconciling Observations of the Yellowstone Hotspot with the Standard Plume Model

The Yellowstone hotspot represents the type example of plume magmatism in the continental setting. The propagation of large silicic magmatic centers along the Snake River Plain independently tracks the southwestward trajectory of North American plate motion over the last 13 My. Structural deformation associated with the hotspot track is consistent with thermal upwelling, and tomographic studies image a well-defined cylindrical conduit at least down to the mantle transition zone. Furthermore, the high $^3\text{He}/^4\text{He}$ signatures suggest a deep mantle origin for Yellowstone magmas. Yet, there are several observations of the Yellowstone region that do not fit the standard plume model for hotspot magmatism that have led a number of researchers to favor a shallow upper mantle origin for Yellowstone hotspot activity. Here, we propose that the enigmatic observations conform to the standard plume model by considering interaction of the Yellowstone plume with the descending Farallon Plate beginning at 80 Ma.

Geology/Computer Science

Ryan Prechel (97)

Faculty Advisor/Collaborator: **Phillip Ihinger** and **Daniel Stevenson**

Web-based Visual Simulation of Crystal Growth and Development of Sector Zoning in Hydrothermal Quartz

Crystal growth in the natural environment is a poorly understood process. Recent measurements of chemical impurities preserved within natural crystals offer important clues toward understanding morphologic evolution during crystal growth. In natural hydrothermal quartz crystals, internal chemical heterogeneities define sector zones as individual growth faces trap different amounts of impurities. The concentration of impurities is a sensitive indicator of the kinetics of crystal growth and thus can serve as a speedometer of the growth rate of individual faces. We present a web-based visual simulation that illustrates the morphologic evolution of a quartz crystal as it grows from hydrothermal solution. We show how growth on different crystal faces leads to chemically distinguishable sector zones inside a single crystal. Our simulations can generate the large differences in impurity concentrations across sharp sector zone boundaries that are observed in natural crystals. Our results constrain the relative growth rates of individual faces during crystal growth in the hydrothermal environment.

Geology/Geography and Anthropology

Jessica Lopez (51)

Faculty Advisor/Collaborator: **Karen Havholm** and **Garry Running**

Geomorphic and Human History in Glacial Lake Hind Basin, SW Manitoba

Rare northern Great Plains mid-Holocene dune deposits are exposed along cut-banks of the Souris River in glacial Lake Hind Basin, southwestern Manitoba. At the Atkinson cut-bank, dune sediments interfinger laterally with fluvial sediments that host rare mid-Holocene Gowen archeological material (5280 ± 50 BP). The purpose of this study is to determine the relationship between mid-Holocene dunes and the adjacent alluvium, as well as to clarify the paleoenvironmental context of the archeological site. Cut-bank and core data combined with a topographic survey were used to develop a three-dimensional reconstruction of the stratigraphy of the study site. At the eastern end of the cut-bank, dune deposits capped with poorly developed A-C soils thin and terminate as they interfinger with silty clay facies interpreted as overbank fluvial. These observations indicate that during the mid-Holocene the dune encroached onto the floodplain, but periodically stabilized, permitting soil formation and overbank stream flooding of the dune. The mid-Holocene landscape was similar to the modern setting. The proximity of dune and stream environments provided a resource-rich habitat for mid-Holocene people. The apparent lack of Gowen archeological sites in Manitoba may result from burial by late Holocene sediments rather than abandonment of the area in response to mid-Holocene aridity.

Geology/Mathematics

James M. Watkins and Lisa Grosvold (100)

Faculty Advisor/Collaborator: **Phillip Ihinger** and **James Walker**

A Geological Application of Fourier Transform Infrared Spectroscopy

Fourier analysis is used in everyday applications to describe naturally occurring signals. For example, time-dependent signals can be decomposed into a series of trigonometric functions. Chemical bonds in minerals absorb and emit photons of energy in the infrared region of the electromagnetic spectrum and generate a natural signal amenable to Fourier analysis. For any given bond, there is a unique set of frequencies at which the bond is capable of vibrating. By measuring the infrared absorption spectrum of a mineral, we can elicit the nature and abundance of a variety of chemical bonds that are present within the mineral structure. Fourier Transform algorithms are used in infrared spectroscopy to characterize and quantify mineral chemistry. Here, we summarize the application of Fourier analysis used in determining the distribution and abundance of hydrous impurities in quartz.

Mathematics

Tyler Birkel and Jessica Eckles (102)

Faculty Advisor/Collaborator: **Robert W. Langer** and **Mohamed B. Elgindi**

Neck-In and Edge Bead in Film Casting

Film casting is a process used to produce plastic films. After leaving a flat extrusion die, the material is stretched or drawn to its final thickness by a chilled roller rotating at high velocity. This process has two undesirable side effects, neck-in, a reduction in the width of the film, and edge-beading, a thickening of the film at the edges. Since the edge bead must be trimmed from the film and either recycled or discarded, accurate prediction of usable film width is important for efficient die design. The purpose of this project is to study the dependence of the film width and film thickness distribution on design and operating conditions of the die and on the material extruded, and to develop and implement mathematical models for predicting film thickness, neck-in, and edge-beading.

Derek Franz (90)

Faculty Advisor/Collaborator: **Robert N. Anderson**

Examination of the Relationships between Transfinite and Infinitesimal Numbers and Surreal Numbers

Surreal numbers were initially developed by John Conway of Princeton University, and the name was coined by Don Knuth of Stanford University. The class of Surreal numbers contain all the linearly ordered classes of numbers used in mathematics including the ordinal numbers and all Real numbers. They also contain numbers that can be quite properly categorized as transfinite as they are larger than any Real number and infinitesimal numbers as they violate the Archimedian property that they are smaller than any Real number and yet are positive. The arithmetic defined on Surreal numbers is quite difficult, and computation is very cumbersome. We have independently developed numbers that can be classified as infinitesimal and transfinite. We wish to explore the relationship between the two classes of numbers. It is clear that the Surreal numbers would include the transfinite and infinitesimal numbers, but we wish to exam the arithmetics of the two systems to see if the easier arithmetic on transfinite and infinitesimal numbers can be used for computation with surreal numbers.

Darin Mohr (101)

Faculty Advisor/Collaborator: **Mohamed B. Elgindi** and **Robert W. Langer**

Finite Difference Solutions of a Linearized Version of the Heat Equation in a Molten Polymer Flowing in a Circular Tube

In this project, we present the mathematical equation that governs heat transfer in a polymer melt flowing in a circular tube with constant ambient temperature, taking into account the viscous dissipation effects. This leads to a nonlinear parabolic partial differential equation. It is shown that the exact solution of a linearized version of the governing equation can be presented in terms of a special function known as the Whittaker function. A finite difference scheme is then used to produce an approximate solution of the linearized problem. This numerical solution is shown to be a good approximation to the exact solution found in terms of the Whittaker function. The results of this project are a starting point toward the development of a finite difference scheme for the solution of the full nonlinear equation governing heat transfer in molten polymer flowing in a circular tube with viscous dissipation, which will be considered in a future project.

Darin Mohr (91)

Faculty Advisor/Collaborator: **Simei Tong**
Spectral Methods in Mathematical Physics

In operator theory, there are two ways to solve the equation $Lf=g$ where g is a given function, L is an operator and f is an unknown function. If an inverse of L exists, we can solve the equation. We can also solve the equation by finding the eigenfunctions of L . If the eigenfunctions span the space and are orthonormal, then the solution of the equation can be written as a linear span of these eigenfunctions. This method of solving $Lf=g$ is called the Spectral Method. We are interested in understanding the spectral method and how limit conditions affect the nature of the operator. We will also consider a brief application to the diffusion equation.

Carolyn Otto (92)

Faculty Advisor/Collaborator: **Michael Penkava**
Moduli Spaces of Lie Algebras of Low Dimension

A change in an algebraic structure is called a deformation. To understand deformations, the space of such structures, known as the moduli space, should be studied. By studying these spaces, one must look at how the elements of the space fit together. To do this one must first classify the space of such structures, and secondly, the deformations of this space must be examined. It turns out that simple geometric descriptions of these spaces can be given for low dimensional Lie algebras. These descriptions illustrate many of the general features of moduli spaces of Lie algebras.

Lori Scardino and Chee Yang (89)

Faculty Advisor/Collaborator: **Veena Chadha**
Least is Best: Envelope Folding Problem

Given a right triangle with perpendicular sides, a and b , suppose we fold the right angle over to some point on the hypotenuse. What is the minimum possible area of the folded triangle? Using trigonometry and computers, we shall show a clever, non-calculus solution to this problem.

Physics and Astronomy

Tiffany Black (55)

Faculty Advisor/Collaborator: **Paul Thomas**
Forces Affecting the Trajectories of Particles in Saturn's E-ring

Saturn's E-ring spans an area of 3 to 8 Saturnian radii and is composed of small micron-sized blue particles. Its existence cannot be explained by the ring formation theories. Saturn's satellite Enceladus is considered the source of E-ring particles. Using Enceladus as the source, the trajectories of μm sized particles with various initial speeds and directions were plotted using a Maple worksheet that models the various forces acting on these particles. Forces included were the gravity of Enceladus, the gravity of Saturn, Coriolis force, centrifugal force, the gravity of the Sun, and the gravities of Saturn's other satellites. It was discovered that many of these forces had small but not negligible effects upon the trajectory and that the gravity of Enceladus accelerates the expansion of the ring.

Kelli Johnson (54)

Faculty Advisor/Collaborator: **Paul Thomas**
The Physics of High Altitude Airbursts: An Analysis of Small Asteroids and Short-Period Comets

Airbursts of small (1-10m radius) comets and asteroids occur frequently at high altitudes ($>10\text{km}$). We used Maple software to create a code that modeled airbursts, including the effects of atmospheric drag, deformation, and ablation. Our model shows that iron asteroids in this size range do not airburst while stony and carbonaceous asteroids as well as short-period (SP) comets will airburst at different altitudes depending on their size and composition. We used U. S. Department of Defense satellite data to determine the energies of specific airbursts. We then modeled various classes of asteroid and comet candidates to calculate the airburst heights for these various objects. For asteroids and SP comets with typical observed airburst energies in the range of $0.02\text{ kT} - 25\text{ kT}$ ($1\text{ kT} = 4.85 \times 10^{12}\text{ J}$) we find airburst altitudes of 21-23 km for stony asteroids, 27-41 km for carbonaceous asteroids, and 41-81 km for SP comets.

William Joynes and Aaron Moscho (67)

Faculty Advisor/Collaborator: **George Stecher and Lyle Ford**
Asteroid Photometry and Light Curve Analysis

Photometry is the study of brightness variations of astronomical objects. Using digital images, a light curve—the variation of the object's brightness with respect to time—can be determined. Images of the asteroid 180 Garumna were acquired using the 0.6 meter telescope at Hobbs Observatory. These images, taken using two different color band filters, were analyzed using Canopus

photometry software to give partial light curves. Furthermore, the effects of camera temperature, measuring aperture size, and measuring aperture shape on the quality of the data were examined. We have also investigated the processes necessary to transform our data onto a standardized magnitude scale so that it can be compared with other researchers' observations. From our measurements we were able to determine a lower bound on the rotation period of Garumna. We were also able to improve our analysis procedures for future photometric work on asteroids.

Darin Mohr (53)

Faculty Advisor/Collaborator: **Paul Thomas**

Modeling Comet Airbursts in Titan's Atmosphere

Over the history of the solar system, the impacts of comets and asteroids have changed the shape of the planets and moons. Low-density atmospheres have little resistance to the passage of asteroids and comets, and so surface impacts are frequent occurrences. However, planets and moons with substantial atmospheres often experience a unique physical phenomenon known as airbursting. Airbursting is a result of ablation and deformation on a hypersonic object. In an airbursting event, almost the entire kinetic energy of the incoming object is deposited in a narrow range of altitudes. The atmosphere of Saturn's largest moon, Titan, has a surface pressure of 1.5 bars and a scale height of up to 40 km (compared to 8.1 km for Earth). This thick atmosphere is probably subject to airbursting events similar to the 1908 Tunguska explosion over Siberia. By using recent spacecraft data and a model that has been successfully applied to the Tunguska explosion, we analyze the fate of comets entering Titan's atmosphere. The results of this model are used to determine the extent of cratering on the surface of Titan.

Justin C. Reiter (68)

Faculty Advisor/Collaborator: **Nathan A. Miller**

Exploring the Direct X-ray Images of Hot Stars

We have obtained an X-ray observation of Cygnus OB2 using the orbiting Chandra Observatory. This stellar association serves as a laboratory for studying the violent wind structures of hot stars. The instrument used for this observation records both images and spectra simultaneously. The spectra come in two forms: high-resolution dispersed spectra, and low-resolution spectra from the direct images of the stars. Only the four brightest stars resulted in measurable dispersed spectra; we have analyzed and published those spectra previously (Astrophysical Journal 616, 542). In continuing this project, our goal is to determine what can be learned from the direct images of the fainter stars. We have been able to detect roughly a dozen X-ray sources in the instrument's field of view (many never previously observed in X-rays), but many of them proved difficult to analyze due to their low numbers of photon events. Nonetheless, we have proceeded to cross-identify these sources with previously known sources in the field and extracted their low-resolution spectra. Analysis of the spectra is ongoing.

Shantih Spanton (56)

Faculty Advisor/Collaborator: **Matthew Evans**

Tempered Deposition Study of Co on As-rich GaAs(001) c(4×4)

Previous studies concluded that at a deposition substrate temperature over 150°C, the formation of the Co₂GaAs interlayer at the Co/GaAs interface no longer acted as a significant diffusion barrier for Co and GaAs intermixing. Thus, at a deposition substrate temperature of 225°C, Co deposited on As-rich GaAs(001) appears to diffuse through the Co₂GaAs interface layer forming a metal overlayer. Scanning tunneling microscopy, low energy electron diffraction, and reflection high energy electron diffraction analysis of such Co/GaAs(001) samples showed increasing deposition temperatures led to smooth surfaces of good crystalline quality. Vibrating sample magnetometer measurements showed a decrease in the magnetic anisotropy with increased growth temperature. To make an atomically abrupt interfacial region Co/GaAs(001) growth techniques must minimize intermixing between ferromagnet and substrate yet still create a smooth template for surface growth. This study attempts to accomplish the former by performing two separate depositions during growth. Cobalt was grown on GaAs(001)c(4×4) at a substrate temperature of room temperature and annealed at 200°C. Subsequent additional depositions of Co onto the Co/GaAs(001) sample surfaces were performed at room temperature and 150°C in amounts ranging from 0.5ML to 40ML consecutively. X-ray photoelectron spectroscopy characterized all stages of the experiment to observe composition and intermixing.

Benjamin J. Sykora (41)

Faculty Advisor/Collaborator: **Kim Pierson**

Micro-Wire Interconnect Fabrication Using Magnetron / DC-Triode Sputtering

Micro-wire interconnect technology has become a limiting component of modern Integrated Circuit fabrication. As Integrated Circuits become more advanced and the number of components placed on each Integrated Circuit gets larger, the space allotted for micro-wire interconnects becomes very limited. The limited space available for micro-wires has brought forth many new problems in interconnect fabrication that must now be solved. By modifying a Magnetron thin film deposition system to include a DC-Triode ion source, we are

able to investigate fabrication techniques not possible with other systems. Preliminary experimentation shows that the DC-Triode makes a significant impact on the quality of thin film deposited during the micro-wire interconnect fabrication process. The DC-Triode bombards the deposited metal film with ions and prevents the formation of voids in the micro-wires, thus preventing open circuits. During further experimentation, we intend to devise a procedure by which the Magnetron and DC-Triode can be simultaneously used to make Micro-Wire Interconnects most efficiently. If successful, this technique will make production of Integrated Circuits cheaper and less complex.

Public Health Professions

Erin Moritz, graduate student, **Karen Bartosh**, **Kristin Hardy**, and **Chris Judkins-Fisher (28)**

Faculty Advisor/Collaborator: **Crispin Pierce**

Toxicokinetics of Methyl Tertiary Butyl Ether

The 1990 Clean Air Act Amendments required “oxygenated” gasoline to be used to reduce carbon monoxide and ozone components of urban air pollution. About 30 percent of US gasoline is now oxygenated, of which about 87 percent uses methyl tertiary butyl ether (MTBE) (other oxygenates are ethanol and ethyl TBE, or ETBE). MTBE is the most water-soluble component of gasoline, and has now leaked from underground storage tanks and entered groundwater in all 50 states. MTBE is classified by the EPA as a possible human carcinogen. Given widespread exposure and potential health risks, it is critical to understand how MTBE and ETBE are absorbed, distributed, metabolized, and excreted by the human body (collectively called “toxicokinetics”). We selected four typical profiles of the blood concentrations of these chemicals and their primary metabolite *tert*-butyl alcohol (TBA) from eight controlled human exposures to 2.5 ppm (a level expected at the gas pump). Physiologically-based models to simulate MTBE, ETBE, and TBA toxicokinetics from these exposures were tested in two ways: residual standard deviations based on model-data differences, and Monte Carlo simulations of average model vs. data compared to average model vs. 95% confidence value. All models were validated by the residual standard deviation test, but some failed the Monte Carlo test. The MTBE model was used to simulate different exposure scenarios. It predicted an internal dose estimate from inhaling 40 ppm (the occupational limit) which was four orders of magnitude greater than the dose from drinking water containing 10 ppb (the environmental limit). Support was provided by the Superfund Basic Research program NIEHS ES 04696, by NIH grant P41EB001975, and by the UW-Eau Claire Office of Research and Sponsored Programs.

Graduate Entries

Adult Health Nursing

E. Marie Allison and **Patricia Schulz**, graduate students, **Emily Bastian**, **Laura Ludwig**, and **Adrienne Sween**, undergraduate students **(183)**

Faculty Advisor/Collaborator: **Joan Stehle Werner**

Spirituality, Quality of Life, and Health in People with Chronic Mental Illness: Pilot Study Findings

The aim of the present study, currently being implemented, is to explore spirituality, health, and quality of life from the perspective of people with chronic mental illnesses. This study employs a descriptive/correlational and exploratory design with triangulation of methods and investigators. The final sample will include at least 30 people with a verifiable chronic mental illness, residing in the community, for the quantitative portion of the study, with from 10 to 20 of these persons continuing on to complete an interview. Settings include community gathering places/agencies for people with chronic mental illnesses. The phenomena that are being measured quantitatively using well-accepted instruments are everyday spirituality (Daily Spiritual Experiences Scale), self-perceived health (Short Form-36), and subjectively perceived quality of life (Quality of Life Scale). Participants who agree to a follow-up interview will be interviewed using a schedule containing open-ended questions focusing on meaning in life, health, and life-satisfaction. Six participants were included in the pilot study: findings indicated great variations in responses. In addition, the researchers found that all instructions and instruments were understandable to participants and tools were able to be completed with or without assistance in 80 minutes or less.

Adult Health Nursing/Social Work

Jane E. Kampa, graduate student, and **Andrea Boh**, undergraduate student **(181)**

Faculty Advisor/Collaborator: **Winifred Morse** and **Gloria Fennell**

An Exploration of Attitudes and Knowledge Before and After a Death and Bereavement Class

The American Association of Colleges of Nurses (AACN) published a document in 2002 reporting the conclusions of experts in the fields of health care ethics and palliative care on the education of health care professionals (HCP) about end-of-life knowledge and

attitudes required in order to provide high quality end-of-life (EOL) care to patients and families. Other studies have documented that HCP frequently have negative attitudes about working with dying patients. An interdisciplinary course titled “Death and Bereavement” was developed by Dr. Winifred Morse and Dr. Gloria Fennell to teach EOL care issues. While the need for EOL education has been documented, little research has been done to document the effects of the education on student knowledge and attitudes. The objective of this research was to determine the impact of this course on student knowledge levels and attitudes surrounding these topics. Education has been documented, little research has been done to document the effects of the education on student knowledge and attitudes. The objective of this research was to determine the impact of this course on student knowledge levels and attitudes surrounding these topics.

Biology

Deb Freund, graduate student, and **Jesse Anderson**, undergraduate student (177)

Faculty Advisor/Collaborator: **Tali Lee** and **Evan Weiher**

The Effects of Chlorothalonil Fungicide on Mycorrhizal Inoculum Potential and Plant Biomass Distribution

There is growing interest in the contribution of mycorrhizal fungi to plant diversity and community composition. The fungicide benomyl, used to experimentally reduce root colonization by mycorrhizal fungi, has been de-listed and is no longer available. We tested an alternative fungicide, chlorothalonil, to assess its suitability as a benomyl replacement. We measured the effects of various dosages of chlorothalonil on mycorrhizal inoculum potential in experimental plots in an old field. Dosages included control, 24 g chlorothalonil (Bravo Ultrex) m⁻², and 108 g m⁻² applied over a growing season. Within treatment plots, we are investigating the effects of chlorothalonil and soil nutrient additions on biomass distribution to roots and shoots in *Andropogon gerardii* and *Aster laevis*; soil used to assess inoculum potential did not receive nutrient amendments. We grew 10 replicate seedlings of *Andropogon gerardii* in pooled soil collected from these plots. After 28 days of growth in the greenhouse, plants were harvested and root colonization by arbuscular mycorrhizal fungi was counted. The lower dosage reduced root colonization by 72%, while the higher dosage reduced it by 85% (one-way ANOVA $p < .0001$). These results suggest that chlorothalonil has strong effects on mycorrhizal inoculum potential and is suitable for experimental use.

Deb Freund, graduate student, **Beth Ryan** and **Steve Chevalier**, undergraduate students (176)

Faculty Advisor/Collaborator: **Tali Lee** and **Evan Weiher**

Physiological and Growth Responses of Heliopsis (False Sunflower) to Competition and Fungal Symbiosis in a Grassland Experiment

Ecologists have long recognized the important roles of competition and mutualism in shaping plant communities. We investigated the physiological and growth responses of a dominant grassland species, *Heliopsis helianthoides* (false sunflower) to competition, mycorrhizal fungi colonization, and resource availability. In a factorial experiment, we grew *Heliopsis* with and without neighbors, with and without high dosages of chlorothalonil fungicide (reducing average MF colonization by 39%), and with varied resource ratios (control, +15 g N m⁻² ammonium nitrate fertilizer, or +15 g m⁻² N in a balanced complete fertilizer). Following two years of growth, net rates of leaf photosynthesis, leaf chlorophyll content, aboveground biomass, and mycorrhizal fungal infection rates were measured. Leaf chlorophyll content was 13% higher in plants grown under complete fertilizer compared to controls and those given only increased N. Biomass had a similar pattern, although it was only marginally significant. Leaf photosynthetic rates were not significantly different between control and N-only treatments and were not measured on plants given complete fertilizer. These responses did not depend on whether plants were grown alone or in mixtures. Mild responses to N-only fertilizer suggest that another resource is limiting growth in this system.

English

Traci Thomas-Card, graduate student, **Andrew Kerbel**, **Rachael Amundson**, and **Daniel Hardy**, undergraduate students (184)

Faculty Advisor/Collaborator: **Gloria Hochstein**

Children's Writing Contest, A Process to Hear the Melodies of Young Writers

For many years now, our chapter has run an annual writing contest for the children in grades K-8 in the schools in a fifty-mile radius surrounding the University of Wisconsin-Eau Claire. The students in the Theta Zeta chapter invite students, through the language arts teachers, to submit original poetry, short fiction, and essays. The university students in our chapter spend many hours reading through the submissions to select at least two outstanding pieces in each grade. The young authors, their teachers, and their families are invited to the university. During the spring UW-Eau Claire English Festival, the young writers of the winning submissions read their pieces at a ceremony that has become a very popular event for the college students as well as for the writers and their families and teachers. The winning authors are also presented with books, including a bound volume of all of the winning submissions.

History

Laura M. Lambert (185)

Faculty Advisor/Collaborator: **Selika Ducksworth-Lawton**

Wisconsin Native Americans in the 24th Infantry

The project will examine the presence of two Native American men from Wisconsin in the 24th Infantry (an all black unit) during the Korean War when most Native Americans who served in the military were placed in white units. These two men were the only two non-blacks in this unit. The major question explored while researching this project was: what idea of race had these two Native Americans classified in an all black regiment? The project gave the researchers an opportunity to explore the intersection of Native American and African American experiences in military history.

Human Development Center

Sara Totten (180)

Faculty Advisor/Collaborator: **William Frankengerger**

Interdisciplinary Professional Education at Lac du Flambeau: A Service Learning Project

Student attitudes were assessed by comparing UW-Eau Claire students' pre and post experience attitudes toward American Indian children, families, and culture. Students were required to complete a multidimensional questionnaire that measured their attitudes, perceptions, and ideas about life in a reservation community. After students participated in the Orientation session and the classroom/tutoring experiences, they were administered a post test. Results indicated that the experience in the Lac du Flambeau community had a significant impact on UW-Eau Claire students' attitudes about the Native American culture. It should be noted that all significant changes were in the direction of students being more sensitive and knowledgeable about cultural issues. In addition, all responses indicated that the Orientation had been a positive educational experience for the students. The students' responses, in their reflection papers, all highly praised the opportunity they had to interact with children and community members, and indicated a profound positive attitude towards their experiences at Lac du Flambeau.

Sara Totten (179)

Faculty Advisor/Collaborator: **William Frankengerger**

Psychiatric Diagnoses and Concomitant Drug Treatment in the Early Childhood Special Education Population

The purpose of this study was to determine the types of psychiatric disorders and the corresponding medications prescribed to children enrolled in Early Childhood Special Education Programs (ECSE). Data from the study were used to determine the number of psychiatric diagnoses associated with children enrolled in ECSE Programs. The study identified specific medication(s) prescribed for children with psychiatric diagnoses, the number of children receiving single and/or multiple medications for their diagnoses, and the attitudes of teachers related to the use of psychiatric medication(s) with children enrolled in ECSE Programs. The data were collected via survey disseminated to 525 Early Childhood Special Education teachers in Wisconsin, Minnesota, and Iowa.

Management Information Systems

Se Hyung Oh (178)

Faculty Advisor/Collaborator: **Thomas S. E. Hilton**

Information Systems Ethics in Oman, South Korea, and the USA

A 30-item, three section IS ethics questionnaire was completed by a convenience sample of 520 bank employees, 129 in the western USA, 176 in the Sultanate of Oman, and 215 in the Republic of South Korea. Section 1 concerned employee use of employer IS resources for personal entertainment, section 2 concerned employee use of employer IS resources for personal gain or the gain of family or friends, and section 3 concerned employer monitoring of employee use of employer IS resources. ANOVA yielded statistically significant differences among the samples on 28 items in all three sections; 14 of these represented different degrees of commitment but overall agreement on the ethicality of the behavior described; 12 represented actual disagreement as to whether a behavior was ethical or not. Of the 12 actual disagreements, 6 were in section 1 and concerned after-hours use of IS resources, two were in section 2 and concerned printing and storing personal documents, and four were in section 3 and concerned giving prior notice to employees when monitoring them. In sections 1 and 2, all three samples gave relatively conservative responses, favoring employer rights of ownership over employee rights of possession and use. In section 3, only the US sample answered conservatively; this section generated differences of the greatest magnitude among the three samples. The US sample was the most conservative on 25 items, the Omani sample was most conservative on four items; the South Korean sample was most conservative on only one item.

Public Health Professions

Evalee Kunkel, graduate student, and **Devon Garratt**, undergraduate student (182)

Faculty Advisor/Collaborator: **Jennifer Johs-Artisensi**

Parish Nursing Programs in the Chippewa Valley Region

Parish nursing is a model of nursing care that focuses on health promotion and disease prevention. Parish nurses are specially trained to act as health educators, patient advocates, counselors, and trainers within their faith communities. A local group of Parish Nurses has built a regional coalition and would like to gain support from the local health systems. The current project is, in part, designed to assist in achieving this goal. This project allowed us to identify the prevalence of Parish Nursing programs in the local eight-country area, describe the services and activities these programs are engaged in, and gain a better understanding of the impact these low-cost programs have, including best practices that can be used to enhance existing programs and/or provide a framework for establishing new programs in the area, thereby expanding access to healthcare for the members of our community. We analyzed the results of our survey, disseminated to 180 churches across the Chippewa Valley.

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History

Melisa A. Cushing Davis, graduate student

Faculty Advisor/Collaborator: **Patricia Turner**

Chippewa Valley Rosies: the Economic, Social and Cultural Impact of World War II on the Women of the Chippewa Valley

From Suzie Homemaker to Rosie the Riveter and back again... During the era of World War II American women were drawn en masse into industry, then “urged” to return to home at war’s end. In between, the seeds of independence were sown for many, inspiring a new confidence borne of necessity. And whether they remained in the workforce or retired to their homes as expected, the perspectives of these women were forever changed, reflected in their growing civic activism, as the 1940’s gave way to the 1950’s. Created in conjunction with the Chippewa Falls Museum of Industry and Technology, this on-line exhibit examines the larger historical events of World War II in a local context, using a variety of media, including oral interviews, documentary photographs and colorful prints and posters. Methods of recruiting women, conditions women faced on the job, and the consequences of reconversion are all examined. The women of the Chippewa Valley continued to impact their community long after their war work ended. Determined to create a better, freer world, far from being shackled to their kitchens, these women swelled the ranks of civic organizations, culminating in a growing social activism that would manifest itself in the 1960’s.

Music and Theatre Arts

Briana Hardyman

Faculty Advisor/Collaborator: **Terry Allen**

H.H. Holmes and the Columbian Exposition of 1893

When embarking on my research for the World’s Fair of 1893 and what H.H. Holmes had to do with it all, I honestly felt overwhelmed at the amount of information I was bound to accrue and was not quite sure what to do with it all. As I predicted, the information was plentiful, and for quite some time I imagined, determined, and discovered theories and possibilities of how the murderous sociopath and a great American disaster were truly connected. Each idea ended in some cloudy mess where another one blossomed, only to drizzle out in the same fashion. I was stumped, for I could’ve written my own novel on the complexities of the sociopath, the characteristics of those who are drawn to and manipulated by them as well as a separate novel for the incongruencies of the period and the fair itself. Then, there of course was the matter of the play, *The Holmes-Pitezal Case*, written and directed by UW-Eau Claire Faculty member Dr. Terry Allen, which examines the life of Holmes in the context of the horrible crime that eventually got America’s first serial killer caught. After months of research, examination, and fear that I would be unable to put it all together into one project, I returned to the very first questions and responses I had when I read the script, found out about Holmes, and learned about the life and times of the fair. I was able to narrow all the information and history I’d encountered into five areas I found to be most interesting and important; the delusion of the era, the arrogance of the sociopath, the naivety in believing them, modern examples relating to the time and crime, and the question of remembrance, which is where the play comes in. And, as it turns out, the very first question that plagued me after reading the original script of *The Holmes-Pitezal Case*,

is the question that finally gave me the answer to how to tackle such a difficult and sensitive project. “If we should forget Herman Webster Mudgett, alias Henry Howard Holmes, why he’ll only come back to haunt us (*The Holmes-Pitezel Case*, pg.108).” The burning question of “why remember such an awful man?” is the very question I will answer, and with all hope, justify the recollection and revisiting of the tragic case of H.H. Holmes and the World’s Columbian Exposition of 1893.

Public Health Professions

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Music Therapy with People with Reactive Attachment Disorder (RAD)

Reactive attachment disorder (RAD) is a relatively new diagnosis. The need to understand people diagnosed with RAD is imperative due to characteristic symptomologies of RAD. Because of the complexity of symptoms and possible comorbidities, individuals diagnosed with RAD cannot be treated in the same manner as other “abnormal” individuals. Their underlying inability to form attachments leads to a lack of conscience development. This lack of conscience leads to no need to follow society’s rules, which consequently leads the individual to manipulate situations, lie constantly, and attempt to triangulate and charm strangers and others directly in their environment. Individuals with RAD have a constant need for power and control, utilized as a coping strategy created in response to underlying tragedies experienced as very young children. Nancy Thomas, one of the leading experts in the field of RAD, has provided insight and training to treat children with RAD. Music Therapy techniques were employed to treat a child with RAD. Techniques used include bilateral stimulation through drumming and ‘Simon Says’ music activities to address lying and manipulation. Through combining aspects of both Nancy Thomas’s and Music Therapy techniques, prospective activities were developed and evaluated on efficacy and practicality of meeting treatment goals.