

*PROCEEDINGS OF THE TENTH ANNUAL
UNIVERSITY OF WISCONSIN-EAU CLAIRE
STUDENT RESEARCH DAY*



April 22-23, 2002

**Center of Excellence for Faculty and Undergraduate
Student Research Collaboration**

Office of Research & Sponsored Programs

PROCEEDINGS OF THE TENTH ANNUAL UNIVERSITY OF WISCONSIN-EAU CLAIRE STUDENT RESEARCH DAY

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

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Arts and Humanities

Academic and Career Services

Caitlin Lee, Mary Lee, and Meng Yang (28)

Faculty Advisor/Collaborator: **Amber Dernbach**

The Living Paj Ntaub Project: Hmong Journeys from Laos to Eau Claire

Three UWEC student researchers, all proficient in Hmong and English, collected stories from Hmong immigrants via personal interviews. The interviews focused on the Hmong exodus from Laos, the journey to the United States, and ultimate arrival in Eau Claire. Hmong actors from UWEC and Upward Bound are currently rehearsing monologues developed from the interviews. Two actors will be available to perform monologues on site at the UWEC Student Research Day. The monologues are part of a performance that will form a living story cloth, or Paj Ntaub, of the Hmong journey from Laos to Eau Claire. Traditionally, Hmong culture is oral. Families tell stories but do not keep written records. Here lies the significance of our project: we communicate orally, the root of Hmong culture, using the medium of live theatre. We will educate all audience members, regardless of age or culture, in a format that is accessible and immediate. The Living Paj Ntaub Project: Hmong Journeys from Laos to Eau Claire preserves Hmong history and embraces cultural diversity in Eau Claire, Wisconsin.

Anthropology

Jack Forbes (8)

Faculty Advisor/Collaborator: **Daniel Strouthes**

The Role of the Marimba in Contemporary Quiche Society

In order to provide an ethnomusicological viewpoint of the Quiche lifeway, this project investigated the role and the importance of the marimba in contemporary Quiche-Maya society. Interviews, participant-observation, and recorded performances were used to examine Quiche attitudes and feelings toward the marimba as a part of their culture. Specific areas that were focused on included the use of the marimba in the Catholic Church, the education of younger marimbistas, the economics of being a professional marimbista, the effects of civil war and the 1996 Peace Accords, the future of the marimba in Guatemala, the role of the Guatemalan government, and other general topics such as style, standard repertory, technique, and performance practice. Fieldwork was conducted for eighty-two days during the summer of 2001, primarily in Chichicastenango, a town located approximately 50-60 miles north-northwest of Guatemala City. Additional research was conducted in Cunen, San Cristobal-Totonicapan, Quetzaltenango, and St. Cruz del Quiche and Guatemala City.

Art

Sara Slattery (7)

Faculty Advisor/Collaborator: **Michael Christopherson**

George Hagale: Sculptor/Collector

The George Hagale: sculptor/collector art exhibition held in the Haas Fine Arts centers' Foster Gallery, February 28-March 21, 2002 is the culmination of a multi-faceted research effort. This faculty/student collaboration provides the rare opportunity to conduct original research which does not rely on existing texts. It is also the first ever retrospective art exhibition displayed in the Foster Gallery. The text included in this exhibition required contacting the artists in George's collection, internet searches, and reviewing art journals and catalogs for pertinent information. The second phase established the chronology of George's life and his exhibition record. Newspaper articles and reviews of exhibitions helped to establish this time line. To prepare the artworks for exhibition two dimensional artworks were matted and reframed. Wood sculptures were refurbished and a re-creation of George's living room and sculpture garden became the focal points of this exhibition.

English

Stephanie Anaya, Joseph Horton, and Guillermo Mendez-Gorski (9)

Faculty Advisor/Collaborator: **David Jones**

African American Music in the Upper Midwest: Music Performance, Student Run Radio, and Cultural Change

The project has four major purposes: 1) to examine the history of African American music in the Upper Midwest; 2) to compare and contrast styles and forms of African American music in the Upper Midwest and national trends in African American music; 3) to build a stronger audience for locally produced music; 4) to produce a series of 3 radio programs for WUEC, tentatively scheduled for May 1, 2, and 3, that would help build campus-wide interest in music and cultural events. This project begins at a time when WUEC's funding from the student senate is in jeopardy. An important part of the station's own long range plans is to increase faculty and student involvement in producing radio programming. Maintaining an active radio station can provide great benefits to the campus community, but a high degree of faculty and student involvement must be maintained to build a wider audience. We hope to build a larger campus and community audience for local music by providing listening opportunities through the radio program and by examining the ties between African American music and the wider body of popular music in American culture.

Meng Yang (27)

Faculty Advisor/Collaborator: **Charles Hanson**

Hmong Storytelling Through Four Mediums

Hmong Storytelling: Four Traditions The Hmong people have evolved from tribesmen living and farming off the mountainsides of Southeast Asia to an educated people assimilated into contemporary American society. Throughout centuries the Hmong have created a rich literature—originally an oral tradition, and since their migration to the United States, also a written one. With an alphabet only a generation old, young Hmong-Americans have initiated a written record of stories and myths, as Hmong elders, the traditional transmitters of lore, do not know how to read or write the language. This study focuses, however, on four means of Hmong storytelling. Along with the oral and the new written traditions lie two other potent storytelling media—Hmong women's richly embroidered "story cloths" and contemporary Hmong-American music. This study traces themes common to each medium—love's triumph over evil, family solidarity, brotherhood, and respect for the elders and the Hmong culture—while noting differences of tone, viewpoint, representation and resolution within each.

Foreign Languages

Jennifer Allen (10)

Faculty Advisor/Collaborator: **Eva Santos-Phillips**

Creating Space for Women to Create: A Closer Look at Mexican Dramatist, Sabina Berman's Plays "El gordo, la pajara y el narco" and "Muerte subita."

This project explores Sabina Berman's plays "El gordo, la pajara y el narco" and "Muerte subita," in which the author focuses on the ways that gender roles in Mexico function, or fail to function, in a romantic relationship. A common thread in these works is the sense of isolation that the characters feel and the lengths to which they will go to try to fix this problem on their own. They do not seem to understand that the source of the problem is not inside of themselves, rather it is located in the very social structure in which they live, which dictates the ways that they think, feel, and act. Eventually, the women break away from performing according to society's script. Once this happens they are immediately taken out of the dramatic action. Is it because the playwright does not know what roles to create for women in a context not dominated by men, or does she assume that society is not ready to accept them in their changing roles? In any case, without the women, the men in these plays fall apart as the old social structure; in the end we do not know whether they will survive or perish. In these plays, Berman calls our attention to the dysfunctional nature of a society in which power is unequally distributed between women and men. She presents an opportunity to consider the possibility of change so that women and men to relate to one another as equals, thus free to create a true sense of community, rather than simply going through the motions of roles that no longer work in today's society.

Colin Crowley (152)Faculty Advisor/Collaborator: **Gale Crouse***Tradition and Change in Modern France*

My project was photographic essay documenting the relationships between traditional and modern elements in contemporary France. The photographs from this project illustrate the tensions that exist between tradition and change, as well as how certain French traditions continue to thrive within a changing society.

Katie Gustad (153)Faculty Advisor/Collaborator: **Martina Lindseth***Language Policies of the European Union: With Special Reference to Minority Languages*

The European Union's unique model of integration and unification of different nations should ensure respect for the cultural and linguistic diversity of Europe. The Union has established eleven official languages in an attempt to include all participating nations. However, in all Member States there are indigenous groups who speak a native language different from the respective official language/s. This is true for an estimated 40 million people in the EU. In 1992, The European Commission initiated a study of the Union's policy in the area of minority and regional languages. The goal of Euromosaic was a methodologically sound study of all regional and minority language groups within the EU, focusing on a number of social and institutional concepts. In our research we assess the current status of Europe's minority/regional languages based on the Euromosaic and EuroLang reports. We examine initiatives and programs such as the European Bureau for Lesser-Used Languages and the Mercator Network, as well as specific projects funded during the European Year of Languages 2001, in order to assess the progress made in sustaining the EU's minority languages. We will specifically look at the present linguistic circumstances and political status of Catalan, a minority language spoken by over 6 million in Spain, Italy and France.

Bobby Kuechenmeister (11)Faculty Advisor/Collaborator: **Patrick Day***Toward a New Definition of Tragedy*

The purpose of our presentation is to demonstrate how the definition of tragedy has changed from the time of Aristotle's *Poetics* to the present day. In *The Poetics* (4th C. B.C.), Aristotle outlines specific "rules" of tragedy that every playwright should follow. What one notices, however, is that very few tragedies after the classical Greek period adhere to Aristotle's strictures. In fact, one comes to find that theater is no longer the sole genre of tragedy. We will show how writers not only wrote tragedies with a decreasing regard for Aristotle's theories, but also how readers came to identify tragedy with literary genres other than that of theater. We will explore the evolution of tragedy and its meaning by analyzing Shakespeare's *Hamlet*, Cervantes's *Don Quixote*, Hawthorne's *The Scarlet Letter*, Hugo's *Preface to Cromwell*, and Miller's *Death of a Salesman*. We will demonstrate how the concept of tragedy has changed over time to include genres other than theater, and how writers either rebelled against or ignored Aristotle's rules.

History**Shane Butterfield (159)**Faculty Advisor/Collaborator: **Jane Pederson***Christmas in Wisconsin, 1850-1980: A Digital Photoessay*

In this project, photographs were collected pertaining to the celebration and recognition of Christmas in Wisconsin, during the era 1850-1980. Both existing photos and other related objects were photographed with a digital camera and are here reproduced, all with permissions granted. To present this project, I will be using powerpoint; in this way, then, I will best be able to display the visual aspect of this particular research and show in a captivating style the information gathered.

Shane Butterfield (12)Faculty Advisor/Collaborator: **Jane Pederson***Pariah, Pedagogy, or Perfection? Wisconsin's Rural Communities, their Schools, and Teachers, 1860-1990*

In this project, the connection between Wisconsin's rural and one-room schools, their communities, and the school teacher are the subjects of investigation. The meaning of the school, both symbolic and real, shown through its annual student Christmas program is

detailed, as well the role of the teacher in the school and community, along with the evolving attitudes of the area's citizens regarding their school's role and value in the progressing 19th and 20th centuries.

Jeremy Byers (157)

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

Tournaments in Steel: Small Unit Tactics in Combined Arms Warfare on the Eastern Front During World War II

World War Two witnessed substantial tactical development in the world's armed forces. Often overlooked but incredibly important, the Eastern Front was a source of most of these tactical adjustments. The five-year conflict between the Soviet Union and its Axis aggressors acted as a significant catalyst for tactical doctrine and technical innovation worldwide. This study focuses on German and Soviet small unit tactics throughout the five-year conflict. Due to the massive amount of men and equipment engaged on the Eastern Front and to the strategic significance of this arena, this theater was center stage for tactical and technical changes. The structural and tactical evolutions of these forces are distinct, and they directly impacted United States doctrine following the war and even into contemporary combined arms warfare. While most research on the Eastern Front is conducted on a larger scope this study focuses on the battalion level and below. Utilizing German High Command Documentation, Soviet Staff Studies and a considerable number of personal accounts, the study demonstrates this evolution in two scenarios illustrating both German and Russian offensive and defensive tactics throughout the war.

Robert Ecker and Rebecca Reid (158)

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

The Deacons for Defense and Justice Outside of Louisiana

The Deacons for Defense and Justice were an important civil rights organization between 1960 and 1967. With a philosophy of armed self-defense, they were involved in community service, organization, and protecting civil rights leaders. This research focuses on the impact the Deacons for Defense and Justice had outside of their home state of Louisiana. These researchers focused on Chicago, Illinois and various cities in Mississippi. Our research points to connections between Chicago and Mississippi between 1960 and 1967. In Chicago, the Deacons for Defense and Justice were involved in organizing gangs away from criminality and into protection militia, and collecting charity for Mississippi. In Mississippi the Deacons for defense and Justice distributed charity from other parts of the country and protected civil rights activists, including James Meridith. We use primary and secondary documents including the Deacons for Defense and Justice FBI file and various dissertations to show these connections. This is part of a research project that has been I going on for more than a year.

Philosophy and Religious Studies

Sara Jensen and Justin Lehmann (156)

Faculty Advisor/Collaborator: **Brett Greider**

Mayan Indigenous Identity in An Age of Globalization

We are collaborating with Religious Studies professor, Dr. Brett Greider, in completing a book on Mayan Indigenous Identity in Guatemala in an Age of Globalization. This book is being development for inclusion in the Ashgate Press "Religion, Culture and Society" series. The Maya of contemporary Guatemala are currently engaged in a struggle for "Pan-Maya revindication" in a cultural resistance movement that includes re-invention of their ancestral religious and spiritual practice. Today the indigenous Maya of Guatemala are recovering from civil war and military occupation by the National Army that claimed the lives of over two hundred thousand people since 1979, 83% of whom were indigenous. The Pan-Mayanists propose a de-colonized, re-invented, and trans-lingual Maya identity. We are researching the current cultural and social dimensions of the Pan-Mayan religious movements, and the current scholarly discussion of the movement, particularly including the voice of Pan-Mayan intellectuals and religious leaders.

Olaf Lind (26)

Faculty Advisor/Collaborator: **Lori Rowlett**

Human Sacrifice and Transference: Linking Frazer, Freud, and Bataille

Many scholars in the field of ritual theory have endeavored to explain the phenomenon of human sacrifice, and many of them believe that such sacrifices were not only present in early stages of human organization, but place human sacrifice as a common and normal occurrence in these cultures. The works of James G. Frazer, Sigmund Freud, and George Bataille all seem to hold this

commonality. Upon further investigation the works of these theorists seem to hold that the goal of human sacrifice is that of transference. While what is being transferred may differ slightly from one theorist to the next there seems to exist, in the idea of transfer, a common assumption that holds implications for the whole of each theory. Through the exploration of these two assumptions one can expose a common thread of influence, as well as a reason to assume such sacrifice as “normal”. However, in the light of increased information in regard to earlier religious activity, as well as the doubtfulness of a real societal progression away from human sacrifice it becomes important to reassess the assumptions and conclusions of earlier theories.

Behavioral and Social Sciences

Communication and Journalism

Maiknue Moua (29)

Faculty Advisor/Collaborator: **Susan Hafen**

Hmong Women Leaders: Identities, Roles, and Stigmas

Within the Hmong community, some say, the terms “women” and “leadership” are incompatible. This study explores how Hmong women leaders view their identities and roles as a balancing act, one that requires them to negotiate a public role of liaison and mentor to Hmong community while privately enduring the stigma of abandoning Hmong tradition. Unlike Hmong men, whose adoption of American ways is commended, Hmong women are held accountable by their communities to preserve “tradition,” that is, gender dicta for performance within the family as wives and mothers. The study, involving in-depth taped interviews with five Hmong women leaders, explores recurring themes through the vehicle of Identity Theory.

Counseling Services/Psychology

Alexis Dorsey, Tamara Plath, Rebecca Reitmeier, Krista Steinmetz, and Stefanie Wood (73)

Faculty Advisor/Collaborator: **Lori Bica, Marie Crothers, and P.J. Kennedy**

A Research Based Approach to Campus-Wide Sexual Assault Prevention

This student and faculty research team is a subgroup of the University of Wisconsin-Eau Claire’s (UWEC) larger Prevention of Violence Against Women Committee. Our goals are to: (1) identify a theoretically and empirically grounded sexual assault prevention program, (2) implement the program with a small group of participants at UWEC, (3) collect data to assess the effect of the program on participants’ behavior, and (4) expand the program, if effective, to additional participants at UWEC. Based on a review of the literature, difficulties associated with preventing sexual assault will be discussed, as will general suggestions for effective prevention programming. The research team’s work to secure external funding and its role in the context of the broader campus community will also be discussed.

Alexis Dorsey, Tamara Plath, Rebecca Reitmeier, and Stefanie Wood (72)

Faculty Advisor/Collaborator: **Lori Bica and P.J. Kennedy**

Sexual Assault on Campus: Incidence Rate and Correlates

This student and faculty research team is a subgroup of the University of Wisconsin-Eau Claire’s (UWEC) larger Prevention of Violence Against Women Committee. Our goals were to determine the incidence rate of sexual assault in the UWEC campus community and to identify groups that are at high risk for sexual assault. During the fall of 2001, the team disseminated Koss and Oros’s (1982) sexual experiences survey via campus and US mail to a 10% random sample of full-time UWEC students. Approximately 12% of female participants in the sample indicated that they had experienced situations that would constitute sexual assault; specifically, the use of verbal and/or physical coercion to obtain sexual intercourse. This finding is lower than what might be expected given national norms for sexual assault reported in the literature. Possible reasons for this finding will be discussed. The low response rate of 28.8% did not allow for conclusions to be drawn about groups that might be at high risk for sexual assault. Possible reasons for the low response rate will also be discussed.

Joshua Kennedy, Rebecca Moe, Kenneth Ortery, Megan Sepnafski, and Katherine Wainscott (89)

Faculty Advisor/Collaborator: **Allen Keniston** and **P. J. Kennedy**

The Incidence Rate and Correlates of Tobacco Use on the UWEC Campus

The researchers administered the College Tobacco Inventory (CTI) to a random sample of undergraduates at the University of Wisconsin-Eau Claire. in order to assess the incidence rate of tobacco use on campus and to identify significant correlates of smoking for college students. This research was supported by a Student Research Collaboration Differential tuition grant and by a supplemental grant from the American Cancer Society.

Economics

Feng Deng (48)

Faculty Advisor/Collaborator: **Maria DaCosta**

China and the "New Economy"

China is playing an increasingly important role in the global economy. In 2001, it ranked ninth in the world in terms of total foreign trade. Its gross domestic product is expected to grow at an average rate of 7 percent over the next ten years. China's rapid growth is driven in part by its explosive growth in information technology (IT). In 1984, China had only 2.8 million telephone lines. That figure rose to 27 million in 1994 and to 125 million lines by July 2000, and the numbers keep growing. In July 2001, mobile phone users in China outnumbered those in the United States, turning China into the biggest mobile phone market in the world. Since the very beginning, subscribers to the Internet grew exponentially from a mere 1,600 in 1994 to 16.9 million in mid-2000. The New Economy, based on information technology, will provide an opportunity for China to restructure its economy as well as provide a stimulus for economic growth. According to the country's five-year plan, by 2005 China's information industry is expected to grow "over 20 percent, on a scale two times greater than 2000, to produce over 7 percent of GDP." This research focuses on the development of the "New Economy" in China. It examines how the IT industry is affecting China by boosting economic growth and restructuring its economy.

David Fuller (31)

Faculty Advisor/Collaborator: **David Schaffer**

Measuring Gender Segregation by Occupation: Theory and Applications

Women in the U.S. labor force are faced with two separate types of discrimination. The first type is called "wage discrimination." It involves paying women lower wages than comparable men doing comparable work. The second, and more-subtle form is called "occupational segregation." It involves denying women entry into or advancement within any high-wage occupations. As a result, women are tracked or "crowded" into a small number of low-wage occupations such as elementary school teachers, nurses, and secretaries. Given the degree of education and training involved, as well as the level of responsibility, these occupations offer unusually low wages. Some previous research by both economists and sociologists has focused on this phenomenon. However, their approaches differ and there is an ongoing debate about the most appropriate methodology. In our research, we review the existing methodologies and then propose our own more general approach. We move away from the common approach of trying to summarize the degree of segregation with a single number. Instead, we argue for a graphical approach which reveals many of the details hidden in a single number. We apply our methodology to U.S. data from the last 30 years and reveal some interesting patterns.

Rebecca Hutchinson (30)

Faculty Advisor/Collaborator: **Fredric Kolb**

Predicting Opening Weekend Box Office Revenues

When a studio releases a film, it is taking the risk that a film will or will not be well received by a mass audience. If box office revenues could be predicted, film distributors would be able to budget appropriately and produce those movies that would bring in the largest amounts of money. One period of particular interest when forecasting revenue is the opening weekend of a film. When substantial revenue is generated during this time, a film presents a strong indication of financial success throughout its stay at the box office. A model using characteristics of a film as independent variables may determine the amount taken in during the opening weekend of a film. We hypothesize that those films that either are sequels, or released on holiday weekends, or contain popular cast members will likely have higher opening-weekend box office receipts. Using data from 1998-2001, we estimate a model of per screen revenue. We find that sequels are

significant to the model as well as budget. Likewise, movies with a top actor or debuting holiday weekend were not significant to the model.

Cristiana Oliveira (150)

Faculty Advisor/Collaborator: **Rose-Marie Avin**

Modernization and Women in Brazil: The Role of Race, Class and Ethnicity

Since World War II, Brazil has experienced a rapid transformation in its socioeconomic system. Its economy, dominated by a few export crops - especially coffee- became more diversified and industrialized. The contribution of agriculture to the economy declined from 28 percent in 1947 to about 11 percent in 1980, and 8 percent in 1998 (Baer 1989, 3; World Development Report 1999/2000). Furthermore, manufactured commodities constituted 53 percent of Brazil's exports in 1997 (World Development Report 1999/2000). At the same time, Brazilian society, which had been rural, became increasingly urbanized. In 1940, only 30 percent of the country's population was urban; by 1980, this percentage had increased to 66 percent, and by 1998 to 80 percent (Baer 1989, 3; World Development Report 1999/2000). The objectives of this research project are two-fold: To study how women of different races, classes and ethnic backgrounds have experienced this rapid economic transformation, compare and contrast their experiences, and examine how their experience is shaping their gender consciousness; and To study whether this rapid economic transformation and the structural changes in the political system created a political space and more economic opportunities for all women in society.

Ravshan Yakubov (151)

Faculty Advisor/Collaborator: **Edward Young**

Uzbekistan: Past and Future Perspectives, The America's New War and Its Influence on the Economy of Uzbekistan.

The objectives of this project are to study the economy of Uzbekistan, show the major achievements of Uzbek economy after Independence and to discuss the influence of the War in Afghanistan on Uzbek economy. The purpose of this project is to show how the economic policies, chosen by Uzbek Government, totally changed the economy of Uzbekistan during the years of Independence. Only ten years ago we thought about Uzbekistan as agricultural-third world country, producing only cotton. Under the Soviet Union control the natural resources of the country were used unefficiently. Now Uzbekistan is Independent country, which exports gold, air planes, automobiles and other high tech. products, but cotton is still a major exporting item of Uzbekistan. Today, because of the War in Afghanistan this part of the World seems to be less attractive for foreign investors. But long run effects of the War in Afghanistan on the economy of Uzbekistan might be positive. The goal of this research is to evaluate the potential impacts of the America's new War on the future development of uzbek economy.

Foundations of Education

James Johnson (90)

Faculty Advisor/Collaborator: **Katherine Rhoades**

Walking the Talk: Exploring Diversity on a College Campus

Diversity is a controversial issue on college campuses across the country. This project explores students' perceptions and definitions of diversity on the UW-Eau Claire campus. An overarching goal of this research is to build an understanding of how diversity is currently treated and referred to, and then consider both the positive and negative aspects of current understandings and portrayals of diversity. The project utilizes a number of movie clips which participants view and then complete a survey that asks them to assess representations of diversity in the clips and to explain their definitions of and responses to diversity.

Geography and Anthropology

Katie Bowen, Christy Dillivan, Amanda Reiter, and Steven Zaun (86)

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

Midwest University Enrollment Change 1980-2000

The purpose of this project is to examine the change in each of the public and private universities enrollment in the Midwest from 1980 to 2000. The Midwest will be defined as the states of Nebraska, North Dakota, South Dakota, Wisconsin, Minnesota, Iowa, and Illinois. Much of the necessary data is available in the Internet. Additional data will be obtained from individual university via

email. Total enrollment data for each university will be collected for three sample years: 1980, 1990, and 2000. All universities, both public and private will form the study population. It is expected that enrollment change over the last two decades of the 20th Century will closely parallel the change in college age populations over the same time period. The spatial (mapping) and statistical analysis is expected to reveal anomalies in this overall trend. We will examine a number of variables as propagators of regional variation in university enrollment change including regional economic growth; net population migration; distance to major city; and regional isolation. A primary hypothesis of this project is that public universities have increased proportionally more than private ones because of a growing gap in costs.

Erin Brown and Sandra Yassin (87)

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

Effects Of Population and Income on Educational Opportunities in Wisconsin

The purpose of this project is to analyze the effects of population and income on selected educational opportunities by school district. The educational opportunities considered in this study are: 1) the availability of Advanced Placement (AP) courses; 2) student/teacher ratio; and 3) student/computer ratio per school district. Data will be obtained through Rick Christofferson, School Performance Report Coordinator for Wisconsin. He is in the process of consulting with his colleagues regarding our request for information and believes he can provide us the data we need in the form of excel spreadsheets. Once the information is obtained, we will compare it to population and income statistics for statistical and spatial analysis. The working hypothesis is that school districts with greater populations and higher income levels will offer more AP courses and have lower student/teacher ratios and student/computer ratios. This is because these sorts of opportunities are more easily provided in school districts where there is more money and funding. Likewise, areas of high population tend to include more people with higher incomes. There will also be more students in high population centers and we believe that these areas will also offer more opportunities to their students.

Lori Hafeman, Paul Sandstrom, and Ruben Seifert (70)

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

County Population Change and the Interstate Highway System 1950-2000

The Interstate Highway System, which fundamentally changed American life, began in the 1950's. The purpose of this project is to determine its impact on county population change in the last half of the 20th Century. The dependent variable used in this project is the percent change in population between 1950 and 2000 for every county in the conterminous United States. The independent variable will be the straight-line distance from the centroid of each county to the nearest segment of the Interstate Highway System. The working hypothesis is that as distance increases, the rate of population growth will decline. This means that the highway system was a powerful force in demographic and economic change over the past fifty years. Both spatial (mapping) and statistical analysis will be used to test the above hypothesis.

Lori Hafeman and Sarah Schreck (71)

Faculty Advisor/Collaborator: **Lisa Theo**

Upscale Upnorth: The Gilding of Wisconsin's Northwoods

At the turn of the 20th Century, when the Northwoods moved from timber and mineral extraction to processing, the area experienced a strong and stable labor market. For many decades, those employed in the processing of timber products experienced tremendous job security. With the advent of new technologies and the growth of the tourism industry, employment in moderate to high-paying jobs declined. Currently the majority of the Northwoods population is employed in the traditionally low-paying service industry. At the same time, property values and demand for property has skyrocketed. The economic and social implications of the changing land use and land value in the Northwoods will have statewide implications for years to come. Data comes from selected recreational sites in Northern Wisconsin. The goal is to determine the change in land use and land ownership patterns in Wisconsin's Northwoods recreational areas.

Patrick Hahn and Tobi Rutten (67)

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

Distribution of Parking Permits at the University of Wisconsin-Eau Claire Campus

There has always been a great deal of debate over the number of off-campus student parking spaces available at the University of Wisconsin-Eau Claire (UWEC). Most of the debate has taken place without any quantitative evidence of the "need" for on-campus

parking for off-campus students. “Need” in this study will be defined as a one-mile radius from the center of the Chippewa River Footbridge; students living outside this radius have a “need” for on-campus parking while those living within the radius do not. The primary purpose of the study is to calculate the number of parking permit holders inside the defined radius. This will yield an estimate of the parking spaces that would be released if these students were not issued parking stickers. The “no-need” number of permit holders will be compared to the total number of students living within the zone to determine whether or not the demand is as widespread as commonly perceived. Two “anecdotal hypotheses” will be tested. The first hypothesis is that “no-need” parking permits are a majority of the total number of off-campus permits. The second is that “no need” students are a majority of the total number of students living in the one-mile zone. Parking permit data will be obtained from the UWEC Parking; off-campus addresses will come from the Registrar’s Office. Addresses will be geocoded for mapping and analysis. The “no-need” buffer will be generated in ArcGIS and the counts needed for hypothesis testing will be derived by standard GIS operations. Final results will be presented in visual (map), statistical, and chart formats along with a detailed discussion of the results.

Erin Heidtke and Carrie Mueller (66)

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

Mapping Confined Animal Feeding Operations (CAFOs) in the United States

The emergence of large Confined Animal Feeding Operations (CAFOs) has raised a number of serious environmental questions in recent years. The high concentration of animals in one area leads to an enormous potential for the rapid spread of diseases than would otherwise be possible. Furthermore, the large amounts of wastes created threaten clean water supplies. As a result groundwater and streams are vulnerable to run-off and contamination of animal fecal matter. In order to prevent water contamination and the spread of diseases, it is necessary to map the location of CAFO’s for reference. Permitting processes vary widely from state to state and there is no comprehensive database of CAFOs at the national level. The purpose of this study was to build a national CAFO database, map CAFO locations, and to analyze the pattern and magnitude of these operations in order to gain a clear picture of potential environmental and sanitation problems.

Brian Kevin (50)

Faculty Advisor/Collaborator: **Helaine Minkus**

Perspectives and Trends in Small, Isolated Religious Congregations

The goal of the study is to examine trends that distinguish small religious congregations in Eau Claire from larger, more mainstream religious groups. The research focuses on three religious communities in Eau Claire that have, when compared with the “world religions,” relatively small membership locally and worldwide, and that are somewhat isolated geographically from their “parent church” or other larger congregations of their church. The study hopes to identify trends that appear unique to small religious congregations in relatively isolated situations. The study will examine how congregation members identify their role within their local faith community, and how they view their position with respect to their “parent church” or larger faith community. It also attempts to identify and explore social trends among congregation members that appear unique to congregations with low membership, as well as worship patterns that seem to result from belonging to a small, isolated congregation. Through survey and interview procedures, the project hopes to describe what congregation members perceive to be the unique challenges and advantages of membership in a small congregation, and examine the methods that the various congregations use to overcome these challenges. The affect of congregation size on evangelical practices will also be explored.

Jonathan Kramer (51)

Faculty Advisor/Collaborator: **Timothy Bawden**

Home Away From Home: History of Tourism in Door County

I will be doing an in-depth research project on the history of tourism in Door County. In addition to the research, I will use data to create maps in ArcView of the Door County surroundings. I will also find a collection of historical photographs, and write text to help explain the history. After all of the research is completed, a publishable poster will be created in Adobe Illustrator, and will be displayed at the student-research day- poster session.

Patrick McGuiness (88)

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

Drug Cases at the University of Wisconsin-Eau Claire from 1997-2002

The purpose of this project is to map and analyze the changes in the number and locations of drug related calls that the University of Wisconsin – Eau Claire Police Department responds to. Data will be collected for the 5 academic years between 1997 and 2002.

Each year will be mapped separately with the intent of showing change from year to year. Calls that have been deemed ‘unfounded’ by the University Police will not be included in the total count. The type of drug involved will categorize the drug calls. The working hypothesis is that the majority of the calls will have involved marijuana and that there has been a sharp increase of calls in the last 5 years. Validation of this hypothesis would correct the popularly held belief that America’s war on drugs has curbed the use of drugs. The data needed for this research will be obtained from the University of Wisconsin – Eau Claire Police Department. The department maintains all cases in a computer database. The database will sort the cases by type, and date. Mapping the data will be done on a case by case basis using standard Geographic Information System techniques.

Eulalie Moe (65)

Faculty Advisor/Collaborator: **Lisa Theo**
Restaurant Recycling in Wisconsin

Wisconsin state law requires that restaurants recycle food and beverage containers such as aluminum, plastic and glass. In addition, recycling is required for office paper, newsprint and cardboard. However, anecdotal evidence suggests that some restaurants may fail to comply with these state regulations. This project will assess the compliance level of larger city restaurants in Wisconsin. For this study “larger” city is defined as populations of greater than 25,000. Data will come from municipal governments and will include the number of restaurants, the local laws pertaining to recycling, and the local ability to enforce current regulations.

Rubin Seifert (69)

Faculty Advisor/Collaborator: **Ingolf Vogeler**
Eau Claire City Council Spatial Representation by District

City council members decide the laws and ordinances, which affect the people of Eau Claire. The purpose of this project is to analyze how well the existing City Council represents Eau Claire’s people. Currently, the council contains one president, five members elected by districts, and five members elected at large. Data were collected from the 1990 Census Tracts of Eau Claire for population, house value, occupations, homeowner, and house-age. The Eau Claire’s City Assessors Office provided information for the houses of the individual council members. The Eau Claire City Directory provided data on individual occupations. The general question is which groups and therefore neighborhoods are under- or over-represented. The working hypothesis is that poorer people, racial minorities, and students are under represented, while the “higher” classes are over represented – each group live in distinctively different places in the city. Consequently, the higher socio-economic classes have a stronger influence with the city’s decisions and solutions. Data and spatial analysis will be used to test this hypothesis.

Political Science

Benjamin Licht (91)

Faculty Advisor/Collaborator: **Geoffrey Peterson**
Transitions Towards Tolerance: The Changing Patterns of Public Opinion on Gay and Lesbian Issues

This paper will examine the shifts in public opinion towards gay men and lesbians in the United States from the early 1980s to late 1990s. The gay community, like many other oppressed groups, has struggled for equality and acceptance for decades. The gay rights movement in the United States has only been active for approximately fifty years, starting with the founding of the Mattachine Society in 1951. Since that time, it has flourished and has seen numerous victories, as well as losses. Using data from the American National Election Studies starting in 1984 (the year the gay/lesbian feeling thermometer was added), we will examine the changes in public opinion towards gay men and lesbians. The ANES data will allow us to determine which demographic groups showed the greatest shifts in opinion about gay men and lesbians and which groups showed the smallest shifts. By combining this information with evidence from previous studies on changes towards racially oppressed groups and key events in the gay rights movement, we hope to explain which groups have become more acceptant and why the groups have made this shift over time.

Rafael Murphy (47)

Faculty Advisor/Collaborator: **Leonard Gambrell**
Beyond Realism: Complex Interdependence and Postinternationalism in William Gibson’s Neuromancer Series

Perspectives on the primary interaction of states, the purpose and basis to their existence, and the relationship of the individual has evolved hand in hand within the real academic pursuit of political science and the hypothetical, extrapolated visions politically

orientated science fiction authors. As the realist paradigm dominated the policy thinking of generals, politicians, academics, and the common man a perception of futures burdened with the same general problems and solutions to these dilemmas are mirrored within the works of Heinlein, Herbert, Miller, Clarke, Orwell and the creators of the original Star Trek continuity. Enter William Gibson from the fringes of science fiction in stride with a host of political observers with a more “recognizable” future and broader perspective of not only how states, but individuals and economic forces in a globalized world, interact. Aspects of Postinternationalism and Complex Interdependence deeply punctuate the global perception of William Gibson’s Neuromancer series in relation to power players in world politics, the role of individuals, economic forces, global identity, and the decreased role of the state.

Lucas Swanepoel (46)

Faculty Advisor/Collaborator: **Ali Abootalebi**

The Affects of Globalization on Lesser Developed Nations in the Middle East

This project will be looking at the Gulf States, Israel, Iran, and Turkey to determine how these countries deal with the affects of globalization. To understand this, the study will use information from the World Bank and other trade organizations to determine the influence of western culture on Middle Eastern countries. The study will also compare the findings from the Middle East to those of Latin America and India. To understand the affects of globalization the study will focus on the influence of the west in regards to the increased number of cell phones, technology, and trade. These findings will be assessed with the role of the state in either protecting Middle Eastern Nations from globalization or opening their markets. The question that will ultimately be addressed will be is it possible to prosper in Global politics in dealing with the west as being an engine provided presence of a state with high level of intervals, capacity, and its relations with domestic and international affairs.

Eric Winkler (49)

Faculty Advisor/Collaborator: **Rodd Freitag**

The Impact of W-2 on Community Service Providers in Three Wisconsin Cities

Welfare reform of 1996 emphasized not only the personal responsibility of aid recipients, but increased community responsibility for the needy as well. The establishment of time limits for welfare in particular clearly placed the burden for helping the needy on the community. While numerous research projects document the effect of welfare reform on individual well-being, few have addressed the consequences for welfare reform on community organizations. This project evaluated the impact of Wisconsin’s W-2 program on community service providers in three Wisconsin cities: Eau Claire, La Crosse, and Wausau. Providers of health, nutritional, counseling, housing, educational, and other services for low-income residents were identified, surveyed, and interviewed. Quantitative data and qualitative responses from the community service providers indicate that demand for services have been on the rise in recent years at the same time that the economy was strong and W-2 caseloads were dropping, suggesting that the new welfare policy does indeed require more from local communities.

Susan Zukowski (68)

Faculty Advisor/Collaborator: **James Tubbs**

Sentencing Disparity in Wisconsin Drug Crimes

Sentencing disparity research looks beyond the crime itself into other factors that may have consciously or perhaps unconsciously affected the sentence the accused individual receives following their conviction. This project looks at a segment of the criminal population over a ten year span from 1990 to 2000 for the state of Wisconsin drug violations. Using the data set titled “National Corrections Reporting Program” compiled by the Bureau of Justice variables such as the individuals race and education will be examined to see if separately or in combination with one another they have an affect on the sentence they received.

Psychology

James Anderson, Kathryn Barutha, Daniel Hehli, Mikhail Koffarnus, and Rebecca Oppenheim (101)

Faculty Advisor/Collaborator: **Gregory Madden**

Do Pigeons Observe Informative Stimuli?

This is a follow-up to the project published by Dr. Madden in 1999. In that study, we found that humans were unwilling to respond to produce informative stimuli that would allow them to earn more money in experimental sessions. This was an important finding

because it helped to explain why humans typically do not conform to Herrnstein's (1970) matching law (the quantitative model of animal choice behavior that enjoys more empirical support than any competing model). The present experiment will examine whether animals (pigeons) will observe these stimuli under comparable conditions. Thus, across five phases, animals will be able to respond to each food from two concurrently available food sources. If they do not respond to observe the informative stimuli, they will be unable to discriminate that one food source pays off more frequently than the other. If they do observe these stimuli, they may learn to discriminate that one food source is richer than the other. Twelve pigeons will participate. Each will be exposed to daily sessions in which they earn their food rations. Five phases are scheduled. Each phase is anticipated to take 30-50 sessions to complete.

Carla Arnold, Luke Klein, James Soldner, and Ashley Wegener (95)

Faculty Advisor/Collaborator: **Gregory Madden**

Human Behavior under Concurrent Schedules of Negative Reinforcement

Herrnstein's (1970) matching law is the quantitative model of choice which enjoys the most empirical support in the animal learning literature. Although much research has been conducted to determine if the matching law also predicts the behavior of humans, the current state of the literature is unresolved. The present study builds upon prior studies by Dr. Madden and by others in the published literature. We will examine human behavior in a two-choice situation in which participants work for money during 2.5 hour session (positive reinforcement condition) or work to avoid losing money (negative reinforcement condition). We anticipate that humans will better conform with the matching law in the negative reinforcement condition because prior studies have shown that humans are more sensitive to losses than gains.

Alicia Bear and Julie Slowiak (115)

Faculty Advisor/Collaborator: **Blaine Peden**

Litter on College Campuses: Environmental Concern, Attitudes, and Reasons for Smoking and Non-smoking College Students

Littering is a problem in society as a whole and more specifically on college campuses. An increasing trend for campuses has been to clean up their campus from unwanted cigarette butts. The present two-factor between-subjects experiment surveyed 59 smokers and 46 non-smokers from introductory psychology classes to determine if this self-classification and the type of litter presented in a scenario influenced environmental concern, attitudes toward littering, and reasons for or for not littering. The Natural Environmental Paradigm scale was used to measure concern, while the semantic differential scale was used to measure attitudes. A 2 X 2 Analysis of Variance evaluated the effects of the self-classification of participants and the two types of litter on participant's levels of environmental concern, attitudes, and reasons for or for not littering. Results presented statistically significant relationships overall for the separate reasons and attitudes presented in the survey. No significance was obtained for the effect of self-classification on environmental concern. Results showed that smokers versus non-smokers were more likely to litter and consider littering more acceptable.

Sara Berkowitz and Laura Carter (75)

Faculty Advisor/Collaborator: **Lori Bica**

Peer Death Experiences

Two hundred and fifty male and female University of Wisconsin-Eau Claire students were asked to respond to demographic questions and the Peer Death Experiences questionnaire. The Peer Death Experiences questionnaire was developed by the researchers for this study and is designed to investigate participants' experiences with the death of a friend and/or classmate during childhood and adolescence. Variables surrounding the death itself, including participant's age at time of peer death, cause of death, involvement in burial process, and sense of support from parents, teachers and school, will be discussed in terms of their relationship to how often participants still think about the death and if they feel this loss is related to their sense of independence, risk-taking behavior, interpersonal relationships, and feelings of mortality.

Charles Burns, Carly Dietz, Lorna Everson, Douglas Flashinski, Kathryn Hamilton, Johanna Johnson, and Derek Lee (93)

Faculty Advisor/Collaborator: **David Jewett**

Behavioral Measures of Food Motivation

Many neurochemicals have been shown to increase eating in rats; however, few agents are effective in increasing both food intake and food motivation (as measured by an increase in lever pressing to obtain food). Recently, our laboratory began examining behavioral and pharmacological mechanisms related to food motivation. Rats were trained to lever press under two schedules of food availability. Under a Fixed Ratio 10 schedule, 10 responses are required to obtain each 45 mg food pellet delivery. Under Progressive

Ratio 3 conditions, the response requirement increased by 3 lever presses following each food reinforcer delivery. These experimental paradigms provide quantitative measures of food motivation. Food motivation inducing effects and the orexigenic (feeding-inducing) effects of various agents will be compared. This research may allow the identification of pharmacological and/or behavioral treatments that reduce not only eating behavior, but also food motivation and a desire to eat.

Molly Ferron (94)

Faculty Advisor/Collaborator: **Gregory Madden**

Behaviorally Rating Shelter Dogs to Improve Adoptability

The purpose of this study was to rate the Eau Claire County Humane Society's shelter dogs' behavior through precise behavioral assessment. Dogs often come to the shelter with little known about their behavior, and are then returned due to adopters' lack of knowledge about them. The behavior of the dogs was observed and assessed according to common desirable and undesirable behaviors potential adopters might consider. A behavioral rating scale was formed to list and display the behaviors of each dog on its cage. The list was constructed through various methods: direct observation, research on previous studies, and discussion with shelter employees. The rating scale allows potential adopters access to accurate information regarding the dogs' qualities. The effectiveness of the test was evaluated by comparing the return rate before and after the rating scale was made, along with continuous modification as the project moved along. The assessments involved applying basic behavioral principles to the testing and rating of the dogs' behaviors.

Douglas Flashinski and Christopher Gade (85)

Faculty Advisor/Collaborator: **Blaine Peden**

Ethics of Behavioral Research on the Internet

The *APA Monitor on Psychology* (July/August, 2000) addressed issues regarding therapy and research on the Internet. Birnbaum (2001) indicates that the number of psychological studies on the Internet doubled from 1998 to 1999. To date conference presentations (e.g., a session at the 2000 MPA meeting) and publications (Birnbaum, 2000; 2001) have focused on how to do psychology studies on the Internet and how the results obtained in laboratory studies compare with the results obtained in Internet studies; however, no one has empirically examined the variety of ethical dilemmas confronting Internet researchers. The present study will report a content analysis of Internet websites for surveys, personality tests, and experiments. The goal is to describe and analyze the extent to which these Internet researchers comply with ethical principles for research. The study will show whether the instances of noncompliance are distributed equally over variables such as the type of research or the individuals doing the research

Jennifer Gross and Krista Krueger (102)

Faculty Advisor/Collaborator: **Gregory Madden**

The Effects of Group Size on Conformity to the Ideal Free Distribution

The Ideal Free Distribution (IFD) is a quantitative model of group foraging that bears a formal resemblance to Herrnstein's (1970) matching law. The model holds that members of a foraging group will distribute their members between two patches in a proportion that matches the proportion of reinforcers obtained in those patches. In the present study, two experiments were conducted. The first experiment demonstrated that increased group size diminished sensitivity to differences in reinforcement rates across the resource sites. Observations suggested that many participants were primarily interested in extra credit, and extra credit was noncontingent upon behavior during the session. The second experiment was conducted to test the hypothesis that sensitivity to the scheduled contingencies can be improved by increasing reinforcing efficacy. This experiment delivered extra credit contingent upon choices made. Those who foraged well earned the most amount of credit possible, and those who did not forage well earned few extra credit points.

Betsy Hallam, Kristen Holnagel, and Roxanne Wolf (92)

Faculty Advisor/Collaborator: **Kevin Klatt**

An Analysis of the Research Settings in the Behavioral Literature

Our research consists of gathering information from various journals focused in the behavioral sciences. From these journals we have collected data from articles pertaining to the participant's diagnosis, the general area of study, the article addressed, and also what type of setting the experiment was conducted in. As we gathered information from these various journals we compared and contrasted the diagnoses, area of study addressed and the setting in which the study occurred.

Kathryn Hamilton (82)Faculty Advisor/Collaborator: **Marie Crothers***The Relationship Between Sports Participation and Depression Levels Among College Students*

This project explores the relationship between sports participation and depression levels among college students. The literature on the subject has shown that such a relationship exists for high school students. Specifically, high school students who play a sport tend to have lower depression levels than non-participants. In addition, high school students who play sports for a moderate amount of time per week have lower levels of depression than those students who play sports for either a low or high amount of time per week. Among people with depression, those participants who use exercise, as opposed to medical treatments, to decrease their depression have longer-lasting effects. Based on such research, the hypotheses of the present research are that sports participants have lower levels of depression than non-participants, that participants playing for a moderate amount of time have lower depression levels than those playing for low or high amounts of time, and that participants who have played more recently have lower levels of depression. The project utilizes the Center for Epidemiological Studies Depression Scale and a researcher-created sports participation survey to analyze the nature of the relationship.

Kathryn Hamilton and Jill Wahlstrom (112)Faculty Advisor/Collaborator: **Blaine Peden***Nonverbal and Verbal Flirtation Cues: Do They Convey Romantic Interest?*

Research has found that people use flirtation to attract members of the opposite sex. Research also indicates that these behaviors have an effect on relationship initiation. This project explored the effects of nonverbal and verbal flirtation on the perception of romantic interest. The hypotheses for the present research were that the presence of nonverbal flirtation would increase the perception of romantic interest, that the presence of verbal flirtation would increase the perception of romantic interest, and that the interaction between nonverbal and verbal flirtation would increase the perception of romantic interest. The present research defined nonverbal flirtation as hair grooming, body grooming, and leaning toward or touching the other person. Verbal flirtation was characterized as personal compliments, sexual innuendos, and pick-up lines. This project employed a 2 (presence vs. absence of nonverbal flirtation) X 2 (presence vs. absence of verbal flirtation) between-subjects factorial design and used researcher-created surveys and video vignettes. Results indicated that there were main effects of nonverbal and verbal flirtation on perception of romantic interest, but there was no interaction between the two independent variables. These results indicate that people recognize flirtatious behaviors as indicators of romantic interest.

Anna King and Julie Mojsiej (84)Faculty Advisor/Collaborator: **Blaine Peden***Undergraduate Understanding of Ethical Boundaries*

Previous research examining actual ethical knowledge of undergraduate students who had and had not completed an ethics course found that students who had taken a prior ethics course obtained higher scores of actual ethical knowledge. In addition, several researchers believe students who work in human service positions need to possess a complete understanding of the variety of moral principles involved in a professional code of ethics. In order to determine the preparedness of graduating students entering helping professions, the present researchers will conduct a study consisting of 180 entry-level and exit-level Psychology and Social Work majors or minors. Through the use of a multiple-choice questionnaire, the researchers will gather participants' factual knowledge of ethical boundaries. Vignettes will also be used to collect the applied knowledge of the participants. The researchers will then compare factual and applied knowledge between the two majors/minors. Additionally, factual and applied knowledge will be compared between entry-level and exit-level undergraduates. The researchers expect that Psychology majors, both entry-level and exit-level, will possess a lesser ethical understanding than the Social Work majors. Also, the researchers anticipate no difference of ethical understanding between entry-level and exit-level Psychology undergraduates.

Jessica Lisow and Rebecca Oppenheim (113)Faculty Advisor/Collaborator: **Blaine Peden***Examining the Acceptability of Different Justifications for Sexual Betrayal*

We examined the willingness of college students to accept justifications for committing sexual betrayal by themselves or their romantic partner. Participants read a hypothetical vignette and completed a questionnaire of 20 different justifications for committing sexual betrayal using a five-point Likert scale. Our results showed some statistically significant main effects but no interactions.

Kelly Matzke and Katie Umberger (114)

Faculty Advisor/Collaborator: **Blaine Peden**

Gender Differences in a Naturalistic Study of Decision-Making Behavior

This study examined male and female decision-making times while evaluating the common task of choosing a greeting card. Participants included 72 adult shoppers in Eau Claire, Wisconsin. The decision-making skills of adults were examined in a public setting to test a hypothesis that the average decision time of females would exceed that of males for choosing a greeting card. Results from a t-test support this hypothesis, and confirm previous research on decision-making, which reveals females take longer to make decisions than males. Our study supports these research findings on a minor level, while evaluating a single decision. The results of this study can serve as a guide for future research on gender roles affecting decision-making.

Ellie Mauel (103)

Faculty Advisor/Collaborator: **Gregory Madden**

Effects of Varying Schedules of Food Rewards on Consumption and Response Output in Pigeons

The economic concept of unit price holds that, all else being equal, the amount of labor supplied by a worker and the amount of a commodity consumed with the worker's wages is determined by the prevailing price of the commodity. Price may be defined as a cost/benefit ratio. Recently, several animal studies have been conducted to empirically test predictions of economic theory that cannot easily be tested in the natural human environment. These studies have generally supported economic theory. The purpose of this study is to test the prediction that the manner in which rewards (i.e., the commodity consumed) are scheduled does not affect labor supplied and consumption as long as the overall price of the reward is unchanged. For example, if the cost of one unit of a reward (benefit = 1) is one hour of labor (cost = 1), then we should see no change in consumption or labor supplied if the reward was given after an average of one hour of work because the overall cost and benefits have not changed. The animal research literature in psychology, however, suggests that the schedule by which rewards are delivered may matter. For example, many researchers have demonstrated that animals and humans will work at much higher rates if rewards are delivered unpredictably (like arranged by a slot machine) rather than after a fixed amount of work. In our study, four pigeons will work for food rewards at a range of unit prices. At each unit price, the animal will complete a series of sessions in which the rewards are obtained after a fixed amount of work and another series in which a variable amount of work will be required to obtain the reward. Across these conditions, the average amount of work required per reward will be constant. Comparing total labor supplied (i.e., total number of times the birds peck the keys to get the food rewards) and total consumption across these two conditions will reveal whether these reward schedules matter.

Catherine Micale (74)

Faculty Advisor/Collaborator: **Lori Bica**

Effect of Refutational Teaching on College Students' Endorsements of Rape Myths

This two-part study is designed to investigate whether refutational teaching is an effective technique for changing commonly held misconceptions about rape. In part I of the study, male and female participants are asked to respond to Burt's (1980) Rape Myth Belief Questionnaire. Participants' endorsement of one specific myth, that women falsely report a rape because they have a need to draw attention to themselves, is the focus of the second part of the study. In part II, participants are divided into three groups: 1) the control group that receives a "neutral" reading about male and female communication patterns, 2) experimental group I that receives a reading containing facts about many victims' unwillingness to report rape, and 3) experimental group II that receives a reading challenging the notion that false claims of rape are made for attention by first stating that this is a myth and then presenting facts about many victims' unwillingness to report rape. After the groups have read this information they are asked to respond to the Rape Myth Belief Questionnaire a second time. Comparisons across the three groups in terms of their endorsement of the myth are explored.

Daniel Necci (100)

Faculty Advisor/Collaborator: **Allen Keniston**

Attending to In and Out of Context Unique Events in a Dichotic Viewing Task

A study is proposed to test hypothesis related to Ulrich Neisser's schema theory of attention. Participants will individually perform a Dichotic Viewing Task (originally referred to by Neisser et al as a Split Attention Task) in which two separate activities are viewed simultaneously. All participants will be told to pay attention to one of the equally visible, superimposed active images. However, in one condition (Film A) a Unique Event will occur in the image participants are not focusing on (the unattended stimuli). While in the other condition (Film B), a Unique Event will occur independently of either simultaneous activity. Levels of noticing of the Unique Event will be tabulated for each condition. The hypothesized

outcome is that more participants will notice the Unique Event that is independent of the two activities than will notice the Unique Event that is embedded in the unattended image. These were the very results obtained in previous pilot work $\chi^2(2, N = 79) = 4.653, p = .031$.

Juliana Smith (107)

Faculty Advisor/Collaborator: **Kimberly Knesting**

Lesbian, Gay, Bisexual, and Transgender Youth: Supporting Teachers in Supporting Schools

Lesbian, Gay, Bi-Sexual, and Transgender (LGBT) people are forced to deal with discrimination and prejudice on a daily basis, with society's attitudes and behaviors often making them invisible to the people around them. Sexual minority students, or those believed to be members of a sexual minority, face distinctive experiences in our public schools, elementary through high school. On the frontline of providing support and guidance to LGBT students are classroom teachers. Despite the importance of the teacher's role, however; LGBT issues are not adequately addressed in many teacher training programs and educators often lack the training they need to provide appropriate support to students. In addition, community attitudes towards people who are LGBT also may make it difficult for educators to adequately support LGBT students. The proposed research will be an exploration of a group of one school district's teachers' experiences with attempting to meet the needs of LGBT students and their families. It seeks to determine what type of assistance needs to be provided to educators to facilitate their interventions with LGBT students both in and out of the classroom.

James Soldner (104)

Faculty Advisor/Collaborator: **Gregory Madden**

Pigeon Preferences Between Equivalent Unit Prices

This experiment is an attempt to replicate and extend findings published by Madden, Bickel, and Jacobs (2000) in human drug-dependent individuals. In the prior experiment, subjects chose between expending little effort to earn small rewards (3 puffs on a cigarette) and expending three times as much effort to earn three times as many puffs. Although microeconomic theory predicts individuals should show no preference between these options (because both are available at the same unit price), a systematic deviation was observed - participants all preferred the larger reward at low unit prices and preference gradually shifted to the small reward at higher prices. To account for these deviations, the definition of unit price was expanded to include handling costs (i.e., effort expended in lighting the cigarette) and psychological discounting of delayed rewards (i.e., because a longer period of time was required to earn 9 puffs, the subjective value of these puffs was discounted more than the 3 puffs which were available sooner. Although this revised unit price equation adequately described the data, it was created post-hoc and so, its predictive ability is unknown. The current experiment is being conducted with pigeons to assess the inter-species generality of our human findings and to assess some simple predictions of the revised unit price equation. The first prediction is that if handling costs are removed or held constant across rewards, preference for the larger reward should not be observed at low unit prices. Preliminary evidence collected to date supports this prediction. This experiment will be continued throughout the Fall semester.

Heidi Thalacker (83)

Faculty Advisor/Collaborator: **Marie Crothers**

Immediate Reactions to Terrorist Attacks: Exploring for the Symptomatology of Acute Stress Disorder

Previous research indicates that mass violence is the most disturbing type of violence (Solomon, 2002). The terrorist attacks on September 11, 2001 affected individuals throughout the United States in various ways. The present study was designed to describe the responses and explore the extent of distress among college students at UWEC after viewing footage and hearing the news of the attacks. An essential aspect of the study was that data must be collected in a timely fashion. Participants were recruited on a direct-request basis from university classes. After providing informed consent, the participants completed a questionnaire that contained items measuring various symptoms of Acute Stress Disorder (yes/no response choice). In addition, participants completed open-ended questions for more personal responses and immediate thoughts and reactions. This questionnaire was administered to participants on the day of the attacks, the day after the attacks, and up to one month after the attacks. While the data analysis is currently in progress, the researchers anticipate that the findings will indicate that a subset of students at UWEC will show symptoms of Acute Stress Disorder and exhibit signs of typical and pathological distress.

Ashley Wegener (105)Faculty Advisor/Collaborator: **Gregory Madden***Real Versus Hypothetical Rewards*

Virtually all psychology and economics research conducted to measure the extent to which humans devalue delayed rewards involves choices between hypothetical rewards (e.g., Madden et al., 1997). The present line of research was designed to determine whether humans are capable of accurately reporting the degree to which they discount delayed rewards when the rewards are not actually received. We will present the results of three experiments that use either within- or between-subjects comparison procedures to answer this question. The first experiment suggested that humans devalued hypothetical delayed rewards more than real rewards that were delayed. The second experiment explored the possibility that a procedural artifact could explain the difference observed in Experiment 1. Experiment 2 suggested there was no difference between real and hypothetical rewards but was still open to alternative explanations. The third experiment employed between-subject procedures and demonstrates no systematic difference across the real and hypothetical rewards groups. Together, the studies suggest that humans are capable of reporting how they would behave under hypothetical reward settings, and offer support for previously published studies that employ hypothetical reward procedures.

Sociology**Amanda Tompkins (106)**Faculty Advisor/Collaborator: **Jeff Erger** and **Melinda Miceli***What Should I Do?: Identity Questioning and Helping Behavior in Lesbian Internet Communities*

This study examines the communication between individuals who are members of lesbian internet communities. Data was gathered from five online message boards where we searched for individuals who were questioning their sexual identity by looking for posts on the boards which asked a question like "I think I might be lesbian, what should I do?" We then looked at the advice that was given to the questioning women. We found that the women tended to question their sexual identity due to them experiencing anything that fell outside of the norm of heterosexuality (e.g. a same-sex sexual dream or fantasy, same-sex attraction or crush, etc.). Those members in the community giving advice often assured the questioning women that their experiences were common by telling them personal stories. However, we found that a questioned identity is almost always assumed to be lesbian or bisexual - the questioners were rarely seen to be just heterosexual with an occasional same-sex crush. This is further illustrated by the fact that the questioners were generally seen to be going through a stage in their sexual identity development which would eventually give way to a permanent lesbian or bisexual identity. One of the most interesting findings was that bisexuality was generally considered to be a valid permanent sexual identity by most members of the internet communities. This goes against what previous research has said about lesbian community dynamics.

Student Health Services**Sara Wilson (108)**Faculty Advisor/Collaborator: **LaVonne Cornell-Swanson**, **Sarah Harvieux**, **Steven Tallant**, and **Jodi Thesing-Ritter***2002 Distribution of the CORE Alcohol and Drug Survey*

The CORE Survey was administered in the classroom during the first weeks of the Spring Semester using a stratified random sample. University Student Health Services and Housing & Residence Life administered the instrument. Along with the instrument itself, participants received a cover letter describing details of the study and whom to contact with any questions. Once all surveys had been collected, the surveys were sent to the Core Institute for scoring and UWEC will receive a final report. It will include the results from our UWEC study, and will also include a comparison with other colleges nationwide. 2002 Core data will be used to develop a positive social norms campaign at UWEC. Students consistently overestimate and misperceive peers' alcohol and other drug use, which results in the notion that "if everyone else is doing it, I should, too." Statistics from the 2002 Core data will be incorporated into a massive media campaign to educate students about alcohol and other drug use, specifically to counter the notion that all other students drink to excess. The Core Survey will be administered again in eighteen to twenty-four months to assess the levels of chemical use patterns of UWEC students and provide posttest data.

Business and Professional Studies

Accounting and Finance/Management and Marketing

Karen Falkenberg, Chad McCartney, and Julie Romary (145)

Faculty Advisor/Collaborator: **Lucretia Mattson and Abraham Nahm**

Credit Card Use by UWEC Students

In many current studies, researchers have found that people in the younger generation are comfortable buying their way into debt. This generation feels debt is good in that it helps them buy items they want but can't necessarily afford. Because of this, credit card debt is becoming a problem among college students. But is it a problem on our campus here in Eau Claire? We surveyed the freshmen and seniors at the University of Wisconsin-Eau Claire about their credit card use and their feelings about debt and materialism. We completed the study to help the University become aware of any problems that may exist, with the goal of educating students on how to use credit cards effectively. We found some interesting results. Of those responding, 42.8% of freshmen and 88.2% of seniors hold at least one credit card. Many of the current published studies report the average college student credit card debt is approximately \$2000. Our study showed a lower average balance of \$1,000, with a range from \$0 to \$13,760. The results of this study will give UWEC a better grasp of any problems and how to approach them.

Adult Health Nursing

Brian Imdieke (110)

Faculty Advisor/Collaborator: **Rosemary Jadack**

Risk Taking Behavior and Social Networks

Prevention of health risk behaviors such as smoking, alcohol/drug use, and unprotected sexual activity is considered a key national health promotion objective. Individual interventions have not resulted in an impressive, sustained decline in risk behaviors. Research is needed that considers risk behavior within the social context of individuals. A promising new approach in the study of risk behavior is social network analysis, which focuses on patterns of behaviors among friends, relatives and acquaintances in social networks. The purpose of this study is to measure risk behaviors and examine social networks of persons accessing a Western Wisconsin health department clinic. A convenience sample of 200 clients will be interviewed at the Dunn County Health Department clinic. To date, 15 clients have been interviewed. Personal social networks, types of support provided by members of the networks and risk are being assessed. The sample is currently predominantly female (85%) with a mean age of 24.6 years. Overall, 71% report current tobacco use, 64.3% have consumed alcoholic beverages in the past week, and only 14% have used condoms consistently. Respondents report an average of 7.0 persons in their social networks; the mean density of the networks was .83. Statistical analyses will describe the relationship network characteristics and patterns of risk behaviors of clients. This study will provide important data about the factors and interpersonal influences that contribute to risk behaviors among clients.

Allied Health Professions

Corinna Foley (129)

Faculty Advisor/Collaborator: **Douglas Olson**

Qualitative Comparison of Long Term Care Facilities in Scotland and Wisconsin

The project involved a qualitative comparison of long-term care facilities in Wisconsin with long term care facilities in Scotland. Facility visits to three facilities in Scotland and one facility in Eau Claire, Wisconsin were completed with interviews of an administrator or director of nursing, a group of nurses, and a group of residents, as well as a facility tour. Areas of interest explored included facility layout, system factors, organizational factors, residents, staff, and communication. Upon completion of these visits, a qualitative assessment of the collected data was derived outlining potential differences and similarities in long-term care facilities in both countries. Similarities include size of facility and dementia care and differences include elements of formality and coordination. The preliminary information gathered in this project could possibly be used as part of a discussion to improve long-term care facilities. Administrators can use this information to provide new ideas and improvements in the delivery of long-term care.

Christina Lobe, Allison Reynolds, and Rebecca Risberg (126)

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

Integration of AMTA Professional Competencies into the Music Therapy Curriculum

Music Therapy majors will rate themselves using the American Music Therapy Association Professional Competencies and will identify courses in which they met these competencies. Students will work with faculty and alumni who serve as supervising music therapists in practica to identify barriers to attainment of competencies and to develop ideas for ways to build supportive work into the curriculum to help students attain these competencies. Work on competencies will be integrated into the Personal Professional Growth Plans of the students.

Amy Ray (144)

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

Anger Management Database

The purpose of this project was to create a website of anger management materials that will be useful music therapy resources for use in music therapy sessions. The database includes descriptions of anger styles, a bibliography, discography, videography and a resource file of session plans and activities that are cross-referenced by clinical applications and types of resources. It also includes responses of clients to the session materials.

Communication and Journalism

Angela Clepper, Eulalie Moe, Heather Peterson, Sarah Przybylski, and Andrea Rowe (147)

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

Analysis of Communication in the Eau Claire Sheriff's Department

A study of the communication styles within the Eau Claire Sheriff's Department was analyzed by students of the CJ 459 Organizational Communication Analysis class. The researchers used the Survey of Organizational Communication, interviews with the participants and the critical incident technique as research tools. Five participants of the Sheriff's Department participated in this study. The results were correlated systematically to determine communication satisfaction within the department. The researchers also analyzed the small group communication to determine the interpersonal relationships and roles of each participant. For example the researchers were anticipating to find a leader, a gate keeper and a clown within the department. Conflict was also examined, but the results did not turn out to be significant to the research.

Alicia Geurkink, Rebecca Hildebrandt, Dawn Janiszewski, and Robert Lawrence (149)

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

Communication Satisfaction

The purpose of this study was to examine communication satisfaction at a typical indoor sports center among full-time employees, part-time employees, and independent contractors. The methods used for this study include a communication satisfaction questionnaire, personal interviews, and the critical incident technique. The results gave the organization a means to identify and explore strengths and weaknesses in areas of its communication practices in order to improve intraorganization communication satisfaction.

Brent Hafele, Joanna Fischer, Heidi Johnson, and Xiong Pao Chang (128)

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

Communication Analysis of a Hotel and Conference Center Franchise

This study presents a communication analysis of a hotel and conference center franchise. The study explores questions about employee and employer communication, which includes management communication, organizational culture and human relations. The research data collection techniques include interviews, document analysis, communication audits and direct observation. The results further the knowledge of employee relations at a service oriented organization. Additionally, it presents a better understanding of both qualitative and quantitative research techniques and the functionality of communication audits.

Jessica Holm (146)Faculty Advisor/Collaborator: **Judy Sims***A Survey of U.S. Pre-Departure Cross-Cultural Training Programs for Germany*

Every year, executives from the United States are sent overseas to conduct business in Germany. Yet far too often these executives or expatriates return home early. One reason why so many expatriates are unsuccessful overseas is the lack of sufficient cross-cultural training before departure. Consequently, the purpose of this research is to further understand the need for effective cross-cultural training and to evaluate existing cross-cultural training programs for Germany. The information gathered will also be useful in improving current cross-cultural training programs. In order to gather the data, a web-based survey questionnaire will be administered to over 200 organizations from the mid-west that conduct business with Germany. The survey includes 11 questions exploring why the company sends executives to Germany and if the company prepares the executives with a cross-cultural training program before departure. If a pre-departure training program is offered, the survey also examines who conducts the training, the components included within the training, and the effectiveness of the training. Finally, the survey gathers information regarding German business practices and overall cultural differences considered most important by the organizations.

Jessica Holm, Shana Kluge, Jaycelyn Kryzer, and Maiknue Moua (148)Faculty Advisor/Collaborator: **W. Robert Sampson***An Organizational Analysis of a Non-Profit Organization*

A non-profit organization is organized for purposes other than generating profit where the organization's income is not distributed to its members, directors, or officers. Because of this unique purpose many non-profits provide a gratifying experience for all constituents, yet, non-profit organizations do face many challenges. Therefore, the purpose of this research is to identify the efficiencies as well as inefficiencies of non-profit organizations. This study is based on conducting an organizational analysis of an Eau Claire area church. The research involved using three research methods: quantitative survey, informational interview, and textual analysis, which entailed researching both internal and external literature. The results of this research will provide insight, which will improve the efficiency of this non-profit organization.

Communication Disorders**Meghan Barnaby, Jennifer Funk, and Jenna Poulos (119)**Faculty Advisor/Collaborator: **Linda Carpenter***Assessment of Non-Native English Speakers*

This project will involve the development and pilot testing of an assessment protocol for use by speech-language pathologists in appraising the English language proficiency of adult non-native English speakers. Unlike the discrete point assessment tools that are currently available, this protocol will focus on all aspects of language simultaneously, providing a comprehensive and integrated view of communicative skill in functional contexts. The final protocol will include at least 10 scripted role-play situations, score forms, and a procedural manual. Activities for the project include developing the role-play situations, writing scripts for each, developing a score form, and writing the procedural manual. In addition, the protocol will be pilot tested with adult non-native English speakers in the Eau Claire area.

Christie Bischel, Renee Charest, and Grace Haley (121)Faculty Advisor/Collaborator: **Larry Solberg***Voice Characteristics of Hmong and Caucasian Children*

The purpose of this study was to: 1) determine differences in voice characteristics of male and female Hmong students, 2) determine whether these characteristics differ in English and Hmong and, 3) determine if a difference exists between voices of Hmong and Caucasian children. Voice samples of Hmong and Caucasian children, ranging in age from 5 to 11 years, were analyzed acoustically for voice quality (sustained /a/) and frequency characteristics (picture description). The Hmong children generated picture descriptions in both English and Hmong. The groups did not differ significantly on any of the voice quality or frequency measures. The frequency variability measure (pitch sigma) was greater for the samples in Hmong than in English. Another benefit of this study was to add to the limited collection of acoustic data available on the voices of children.

Amy Feit (154)Faculty Advisor/Collaborator: **Linda Carpenter***Cochlear Implants: A Case Study*

The purposes of this project are to identify factors that contribute to successful outcomes after cochlear implant surgery and to highlight those factors through a case study. Results of a literature review about the following topics will be displayed: description of cochlear implant surgery, selection criteria for surgery candidates, and factors important to success. The case of a young child who received a cochlear implant will also be presented. Relevant information will include the child's family background, hearing history, qualifications for surgery, pre- and post- surgery treatment by audiologists and speech-language pathologists, and pre- and post- surgery speech samples.

Michelle Finup, Haley Harper, and Nicole Litka (120)Faculty Advisor/Collaborator: **Linda Carpenter***Non-Native English Speakers' Effectiveness in Clinical Services: Consumer Ratings*

This project involves design and implementation of a study to examine the ratings of consumers of speech-language pathology services regarding the effectiveness of non-native English speakers in providing speech and language services. Parents and spouses of clients receiving services at the University of Wisconsin-Eau Claire Center for Communication Disorders (CCD) will be selected. Subjects will complete a demographic questionnaire and listen to and rate 12 audiotaped speech samples of native speakers of English, Chinese, and Spanish (4 speakers per language); each speaker will produce spontaneous utterances in English. Differences in ratings will be explored as a function of native speaker language, relationship between consumer and client, client disorder, and consumer non-English language and cultural experience.

English**Amanda Fullan (130)**Faculty Advisor/Collaborator: **Ruth Cronje***Evidence-Based Medicine: Defining Evidence*

Recent advances in digital media have made it efficient for healthcare professionals to consult vast collections of health sciences literature (e.g., Medline) before making a definitive patient-care decision, facilitating decisions based on "evidence" from health sciences literature. This capability and an increased interest in developing standard clinical practice guidelines has coalesced into a systematic technique called "evidence-based medicine" (EBM), in which patient-care decisions are based on consultation of the literature rather than just the clinical experience of the practitioner. Advocating the use of "evidence" implies a specific definition regulating the information that is deemed "valid" (i.e., qualifies as "evidence"). The EBM paradigm advocates a definition of "evidence" that is consistent with the norms and values of the scientific method-standards which may be problematic when applied to medical practice. EBM texts consequently provide rhetorical analysts with opportunities to analyze the processes by which definitions of terms like "evidence" mediate and constrain the social standards that authorize the practice of medicine. In this study, we examined EBM training materials and related literature to investigate how medical professionals are being persuaded to adopt the definitions, norms, and presuppositions of science in their clinical practice, specifically focusing on the term "evidence."

Family Health Nursing**Kathryn Forkrud, Jennifer Greiber, Amalie Meyer, and Dianna Moll (111)**Faculty Advisor/Collaborator: **Kathryn Anderson***The Effects of Chronic Illness on Marriage*

Five questions were added to the Oral History Interview (Buehler & Gottman, 1995) to develop a questionnaire that not only focused on marriage, but also on the impact of how chronic illness affects a couple and their marriage. Twenty-five clinical interviews with couples experiencing chronic illness or cancer were completed to test the viability of responses achieved from the additional questions developed by Dr. Anderson. The information from these additional questions will be used to help understand what the couples may be going through, how they are dealing with the situation, and help develop and implement nursing interventions towards couple needs. The main question added was: How has the illness you are experiencing affected your life as a couple? To facilitate communication, this question was broken down into several smaller questions. The overwhelming response showed the

hardest part of the illness for the couple was accepting the fact that one of them had the illness. Other responses elicited from the student interviewers and themes generated from the couples are included on the poster.

Emily Geissler (123)

Faculty Advisor/Collaborator: **Nola Schmitt**

Nurses' Expectations of Touch and Healing

Touch and nursing have a significant connection involving the expression of compassion and caring. A descriptive, qualitative approach will be used to collect and evaluate the written narratives of twenty nurses' descriptions of meaningful situations involving touch. The narratives will be examined and pieces will be identified to construct themes common throughout the narratives. The purpose of this study is to identify themes supporting the relationship of touch and healing, to document significant experiences that nurses have that involve touch, and to build on previous study and literature reviews regarding touch and health.

Samantha Gueldenzopf and Jessica McDaniel (122)

Faculty Advisor/Collaborator: **Susan Moch**

Undergraduate Students as Research Assistants: What, Why, and How

Many researchers do not employ undergraduate research assistants to assist with research. Yet, many researchers are employed in institutions that do not have doctoral or masters students readily available as research assistants. Employing undergraduate nursing students can be a very effective means for increasing the time that busy faculty members engage in research. Thirteen years of experience with undergraduate research assistants has provided great insight into the process of working with undergraduate students in an effective manner. This presentation will describe why it is important to employ undergraduate students in research and successful strategies for working with undergraduate students. If not engaged in research, most students do not envision themselves as future researchers and/or professors. Because of the predicted professor shortage and the limited diversity within nursing faculties, mentoring through undergraduate research is essential. Undergraduate research assistants can also be important spokespeople for generating enthusiasm for research in an undergraduate program. Some effective means for working with undergraduate students in research include having institutional support, employing teams of students, identifying specific tasks for each student and providing for a division of labor within each team. It is also important to help the student identify his or her own learning needs. Through this presentation, both the role of the faculty member in working with an undergraduate research assistant and the student perspective on involvement in research will be shared.

Foreign Languages

Sara Doering (109)

Faculty Advisor/Collaborator: **Gale Crouse and Carter Smith**

Central States Conference REPORT

I served as a co-editor of the Central States Conference REPORT for 2002 along with Dr. Gale Crouse and Dr. Carter Smith of the Foreign Language Department. The CSC REPORT is a published journal of foreign language pedagogy. Articles were submitted to us by researchers from across the country. As the editorial board, we reviewed the articles for their inclusion in the journal. Working with the authors, we helped to clarify the language and the concepts presented in the selected articles. The completed CSC REPORT for 2002 reflects the roles of technology, community-based learning, and professional development in the field of foreign language education. We will attend the Central States Conference in Kansas City, MO in late March.

Kimberlee Sapetta (116)

Faculty Advisor/Collaborator: **Mary Iribarren**

Estudios de la Mondragon Corporacion Cooperativa

The Mondragon Corporacion Cooperativa is a Spanish cooperative that consists of over 120 different companies, 42,000 worker-owners and does more than \$4.8 billion dollars in annual sales. This management phenomenon is predominant in many business including manufacturing, services, retail and wholesale distribution. The mondragon maintains factories and ties across the globe. They are a fairly self-sufficient community and sponsors many programs that encompass health care, housing, banking, social security, primary and secondary education, employee training and unemployment insurance.

Foundations of Education

Seth Zlotocha (155)

Faculty Advisor/Collaborator: **Roger Tlusty**

Investigating the Historian's Craft: Teaching Students the Processes of Historical Inquiry

This project will research and design a hyper-linked instructional component which will promote understanding of the process of historical inquiry. An analytical framework for historical inquiry will be adapted to a hyper-linked format. An existing history research project will then be restructured around the hyper-linked format to depict how an historical narrative was constructed from a collection of primary resources that have been digitally scanned and catalogued. The project will produce a pilot instructional component that can be examined as tool for facilitating student understanding of how alternative historical narratives can be constructed from a body of primary sources.

Geology

Lisa Hansen (141)

Faculty Advisor/Collaborator: **Karen Havholm**

Earth Science Teaching Materials and Techniques for the Visually Impaired

Geology is a division of science that relies heavily on the use of sight for gathering data and making interpretations about earth history. Utilizing maps, identifying rocks and minerals, recognizing rock relationships in the field, and sequencing events using cross sections are primarily visual activities. For a student with a visual impairment this can cause a great deal of frustration. As a student with a Visual impairment, I experienced this firsthand in an introductory level geology course. Though willing to adapt the curriculum, the professor lacked the resources and knowledge required to do so. To help others in the same predicament, we decided to search for existing resources on teaching geology to students with Visual impairments. We found approximately ten articles and abstracts on how to adapt laboratory and lecture materials to meet the needs of Students with visual impairments. In addition we uncovered several ways of making geologic maps and diagrams tactile as opposed to visual through the use of glue, fabric paint, wikki stix, and thermoform techniques. Our research also led us to an understanding regarding the levels of visual impairments and how students' needs will differ based on their visual abilities and experiences. A searchable database consisting of articles, catalogs, websites, and abstracts on this subject is in progress.

Management and Marketing/Management Information Systems

Stephanie Carlson (117)

Faculty Advisor/Collaborator: **Thomas Bergmann** and **Dale Johnson**

Assessment of Electronic Focus Groups to Evaluate the College of Business Core Curriculum

Assessing the core curriculum requires collection of valid and reliable data. The research includes what assessment is, why to use assessment, and the three stages of the assessment process: planning, development, and implementation. Also incorporated are the advantages and disadvantages of data collection methods such as e-mail surveys, mail surveys, web-based surveys, traditional focus groups, and electronic focus groups. GDSS-Group Decision Support Systems was chosen as the method of evaluation for the core curriculum of the College of Business. GDSS is a computer-aided meeting that allows for an anonymous, systematic approach to organize ideas and promote consensus.

Nursing Systems

Tara Bowlds, Alice Knutson, Jennifer Platt, and Karolyn Tamke (124)

Faculty Advisor/Collaborator: **Mary Stolder** and **Lois Taft**

Oral History Project: Memories of World War II

The purpose of this research is to examine oral histories about life in the 40s and World War II. Twenty-two older adults, ranging in age from 74 to 92, were interviewed. Twelve interviews were completed with nursing home residents. Potential participants were identified by the facility's social worker. Residents with severe memory problems or communication deficits were excluded. If residents chose to participate and signed informed consents, they were interviewed by one of the research team members. A parish nurse or a nursing faculty member identified potential community participants. Ten interviews were completed with community residents, and four of the interviews included both husband and wife. After each interview, researchers completed an evaluation that documented information including barriers and strategies to cope with the identified barriers. These process evaluations also recorded personal responses of the researchers. All interviews were tape recorded and transcribed. Case reports were developed from each transcript summarizing the informant's oral history. Case reports will be shared with the informants, and additional evaluation data will be collected from the research participants. This project provides historical documentation of personal experiences of older adults and preserves oral history from a decade that changed the course of the world.

Leslie Bruss and Sean Grorich (125)

Faculty Advisor/Collaborator: **M. Cecilia Wendler**

The Relationship Between Food, Caffeine, and Nicotine Use and Hours of Sleep and State Anxiety in Students Facing an Important University Examination

The Spielberger (1983) tool measuring state anxiety is considered the "gold standard," as it is a valid and reliable tool used for measuring anxiety more than two decades. However, the tool's length, at 20 questions, make it difficult to use when repeated measures are needed in a rapidly changing clinical situation, such as during an anxiety-provoking medical procedure. The purpose of this study was to establish a relationship, if any, between the experience of state anxiety (Spielberger, 1983) and five versions of unidimensional numeric rating scales (NSRs) to determine the most valid and reliable proxy to the Spielberger tool. Since the Spielberger tool was normed to college students facing an important university examination, the proxy tools were tested under these same conditions. This poster describes a subset data gathered within the context of the larger study, in which student collaborators wanted to determine the relationship between state anxiety just before an important university examination and intake or use of food, and/or nicotine, and caffeine, as well as amount of sleep in the 24 hour period prior to the examination. Routine demographic questions regarding gender, cultural affiliation, age and other pertinent information were also obtained. The actual research questions for the subset were: 1) What is the relationship, if any, between intake of food and state anxiety before an important university examination? 2) What is the relationship, if any, between nicotine use and state anxiety before an important university examination? 3) What is the relationship, if any, between intake of caffeine and state anxiety before an important university examination? 4) What is the relationship, if any, between amount of sleep and state anxiety before an important university examination?

Psychology

Constance Cameron, Melissa Marsh, and Roxanne Wolf (127)

Faculty Advisor/Collaborator: **Kevin Klatt**

A Review of Target Behaviors in Published Research for Persons with Autism

We reviewed several journals to investigate variables pertaining to persons diagnosed with autism. Specifically, we recorded target behaviors, dependent measures, ages, and other diagnoses. Data were evaluated across years and journals.

Social Work/Adult Health Nursing/Music and Theatre Arts

Anthony Schieffer, Herman Schultz, and Jason Stoelting (143)

Faculty Advisor/Collaborator: **Terry Allen, Leonard Gibbs, and Joan Stehle Werner**

Three Interactive Measures of Critical Thinking for the Helping Professions

This project summarizes three successive faculty/student research projects spanning four years involving approximately 48 people from seventeen disciplines and special skills. The project has developed three interactive CD-ROM measures of ability to reason critically and scientifically about practice. These include the following: Hospital Interactive Team Thinking Test, Courtroom Interactive Testimony Thinking Test, and the Multidisciplinary Interactive Team Thinking Test. These measures record the respondent's reaction to thinking that immediately precedes a pause in the video and records the user's response in a computer file for scoring. Scoring for all three can be done reliably. Other than the critical thinking, informal logic, and clinical reasoning literature

that serves as the basis for these measures' items, we have no claim to the measures' validity. We intend that these measures will help to evaluate reasoning by practitioners across the professions whose members make life-affecting judgments and decisions. All three measures will be published by Brooks/Cole of Thomson Learning.

Social Work

Yeng Yee Lor, Keri Saxrud, and Amy Welbourn (118)

Faculty Advisor/Collaborator: **Donald Mowry** and **Richard Ryberg**

Addressing the Digital Divide: Information Technology Integration and Nonprofit Agencies in the Information Age

The influx of information technology has created change in all aspects of society. For the nonprofit agency sector, the growing convergence of information delivery systems (e.g., broadcasting, computers, telephones, video) is making one of the primary roles of nonprofits, the role of information provider, a critical role that could lead to general improvements in the quality of life. However, nonprofit organizations, foundations, and local community groups have not kept pace with other sectors of society and face the growing danger of being on the wrong side of the digital divide. This research project was designed to determine the nature and extent of a digital divide among the nonprofit agencies in Wisconsin's Chippewa Valley. A comprehensive information technology survey to assess information technology utilization and integration was sent to 35 nonprofit social service agencies. This comprehensive assessment went beyond a simple count and assessment of hardware and software to include other critical components such as; readiness of nonprofit staff to integrate technology, presence of initial and ongoing staff training and development, and the presence and adequacy of long-range plans for information technology use. The results may be used to maintain or enhance adequate information technology systems in nonprofit agencies.

Natural and Physical Sciences

Biology

Joshua Bonis (17)

Faculty Advisor/Collaborator: **Jon Scales**

Is the C-terminal Domain of EphA4 Required to Mediate Disruption of Cadherin-based Cell Adhesion?

We have previously demonstrated that only a small intracellular region of cadherin is sufficient to mediate interaction (directly or indirectly) with EphA4. We have generated two altered versions of EphA4 which lack the C-terminal amino acids. We have examined the ability of these constructs to cause cell dissociation in a developing embryo by microinjection. We report the results of these analyses in this poster.

Lindsay Bremer and David Prall (3)

Faculty Advisor/Collaborator: **Lloyd Turtinen**

Function of the US29 Gene in Cytomegalovirus Infections

Human cytomegalovirus (HCMV) infections cause significant disease in newborns and immunosuppressed patients. Various viral genetic components that may contribute to the disease are under investigation. The US29 gene of the HCMV (Towne strain) is expressed in infected cells but its function remains unknown. We used Blast and Fasta computer database searches and found similar rib-b-nxMV isolate (LB). Preliminary studies of the LB strain indicate the gene is present but with some DNA sequence changes.

Aaron Broege and Carolyn Norquist (18)

Faculty Advisor/Collaborator: **Jon Scales**

Construction of Homologous TCK Expression Constructs

Our project was to identify and characterize the transcriptional regulatory sequences of the Eph receptor tyrosine kinase TCK. We have sequenced about 15,000 base pairs of TCK genomic DNA. Computer analysis of this sequence has allowed us to identify those regions corresponding to the transcriptional regulatory sequences of this gene. Now we have subcloned those regulatory sequences

into special vectors to generate transgenic frogs. Using these transgenic vectors we will be able to discover the specific role the TCK gene plays during embryonic development of *Xenopus laevis*.

Tara Culligan and Abigail Vogler (39)

Faculty Advisor/Collaborator: **Amy Krist**

*Variation in Fecundity Among Populations of the Freshwater Snail *Helisoma Anceps**

According to life-history theory, selection should favor individuals with high reproductive effort and early age at first reproduction when the threat of mortality is high. We examined this theory among populations of the freshwater snail, *Helisoma anceps*, that vary in infection levels of trematodes because these parasites castrate the snail, which from an evolutionary perspective is equivalent to mortality. We collected snails from seven lakes in Chippewa, Barron, and Rusk counties. Because we were not able to obtain sufficient sample sizes to estimate parasite prevalence, we only examined fecundity among populations. We found significant variation in fecundity among populations suggesting that genetic differences among populations as a result of selection by parasitism is possible. This spring and summer, we will collect data on parasite prevalence and on age at first reproduction to determine whether parasitism is correlated to these life-history traits.

Jeral Dennis (19)

Faculty Advisor/Collaborator: **Daniel Janik**

Circadian Leptin

Certain factors can be manipulated to alter Golden hamsters' (*Mesocricetus auratus*) non-photic circadian clock resetting patterns. One of the factors this experiment deals with is the presence or absence of a food source. Through a 48-hour period of food deprivation, we are able to advance the animal's circadian rhythm up to 3 hours into the subjective day. We also manipulate circulating levels of the OB protein, leptin. This protein plays a major role in weight regulation and we hypothesize it also plays a role in circadian clock shifting. Through systemic injections of leptin, we are able to increase the circulating levels of the protein in the animals and ascertain its effect on phase shifting.

Melissa Garney (1)

Faculty Advisor/Collaborator: **Daniel Conklin**

Role of cGMP in Methylamine-Induced Vascular Relaxation

Diabetics suffer from a higher rate of cardiovascular disease than the general population. A potential role for methylamine (MA) in initiation, development, and progression of cardiovascular disease in diabetics has been hypothesized. There are elevated plasma levels of both MA and a MA-metabolizing enzyme, semicarbazide-sensitive amine oxidase (SSAO), found in diabetics. There is also a strong correlation between plasma SSAO levels and the degree of vascular injury in diabetics. SSAO activity converts MA into formaldehyde, hydrogen peroxide, and ammonia. Formaldehyde and hydrogen peroxide are thought to damage the blood vessel endothelium, which is recognized as an initiating step in cardiovascular disease, including atherosclerosis and vasospasm. MA produced an SSAO-dependent relaxation. Since H₂O₂ relaxes isolated blood vessels via a cyclic guanosine monophosphate (cGMP)-dependent pathway, we hypothesized the MA-induced relaxation was also due to increased cGMP. To test this we measured blood vessel cGMP levels following the addition of MA and sodium nitroprusside using enzyme-linked immunosorbent assay (ELISA) technology. This work was supported by the UWEC ORSP student/faculty collaboration grants and the McNair program.

Katherine Hawkins (41)

Faculty Advisor/Collaborator: **Evan Weiher**

Butterfly Diversity and Assembly Rules in Prairies and Oak Savannas

The diversity of butterflies in an area is generally thought to be an indicator of the ecological and environmental quality of that area. The butterfly diversity of the Lower Chippewa River State Natural Area (LCRSNA) has not been studied, but is an interest of the Wisconsin Department of Natural Resources. The Pollard-Yates method of butterfly surveying was used to inventory the butterfly species of selected prairie and oak savanna remnants within the LCRSNA. There was no significant difference between the mean standardized species richness of prairies and oak savannas and of upland and lowland sites. Monte Carlo tests showed strong non-random patterns of community assembly. The sites were significantly nested ($p < 0.001$), meaning that the uncommon species tended to be found in the most diverse sites. Fourteen species pairs showed strong checkerboardness because they were found together less often than expected by chance ($p=0.015$). Possible causes for these patterns include the flight patterns of individual species, differences or similarities in food plants, and the overall ecological health of these sites. These results have potential ramifications in the management and restoration practices of the LCRSNA.

Heidi Heizer and Alexander Kluiber (20)Faculty Advisor/Collaborator: **Christy Carello***Is Running Downhill Really Easier?*

Numerous studies have shown that running uphill results in an increase in cost. Yet, there have only been a few studies on the cost of locomotion for running downhill. In humans, running on a slight gradient results in a substantial energy savings. One would expect that those same savings would be seen in much smaller birds. We used Button Quail to examine whether a 45g bird benefits from running downhill. We measured oxygen consumption as a determinant of energetic cost at three different speeds on a level surface and a 10° decline. Button Quail are ideal avian subjects for this study because they are mostly terrestrial. We found that running downhill does not result in a lower cost in Button Quail. Our results suggest that in small animals the energy cost used for controlling forward momentum on a downhill slope is at least equivalent to any benefit gained from gravitational forces, or that small animals simply do not have enough mass to benefit from running downhill.

Alicia Howe (36)Faculty Advisor/Collaborator: **Evan Weiher***On the Combined Effects of Scale, Disturbance, and Stress on Species Richness in Oak Savannas*

In order to investigate how scale (grain size) affects species richness patterns, we collected 12 nested quadrats (from 0.25 m² to 1000 m²) from seven remnant oak savannas located in the floodplain of the Chippewa River in western Wisconsin. Small-scale species richness and the constants (c) of the species-area relationships ($\log S = \log c + z \log A$) showed unimodal (humped) relationships with biomass and disturbance. Fire frequency explained 83% of the variation in small-scale species richness and 91% of the variation in the constants. This confirms a recent structural model which showed the importance of intermediate disturbance in these oak savannas. The slopes (z) of the relationships were not significantly related to any environmental factor. The slopes (z) and constants (c) were negatively correlated, in accordance with other studies. Large and small-scale richness were not significantly correlated, suggesting that local species pool effects are not strongly affecting small-scale richness. Large-scale richness was strongly related to percent tree canopy and soil heterogeneity. These factors explained 89% of the variation in species richness. Thus large-scale richness and small-scale richness appear to be under different controls in the oak savannas studied here.

Timothy Johnson (38)Faculty Advisor/Collaborator: **Wilson Taylor***Wall Ultrastructure of Hornwort Spores*

The early history of land colonization is shrouded in mystery. Fossil remains point strongly to plants or their immediate progenitors as the first to colonize, but the remains are sparse and the research on them in its infancy. One fruitful area of inquiry has proven to be the wall ultrastructure of the first definitive plant remains, spores. It is possible to compare living and fossil groups on the basis of this characteristic because the structure of these highly resistant walls has been demonstrated to persist up to half a billion years. Among modern groups, the non vascular land plants (a.k.a., bryophytes) are the most likely candidates for close affinity to these earliest land dwellers. But among the bryophytes, two groups are disputed as being the most primitive. For many years, the liverworts were considered the most likely basal group, but in recent molecular phylogenies the hornworts have been increasingly mentioned. Comparisons between these two groups and with early fossil spores have been hampered by the dearth of published information on the spores of the hornworts. This contribution aims to rectify this by providing ultrastructural information on spores of members of four genera: *Anthoceros*, *Dendroceros*, *Phaeoceros* and *Notothylas*.

Danica Kranig and Hanni Mueller (167)Faculty Advisor/Collaborator: **Daniel Conklin***Human Vasospasm: A Murder Mystery in Two Acts. Act I: The Crime Scene and Building a Case*

Like crime, vasospasm strikes the unsuspecting and often with serious and potentially fatal consequences. Vasospasm, a spontaneous, prolonged powerful contraction of a blood vessel, is an extremely difficult event to reverse, and it is associated with 15% of human heart attacks (the actual contribution to morbidity and mortality may be vastly underestimated). Like a thief in the night, vasospasm of the coronary arteries robs the heart of precious oxygen by reducing the blood flow (ischemia). In order to better understand the nature of human vasospasm, we developed an in vitro vasospasm model using isolated human blood vessels discarded after coronary artery bypass graft (CABG, pronounced “cab-bage”) surgery. In fact, CABG blood vessels (i.e. internal mammary artery, IMA; radial artery, RA; saphenous vein, SV) suffer from both pre- and postoperative bouts of vasospasm (5-10% of RA grafts). To develop our model, we exposed isolated CABG vessels to allylamine (AA), a well-known cardiovascular “felon” and a perpetrator of vasospasm in rat blood vessels. We found AA induced vasospasm in each of the three CABG vessels to varying

degrees in vitro. This work was supported by the UWEC ORSP student/faculty collaboration grants and the Luther Hospital/Midelfort Clinic Cardiothoracic Surgery personnel.

Danica Kranig and Hanni Mueller (166)

Faculty Advisor/Collaborator: **Daniel Conklin**

Human Vasospasm: A Murder Mystery in Two Acts. Act 2: Modus Operandi – A Comparative Approach

Previously, we showed that allylamine (AA) produced a prolonged and significant increase in blood vessel contraction that was difficult to reverse, i.e., vasospasm (see “Act 1”). To understand how AA committed this crime, we hypothesized that AA had an accomplice! Our hunch proved correct as pretreatment of CABG vessels with semicarbazide blocked AA’s effects. Semicarbazide served as a “bulletproof vest” by inhibiting the vascular enzyme, semicarbazide-sensitive amine oxidase (SSAO). SSAO converts AA into acrolein, hydrogen peroxide (H₂O₂), and ammonia (NH₃). Thus, SSAO abetted AA, and we hypothesized that AA’s modus operandi was perpetrated by the aldehyde product, acrolein, while the other two products were merely “innocent bystanders.” To test this hunch, we exposed CABG blood vessels to two other related amines, benzylamine (BZA) and methylamine (MA) to see if the vascular responses were similar to AA’s. Both BZA and MA have “priors” for “hooking up” with SSAO, and thus, are converted into an aldehyde, H₂O₂, and NH₃. We compared the “blood pattern” from CABG blood vessels exposed to each “suspect” amine separately. AA produced a vasospasm pattern different from that of BZA and MA. Therefore, we “accused” acrolein as the sole perpetrator of the AA-induced vasospasm crime. This work was supported by the UWEC ORSP student/faculty collaboration grants and the Luther Hospital/Midelfort Clinic Cardiothoracic Surgery personnel.

Chris Lammana and Thomas Tysver (16)

Faculty Advisor/Collaborator: **Sasha Showsh**

Analysis of Plasmid pAM369: a Bacteriocin Encoding Plasmid Isolated From Enterococcus Faecalis 368

Bacteriocins are proteins produced by bacteria that have antimicrobial activity. Because of these antimicrobial properties bacteriocins are potentially applicable for use in treating infections and as food preservatives. *Enterococcus faecalis* SAS58 contains a conjugative plasmid (pAM369) that encodes for production of bacteriocin and resistance to antibiotics gentamicin and erythromycin. Analysis of the bacteriocin revealed that it is a heat labile protein with bacteriostatic activity against *Staphylococcus aureus*, *Escherichia coli* and *Enterococcus faecalis*. The bacteriocin is active over a wide pH range (pH=5 – pH=10) and is inactivated at temperatures above 40 degrees Celsius.

Justin Lehmann and Kelly Leinberger (37)

Faculty Advisor/Collaborator: **Joseph Rohrer**

Floristic Survey of the Joas Tract, Chippewa County, Wisconsin

The Chippewa County Land Conservancy has expressed interest in obtaining a 52-acre tract in Chippewa County, Wisconsin, just south of the city of Chippewa Falls. The land is owned by Mr. Joseph W. Joas, whose family has preserved it in its natural state since 1907. During the summer of 2001, we surveyed the flora and vegetation of the area. Although not large in size, this tract has considerable habitat and ecological diversity. The major plant communities are a dry oak-pine forest, mesic northern hardwoods forest, wet swamp forest, marsh, railroad prairie, and an old field. In addition to describing the dominants of each community and listing all species seen, we mapped the vegetation onto an aerial photograph of the tract and made suggestions for maintaining biodiversity on the land. A total of 201 species of plants was observed on the site. Voucher specimens of 85 species were collected, pressed, dried, labeled, and deposited in the UWEC Herbarium. The results of this research will benefit the ongoing work of the Chippewa County Land Conservancy to acquire, manage, and preserve this property. This research will also provide baseline information for tracking changes in the vegetation and flora over time.

Heather Lindner and Ingrid Ovans (40)

Faculty Advisor/Collaborator: **David Lonzarich** and **Paula Kleintjes**

Effects of Two Environmental Gradients on the Diversity of Intertidal Communities of San Salvador Island, Bahamas

Two aspects of the physical environment, habitat size and stress, are important determinants of biological diversity. In tidal habitats, tide pool diversity can be explained in terms of physical gradients (e.g., temperature, desiccation). Studying a reef on San Salvador Island, Bahamas, we examined the relative effects of tide pool size and tidal elevation on pool diversity. The study was completed in January 2002 and included 62 pools ranging in size from 1 m² to > 10 m². Twenty-six taxa were identified from an intertidal reef approximately 100 meters long. Differences in pool assemblages were strongly correlated with both tidal height and pool size. Snails dominated in high intertidal pools while fish, urchins and coral dominated in lower pools. Lower pools also had twice as

many species as higher pools. Fish and coral were more common in large pools, while snails were more common in smaller pools. Diversity also was lower and more variable in these small pools. Examining the combined effects of pool size and tidal elevation, we discovered that elevation affected diversity in small but not large pools. These latter results are consistent with the view that large habitats provide greater refuge from environmental stress than do small habitats.

Glenn Schmukler (168)

Faculty Advisor/Collaborator: **Kristina Beuning**

Utilizing Grass Cuticle Morphology to Refine Characterization of Paleograssland Communities

Isotopic and morphological analyses of organic remains in lake sediments allow characterization of paleograssland communities. Carbon isotopic analysis of bulk sediment offers an important first-order approximation of the relative abundance of C3 vs. C4 plants on the landscape. However, such analysis does not directly address paleograssland composition, as contributions from arboreal C3 plants may hinder interpretation. Comparison of the bulk sediment carbon isotopic signal with carbon isotopic values of grass cuticle extracted from the same sediments allows evaluation of the integrity of the bulk sediment carbon isotopic signal as a record of paleograssland composition. Concomitant analysis of grass cuticle morphology further refines reconstructions of paleovegetation by allowing identification of specific grass taxa within the paleograssland community. The morphology and distribution of stomata, phytoliths and long cells on the grass cuticle, as well as microhairs, macrohairs and papillae are useful in determining the subfamily and tribe of the grass. This multi-proxy approach was applied to sediments from Lake Bosumtwé, Ghana. Carbon isotopic analysis of fossil charred cuticle demonstrated a shift from C3 grasses during the Pleistocene to C4 grasses during the Holocene. Morphological analysis of charred cuticle from the same samples confirmed these results through identification of specific grass fossil remains.

Nicholas Wiegert (165)

Faculty Advisor/Collaborator: **Tim Ho**

Increasing Dispersion in Conduction Velocity Increases Defibrillation Energy Requirements

Previous studies have shown that dispersion in conduction velocity, when created by regional sodium channel blockade, is an important regulator of electrical defibrillation (Circulation 1999;100:2534-2540). However, it is not clear if this occurs due to conduction velocity dispersion or regional sodium channel blockade. Thus, we aim to prove that dispersion in conduction velocity regulates defibrillation by hypothesizing that increasing dispersion in conduction velocity via regional gap junction inhibition, will increase defibrillation energy requirement (DER) values. Sixteen swine were instrumented with a left anterior descending artery (LAD) perfusion catheter for regional infusion of heptanol (n=8) or normal saline (n=8) to create dispersion in conduction velocity or serve as control. Conduction times (CT) were measured from 5 myocardial sites to the apical right ventricular endocardial pacing site. DER values were determined using an up/down algorithm. Regional heptanol significantly increased DER values by 32.8% (p=0.01) and CT dispersion by 99%. Regional normal saline produced no altered values. This study shows that increasing dispersion in conduction velocity increases DER values, similar to what occurs during a heart attack. The data shows that dispersion in conduction velocity is an important regulator of defibrillation efficacy, regardless of the way in which conduction velocity dispersion is created.

Biology/Kinesiology

Alyson Hudock (21)

Faculty Advisor/Collaborator: **Christy Carello** and **Toni Poll-Sorensen**

The Alexander Technique: Efficiency in Human Movement

The Alexander Technique is a way to release unneeded tension in the body. By becoming more aware of one's own body, a person is better able to use their body to its fullest capacity. Current research on the Alexander Technique emphasizes how walking with the correct body alignment can improve the efficiency of locomotion. Most of these benefits have been reported qualitatively and have not been quantitatively measured. I propose to determine whether heart rate decreases, blood pressure decreases, and efficiency increases when the Alexander Technique is used while walking. I will then determine the quantitative biological significance of the data. To test this hypothesis, 20 subjects who are currently enrolled in kinesiology 101, a course specifically designed for this research project will be tested. This research is beneficial to everyone because it will confirm or disprove the current model of the American walking style. It has the potential to change the way we view our own habitual movement patterns.

Chemistry

Emily Bauer and Theodore Weiland (164)

Faculty Advisor/Collaborator: **Scott Hartsel**

Can Alzheimer's and Mad Cow Disease Be Treated With a Common Antibiotic? Evidence from the Lab

The common antifungal drug, Amphotericin B (AmB), is one of the only agents shown to slow the course of prion diseases in mammals (e.g. "Mad Cow" and Creutzfeldt-Jacob diseases). These disorders are characterized by brain-damaging protein fibrils (amyloid) like those observed in Alzheimer's disease. Congo Red is a dye that has been reported to directly inhibit deadly fibril formation in both prion and Alzheimer disease model systems by binding to fibrils and arresting their growth. This dye has been used diagnostically since Alois Alzheimer's original description of the disease in 1907. We propose it is possible that AmB may act like Congo Red to prevent fibril formation in amyloid diseases. Our experiments show that AmB does indeed bind strongly to amyloid fibrils, but not to the corresponding natural proteins. It also binds to Congo Red. Thus AmB seems to have a complimentary face both for Congo Red and amyloid. The chemical structure of AmB suggests a mechanism by which it could prevent fibril growth. However, AmB is a multifaceted drug and could act by other mechanisms as well.

Stacy Burich, Erin Gannon, and Danielle Schulta (23)

Faculty Advisor/Collaborator: **Thao Yang**

NMR Studies of Short RGD Peptide Structures in SDS Micelles

The amino acid sequence RGD (Arg-Gly-Asp) has been known to be critical for biological activity among several extra cellular matrix proteins for binding to receptors on the cell surface. In this study the conformations of short non-cyclized cell-attachment RGD peptide (YGRGDSP) and its derivative peptides with variations at the RGD sequence have been studied by 2D NMR in solution containing Sodium Dodecyl Sulfate. For proteins or peptides bearing the sequence RGD, if the sequence RGD is altered, the peptides or proteins lose their biological activity. We are interested to understand why variations at the RGD sequence would alter the biological activity, addressing this from the stand point of structural conformations. The conformations of derivative peptides with variations of similar amino acid at the RGD sequence were studied comparative to that of the native RGD peptide. The cell-attachment sequence of the variant peptides investigated were YGKGDSP, YGRGESp, YGKGESP, and YGRGDSPA. The SDS micelle-bound structures of these peptides were determined to contain a common structural motif with a reverse turn in each peptid, known as beta 1-turn.

Derek Fox and Heather Moore (45)

Faculty Advisor/Collaborator: **Jason Halfen**

S-Alkylation of Square-Pyramidal Cationic Metallothiolates: Relevance to Biological Metal-Mediated Alkyl-Group Transfer Reactions

Cysteine thiolate ligation is present in the active sites of many mononuclear metalloproteins, including those involved in alkyl group transfer (methyltransferase MTA-2, Ada protein). Our interest in these metalloproteins has led us to prepare a family of mononuclear metallothiolate complexes supported by the tetradentate ligand 1,5-bis(2-pyridylmethyl)-1,5-diazacyclooctane (L). Iron(II), cobalt(II) and nickel(II) complexes of the general formula [LM(SR)]⁺ (M = Fe, Co, Ni; R = aromatic or aliphatic group) have been prepared and characterized to help elucidate the electronic structures and the reactivity pathways of square-pyramidal metallothiolates. Square pyramidal geometries and axial thiolate ligation typifies the structures of these species. Solutions of these new complexes are intensely colored, the result of multiple charge transfer bands in the visible region that are tentatively assigned as thiolate-to-metal(II) charge transfer transitions. A particularly intriguing aspect of the chemistry of these metallothiolate complexes is their ability to be alkylated at sulfur by common electrophiles. Kinetic and mechanistic evidence suggests that the metallothiolate units, not simply dissociated thiolate anions, are the active nucleophiles in these S(N)2-type reactions of the metallothiolate complexes with alkyl halides, results that are relevant to the reactivity of metalloenzymes that mediate alkyl group transfer reactions.

Emily Gilles (33)

Faculty Advisor/Collaborator: **Stephen Drucker**

Triplet-State Spectra of Small Organic Molecules

We have used cavity-ringdown (CRD) laser absorption spectroscopy to study transitions terminating in the lowest-energy triplet states of small organic molecules. Triplet states are electronically excited species in which two electrons are unpaired. These species

are significant because they are often intermediates in photochemical reactions. However, spectroscopic studies of triplet states are sparse, because transitions from the ground state to the triplet are very weak. We have overcome this limitation by employing the ultrahigh-sensitivity CRD detection method. The goal of our studies is to characterize structural changes that accompany triplet-state excitation. Such experimental knowledge is particularly beneficial to computational chemists, because it helps to calibrate the results of prototype calculations on triplet species. This can ultimately lead to the development of more efficient computational techniques for predicting the outcomes of photochemical reactions. We will present recently obtained spectroscopic information pertaining to the triplet states of carbonyl-containing molecules.

Glen Gullickson (34)

Faculty Advisor/Collaborator: **David Lewis**

Benzhydrylation of Active Methylene Compounds

Benzhydrol reacts with active methylene compounds in refluxing formic acid to give products of substitution. The products of C-alkylation are obtained using beta-diketones, beta-ketoesters and Meldrum's acid; nitriles, (cyanoacetic esters and malononitrile) give the products of Ritter reactions; diethyl malonate yields no alkylation product. The yield of reaction product correlates with the equilibrium enol content of the active methylene compound. The reaction fails in acetic acid solvent when benzhydrol is used as reactant, but proceeds slowly in the same solvent when benzhydryl formate is the reactant. It is suggested that the reaction is an SN1 substitution of benzhydryl formate by enol nucleophiles.

Danah Holman (24)

Faculty Advisor/Collaborator: **Michael Carney**

Chromium(III) 2,6-Bis(imino)Pyridine Complexes as Ethylene Polymerization

Commercial ethylene polymerization catalysts currently produce nearly 22 billion pounds of polyethylene per year. These polymers are used in a wide variety of familiar applications including trash bags, grocery sacks, milk and detergent bottles, and various types of consumer packaging. In spite of their tremendous economic value, the catalyst structures are still rather poorly understood at the molecular level. The desire to model catalyst structure and, in turn, exert more control over basic polymer properties has led to the development of discrete transition metal complexes as polymerization catalysts. Such systems are called "single-site catalysts" because of their ability to produce extremely uniform polymers, which, in turn, yield plastic films and bottles with exceptionally high strength and clarity. Research by many groups over the past 15 years has extended the range of transition metals and coordination geometries that will support olefin polymerization. To further this work, we have synthesized a family of chromium(III) complexes supported by tridentate 2,6-bis(imino)pyridine ligands. These complexes have been characterized by x-ray crystallography, elemental analysis and various magnetic and spectroscopic techniques. These results will be presented along with initial polymerization data showing the impact of ligand structure on catalyst activity and polymer properties.

Joel Lischefski (35)

Faculty Advisor/Collaborator: **David Lewis**

Multistep Synthesis Experiment for the Organic Laboratory

Multi-step synthesis can be an important learning experience for the undergraduate student in the organic chemistry laboratory. We present a simple multi-step synthesis involving sequential hydrolysis of the anhydride formed by Diels-Alder reaction between cyclopentadiene and maleic anhydride, bromolactonization of the resultant diacid (which permits discussion of electrophilic addition of bromine to an alkene and intramolecular SN2 substitution), and Fischer esterification of the product. This sequence has several advantages: each step involves a short reaction time and readily available reagents, produces high yields of crystalline solids that are easily purified by recrystallization, and produces little or no hazardous waste. One particularly attractive feature of the sequence is the fact that water is the solvent and recrystallizing solvent of choice for two of the three steps.

Westley Manske (44)

Faculty Advisor/Collaborator: **Marcus McEllistrem**

Structure of GaN Surfaces—The Persistence of Surface Clusters

Group-III nitride semiconductor research has led to the commercial realization of green-, blue-, and even violet-light emitting diodes (LEDs), wavelengths not attainable with most other semiconductors. Nitride-based devices have found use in traffic signals and are being considered in solid-state lighting, in part because high brightness LEDs can be made from Group-III nitrides and their alloys. The wavelength of light produced by these devices can, in principle, be "tuned" over the entire visible spectrum by controlling the stoichiometry of AlGaInN alloys. Significant advances in film quality of InGa_xN_{1-x}, which emit in the green to blue

color range, will require an improved understanding of how material growth influences, and is influenced by, alloy composition. Our research into the surface morphology of GaN by low-energy electron diffraction (LEED) and scanning tunneling microscopy (STM) has revealed that GaN forms surface clusters under a variety of conditions, even though LEED indicates that the surface is still crystalline. We conclude that surface clusters form as a consequence of surface treatment, or re-form afterwards, and that the formation of these clusters is highly favorable. The interplay between surface structure and composition (that is, the Ga/In surface composition) is the focus of this research.

Heather Moore (32)

Faculty Advisor/Collaborator: **Jason Halfen**

Synthetic Approaches to Modeling the Active Site of the Non-Heme Iron Enzyme Superoxide Reductase

Organisms are protected from the toxic effects of superoxide, an unavoidable byproduct of aerobic respiration, by a family of superoxide scavenging metalloenzymes, including the recently described superoxide reductases (SORs). Spectroscopic and crystallographic studies of these SORs reveal an active site comprised of a single, non-heme iron ion bound by five protein-derived ligands including four histidines and one cysteine. We have recently targeted synthetic models of the SOR active site for preparation, structural and spectroscopic characterization, and reactivity studies. The pyridyl-appended macrocycle 1,5-bis(2-pyridylmethyl)-1,5-diazacyclooctane (1) which mimics the array of histidines in the SOR active site, reacts with iron(II) chloride to form a trigonal prismatic, dichloroiron(II) complex (2). In contrast, reaction of the tetradentate ligand 1 with hydrated iron(II) tetrafluoroborate provides a novel square-pyramidal tetrafluoroborate-ligated complex (3). Reactions of 2 or 3 with sodium thiolates provide square-pyramidal, thiolate-ligated model complexes that mimic the structure of the active site of superoxide reductase. The structural, spectroscopic, and electrochemical properties of these compounds and their precursors will be discussed.

Nicholas Robertson (25)

Faculty Advisor/Collaborator: **Michael Carney**

Synthesis and Reactivity of Chromium(II) and Chromium(III) Complexes Incorporating Bis(2-Pyridylmethyl)Amine and Tris(2-Pyridylmethyl) Ligands

Chromium ethylene polymerization catalysts were first developed in the 1950's at Phillips Petroleum Company. In the United States alone, these catalysts currently produce nearly 14 billion pounds of polyethylene that is, in turn, used to fabricate trash bags, grocery sacks, milk and detergent bottles and piping for water and gas service. Despite their long history and commercial importance, the structure of chromium catalysts and their polymerization mechanisms are still poorly understood at the molecular level. Attempts to model commercial catalysts have led various research group to develop discrete organometallic chromium complexes as polymerization catalysts. Most of the complexes have employed cyclopentadienyl and other negatively charged (anionic) ligands. We have sought to extend the family of useful polymerization catalysts by synthesizing a series of chromium(II) and chromium(III) complexes supported by neutral tridentate bis(2-pyridylmethyl)amine and tetradentate tris(2-pyridylmethyl)amine ligands. These complexes have been characterized by x-ray crystallography, elemental analysis and various magnetic and spectroscopic techniques. These results will be presented along with initial polymerization data showing the impacts of ligand structure and metal oxidation state on catalyst activity and polymer properties.

Danielle Schulta (22)

Faculty Advisor/Collaborator: **Thao Yang**

NMR Studies of RGD Peptide Structure

Peptides containing the amino acid sequence Arginine-Glycine-Aspartate are known as RGD-peptides. The amino acid sequence Arg-Gly-Asp or RGD (R = Arginine, G = Glycine, D = Aspartate) is commonly found on various extra cellular matrix proteins, such as fibronectin, laminin, vitronectin and others. These extra cellular proteins carry out their multifunctions by binding to each other and to receptors on the cell surface. Fibronectin, in particular, binds to a group of membrane spanning proteins known as integrins. The sequence RGD has been identified to be the specific binding site on the extra cellular matrix proteins to integral membrane protein receptors. In this project, we have synthesized a 14-mer RGD peptide fragment via Solid Phase Peptide Synthesis Method; its sequence is Try-Ala-Val-Thr-Gly-Arg-Asp-Ser-Pro-Ala-Ser-Ser-Lys. Two-dimensional NMR data that were used for making assignments of the protons and for evaluation of possible peptide structure in dimethyl sulfoxide will be presented. Preliminary two-dimensional Nuclear Overhauser Effect (NOE) data indicate that the peptide possesses structure in solution as indicated by several NOE cross-peaks at the amide region of the 2D NOE spectrum.

Rebecca Siemer and Amber Zopp (163)Faculty Advisor/Collaborator: **Marcia Miller-Rodeberg***The Catalase/Peroxidase Enzyme from Brevibacterium Fuscum*

Catalase/peroxidase enzymes have two primary functions in organisms. In all obligate aerobes, these enzymes remove toxic hydrogen peroxide produced as a by-product of aerobic metabolism. In bacteria, fungus, and plants, this class of enzymes also serves to oxidize organic and metal substrates with concomitant reduction of hydrogen peroxide to water. The catalase/peroxidase enzyme (KatG) from the bacteria *M. tuberculosis* is involved in the activation of and resistance to Isoniazid, an aromatic compound that is a front line drug in the treatment of tuberculosis. The proposed activation mechanism is oxidative cleavage of the hydrazine substituent of Isoniazid by KatG, resulting in a reactive radical compound that subsequently inactivates another key enzyme. Similar enzymes are found in closely related bacteria, such as *Brevibacterium fuscum*, which have the ability to use simple aromatic compounds as a carbon and energy source. The physiological role of this enzyme may be to modify aromatic compounds into suitable substrates for the aromatic degradation enzymes, which is the focus of our work. We have purified and characterized the heme catalase/peroxidase enzyme from the Gram (+) bacteria, *B. fuscum*. Its physical and catalytic properties will be presented.

Nathan Wells (15)Faculty Advisor/Collaborator: **James Phillips***A Comparative Study of the Matrix Isolation Infrared Spectra of Nitrile Donor-Boron Trifluoride Complexes*

Complexes formed from nitrile donors and boron trifluoride have drawn much attention from structural chemists since their structure and bonding obscures the distinction between bonded and non-bonded interactions. Furthermore, their structures are quite sensitive to chemical medium, a phenomenon that is most clearly illustrated by dramatic differences between the gas- and crystal phase structures. For CH₃CN-BF₃, the B-N bond contracts from 2.0 to 1.6Å upon crystallization, and the N-B-F angle opens by 10°. In a previous matrix-IR investigation of CH₃CN-BF₃, the C-N stretching frequency (ν_2) was observed very near the value for the crystalline complex, suggesting that the structure and bonding of the matrix-isolated species was quite similar to that of the crystal. Results will be presented that correct and extend the initial study. A new assignment for the C-N frequency (ν_2) will be reported, which has been verified by ¹⁵N substitution, as will the frequencies of the BF₃- asymmetric stretching (ν_{13}) and umbrella (ν_7) modes. These data indicate that matrix-isolated CH₃CN-BF₃ is, in fact, much more weakly bonded than its crystalline counterpart, though it is still unclear how it compares to the gas phase complex. At this point, the analogous vibrational bands have also been measured for (CH₃)-3CCN-BF₃ and C₆H₅CN-BF₃ as well. Current efforts are centered on obtaining data that will link these frequencies to structural properties, and recent results from ab initio calculations, x-ray crystallography, and solid-state IR spectroscopy will also be presented.

Computer Science**Ben Covi (42)**Faculty Advisor/Collaborator: **Andrew Phillips***Conversion to OCCF Compliant C++*

The primary objective of this project is to develop a standardized, or canonical, “minimum” object-oriented class definition format to which all classes must adhere (otherwise referred to as OCCF; Orthodox Canonical Class Form). That is, each class in an application must adhere to certain rules; it must include specific (default and other) constructors and destructors, methods for object comparison and assignment, and satisfy certain rules regarding the access to private data. The particular application we have chosen to study provides extensive opportunities for this standardization since it presently consists of over thirty classes with very little standardization of the existing interfaces. This application is an algorithm used in the prediction of three-dimensional protein structures. It was originally developed in C, and then converted into C++. The goal of this project is to produce a version written to the specification of the canonical form we will develop. As a test of our canonical form, we will then develop a new class that meets those specifications and that provides a flexible interface enabling users to specify algorithmic parameters at runtime.

Michael LeMay and Matthew Meyer (62)Faculty Advisor/Collaborator: **Michael Wick***DNA Computing*

The primary objective of this project is to develop a computerized simulation of a DNA computing engine. DNA computing is an exciting new area of nonstandard computing that focuses on using biological experiments (involving DNA) to solve very difficult

computational problems. Recent advances have shown that DNA computing is capable of producing highly efficient solutions to problems for which no polynomial algorithm is known to exist. We propose to study the design and implementation of a DNA computing simulation framework that would serve as a problem-solving system for a variety of classic optimization problems.

Joseph Meehan (55)

Faculty Advisor/Collaborator: **Daniel Stevenson**

Redesign of the Hierarchical Concurrent State Machine

The Hierarchical Concurrent State Machine (HCSM) formalism is a computational model for designing the behaviors of reactive, semi-intelligent agents in virtual environments. It is actively being used to provide vehicle behaviors and scenario control in the HANK driving simulator project at the University of Iowa. However, in its current form, complex arbitration functions need to be coded to allow HCSM models work together. And, in addition, when attempting to script driving simulator experiments it is often difficult to add new behavior controls on top of existing HCSM models. The objectives of the project are to address these shortcomings by redesigning the HCSM formalism, implementing the new version, and testing it in a simplified version of HANK.

Theresa Steffen (54)

Faculty Advisor/Collaborator: **Daniel Stevenson**

The PNG Image Format and Its Impact on Web Pages

It is difficult to design professional web pages without including images. However, picking appropriate file formats for these images can be a challenging problem. Image file size and quality play big parts in the proper choice of format. File size is important because one wants to keep the download size of web pages as small as possible. Quality is important because no one wants to view distorted images. However, there is an inherent trade-off between size and quality when it comes to picking an image format. There are a few well-known rules for choosing between the GIF and JPEG image formats, but much less is known about when to use the latest format to be supported by common web browsers: the PNG format. The objective of this research project is to explore the details of the PNG format and provide an in depth analysis of when it should be used verses the other existing web image formats (GIF and JPEG). Specifically, mixed content images will be explored, as PNGs seem especially suited to handle their unique construction.

Daniel Williams (43)

Faculty Advisor/Collaborator: **Andrew Phillips**

Strategies for Random Conformation Generation in Protein Structure Prediction

The objective of this project is to develop a software artifact that implements the strategy design pattern for generating “random” points in a high dimensional space, but which satisfy some predetermined criteria. Use of the strategy pattern will provide for dynamic runtime flexibility in selecting the means by which the n-dimensional points can be randomly generated. The goal is to provide a common interface for random number generation while at the same time increase the efficiency of the “random” sampling used in an application of interest to us. This will be done by providing both a standard pseudo-random number generator (for uniformly distributed random numbers) with a sub-random number generator that uses the Sobol’ sequence. As an additional, but optional, criteria, we will provide a mechanism for restricting the random number generation to various subspaces defined by the problem domain.

Geography and Anthropology

Marc Brandford, Patrick Hahn, and Ross Kleiner (60)

Faculty Advisor/Collaborator: **Harry Jol**

Investigation of Differential Global Positioning, The Big Island Of Hawaii: Field Work From Hapuna Beach And Mauna Kea

Differential Global Positioning Systems (DGPS) allows one to accumulate, collect, and interpret spatial data. Two separate surveys using DGPS were conducted in two different locations on the Big Island of Hawaii. The first location was Hapuna Beach, a large tourist spot that is vital to the Island’s economy. Each year a measurable amount of sand is eroded away from the beach. Evidence of the erosion can be seen by looking at how the walkways, once built adjacent to the sand, now appear to be at a higher level. The purpose of the field research was to better understand erosion on Hapuna Beach. If the loss of sand can be measured and recorded, then steps can be made toward the prevention of beach erosion. The Trimble ProXR DGPS was used to map physical features on the

beach including perimeter of the beach, sand dunes, rocks, lifeguard towers, showers, and trails. Additional fieldwork being conducted was laser leveling and ground penetrating radar (GPR). The laser leveling lines and GPR transects were also recorded on the DGPS. If the same survey was conducted annually or seasonally, then conclusions could be made on the beach erosion and prevention. The second location was Mauna Kea, Hawaii's tallest volcano. A study determining how variations in altitude can affect the accuracy of the DGPS was conducted. Not-in-point features were plotted every 30 seconds starting from the coast of South Kona and ending at the summit of Mauna Kea (13,796 feet above sea level). Observations used for determining accuracy included comparing altitude on the Trimble with survey markers, number of active satellites, and positional dilution of precision (PDOP). The project showed that the accuracy of the DGPS did improve as the altitude increased.

Erin Brown and Robert Passow (169)

Faculty Advisor/Collaborator: **Harry Jol**

Laser Leveling Hapuna Beach, Hawaii – The Big Island

Hapuna Beach is the most popular beach on the Big Island of Hawaii. The beach attracts visitors for a wide variety of recreational activities and generates important revenue to the area. It is not an accepted fact that Hapuna Beach is eroding, but there is some concern by local residents about Hapuna Beach. Our research may help us to understand by how much, and how quickly this is occurring. The purpose of our study is to create an elevational profile of the beach, using a Laser Level, data collection and manipulation, and *Microsoft Excel*. The transects that were taken helped to support the Ground Penetrating Radar research slopes by providing topographic data. Data was collected with a laser leveler along six transects. Transects one through five were positioned from north to south along the beach, with transect six located in a separate cell north of transect one, sectioned off by a rock outcropping. Once data was collected measurements were entered into *Microsoft Excel* to generate graphs. The results were a topographic model of the elevational surface of the beach. Interpretation of these graphs showed us that there is variation in the land surface of Hapuna Beach between the transects, which may be signs of erosion. Areas behind transects with steeper slopes are less susceptible to wave erosion because water is somewhat buffered from traveling inland. Alternately, areas behind transects with shallower slopes are more susceptible to erosion because water is allowed to travel further inland, which could damage property and become a threat to people. The transects seem to get flatter and thus more susceptible to erosion the further south they are located along the beach.

Ryan DeChaine (77)

Faculty Advisor/Collaborator: **Garry Running**

GIS as Geoarchaeology: Testing an Archaeological Hypothesis at the Hokanson Site, Tiger Hills, South Central Manitoba

The Tiger Hills, a wooded, hummocky, landscape in south central Manitoba is one of four Canadian prairie localities under investigation by members of SCAPE (Study of Cultural Adaptations within the Prairie Ecozone). The Hokanson site, located in the Tiger Hills and occupied 1,500 years ago lies along gentle slopes marginal to a small wetland. Recent archaeological investigations suggest the site is primarily a bison kill and processing site. However, this interpretation hinges on the hypothesis that bison were trapped at a small jump adjacent to the wetland and subsequently dispatched and butchered at the site. The purpose of this research is to apply innovative GIS-based techniques to, 1) reconstruct paleotopography and paleovegetation at the site and, 2) to determine if (or how) the bison trap would have functioned as currently hypothesized. Topographic data was collected across the site (Trimble ProXRS dGPS, and total station survey). A digital elevation model (DEM) of the site was then produced using ArcView GIS software. Native vegetation communities, excavated areas, and activity areas were added to the DEM using ArcView software. "Bison eye" view sheds were then constructed and analyzed (ArcView modules 3-D and Spatial Analyst) to test the bison trap hypothesis. Preliminary results indicate the 3-D model and subsequent view shed analysis provide useful 3-D visualization of the site and that for the most part, the bison trap hypothesis is sound. In addition, though our research is ongoing, we are beginning to address a wider variety of archaeological research questions using our GIS-based approach.

Ryan DeChaine (78)

Faculty Advisor/Collaborator: **Harry Jol**

GPR in Geoarchaeology: A GPR Survey at Rennes-le-Chateau, Southern France

GPR surveys were conducted at two sites within the community of Rennes-le-Chateau, Southern France. The community is tied to many mysteries, one of which includes the possible location of the Holy Grail, along with other historical items. For the initial project, two locations were chosen: 1) the Tour Magdala and 2) the Church of St. Mary Magdalen. The survey at the Tour Magdala was carried out to image any anomalous features that may be located beneath the tower floor and around its outer perimeter. Built on the local bedrock, results indicate possible surface and subsurface disruptions in stratigraphy, while 3D cubes reveal a hyperbolic reflection, which may indicate the location of a buried feature. The survey at the Church was carried out to image the subsurface floor in search of buried features. 2D and 3D images reveal a subsurface anomaly (hyperbolic feature) extending across several

parallel lines, possibly indicating a burial crypt. Until archeological excavation permission is granted, subsurface anomalies will remain unidentified. In conclusion, GPR proved successful in initial efforts to locate possible historical items in the subsurface, possibly aiding archeological reconnaissance efforts in the future.

Ryan DeChaine and Jedediah Durni (61)

Faculty Advisor/Collaborator: **Harry Jol**

A Ground Penetrating Radar Investigation at Hapuna Beach, The Big Island Hawaii: Inspecting Sediment Supply, Stratigraphy, and Pocket Beach Erosion

Hapuna Beach, located in the northeastern coastline section of the South Kahala Range on Hawaii's Big Island, is one of the most popular tourist beaches in the Hawaiian Archipelago. Decades of anecdotal data indicate that the beach has experienced continued erosion, threatening the region with economic and physical loss. In order to provide insight into the problem, ground penetrating radar (GPR) data was collected, providing subsurface images, revealing patterns that help understand the dynamics of beach erosion. Hapuna Beach is 565 m in length and ranges 25 m-100m in width. A total of 6 GPR transects (lines) were collected in an east-west direction perpendicular to the ocean using a pulseEKKO 100 GPR system, 200MHz and 100MHz antennae, and 400 V and 1000 V transmitters. Transects were collected from the vegetation line to water line, and ranged 20 m - 96 m in length. Transects 1-2 were separated by 50 m, followed by a 100 m separation between lines 2-4, and a final 25 m separation between 4-5. Transect 6 was collected at the northern extent of the beach. Datapoint collection varied from every 0.10 m to 0.25 m and antennae separation from 0.5 m (200MHz) - 1.0 m (100MHz). Analysis of the GPR profiles reveal a dipping bedrock stratigraphy toward the ocean ranging between 0.5 m - 7 m in depth and a bedded sand accumulation up to 7 m in depth in transect 5. The data, the first of its kind in the region, coupled with laser level elevation data, dGPS data, and a GIS, provides useful information in understanding and consequently preventing beach erosion in Hawaii.

Daniel McDonnell (58)

Faculty Advisor/Collaborator: **Harry Jol**

Zonation of Hapuna Beach Dunes, A Study of the Ecological Plant Structure on the Big Island of Hawaii

Biological zonation is the spatial distribution and composition of biota in a given system. The objectives of this study are to use ecologically safe and effective observational methods and collect data that can help in assessing the health of the sand dune ecosystem at Hapuna Beach, Hawaii. This biological study focused on plant biota. The study found that density decreases sharply from the dune crest down the dune face, and varies with abiotic conditions behind the dune crest. Also obtained was a sketch of plant species composition and distribution. The data collected can be used in assessing the overall health of the dune ecosystem.

Christopher Morton and Tobi Rutten (59)

Faculty Advisor/Collaborator: **Harry Jol**

Geographic Information Systems Analysis of Hapuna Beach Big Island, Hawaii

Beach erosion is a widespread concern for many communities as they slowly watch their beaches disappear. Shorelines are a very important asset to a community as they provide recreation, tourism, and unique environmental habitats for selected species. Geographical Information Systems (GIS) helps identify eroding beaches by maintaining a detailed database of spatial geographic information. Hapuna Beach on the Big Island of Hawaii provides an excellent research opportunity to test advanced geo-physical technologies. The goal of the research is to provide GIS data at Hapuna beach to determine if beach erosion is occurring, and at what rate. Data sets were collected on-site using Global Positioning Systems (GPS), ground penetrating radar, and laser leveling technologies. The data sets were analyzed in real-time using ArcPad 5, a GIS software program created by ESRI. Windows CE on Personal Data Assistants (PDA's) powers the ArcPad 5 software and uses unique bi-directional communication with GPS units to provide a fully flexible and mobile GIS data collections system. While collecting data on the beach, a Garmin GPS unit attached to the PDA would not work. An error was displayed that said, "A License is required to operate this GPS unit in this geographic location." Therefore a Trimble GPS unit was required to complete data collection. GPS data and beach attribute information was successfully stored in a maintainable relational database which will provide background data for further research developments.

Corinne Orzech (76)

Faculty Advisor/Collaborator: **Garry Running**

Modern Land Use in the Glacial Lake Hind Basin

The Glacial Lake Hind Basin (GLHB), located in southwestern Manitoba, is one of the four localities currently under investigation as part of the multidisciplinary SCAPE project (Study of Cultural Adaptations in the Canadian Prairie Ecozone). The purpose of this

study is to test the validity of the accepted hypothesis regarding the impact soil-geomorphic variation in the basin has on rural land use and population density. The cultural landscape characteristic of the basin is homogeneous with respect to demographic characteristics, economic activities (farming), and settlement history. The physical landscape of the basin is divisible into two distinct soil landscape associations, one dominated by “poor” soils and smaller areas suitable for cultivation using modern machinery, and the other dominated by “better” soils and larger areas suitable for cultivation using modern machinery. The accepted wisdom holds that soil-geomorphic differences in these soil landscape associations have led to unique land use patterns and population densities. In turn, existing policies of land and resource management agencies are based on the untested “accepted wisdom.” Data generated from the interpretation of orthophotographs and cadastral maps will be combined and analyzed in a GIS using ArcView software. Four variables significant in differentiating land use patterns are selected for analysis: number of farmsteads/unit area, size of farm holding/unit area, size of cultivated fields/unit area, and the ratio of cultivated/uncultivated land. ArcView themes and attribute tables will be compiled, and statistical comparison of the two populations will be conducted. The resulting ArcView GIS database and maps will be a significant contribution to SCAPE and may have important implications with respect to improved land and resource management practices in the study area.

Don Porschien and Paul Sandstrom (137)

Faculty Advisor/Collaborator: **Sean Hartnett** and **Garry Running**

Mapping the Accuracy of Global Positioning System Receivers: A Comparison of Cost, Data Quality, and Ease of Use

The purpose of this project was a quantitative/qualitative comparison between “low-end” (inexpensive, hand-held) and “high-end” (survey grade) Global Positioning System receivers used for mapping and other geo-science fieldwork. Equipment cost, data accuracy, efficiency, and ease of use were analyzed. Costs range from a few hundred to several thousand dollars. Accuracy was measured by traversing the same routes with multiple Global Positioning System receivers at the same time, both with and without differential beacons. The recorded points were then mapped and the difference between the two types of receivers measured in feet. The positional difference between the location returned by each type is a quantitative measure of accuracy. Terrain, weather, vegetation and land cover, time of day, season, and satellite availability were also considered. Qualitative differences such as data storage capabilities, data automation, and types of data storage were also analyzed. The working hypothesis of this investigation is that both quantitative and qualitative differences between the two types of receivers are significant.

Tobi Rutten (57)

Faculty Advisor/Collaborator: **Douglas Faulkner**

Tributary Stream Channel Stability in the Buffalo River Watershed, West-Central Wisconsin

The Buffalo River has flowed into Riecks Lake, a backwater lake that fills the mouth of its valley, since 1935 when Lock and Dam 4 was closed on the Mississippi River. Currently, Riecks Lake is largely filled with sediment. Given its location at the mouth of a large agricultural watershed, it is not surprising the lake has experienced dramatic sedimentation. It is, however, unexpected that the rate of infilling has not slowed in recent years despite widespread efforts to control soil erosion in the Buffalo River watershed. The purpose of the research was to determine whether tributary stream channels have been a significant source of the sediment delivered by the Buffalo River to Riecks Lake. To achieve this objective, 25 transects across tributary streams, which were originally surveyed in 1992 and 1993, were relocated and resurveyed. From the resurveys, we found that tributary stream channels have been remarkably stable, indicating they have been a negligible source of sediment. A GIS-based analysis of recent aerial photography was then done to determine if changes in land use and land cover could be a cause of persisting high sedimentation rates in Riecks Lake.

Rubin Seifert (56)

Faculty Advisor/Collaborator: **Sean Hartnett**

DGPS of the Lower Chippewa River Cutbanks

The banks of the Lower Chippewa River have been influenced by erosional scarring. The purpose of this project is to create baseline data for future fluvial bank surveys of the Lower Chippewa River as well as experiment and develop the methodology of data collection. Trimble Pro XR DGPS receivers need to be transported over the cutbank to collect the data. Variables to be collected are top of the banks, bank shoreline, and type of bank, whether the bank is grassland, rip-rap, or contains trees. Elevation, longitude, latitude and time are collected by DGPS, which traces the variables precise locations. The different methods of data collection are walking over top of the desired area, or by floating along side the bank with the antenna secured to a 16-foot pole. Once the data is collected, a comparison will be made with 1992 DOQ aerial photos of the concentrated area. This data can be used for future periodical comparisons and also to analyze flood damage.

Geology

Luke Beranek (80)

Faculty Advisor/Collaborator: **Bradford Burton** and **Phillip Ihinger**

Geology and Geochemistry of the North Doherty Mountain Intrusive Complex, SW Montana

This study analyzes the geology and geochemistry of the Boulder Batholith area in southwest Montana and its correlation with regional satellitic plutons such as the North Doherty Mountain Intrusive Complex. A suite of rocks collected in summer 2001 questions fundamental geologic processes such as placement of magmatism in continental areas and generation of derivative magmas from possible parental material. Analysis of both mafic and calc-alkaline rocks from the North Doherty Mountain Intrusive Complex was completed by both geochemical and petrological examination. Geochemical data, including major and trace element concentrations, were collected using X-Ray Fluorescence analysis here at UWEC. In addition, detailed thin section petrography provided further information on the crystal chemistry of the mineral phases within the rocks. This data has been used to hypothesize trends and timing of magmatism found in the Montana Fold-and-Thrust Belt along with developmental models of the Boulder Batholith, its evolution, emplacement, and uplift.

Nicole Bergstrom (81)

Faculty Advisor/Collaborator: **Karen Havholm**

Mid-Holocene Dune and Sand-Sheet Environment, Lauder Sandhills, Glacial Lake Hind Basin, Southwestern Manitoba, Canada

A buried mid-Holocene eolian sand deposit, formed between 6760 and 5350 RCYBP, is observed in three cut-bank exposures along the Souris River in the Lauder Sand Hills, glacial Lake Hind Basin, southwestern Manitoba. This deposit overlies a lacustrine/wetland deposit and is overlain by sand-sheet/fluvial deposits. A late Holocene parabolic dune unit caps the sequence. The eolian unit comprises two subangular to subrounded, fine- to medium-grained sand facies. 1) Packages up to 1m thick of low-angle cross-stratified to horizontally laminated strata consist of thin, laterally continuous to lenticular beds with interbedded lenses/layers of predominantly medium-grained sand. This facies represents an irregular sand sheet surface with vegetation disrupting flow, producing irregular and discontinuous strata and packages of steeper strata formed on small shadow dunes. 2) A set of NE to ESE (42-107°) dipping high-angle (up to 32°) cross-strata up to 1.5m thick contains packages up to 3cm thick of millimeter scale laminations alternating with predominantly medium-grained strata up to 3cm thick. Locally, laminated packages are lacking. This facies represents slipface deposition with grainfall/grainflow strata alternating with packages of wind ripple strata. Parabolic or crescentic dunes >1.5m high migrated northeast, or eastward in a bimodal wind regime. This contrasts with late Holocene dune migration to the southeast. Together, these deposits suggest a landscape where dunes interspersed with and migrated over vegetated interdune sand sheets.

Joshua Carlisle (79)

Faculty Advisor/Collaborator: **Bradford Burton** and **Phillip Ihinger**

Geochemistry of Eocene–Oligocene Volcanic Rocks in the Carlin-Pinon Range, Elko County, Nevada

Our study examines the nature of the volcanic rocks of the Robinson Mountain Complex in northeastern Nevada. The major and trace element geochemistry of these rocks are compared to that of the intrusive rocks of the Ruby Mountains located ~ 25 km to the east. This study provides compelling evidence that the two respective mountain ranges are composed of igneous rocks that were part of the same plumbing system, and thus they quantify the slip along the Ruby Mountain shear zone. Our results, for the first time, serve to constrain the extent of crustal extension within the Basin and Range Province throughout Eocene-Oligocene time. Our study builds upon the results of the field studies of Sarah Gordee (UWEC 02) and Carter Dettloff (01) (see map presented by Melissa Weisheipl at Poster Day 2002). This study area is of interest to industry because of its location within, and relevance to the development of large disseminated gold deposits of the Carlin trend, northern Nevada.

Jacob Chmielowiec (139)

Faculty Advisor/Collaborator: **Phillip Ihinger**

Computer Simulations of Crystal Growth

Computer simulations of crystal growth from hydrothermal solution have been conducted using data available from measurements of impurity concentrations in natural crystals. The measurements on natural crystals show that different crystal faces grow at different rates (and hence incorporate different concentrations of impurities). Order-of magnitude differences in the concentration of these impurities have been observed across sharp boundaries indicating that minimal diffusion has occurred since crystallization. In this

project we used these measurements to simulate the morphological changes of the crystal through time. Our simulations allow us to see, for the first time, how crystals behave during growth and, furthermore, how growth rates on the crystal faces are dependent upon each other. The results are displayed visually using graphing software. Three-dimensional software will allow the data to be displayed as a three-dimensional crystal model that can demonstrate visually how the crystal looked and grew through time.

Sarah Gordee (97)

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

Petrology of Granitic Suites in Eastern Bella Coola Area

The eastern Bella Coola map area in southwest, coastal British Columbia, is currently the focus of a new, federal Targeted Geoscience Initiative (TGI) project that intends to increase understanding of the geological evolution and assess mineral potential. Bedrock geologic mapping was conducted during the summer of 2001, and this study is an attempt to characterize the magmatism of the Bella Coola area. The geology of the Bella Coola map area (NTS 93D/7, 8, 9, 10) is dominated by extensive Middle Jurassic to Early Cretaceous volcanic and sedimentary sequences intruded by voluminous, dominantly intermediate, plutonic rocks. Plutonism is tentatively interpreted to be Jurassic to Eocene in age. Suites in this study are divided mainly on the basis of composition, texture, weathering, alteration, fabric, and cross-cutting field relationships. Jurassic magmatism includes intermediate, fine-grained dioritic intrusive complexes associated with the Hazelton volcanics, and coarse-grained granite of the Dean River pluton. The Cretaceous includes several distinct suites; quartz dioritic intrusions related to the Monarch volcanics, and other tonalitic to granodioritic plutons. Eocene plutonism is homogeneous, coarse grained, two-mica granite. These divisions will be tested and modified by ongoing detailed petrographic, geochemical, and geochronological studies.

April Johnson (134)

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

Characteristics of Submarine Mass-Flow Deposits Adjacent to Nifty Volcanogenic Massive Sulphide Occurrences, Eastern Bella Coola

Within the Canadian Cordillera, the Hazelton Volcanic Group, consists of one of the most widely distributed Mesozoic arc-magmatic successions. Rocks of the Hazelton Group consist of dominantly mafic island-arc volcano sedimentary assemblages that broadly range from Early to Middle Jurassic. However, in the Mt. Collins Nifty area a large felsic succession of rhyolitic pyroclastic and resedimented pyroclastic strata form an areally restricted lense enclosed by the more mafic volcanic components of the Hazelton Group. The geographic setting of the Mt. Collins/Nifty region is important because of its similarity to the Eskay Creek type that has hosted massive sulphides, epithermal gold, and associated copper gold porphyry deposits. These deposits were found within a (mafic) mudstone succession intercalated within a (felsic) bimodal volcanic succession. The investigation of this region describes the stratigraphic and petrographic character of the rhyolitic sedimentary succession and incorporates detailed data of the adjacent coeval mafic rocks of the Hazelton Group to provide a comprehensive framework of the geologic setting and mineral potential of the Hazelton Group in the Mt. Collins/Nifty region.

Paul Knippel (96)

Faculty Advisor/Collaborator: **Karen Havholm**

Investigation of the Local Mt. Simon Formation

The Upper Cambrian Mt. Simon sandstone is a quartz arenite, deposited as part of a transgressive epicontinental sea. It unconformably overlies the Precambrian basement, and is reportedly 70-80m thick in the study area. It has a gradational contact with the overlying, finer-grained Eau Claire formation. The purpose of this study is to examine local, undocumented outcrops of the Mt. Simon Formation, and compare them to a regional study of the unit by Driese in 1981. Stratigraphically, the outcrops studied should correspond to Driese's (1981) upper facies, which is described as a fine to coarse grain quartz arenite with abundant Skolithos traces, and structureless beds with cross- and troughcross-strata in the upper 2-5m. Abundant Skolithos grade into abundant, disarticulated brachiopods up section, and the depositional environment is interpreted as tidal flats. The outcrops examined match this description, and additional observations include sub- to rounded grains, and interbedded 2-4mm silt and shale beds that vary in abundance, and appear as coherent beds and discontinuous drapes, with bioturbation as horizontal, branching burrows. Preserved structures indicate multi-directional transport, and vertical Skolithos burrows indicate a high-energy, near-shore environment. Results of the study may be used to update the resources available for understanding the geology of the Eau Claire area, providing information for continued research, and engineering or hydrogeology interests in the Eau Claire area.

Benjamin Paulson (98)Faculty Advisor/Collaborator: **Phillip Ihinger***Crystal Fractionation in Mafic Alkaline Magmas: Insights into the Chemical Evolution of the Mantle*

Mafic alkaline magmas are the products of melting the deep mantle. Although to date they are poorly characterized, they represent our most direct way of determining the chemical composition of the Earth's interior and how it has changed through time. In order to extract the composition of the source of this (or any) magma, it is essential that we track the processes that have changed the magma's composition while ascending through the crust. Crystal fractionation is one such fundamental process that changes the composition of magmas; as crystals are removed from the magma, they change the concentration of the residual chemical components. The Shonkin Sag in central Montana is a large intrusive complex that consists of a continuous series of crystals that were progressively removed from a single vat of mafic alkaline magma. We have taken samples from seven localities within the complex that represent different stages of crystallization of this magma. These samples have been sectioned and analyzed petrographically for mineral content and mineral texture. In addition, we have begun to characterize the trace element mineral chemistry of the principle phases to document the crystallization sequence using the electron microprobe here at UWEC. Our results are compared to the mineral chemistry of the well-characterized New England lamprophyre suite so that the chemical variations resulting from fractional crystallization within those magmas can be distinguished from changes resulting from other magmatic processes (such as crustal assimilation and magma mixing) that have affected their composition.

Molly Sandgren (99)Faculty Advisor/Collaborator: **Robert Barth** and **Phillip Ihinger***Geochemical Analysis and Sourcing of Wisconsin Obsidian Artifacts*

New research conducted by Dr. Robert Barth, Dr. Phil Ihinger, and Molly Sandgren, in association with the Northwest Research Obsidian Studies Laboratory, presents reason for the greater understanding of obsidian use and trade in Wisconsin. Two recent finds in the counties of Dunn and Chippewa were analyzed by use of non-destructive X-ray fluorescence spectrometry and obsidian hydration dating, sourced to Obsidian Cliff and approximated to Late Woodland time.

Jeremy Treague (140)Faculty Advisor/Collaborator: **Kent Syverson***GIS Analysis of Northern Wisconsin Glacial Till Units*

Several distinct glacial till units are present in northern Wisconsin. In northwest and north-central Wisconsin, grey, calcareous till of the Pierce and Marathon Formations is present that was deposited more than 400,000 years ago. These calcareous tills are overlain by pre-Late Wisconsinan, reddish-brown, sandy till of the River Falls and Lincoln Formations. The reddish-brown, sandy till of the Copper Falls Formation was deposited 18,500-15,000 years ago and can be found at the surface throughout northern Wisconsin (Syverson, 1998). We currently have data for 2,500 glacial till samples. A database allows us to analyze till properties such as the mean grain size, magnetic susceptibility, and carbonate percentage. However, it does not permit determination of regional trends. I am using GIS software to present this data in a visual format and look for regional trends. This expands upon the work of Mace and others (2000). The primary objective of this research project is to determine if there are any unrecognized till units present in northern Wisconsin. To do this, we have converted the till data's section/township/range values into latitude/longitude and WTM coordinates. We have displayed and analyzed the data using ArcView GIS 3.2 and ArcGIS 8.1.

Melissa Weisheipl (138)Faculty Advisor/Collaborator: **Bradford Burton***Tertiary Volcanics of the Robinson Mountain 7.5 Minute Quadrangle, Carlin-Pinon Range, Elko, Nevada*

We present the geologic map of the Robinson Mountain 7.5 Minute Quadrangle. The map was compiled using Arc View GIS software from ESRI and is based on the field excursions conducted by Dr. Bradford R. Burton, professor of Geology UWEC, and Carter Dettloff, 2001 UWEC graduate, during the summer of 2001. The volcanic rocks of the Carlin-Pinon Range were originally grouped into a thick and varied package called the Indian Well Formation. This map was produced to show the internal architecture of the Tertiary volcanic field and the complex relationships between varied units of Tertiary volcanic rocks. My purpose for this project was to prepare a map, consisting of data compiled in the summer of 2001, in an Arc View GIS file. The map was prepared by inputting data into Arc View GIS using a high-end quality digitizing board. The map will be published with the Nevada Bureau of Mines and Geology, as well as with the United States Geologic Survey (USGS) upon review.

Kinesiology

Darren Faherty (2)

Faculty Advisor/Collaborator: **Donald Bredle**

Associating Pulmonary Function with Smoking and Exercise Habits Over Four College Years

PURPOSE: To longitudinally study pulmonary function as it relates to physical activity and smoking habits, beginning with the college years. **METHODS:** 402 freshmen entering a Midwestern college were recruited from a required wellness course, thus assumed to be representative of their entire class ($18.4 \pm .6$ yrs, 62% female). We conducted electronic pulmonary function testing and surveyed physical activity levels (Baecke questionnaire of work, sport, and leisure categories), smoking history (including second-hand exposure), and pulmonary history. 98 of the subjects were reassessed as seniors. **RESULTS:** Over the 4 college yrs, there was a small but significant ($p < .001$) increase in vital capacity (.18 L or 3%), maximal flow rate (0.7 L/s or 7%), and 12-sec maximal voluntary ventilation (16 L/min or 11%), while FEV1/FVC decreased slightly (from .87 to .85). Height did not change significantly. As a group new smokers had lower FEV1/FVC (near .80). The prevalence of asthma decreased from 14% to 12%; 7 of the students 'grew out' of their asthma while another 5 students acquired it. Substantial second-hand smoke exposure decreased from 31% to 22% of the subjects. A higher score on the 'sport' component of the activity questionnaire was positively, but weakly, correlated with better results on the pulmonary variables, at the beginning as well as at end of college. **CONCLUSION:** The college years present an opportunity for continued growth and strengthening of the pulmonary system, as reflected in an increased VC, MVV, and reduction in asthma. However, the FEV1/FVC suggests the small airway function is already beginning a slight decline. Additionally, lifestyle habits such as smoking and second-hand smoke exposure are beginning to affect the pulmonary function even over these four years.

Mathematics

Stephanie Anderson (160)

Faculty Advisor/Collaborator: **Shyam Chadha**

On the Numerical Computation of Some Useful Matrices

This project shows how to construct a family of: (i) Integer square matrices, P and Q, such that $PQ = I$ and (ii) Non-zero matrices, P and Q, such that $PQ = 0$. Methods for constructing these matrices are shown, and are followed by a discussion of useful applications of these matrices and methods.

Thomas Awe (5)

Faculty Advisor/Collaborator: **Mohamed Elgindi**

Internal Design of Uniform Shear Rate Extrusion Dies

Design equations of uniform shear rate dies for power law non-Newtonian fluids are presented together with their derivations, and flow properties of such dies are examined. In an attempt to decrease the limitations of such dies, renovations of design equations are given and results are discussed.

Bradley Barth, Leon Buck, and Alex Johnson (14)

Faculty Advisor/Collaborator: **Marc Goulet** and **Alexander Smith**

A Two-Dimensional Model for the Refreezing of the Ice Sheet on Europa After a Melt-Through Event

Europa is one of the moons of Jupiter. Due to tidal heating, it is conjectured that underneath the icy surface is a liquid ocean. It is expected that the ice shell experiences occasional melt through events as a result of large impact events, large scale diapirism or even hot plumes from the base of the European ocean caused by magmatic eruptions. We model the refreezing of the icy shell following such a melt through event. Our model numerically solves the two-dimensional heat equation in cylindrical coordinates with constant temperature boundary conditions and temperature dependent heat conductivity. The model incorporates a basal heat flow due the tidal heating of Europa's core, together with a constant tidal heating of the ice shell.

Derek Bodin (162)Faculty Advisor/Collaborator: **Michael Penkava***Calculation of Cocycles in Infinity Algebras*

Infinity algebras play an important role in some recent constructions in mathematical physics related to string theory. Very few examples of such algebras have been constructed up to now. In this research project, new examples of infinity algebras are constructed using a computer program using Maple to compute the graded Lie brackets which are necessary for this construction. Our future goal is to take these calculations and use them to compute the deformations of our structures. Already we have discovered some interesting results for two dimensional A-infinity algebras. Every infinity algebra is given by an operator which is a sum of a possibly infinite number of terms. We studied the first of these terms and found there are three possible values for this term. Two of these possibilities appear to be fairly simple to classify. The third possibility is more complicated, and we are just beginning to analyze it.

Jennifer Cox (4)Faculty Advisor/Collaborator: **Michael Penkava***Infinity Algebras and Deformation Theory*

Infinity algebras play an important role in mathematical physics, as well as in pure mathematics. There is an infinite family of one dimensional infinity algebras which have been conjectured by Maxim Kontsevich to give rise to some very important homology classes in the moduli space of Riemann surfaces, called the Deligne-Mumford classes. We computed all one dimensional A-infinity algebras, and found there are two families of non equivalent one dimensional A-infinity algebras, and we also constructed their deformation theory. We have thus completely analyzed all one dimensional A-infinity algebras. In addition to the concrete examples, we studied automorphisms of the tensor coalgebra of a vector space, and came up with a useful criterion to determine when a coalgebra morphism is an automorphism.

Rebecca Hutchinson (13)Faculty Advisor/Collaborator: **Mohamed Elgindi and Robert Langer***Pressure and Temperature Balance for Non-Newtonian Flow Through a Rectangular Tube*

Extrusion die design for plastic materials requires modeling the flow of a non-Newtonian (non-constant viscosity) fluid through channels of various shapes. Because the polymer melt flowing through the die tends to heat up due to internal friction, accurate modeling of the flow must take into account the dependence of viscosity on temperature as well as on shear rate. In this project the Arrhenius Law model of temperature dependence is combined with the Power Law model of shear rate dependence to model non-Newtonian flow through a rectangular channel.

Chong Hoong Leong (6)Faculty Advisor/Collaborator: **Mohamed Elgindi, Robert Langer, and James Walker***On the Temperature Profile of Polymer Flow through Circular Pipe*

A nonlinear parabolic equation was derived to model the temperature profile of power-law polymer flow with viscous dissipation inside a circular straight pipe encountered in extrusion dies. In order to develop this equation, continuity, momentum, and energy equations were simplified by making appropriate assumptions regarding the polymer flow in extrusion dies. Then, finite difference method was used to give a discrete approximation of the nonlinear parabolic equation.

Music and Theatre Arts**Amanda Potts (161)**Faculty Advisor/Collaborator: **Gary Don***The Application of Fractal Geometry to Sound Synthesis*

This project involves the implementation of an algorithm that generates fractal shapes, such as the Sierpinski Triangle and fern leaves, both as two-dimensional visual graphs and as sound synthesis files. This algorithm is based on a recursive Iterative Function System that employs affine transformations and probability weighting to produce a series of (x,y) points, each of which is a transformation of the preceding (x,y) point. The visual implementation uses Maple 6, a program that solves the affine equations and graphs the points on a coordinate axis system. The sonic implementation uses Common Lisp and Csound, which interpret the

x axis as time and the y axis as pitch and scales the graph to produce an audible version of the visual fractal shape. Interesting questions arise: can one perceive the relationship between visual and sonic realizations of the same shape, or are they perceived as unrelated entities, due to the fact that the visual shape is perceived all at once, whereas the sonic shape is realized in time? This project makes possible direct comparisons between visual and aural domains, and opens up possibilities for the creative manipulation of shape in both domains.

Physics and Astronomy

Theodore Jaeger and Michael Weiss (53)

Faculty Advisor/Collaborator: **Lyle Ford** and **George Stecher**

Determination of the Spin Axis Orientations of Asteroids

As an asteroid rotates, its apparent brightness varies. This variation in brightness, when examined as a function of time, is called a light curve. The light curve of an asteroid can be used to determine its rotation period. Several light curves taken at different points in an asteroid's orbit can be used to estimate the spin axis orientation of the asteroid, that is, the direction in space that the asteroid's north pole points. The determination of these properties for asteroids measured at Hobbs Observatory is discussed.

Stephanie Johnson (63)

Faculty Advisor/Collaborator: **Matthew Evans**

Morphological Studies of GaAs(001) c(4x4) Surface Reconstructions

The surface of GaAs can be rearranged depending on various growth parameters, such as As pressures, annealing temperatures and annealing times. The growth of GaAs surface reconstructions was monitored during deposition by Reflection High Energy Electron Diffraction (RHEED). This allowed us to understand the temperatures where transformations from a 2x4 unit cell to a c(4x4) unit cell occurred. After the growth and manipulation of the surfaces the GaAs surface was imaged with Low Energy Electron Diffraction (LEED) to obtain the periodicity of the sample, and Scanning Tunneling Microscopy (STM) to fully understand the surface roughness. We found that GaAs c(4x4) is very difficult to grow consistently and variations in growth temperatures caused the As concentration on the surface to change dramatically. This study shows the best procedures to follow to get a smooth c(4x4) surface reconstruction on the GaAs(001) surface.

Jack Kollwitz (52)

Faculty Advisor/Collaborator: **Kim Pierson**

Low Temperature Epitaxial Deposition of Thin Silicon Films: Applications for Semiconductor Industry

To enhance the performance of electronic equipment, future designs of the integrated circuits, which are at the heart of this equipment, require the use of more exotic materials and lower processing temperatures. One crucial step in the fabrication of integrated circuits requires the deposition of materials epitaxially. This entails growing a perfect crystalline film on the surface of a crystalline substrate. Currently, there is a large research endeavor to reduce the processing temperature required to ensure epitaxial crystalline film growth. This is desired to reduce the diffusion of materials through out the integrated circuit, because the amount of diffusion depends exponentially on temperature. Current industrial processes are not able to achieve low temperatures. With the aid of a unique system design and a process called energetic condensation we have performed experiments directed toward lowering the epitaxial temperature. Energetic condensation is a new experimental process that adds energy to a film during growth. This raises the effective temperature and enables crystalline growth at lower substrate temperatures.

Chong Hoong Leong (64)

Faculty Advisor/Collaborator: **Andrew Swanson**

Non-Classical Decay of a Model Silicon Surface

The decay of two-dimensional bi-periodic gratings on a model stepped (001) surface of Silicon was studied using Monte Carlo simulation. Over the temperature range of 700K to 1250K, exponential decay was observed. The decay constant was approximately proportional to the square of the wavelength. However, as the Schwoebel barrier was adjusted, non-exponential decay was observed. This phenomenon was further investigated.

Graduate Entries

Adult Health Nursing

Dorothy Hoeltzer, Sharon Hydo, Tricia Moon, and Ruth Tanyi (132)

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

Spirituality, Health and Quality of Life in People with Chronic Mental Illness

Despite a historical commitment to nursing the spirit as well as the body and mind, it is only in contemporary times that nursing has begun to re-emphasize the place of spirituality in practice and research. Much of the current research in this area, however, focuses on populations that are healthy or who have a chronic physical illness. Far fewer studies focus on spiritual matters in people with a chronic mental illness. The aim of the present study, still in its development stages, is to explore spirituality, health, and quality of life in people with a chronic mental illness. For this descriptive/exploratory study, the sample will consist of 50 people with a verifiable chronic mental illness, half residing in the community and half in a county institution. The concepts that will be measured quantitatively using well-accepted instruments are spiritual self-transcendence, self-perceived health motivation, and quality of life. In addition, a portion of the participants will be interviewed using open-ended questions focusing on meaning in life, health and life satisfaction. Underwood's working model is the framework for the study. Participants will be paid for their participation. Despite perceptions to the contrary, people with chronic mental illness have been shown through previous research to be well able to respond to both self-report instruments and to interviews. Methods will insure dignity for all participants. The findings will contribute to a growing body of knowledge regarding the central and directive roles that spirituality, health, and quality of life play in the lives of people, particularly in those with chronic mental illness.

Communication Disorders

Megan Bohlken, Rebecca Brown, Karyn Nyhus, Katherine Radmer, and Jonathan Schmitz (133)

Faculty Advisor/Collaborator: **Larry Solberg**

Long Term Average Spectrum as a Predictor of Dysphonia

Connected speech samples of 20 subjects with perceptually normal voices and 20 subjects with dysphonia secondary to vocal nodules were compared using long term average spectrum (LTAS) analysis. Four measures were derived from the LTAS analyses. Results indicated significant differences between groups on the four measures of LTAS utilized ($p < .05$). One LTAS measure (i.e., difference between the maximum amplitudes in dB in the 0-2 kHz and the 6-10 kHz ranges) entered into a stepwise discriminant function analysis and correctly classified 77.5% of the voices (i.e., 80% of the normal voices and 75% of the dysphonic voices). Results of this study add to the growing body of research supporting LTAS as a useful acoustic measure for determining voice quality differences in connected speech that can be used in voice evaluations or when documenting change in voice quality due to treatment.

English

Daniel Boster (131)

Faculty Advisor/Collaborator: **Karen Welch**

Assessing the Value of an Institution-Wide Requirement for Writing Intensive Courses Beyond the First-Year Composition Course

This project explores the writing programs of four-year universities similar in size to the University of Wisconsin-Eau Claire that require writing-intensive courses beyond the first-year composition course. We hope to learn the nature of such requirements and any effects that have been determined upon student retention, matriculation, and graduation. The following objectives will guide our research: 1) To explore the nature of these requirements by answering the following questions: a. Are the requirements campus-wide? b. Are the writing intensive courses team-taught (interdisciplinary) or taught within the varied disciplines? c. When in the scope of study are students required to complete these courses? d. Are these writing programs directed/coordinated by individual departments or a central program coordinator? 2) To examine the results of any studies on campuses that have evaluated the effectiveness of these requirements. 3) To learn what challenges each campus faces in establishing and enforcing these requirements. 4) To learn the advantages and disadvantages of these requirements to students, faculty, and their institutions. We also hope to answer the following questions: How widespread are these requirements? How effective are they in improving student writing, retention, and matriculation? In what other ways do these requirements and programs benefit students and the campuses that serve them?

Human Development Center

Steven Carlson and Katarina House (142)

Faculty Advisor/Collaborator: **William Frankenberger**

Swedish and American Teachers' Perspectives on ADHD Behaviors and the Use of Stimulant Medication

Using a survey format, this project examines how teachers in the United States and Sweden (1) view the use of stimulants to treat inattention, hyperactivity, and impulsivity in children, (2) attribute the causes of these behaviors, and (3) rate the acceptability of various interventions used to treat these behaviors. The samples consist of 400 first through fourth grade general education classroom teachers randomly sampled from Wisconsin and 400 first through third grade general education teachers randomly sampled from Sweden. First, teachers are asked pertinent questions about their professional background. Second, they are prompted to read a descriptive vignette on a student whose behaviors meet the diagnostic requirements for ADHD according to the Diagnostic and Statistical Manual of Mental Disorders (4th ed). Third, teachers are asked a series of questions that attempt to elicit possible differences in how teachers in the United States and Sweden attribute causation and perceive the hypothetical student's behaviors. Next, three interventions describing medical, behavioral, and educational approaches are presented along with questions about each intervention, such as each particular intervention's acceptability to the teacher. This research is of interest because of the economic, educational, and social-cultural differences between the United States and Sweden and how these may influence how teachers perceive children who are inattentive, hyperactive and impulsive in the classroom. The results may facilitate further research on how factors in society contribute to ADHD behaviors and how the disorder of ADHD may be in part a socially constructed phenomenon.

Trisha Groeschl (135)

Faculty Advisor/Collaborator: **William Frankenberger**

Lac du Flambeau Service Learning Opportunity

Over fifty undergraduate and graduate students from UWEC attended a two-day orientation seminar held in the Lac du Flambeau community. The students came from a variety of disciplines with the majority coming from Communication Disorders, Psychology, School Psychology, Social Work, Nursing, Special Education, and Education. The orientation program began with tour of the Lac du Flambeau museum to provide an understanding of Ojibwe history and culture. The tour was followed by a discussion of family and child needs in the community to provide further context for student experiences. In addition, specific discussions were held to help students learn about the history and focus of Headstart and strategies for designing and implementing instructional reading lessons with the children. Finally, students toured Headstart, the Lac du Flambeau public school, and the youth center to see the facilities and to meet the staff whom they would be working with on their second trip to the reservation. Pre and post surveys were administered that assessed students' knowledge of Native American culture and their comfort level working with the Native American population. Students also wrote reaction papers about the experience. Results of the surveys showed a marked increase in students' knowledge and comfort levels, and the majority of the reaction papers stated that the program was a great learning experience.

Psychology

Laura Lockner (136)

Faculty Advisor/Collaborator: **Kimberly Knesting**

Zero Tolerance Policies: Their Impact on Students' Perceptions of Safety in School

The recent highly publicized school shootings have administrators, educators, parents, and students concerned about violence in school and measures taken to ensure student safety. Many school districts have taken a reactive response to violence and have adopted zero tolerance policies, which involve get-tough disciplinary actions for both major and minor offenses on school grounds. This study examined the perceptions of safety by students in a large, urban school district. A questionnaire addressing factors contributing to safety issues at school was completed by 227 ninth through twelfth grade students. Results show that 31 percent of students report feeling less safe at school, and 25 percent of students perceive that violence has increased in their school within the past year. Results also indicate that the students with knowledge of their schools discipline policies feel no more safe than the students that do not know their school's discipline policies. Other factors that are associated with the students' perceptions of being less safe in school are also discussed.