Center of Excellence
for Faculty and Undergraduate Student Research Collaboration

Proceedings of the 14th Annual
University of Wisconsin-Eau Claire
Student Research Day

May 1 and 2, 2006
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Office of Research and Sponsored Programs
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Schedule of Events

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<tr>
<td>7:00 - 9:30 a.m.</td>
<td>Students set up posters</td>
<td>Council Fire Room</td>
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<tr>
<td>9:00 - 9:30 a.m.</td>
<td>Judges orientation</td>
<td>Alumni Room</td>
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<tr>
<td>9:30 a.m. - 3:00 p.m.</td>
<td>Judging</td>
<td>Council Fire Room</td>
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<tr>
<td>Noon - 1:00 p.m.</td>
<td>Judges luncheon</td>
<td>Alumni Room</td>
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<tr>
<td>Noon - 5:00 p.m.</td>
<td>Poster session open to University community</td>
<td>Council Fire Room</td>
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<tr>
<td>4:00 - 5:00 p.m.</td>
<td>Student Research Day reception</td>
<td>Tamarack Room</td>
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<tr>
<td>4:15 p.m.</td>
<td>Announcement of UW-Eau Claire Student Research Day Awards and Kell Container Corporation Collaborative Research scholarship</td>
<td>Tamarack Room</td>
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Tuesday, May 2, 2006

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<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00 a.m. - Noon</td>
<td>Poster session open to University community</td>
<td>Council Fire Room</td>
</tr>
<tr>
<td>Noon - 1:00 p.m.</td>
<td>Students remove posters</td>
<td>Council Fire Room</td>
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Arts & Humanities

American Indian Studies

Tammy L. Goss (191)
Faculty Advisor/Collaborator: Lawrence Martin
Bake in a Slow Oven: Cooking from Church Cookbooks in Eau Claire, Wisconsin

This project involved the societal, linguistic, authorship, and cultural study of two mid-twentieth century cookbooks from Grace Lutheran Church in Eau Claire, WI. Document analysis and interviews revealed such phenomena as revival of ethnic cooking interest in the 50s, “scientific/precision” approach to cooking, adoption of name brand ingredients, and use of genre as a “soft” proselytizing agent.

Tammy L. Goss (12)
Faculty Advisor/Collaborator: Lawrence Martin
Comparison of the Passion of Christ in Frederic Baraga’s 1837 Jesus Obimadisiwin and Baraga’s 1850 Katolik Enamiad O Nanagatawendamowinan

This research compares the sections of Frederic Baraga’s 1837 Jesus Obimadisiwin dealing with the Passion and death of Jesus with his later work from 1850 entitled, Katolik Enamiad O Nanagatawendamowinan. The 1850 book of devotions and instructions for Catholics may be one of the richest sources of written Ojibwe from this time period. The text is over seven hundred pages and has chapters that address all manner of religious meditations for Baraga’s Ojibwe congregation. This comparison will trace Baraga’s linguistic grasp of Ojibwe and changes to his Ojibwe syntax and vocabulary over a thirteen-year period.

Art & Design

Anne A. Jensen (13)
Faculty Advisor/Collaborator: Michael Christopherson
Doves Ascending through the Sphere

The High Grounds Memorial Park, Neillsville, Wisconsin organized a statewide sculpture competition for their Meditation Garden. My proposal, “Doves Ascending Through the Sphere,” was selected by the Board of Directors in June 2005. The sponsors, Mr. and Mrs. Joel Brockman, were seeking a site-specific signature sculpture that would reflect the healing process. I created models and drawings to guide David Marten, owner of Hallie Welding Company, in the construction of the sculpture. In collaboration with David, I was able to complete the sculpture for the February 2006 installation. The sculpture will be formally dedicated on July 4, 2006. The dove is a universal symbol of peace, and its significance became even more apparent in the construction of this sculpture. Mr. and Mrs. Brockman lost their son in Iraq in September of 2005. The sculpture is dedicated to their son Sgt. Andrew Wallace. The High Grounds Memorial Park’s landscape shows a large silhouette of a dove, and the family of Andrew released seven doves at his burial. My sculpture, “Doves Ascending Through the Sphere,” is symbolic of spiritual release for the Brockman family and everyone seeking help in the healing process.

Cheryl Loschko (36)
Faculty Advisor/Collaborator: Karen O’Day
An Iconographic Problem in Egyptian Tomb Relief Based on Jules Prown’s Material Culture Method of Object Analysis: Ambiguity of Libation Vessels at Offering Tables

The objective of this research paper is to present an iconographic problem posed by an ancient Egyptian relief located at the Oriental Institute at the University of Chicago. I will identify and present an iconographic interpretation of the relief in its original cultural context, based on Jules Prown’s material culture method of object analysis. The work chosen, “Making Offerings to the Deceased,” is a New Kingdom, Dynasty 18 ca 1450 bc, limestone relief from Abydos.
Aaron Schasse (189)
Faculty Advisor/Collaborator: Cara Tomlinson
Costa Rica: Inside and Out

Costa Rica: Inside and Out is a video documentary project that explores the immersion into another culture, particularly focusing on the experience of a traveler navigating a new culture and language. The questions I began with include: How do the perceptions of the self change or remain the same? How does video become a mediating process for personal experience? How can art, specifically video, recreate an experience so that it is closest to the actual? The resulting video comes out of an assemblage of short video “poems” that were critiqued and then revised and changed many times over. This process of consistent revision has distilled my footage to its most essential elements, which communicate the sense of my experience in Costa Rica.

Communication & Journalism

Christina Harris (40)
Faculty Advisor/Collaborator: Jack Kapfer
Documentary Film on Alcohol Awareness

The University of Wisconsin-Eau Claire was awarded a $300,000 grant to reduce rates of drinking among freshmen students. Last semester Jack Kapfer, Chris Baylor, and I received a research grant to create a documentary film aimed at first-year students. The film is based on the Social Norms Theory, which states that students perceive their peers to consume more alcohol than they do in reality. According to this theory these misperceptions can be changed only from within the student culture. By interviewing current students about their drinking habits, our film hopes to alter the attitudes and behaviors of freshmen towards high-risk alcohol consumption. Over the past few months, we have begun interviewing officials and students to gain a multi-dimensional outlook on the drinking culture in our community. The film is student-oriented and is told through the eyes of current students who have experienced the dangers of excessive drinking first-hand. In the film we illustrate the negative secondary effects students have had due to drinking to incapacitation. In interviews students have been willing to speak about some of their regretful experiences under the influence of alcohol. Incoming freshmen students need to be informed of the drinking scene at UW-Eau Claire to correct their misperceptions. This film hopes to welcome freshmen students to our college and encourage them to drink responsibly.

English

Jared Balkman (190)
Faculty Advisor/Collaborator: Erica Benson
Verging on Merging?: The Low Back Vowels of Eau Claire

The Low Back Vowel Merger is a sound change involving the loss in distinction between vowels in words like cot–caught and Don–Dawn, resulting in homophones. The merger, now standard in Canadian English (Hazen 2005), is “one of the major phonological variables differentiating regional varieties of American English” (Wolfram & Schilling-Estes 2006) and is already found in New England, western Pennsylvania, the central Midwest, and nearly all areas west of the Mississippi River (e.g. Wetmore 1959; Labov, Ash, & Boberg 2005). West Central Wisconsin lies in a shrinking region where presence of the merger has yet to be established, motivating my study. I conducted sociolinguistic interviews with 7 women and 6 men, all lifelong residents of Eau Claire, ranging in age from 18-85. I examined 564 recorded vowel tokens for location in vowel space (F1-F2 measurements correlating with tongue height and frontedness) as well as duration and relative spectral shape (cf. Majors 2005). Acoustic analysis showed no evidence of merged vowels among older speakers, but some younger speakers are showing evidence of the merger. Though inconclusive, intriguing patterns among the younger speakers call for further investigation of the status of the low back vowel merger in Eau Claire and surrounding communities.

Sabrina Gilchrist (8)
Faculty Advisor/Collaborator: Marty Wood
The Two Faces of Albany

The textual differences in the Quarto and Folio versions of Shakespeare’s King Lear are made abundantly clear through the Duke of Albany. Through a closer examination of this character, the Folio version can be seen as one revision of the Quarto. In the Folio, the character has been regarded as more ambiguous and weaker, while the Quarto portrays him as a strong counterpart for Goneril, his wife and one of the villains in the play. One reason for this revision could have been based on the actor’s inability to play the part of Albany as it was originally intended. If possible to prove, it would demonstrate
Shakespeare’s ability, as a director, actor, and author, to make improvements to his own plays based on what he thought would deliver best for each particular production.

**Tammy L. Goss (15)**
Faculty Advisor/Collaborator: **Erica Benson**
*Silent Service: Specialized Submariner Speech from WWII to Present*

This study employs surveys and interviews with 170 Submariners to identify and analyze the lexicon, slang, jargon, etymology, and semantic shifts of this specialized gloss. This study identified 475 naval and Submariner lexical items and includes historical analysis of the creation of some of these terms.

**James P. Hahn (33)**
Faculty Advisor/Collaborator: **Erica Benson**
*Folk Linguistics & Sound Change in Wisconsin*

Wisconsin is currently at the crossroads of two major sound changes—the Low Back Vowel Merger (where cot and caught are pronounced the same) from the West and the Northern Cities Shift (vowel changes characteristic of Buffalo, Chicago, and more recently, Milwaukee) from the East. This study investigates the role that folk beliefs play in the spread of these sound changes into West Central Wisconsin, particularly Eau Claire. A series of interviews was conducted with 14 life-long residents of the Eau Claire area, and the respondents completed several tasks that revealed their opinions on how Eau Claire speech compares to the speech in other cities in and around Wisconsin. The information and opinions gathered from the interviews show that Eau Claire residents have a greater affinity for the speech in the Low Back Vowel Merger areas, for example Minneapolis, Mankato, and Dubuque, and less affinity for the speech in North Cities Shift areas like Chicago and Milwaukee. Thus, Eau Claire residents are more likely to adopt the Low Back Vowel Merger than the Northern Cities Shift in the future.

**Moriah Koehler (34)**
Faculty Advisor/Collaborator: **Erica Benson**
*Cot in the Middle: The Vowel Landscape of Appleton, WI*

This project presents an analysis of the vowel systems of young Appleton speakers. Linguists agree that vowels are the most significant factor in distinguishing regional dialects (Wolfram & Schilling-Estes 2006). The city of Appleton, WI is located in an interesting linguistic area, sandwiched between two major changes in vowel pronunciation: 1) The Northern Cities Vowel Shift, spreading westward through urban centers along the Great Lakes and present in varying degrees in the Madison, Milwaukee, and Green Bay areas, and 2) the cot–caught merger, spreading eastward from areas west of the Mississippi, where the vowels in both words are pronounced the same. With these linguistic events approaching from different directions, it is likely that Appleton speakers have the potential to reflect these trends. This research uses acoustic analysis to investigate the vowel systems of young Appleton adults to prepare for studying the progress of the cot–caught merger and Northern Cities Vowel Shift. The acoustic analysis compares the sound frequency production (F1 and F2) for approximately 74 vowel tokens among six 19- to 20-year-old lifelong Appleton residents. As of the time of this study, no significant research has been conducted on the status of Appleton’s system of vowels. Through these data, we can begin to understand where Appleton stands in the progress of these changes.

**Anna W. Moehagen and Jennifer L. Peterson (16)**
Faculty Advisor/Collaborator: **Erica Benson**
*Who’s Positive Anymore in West Central Wisconsin*

This project investigates the use of positive “anymore” in west-central Wisconsin. Common usage of the word “anymore” is restricted to negative sentences, for example, “I don’t go to the movies anymore,” or questions, “Do you go to the movies anymore?,” whereas instances of positive “anymore” occur in declarative sentences such as, “I go to the movies anymore,” in which “anymore” is interpreted as “nowadays.” Positive “anymore” is believed to be spreading from the Midland dialect region and has already been found in southern Wisconsin (Murray 1988, Labov 1973). The primary data come from interviews and questionnaires completed by 29 life-long residents of the Chippewa Valley. Some usage of positive “anymore” is found in the Chippewa Valley but not in high concentrations. The small sample size, the effects of a written questionnaire, the lack of large-scale migration from the Midland, and homogeneity of the population may account for the lower than expected levels of use. To better understand the use and spread of positive “anymore” larger studies need to be done not only in the Chippewa Valley but also in other areas of Wisconsin.
**Juli Pitzer (193)**
Faculty Advisor/Collaborator: **Stacy Thompson**  
*Over One Hundred Years of History: The Evolution of Movie Theatres in Eau Claire, WI, 1883-2005*

Throughout the history of motion pictures, the evolution of movie theatres is most intriguing. From storefront theatres to the movie palaces of the 1920s to multi-screen cinemas, movie theatres have evolved through the economic and social market of motion picture entertainment. Eau Claire, Wisconsin has hosted over twenty movie theatres during the past 100 years. These theatres transitioned from silents to talkies, from black-and-white to color, from indoor to outdoor, and from standard theatre seating to the new stadium seating. This research project will look at the history and evolution of movie houses through the medium of documentary film. The most intriguing discovery was made during an interview with Gene Grench, a local theatre owner. He revealed the great history of the Grench Family Theatres in Eau Claire and how a small business has maintained its presence since the 1930s. He also provides insight about what to expect in theatre design in the future. The filmmaker also researched and scanned old photographs, video-taped on location, and conducted other interviews to produce a 20-30 minute video. This short film may serve as a resource for the community.

**Ryan Warnberg (192)**
Faculty Advisor/Collaborator: **David Jones**  
*Enhancing Community through Radio Production: Jazz, Blues, and Beyond on WUEC*

This project is designed to increase public knowledge and appreciation of the role of popular music in American cultural life. This is an objective that public broadcasting in both radio and television aims to serve, producing shows that have made genuine contributions to the scholarship on popular music in American cultural history. Local stations and programs have a special role in broadcast communities because they collect detailed data on the listening habits of their audience and are familiar with the entire range of radio programming that is available in a given locality. *Jazz, Blues, and Beyond* has been developed with the specific interests of the local community in mind, in view of the vitality of the UWEC jazz performance program, the thriving local scene for live music, the disappearance of independent and local commercial radio stations through industry consolidation, and the difficulties inherent in sustaining such microradio projects as WOLF-FM and WHYS-FM in a small local radio market. *Jazz, Blues, and Beyond* is an ongoing and sustainable radio program that provides undergraduate students with significant experience in radio production and serves the educational and entertainment needs of a local and regional audience.

**Foreign Languages**

**David Koslov (194)**
Faculty Advisor/Collaborator: **Manuel Fernandez**  
*CUBA: Beyond the Embargo. The Failure of the Cuban Embargo.***

The United States has historically had a vested interest in open, although not always mutually beneficial, economic relations with Cuba due to its location and natural resources. When Fidel Castro led his guerrilla revolutionaries to victory over Eugenio Fulgencio Batista, and foreign owned properties were nationalized, political sanctions on behalf of the United States against the island’s government began, which culminated in an embargo on Cuba, which is still in effect today. An in-depth study of the Congressional legislation surrounding the Cuban embargo was conducted, from its inception in the early 1960s to the Democracy Act of 1992 and the Libertad (Helms-Burton) Act of 1996, and the circumstances under which they were imposed. This was done in an effort to understand the conflicting portrayal of the situation offered by various sources and officiating bodies, including Cuban newspapers, the Cuban exile community, international political officials and political analysts of the media. It was felt that awareness of the rationale behind the different interpretations could be useful in defusing the tense situation.

**Eric Pugh (7)**
Faculty Advisor/Collaborator: **Irene Lazda**  
*After the Wall: The Story of Five German Women*

In 1989, the Berlin Wall fell after 45 years of separation between the democratic West Germany and the communist East Germany. People who lived in the different countries developed diverse historical perceptions. The people of East Germany, specifically those born and raised there, had to adjust to an unfamiliar and new form of government and economy in order to succeed; this project focuses on five women and their experience. From February to May of 2005, Professor Lazda lived in Lutherstadt Wittenberg in Saxony-Anhalt and interviewed five women who were native “Wittenberger.” I transcribed and analyzed the interviews. At times that proved to be difficult because of the pace and content of the interviews, but I had the
advantage of studying abroad in Wittenberg and being familiar with the topics. The women explained their education and occupational history before reunification, how reunification affected their lives, and their views on the negative and positive aspects of life in the former communist East Germany. Professor Lazda and I will present the stories of these women as representative of the generation whose careers were abruptly dislocated by reunification and how they reestablished their lives and careers.

**History**

Chad Conrady (11)
Faculty Advisor/Collaborator: Earl Shoemaker
*Policies and Tactics: Effectiveness of Chemical Weapons in the Great War*

My research looks at the use and development of chemical weapons used by the British military in the Great War. I will look specifically at the Battle of Loos in 1915 and the Battle of Arras in 1917 to demonstrate how chemical weapons did or did not develop into an effective weapon by the British. In addition, my research will look into the technological development of chemical weapons, further demonstrating their effectiveness.

Jacquelyn Dumin (9)
Faculty Advisor/Collaborator: Jane Pederson
*Women’s Lives in Rural Wisconsin during World War II: Rationing and Recreation*

The women of Park Falls and Butternut Wisconsin watched loved ones and friends join the military and leave during World War II. They participated in the homefront war effort through monetary donations to the War Loan Drives and the Red Cross Drives, as well as food rationing. But, they also carried on with their lives. They went to high school and graduated. They enjoyed recreational activities like the Price County fair, and especially dance halls. The individual lives of the residents felt the impact of World War II more than the economy or organizational life of the area did. My work explores all of these areas to discover what women on the homefront in small town rural Wisconsin experienced during World War II.

Paul Huset (10)
Faculty Advisor/Collaborator: Earl Shoemaker
*Evolving Depictions of the Korean War, 1950-1953*

*Evolving Depictions of the Korean War, 1950-1953,* focuses on media in war and the connection between the two. This presentation examines the media and their views toward the war as it progressed. Specifically, this ranges from initial support for United States involvement in Korea, to dissatisfaction with “progress” on the battlefield, and finally, assessing blame for the inconclusive resolution of the conflict. The presentation begins by discussing the situation of the 1950s with images of Sen. Joseph McCarthy. It progresses through the war of movement and emphasizes the changes and the media’s portrayal of it all through supportive images such as cheering Korean citizens and unsupportive ones, too. As the war of stalemate progresses, the presentation analyzes the media’s tone towards the truce talks and its frustration with a graph of war casualties. It will finish with images of the Korean War Veterans Memorial and discuss the war as viewed 50 years later. In summary, the vision is to analyze the media and its changing views on a changing war. Sources such as Time-Life, the Center for Military History, and the Associated Press will be used as the connection between war and media is explored.

**Music & Theatre Arts**

Amanda Blaylock (35)
Faculty Advisor/Collaborator: Mitra Sadeghpour
*Creating a Teaching Portfolio for Developing Basic Music Theory and Sight Singing Skills in Beginning Voice Students*

With Dr. Sadeghpour serving as a mentor, Amanda Blaylock created a teaching portfolio of exercises and techniques that work to teach basic music theory and sight singing skills to beginning voice students. The project began with Amanda preparing an extensive literature review. Currently, there are no existing texts that are designed specifically for voice students, so she reviewed other current sources. Amanda then evaluated the exercises and methods used for their possibility of being adapted to the teaching of singing. Following the literature review, Amanda modified some of the exercises from the existing texts and also created new exercises and activities to teach the basics of music theory and sight singing. She organized them into systematic lessons and created application exercises for each lesson that show the concepts being used in the context of song. She then compiled the lessons into a workbook for students. Once completed, Amanda used the workbook with many of her private voice students and kept a log of each lesson’s success. After a complete assessment of the
lessons, Amanda developed a final portfolio/workbook of the most effective techniques and sequenced them into a complete semester plan.

Courtney Doyel (14)
Faculty Advisor/Collaborator: Mitra Sadeghpour
Assessing the Correlation between the Learning Styles and Practice Techniques of Voice Students

I have had an interest in learning styles since I was introduced to the concept by my homeroom teacher in middle school. My faculty mentor and I began discussing the presumed benefits of using the correct learning style in voice practice. We decided to examine the question, “What is happening in the practice room?,” and designed a study to research if and how much students utilize practice techniques that correlate with their learning style. A volunteer group of voice students completed a learning style test and were given a questionnaire to fill out every day they practiced for five weeks. Listed on the questionnaire, formulated with input from four voice faculty members, were a variety of different voice practice techniques that each related to a specific learning style. The students were asked to check off the techniques they used in their practice sessions. At the end of five weeks, we gathered the questionnaires and are currently looking for a correlation between the tested learning style and the techniques that each participant utilized in their practice sessions. We hope that by finding out how students are using their learning style we can better understand how teachers can help their students practice more efficiently.

Political Science

Sally Trnka (185)
Faculty Advisor/Collaborator: Geoff Peterson
Public Opinion and Legal Closure: The Politics of Law and Order

The remarkable success of the television program Law and Order can be explained in a variety of ways, including ripped from the headlines stories, solid acting, and excellent writing. One aspect of the show that remains unexamined is the extent to which Law and Order serves as a form of legal catharsis for the viewing public. Law and Order has run dozens of episodes that clearly parallel real cases from the United States court system, but in nearly every case, the television show provides legal and moral closure that the actual cases did not. We believe the writers and producers of Law and Order simplify and distort the cases in order to create drama, but such modifications also give a sense of closure for the audience that they could not achieve in real life. We also believe that the writers and producers of the show take the views of their target demographic groups into account when determining the direction of the episode.
**Behavioral & Social Sciences**

**Communication & Journalism**

Megan L. Engmark (57)
Faculty Advisor/Collaborator: Won Yong Jang
*Effects of Alcohol Advertising on Alcohol Expectancies and Drinking among Hmong Students over the Legal Drinking Age*

This study examines the effect that alcohol advertisements have on college students’ actual consumption of alcohol as well as their attitudes about drinking, especially in the American-Hmong culture. Research shows that alcohol advertising messages lead to more positive expectancies about drinking, which, in turn, lead to increased actual consumption. In addition, this study continues that investigation and asks whether certain ethnic student populations are more susceptible than others to the influence of this alcohol advertising. Adolescents from different ethnic groups show different alcohol use rates. While alcohol is not used in traditional Hmong culture, the current studies suggest that young Hmong’s drinking rates conform to those of the United States population as acculturation occurs. The effects of alcohol advertising on their actual consumption of alcohol are mediated by positive expectancies of drinking alcohol. The findings will suggest that understanding these differences will be helpful in designing more effective health interventions.

Jacqueline Phelan (58)
Faculty Advisor/Collaborator: Won Yong Jang
*Effects of Alcohol Advertising on Underage Drinking among Hmong students*

Research clearly indicates that adolescents are exposed to alcohol advertising messages everyday, and it has quite an impact on their decisions and actions to drink. In addition, adolescents from different ethnic groups show different alcohol consumption, suggesting potential differences in their attitudes and perceptions about alcohol advertising messages. This study examines how alcohol advertising affects underage drinking among Hmong Students. Specifically, the effects of alcohol advertising on intentions to drink are mediated by the influence of Hmong culture. The findings will suggest that understanding the mediation effect will be helpful in tailoring more effective health interventions.

**Economics**

David Carpenter (39)
Faculty Advisor/Collaborator: David Schaffer
*Changes in U.S. Labor Markets: Impacts of Education, Gender, Occupation, & Race*

We examine the composition of U.S. labor markets, utilizing demographic data from the U.S. Census Current Population survey. This data has been modified using a unique method of statistical decomposition, designed to allow for examination of aggregate versus structural changes in occupation in the United States. We attempt to isolate the impacts of race, gender, occupation, and education on U.S. labor markets in order to explore the shifting patterns of employment in America over the past three decades.

Casey Farrell, Daniel Platta, and Ryan Tessmer (60)
Faculty Advisor/Collaborator: Eric Jamelske
*Eau Claire Area Stock Project*

This project identifies publicly traded businesses with an employment presence in the Western WI Eau Claire regional area for 2005. We compare the return on an investment in the stock of these companies relative to the same investment in either gold, the Dow Jones, or the Standard & Poor’s 500. We then focus our attention on the retail sector in Eau Claire. In particular, we compare the performance of the retail stocks to the overall Eau Claire investment. Using a global positioning system (GPS), we then mapped the stores that comprise the Eau Claire retail sector. In our presentation of this map we identify each store’s employment as well as their revenue from sales. Overall, this project provides students with practical data collection and management experience as well as building strong presentation and organizational skills. For more information on this project, please see our website at http://www.uwec.edu/econ/Research/ec_stock_index.htm.
Minh Nguyen (37)
Faculty Advisor/Collaborator: Rose-Marie Avin
An Economic Analysis of the Status of Women in Vietnam

The objective of this research project is to increase understanding of the economic status of women in Vietnamese society in the context of the economic transformation that has taken place since the mid-1980s. The Communist Party of Vietnam adopted a number of economic reforms intended to transform Vietnam’s command economy into a market economy. Those changes have brought strong economic growth, averaging 8 percent annual growth between 1993 and 1997 and 7.1 percent during 2001-2002. This research project will analyze the impact of the fast economic growth on women’s employment and economic status in Vietnam. The project will investigate the following questions: What are the diverse ways women are integrated into the Vietnamese economy? What role do women play in the informal economy? Have the economic reforms made it possible for women to access paid, more remunerative and more stable work in the informal and formal economy? Have women achieved the empowerment and well-being associated with human development?

Erin Nicksic, Beth Lutz, Matthew Weiss, and Emily Ley (59)
Faculty Advisor/Collaborator: Eric Jamelske
A Brief Economic Comparison: The United States, Wisconsin, and Eau Claire, A Review of 2005

We have been collecting and maintaining economic data for the Eau Claire metropolitan area as well as for Wisconsin and the United States. For this report we will first compare the Eau Claire area to the state and the nation with regards to employment and unemployment, as well as average annual wages. We then look specifically at the Eau Claire area, comparing the levels of economic activity in 2004 and 2005. In particular, we examine residential and commercial building, the housing market, retail sales, and gasoline prices. Overall, this project provides students with practical data collection and management experience as well as building strong presentation and organizational skills. For more information on this project, please see our website at http://www.uwec.edu/econ/Research/EconomicIndicators.htm.

Victoria Udalova (38)
Faculty Advisor/Collaborator: Wayne Carroll
Labor Force Participation Rates among Hmong Immigrants

Labor force participation is an important element in the process of immigrant assimilation. Entering the labor force in the U.S. for the first time is a critical step toward the mainstream for an immigrant, and it is the first step on the path toward improved living standards. This project will investigate the determinants, effects, and policy implications of labor force participation rates for Hmong immigrants. We will use econometric analysis to explain how the probability of labor force participation depends on gender, age, years in the U.S., education, English skills, and other factors. If our econometric analysis shows that it typically takes longer for Hmong immigrants to prepare for entry into the labor force, this may suggest that they are not well served by welfare programs that push able-bodied adults into employment (and off public assistance) according to a fixed schedule.

Brandon Cramer (188)
Faculty Advisor/Collaborator: Paul Kaldjian
Geographic Literacy and the Press—Print Media Portrayals of the Middle East

This research explores what readers are learning of the Middle East and North Africa through North American print news media. The content of major daily newspapers and weekly magazines are examined in an attempt to understand how North American’s geography and cognitive images of the Middle East may be influenced by the print media. Preliminary evidence suggests that mainstream print news media in North America vary significantly in their portrayal of the Middle East and North Africa and that an incomplete portrayal of this region contributes to generally held misperceptions of people and place. This study will analyze news articles about the Middle East and North Africa over a one-year period and categorize their content as positive or negative in nature. Each article will be analyzed to assess what readers are learning, and the newspapers and magazines will be compared to show how the terminology, imagery, and headlines of articles can affect peoples’ opinions, views, and geographical understanding of the Middle East and North Africa.
Serena Davis (156)
Faculty Advisor/Collaborator: Tim Bawden
*Latino Migration to St. Paul, Minnesota: 1980-2000*

In recent decades, the population of the Hispanic community has increased rapidly in Minnesota, a mirror of the United States overall. Newspaper and other media coverage of this phenomenon fail to explain why this growth is happening. In general, our research examines the migration of Latinos to St. Paul, Minnesota between 1980 and 2000. In particular, this poster will illustrate the patterns of the Latino population and its growth during this period in St. Paul and where they are migrating from. Finally, summaries of interviews obtained from residents and business owners lend further descriptions of the Latino community and culture in this Upper Midwest city.

**Kelly Erickson (133)**
Faculty Advisor/Collaborator: Tim Bawden
*The Menominee Tribe and Their Sustained Yield Forestry Practice*

The purpose of this project is to illustrate the techniques, history, and benefits of sustainable forestry. This project will take an in-depth look at the Menominee Tribe of Wisconsin, who have been leaders in this practice towards sustainability in commercial logging. Along with viable facts, this project will look at a comparison of commercial logging by county in Wisconsin to show the long-term benefits of using the sustainable yield method in logging.

**Kelly Erickson, Vanessa M. Helland, Lynn R. Hilgendorf, Tyler G. Moe, Daniel D. Rogge, and Emily E. Szajna (134)**
Faculty Advisor/Collaborator: Brady Foust and Lisa Theo
*Cartographic Analysis of Migration in the Yazoo Delta, MS*

This project is a detailed examination of migration to and from Mississippi counties. The Bureau of the Census released county-by-county migration data beginning in 1990. Both in and out migration streams were analyzed by examining the relationship between the number of migrants (dependent variable) and the migration distance and economic conditions in the destination counties, such as income, unemployment rates, and education levels. The project also considers cluster migration effects through an analysis of the number of migrants from/to the same county.

**Renae Haug, Lisa Brzezinski, William Hamilton, Philip Holleran, Fabio Perez, and Leah Nicol (154)**
Faculty Advisor/Collaborator: Lisa Theo and Brady Foust
*Blues Musicians Migration In/Out*

The goal of this project is to map and analyze the migration of blues musicians from Mississippi to the rest of the United States. The “Delta” is generally considered the cultural hearth of the blues, but this project considers the entire state of Mississippi. Migration, in this project, is defined by mapping the rays connecting the birth place of individual blues musicians to their current city of residence or place of death. We analyze these patterns by distance/time and by destination. A major focus of this research was to consider whether the migration of blues musicians was substantially different from the so-called “Great Migration” of African Americans out of rural South to the Northern Industrial cities.

**Lynn R. Hilgendorf and Amy Ledin (135)**
Faculty Advisor/Collaborator: Lisa Theo
*School District Consolidations and Community Decline: Lessons for Wisconsin*

Economic restructuring in Wisconsin’s Northwoods during the past 80 years has led to significant school district consolidations. These consolidations have contributed to a decline in community identity and a change in social structure. Researchers examined the continuing effect of school district consolidations on demographic structure in an effort to determine which variables were the cause and which were the effect. Demographic data was acquired from the United States Bureau of the Census, and information on school enrollment and school district consolidations was supplied by the Wisconsin Department of Public Instruction, while other information was from articles by the Wisconsin Historical Society. Data analysis and spatial analysis were conducted using statistical software and Geographic Information Systems (GIS). Demographic data were collected and analyzed in Microsoft Excel and spatial data were collected and analyzed in ESRI’s ArcGIS.
Lawrence A. Hoffman (157)
Faculty Advisor/Collaborator: Paul Kaldjian
*Latino Migrants Aid Wisconsin Dairies’ Labor Void*

Wisconsin’s dairy sector has been forced to be innovative in order to remain viable in a competitive national market. Conventional wisdom calls for consolidation, increasing economies of scale, and replacing labor with technology. However, such prescriptions overlook local opportunities and capacities. Labor continues to be a significant obstacle. Because of emigration of Wisconsinites from rural counties due to competing opportunities, reliable labor has proven to be difficult for many farmers to retain. Latino labor has become an increasingly popular method of satiating this labor void. Based largely on field interviews with dairy producers, farm workers, and others in two case study counties, this research explores the growing practice of hiring Latino labor on dairy farms in Western Wisconsin. Specifically, it examines the economic, cultural, and environmental benefits and impacts associated with this recently emerged workforce.

Chad Jansen, Rachel Kjos, Kelly Erickson, Drew Flater, Brandon Miller, and Philip Holleran (136)
Faculty Advisor/Collaborator: Lisa Theo
*Impacts of Four-Year UW-System Schools on Wisconsin Communities*

The purpose of this project is to map and analyze the socioeconomic effects of four-year UW schools on their respective communities. Several cities with universities will be compared to control cities of similar size without a four-year institution. Some factors which we will consider include: population effects, employment in various sectors, educational levels, income levels, housing value and occupancy, general economics, and parking and traffic factors.

Amy Ledin (153)
Faculty Advisor/Collaborator: Lisa Theo
*The Changing Visibility of Wisconsin’s LGBT Communities*

Previous research on Wisconsin’s Lesbian, Gay, Bisexual and Transexual (LGBT) communities demonstrated a diffusion of LGBT focused businesses and/or organizations from predominantly mid-size cities and large urban areas to rural regions and smaller towns (Theide and Theo, 1997). This project examines the current visibility of Wisconsin’s LGBT businesses and/or organizations to determine if a similar spatial distribution currently exists. Data were collected on the type and location of businesses and/or organizations advertising in publications marketed towards LGBT individuals such as: Damron’s Travel Guide, Gayellow Pages, Quest, and Instep. The number, type, and distribution of LGBT businesses and/or organizations are compared to similar data collected for the years 1979, 1985, 1990, 1995.

Jason Prairie (187)
Faculty Advisor/Collaborator: Paul Kaldjian
*Wisconsin Neighbors: Video Project on Interethnic Relations in Northern Wisconsin*

The goal of our research is to produce a 30-minute video on relations between white majority communities and indigenous or recent immigrant communities in northern Wisconsin towns. It will focus on how efforts have been made to build bridges and find common ground. The project will focus on three case studies by gathering historic footage and photos, conducting contemporary interviews, and filming the affected places. First, it will show the transition from the Ojibwe treaty rights conflict that pit Native spearfishers against white anglers, to the alliance of the two groups to protect the fishery from the proposed Crandon mine. Second, it will look at the recent backlash against the Hmong community after the Sawyer County tragedy, and how some neighbors have stood in support of the Hmong. Third, it will examine the tensions in Barron after Somali immigrants arrived to work in a poultry plant, and efforts that have been made in local schools to narrow the racial, cultural and religious gap with American residents. The video will not focus on the “minority” groups’ cultures, but rather on the responsibilities of the majority community to understand and respect their neighbors, and how such respect ultimately benefits themselves.

Craig G. Sternberg, Matt Nier, Amy Williamson, Chad Jansen, Micheal Yohnk, and Thong Moua (155)
Faculty Advisor/Collaborator: Brady Foust and Lisa Theo
*Defining the Mississippi Delta*

The purpose of this project is to define the Mississippi Delta. The Delta can be defined in both physical and cultural terms. Physically, the delta is the land between the Mississippi River and the Yazoo River, south of Memphis. Culturally, the Delta has traditionally been seen as the epitome of the plantation south and its associated attributes. This project uses census and other data to map and define the delta based on socio-economic conditions including race, poverty, employment, occupational structure, and other factors. Our definition is then compared to earlier, traditional definitions.
Neil R. Trombly (158)
Faculty Advisor/Collaborator: Doug Faulkner
Electric Power Generation and Reduction of Greenhouse Gas Emissions: Antithetical Paradigms of France and Germany

France and Germany are primary and commensurate influences within the 20-nation European electric power grid but follow antithetical strategies for energy independence and avoidance of greenhouse gasses from electric power generation. Whereas France is the world’s most nuclear-powered nation and is committed to developing new classes of nuclear generating plants, both fission and fusion, Germany, although heavily dependent on nuclear-electric capacity, is committed to elimination of its nuclear park by 2020. Further, whereas Germany has sacrificed rural vistas and ridges to make windfarm electricity a primary national energy resource, France, despite considerable potential, has little windfarm generation and there is evidence of growing opposition to onshore windfarm development due to eyesore burden as already demonstrated within Germany. Windfarm opponents point out their visual clash as a backdrop to ancient rural villages, nuclear opponents point out their unsightliness along once-natural shores and long-term waste problems. Critically current common ground between these competing technologies is that neither produces global warming greenhouse gasses. This study looks at physical and cultural factors underpinning this pronounced divide between immediate neighbors and is based, in part, upon direct observations, photography, and interviews by the author in Europe during November, 2005.

Political Science

Adam C. Hinz (159)
Faculty Advisor/Collaborator: Justin Patchin
Cyberbullying: A Qualitative Study of Adolescent Social and Emotional Responses

Traditional bullying, both physical and social/emotional, has captured the recent attention of sociological and educational researchers. Increased levels of adolescent sadness, anxiety, and anger are agreed upon results of this phenomenon. In addition to its occurrence in traditional interactions, social and emotional bullying frequently occurs in the realm of digital communications. This digital form of harassment is broadly defined as cyberbullying. Current research of Internet-using adolescents provides evidence that social and emotional harassment—transmitted via popular digital communication—affects the well being of many adolescents. Even though the harassment is transmitted in a digital environment, the open-ended statements of cyberbullying victims demonstrate that emotional and social repercussions feel very real. This analysis categorizes free responses into emotions reported by victims of cyberbullying in order to support our belief that cyberbullying is a new form of digitalized bullying that deserves continued investigation. Future analyses of the data will attempt to provide support that the emotional and social strain caused by cyberbullying help perpetuate the phenomena in cyberspace and potentially increase levels of distress and delinquency in traditional situations, away from the computer.

Stanley J. Howard (186)
Faculty Advisor/Collaborator: Justin Patchin
Crime in Eau Claire, WI: The Effects of Social Disorganization on a Nonmetropolitan City

The effects of social disorganization have been positively associated with illicit activities that occur within a city (Shaw & McKay, 1942; Kornhauser, 1978; Sampson, Raudenbush, & Earls, 1997; Cancino, 2005). Due to this disorganization a community will be no longer able to instill the social constraints that are needed to ensure social control. One measure used to determine the disorganization is by locating burglaries and identifying areas throughout the city with high residential mobility and low socioeconomic status. This study seeks to relate that the effects of social disorganization in a metropolitan city is similar to the effects that are endured by a nonmetropolitan city. Therefore, a number of nonmetropolitan cities would benefit from implementation of programs that have been successfully used by metropolitan cities to reverse the effects of social disorganization.

Hannah Lott (160)
Faculty Advisor/Collaborator: Margaret Gilkison
From Women’s Movement to Political Equality: Comparative Analysis of Political Socialization and Participation of American and Swedish Women

This project will analyze the perplexing and important question of why the United States continues to have a sizable gender gap between male and female candidates and winners at election time. This project will compare the United States, a country where many more men hold political office than women, to Sweden, where men and women hold approximately equal numbers of political positions. The political socialization of the office holders in these two countries will be examined first. The history of the women’s movements in both Sweden and the United States will be analyzed, as well as changing political
socialization patterns and attitudes over time. This project will also examine the demographic characteristics of female politicians by age, educational level, and type of political position held. The role of outside forces (such as interest groups and political parties) in the recruitment and election of female candidates will be explored. This project will examine what female politicians in both Sweden and the United States believe to be key policy issues and what action they have taken on these issues.

**Psychology**

**Julie Ackerlund** and **Sara Weinkauf** (86)
Faculty Advisor/Collaborator: **Kevin P. Klatt**

Comparing Two Different Procedures on Teaching Children Diagnosed with Autism

Research up to this point has suggested that some teaching systems are more effective than others. In particular, teaching with a simultaneous prompt has been said to be a better teaching tool, presumably because the children are not given the opportunity for error. This study compares the simultaneous prompting procedure with a constant prompt delay procedure. The results from this study have shown that there is very little difference between the two procedures. The results did show, however, that the constant prompt delay procedure was slightly more effective than the simultaneous prompt delay. This suggests that the constant prompt delay procedure may be more effective than the simultaneous prompting procedure.

**Amanda J. Bever** and **Britta L. Fiksdal** (108)
Faculty Advisor/Collaborator: **Kevin P. Klatt**

An Intervention for Stereotypic Toe Walking in a Young Girl with Autism: Self-Monitoring and Differential Reinforcement of Incompatible Behavior

Stereotypic toe-walking has been observed in normally developing children as well as children with developmental disabilities including autism. Relatively few studies have investigated the treatment of stereotypic toe-walking in children with autism, and no studies have explored the use of a self-monitoring device or differential reinforcement of incompatible behavior (DRI) as a treatment for toe-walking. The present study investigated the efficacy of a DRI procedure used in conjunction with a self-monitoring device to reduce stereotypic toe-walking in a six year-old girl with autism. A multiple-probe with reversal design across settings was used to demonstrate the effectiveness of the two procedures. The results showed a decrease in toe walking across both settings.

**Kelli B. Capocasa** and **Kristina L. Chase** (109)
Faculty Advisor/Collaborator: **April Bleske-Rechek**

Personal and Relationship Correlates of Intimate Sexual Activity among Young College Couples

Much research has been devoted to documenting individuals’ life-time rates of engaging in various sexual behaviors, such as vaginal and oral intercourse. Little research, however, has identified variables that covary with young adults’ engagement in intimate sexual activities within the context of a specific dating relationship. As part of a longitudinal investigation of college couples’ sexual behavior, we collected data from 116 young adults involved in a heterossexual dating relationship. We found that with their current partner, 76% of the sample had engaged in vaginal intercourse, 72% had engaged in oral sex, and 15% had engaged in anal sex. Occurrence of anal sex within a relationship was not associated with relationship duration or with self and relationship evaluations. Vaginal and oral sex, however, were more common in relationships of longer duration; and participants who engaged in vaginal or oral sex reported a more unrestricted sexual strategy, higher levels of satisfaction with their current relationship, and more commitment toward their partner. Because sexual activity continued to predict relationship satisfaction and commitment after controlling for relationship duration, our findings suggest that relationship duration does not account for the positive link between intimate sexual behavior and relationship satisfaction.

**Regina Carroll, Sara Weinkauf, and Kelli B. Capocasa** (85)
Faculty Advisor/Collaborator: **Kevin P. Klatt**

The Use of Behavioral Procedures to Teach Vocal Verbal Behavior to Children with Autism

Many children diagnosed with autism do not learn to talk and, as a result, must communicate using sign language or pictures. In this study the effects of a stimulus-stimulus pairing procedure were used to increase vocalizations for two children diagnosed with autism. This procedure includes pairing a vocal sound with a preferred stimulus (e.g., toy) to condition automatic reinforcement. In addition, this study assessed the effects of direct reinforcement procedures to bring vocalizations under echoic control following the pairing procedure for one of the participants.
Opioid agonists increase eating under a variety of conditions. We tested the effects of the mu-opioid agonist DAMGO and the delta-opioid agonist DSLET in rats trained to discriminate 22 hours food deprivation from 2 hours food deprivation in a two-lever, operant choice task. After rats acquired the discrimination, subjects were food restricted for 2 hours and responded appropriately. Immediately after the response period, rats were injected in the paraventricular nucleus of the hypothalamus (PVN) with saline (0.5 µl), DAMGO (0.1-3 mol), DSLET (0.1-3 nmol), or neuropeptide Y (NPY; 0.8 nmol). One hour later, the discriminative stimulus effects were assessed. DAMGO and DSLET did not induce discriminative stimulus effects similar to 22 hours food deprivation at doses previously demonstrated to increase eating when food is freely available. As previously demonstrated, NPY induced discriminative stimulus effects similar to those of 22 hours food deprivation. These findings are consistent with hypotheses that 1) in the PVN, mu-, and delta-agonists increase food intake by increasing meal duration rather than initiating eating, and 2) NPY administered into the PVN appears to increase food intake by initiating eating.

Eric Ewan (87)
Faculty Advisor/Collaborator: David Jewett

*Effect of Opioid Agonists in Subjects Trained to Discriminate 22 from 2 Hours Food Deprivation*

Random payoff amounts are a salient feature of the consequences of gambling (e.g., the payoffs of a slot machine are random amounts). Animal foraging research suggests that an animal’s tendency to choose either a fixed or a random reward amount is determined by its energy budget. Specifically, as an organism’s daily energy intake falls below its energy output requirements, it should engage in risk-taking—preference for a random over a fixed payoff amount. By contrast, the behavioral economic concept of unit price holds that preference is determined by a cost/benefit ratio (number of responses divided by payoff amount). Thus, preference should be unaffected by random- and fixed-amount schedules when the average amount obtained on a random-amount schedule is equivalent to that obtained on a fixed-amount schedule. We tested this prediction using four pigeons working in a choice and a non-choice context, in a closed economy (no feeding outside of the study sessions), across a wide range of prices. In both contexts, no preference was observed between reward types. These results are consistent with the behavioral economic concept of unit price and suggest that random payoffs may not be that important in maintaining gambling behavior.

Kelsey Fasteland and Stephanie Preder (131)
Faculty Advisor/Collaborator: April Bleske-Rechek

*Self-Friend Agreement and Assortment in Same-Sex Friendship: Why Sexual Strategy Matters*

Same-sex friends are unique in their potential to both facilitate mating (e.g., through networking) and impede mating (e.g., through rivalry). If humans have an evolved friendship psychology that guides the selection of friends who facilitate rather than impede mating, then they should demonstrate sensitivity to the sexual strategy their friends pursue. In the current study, we investigated self-friend agreement and assortment on sexual strategy among 43 male and 99 female same-sex friendship pairs. Men, and especially women, showed high self-friend agreement on sexual strategy. High agreement coefficients endured after controlling for assortment on sexual strategy; and near-zero correlations among numerous sets of randomly constructed friendship pairs suggest the friendship correlations are valid. Female but not male friendship pairs demonstrated moderate assortment on sexual strategy. We discuss potential links between degree of assortment on sexual strategy and women’s perceptions of friendship trueness, friendship stability, and rivalry in the friendship.

Shannon Huff (63)
Faculty Advisor/Collaborator: Catya von Károlyi

*Parental Expectations and Achievement in Gifted Students*

The goal of this study is to determine if a relationship exists between the perceptions gifted students have of their parents’ expectations and their academic achievement. A questionnaire will be mailed to junior high students in the Eau Claire school district who have been identified as Gifted and Talented in at least one area. The results of the study will be analyzed to determine if there is a correlation between perceived parental expectancy and achievement levels of gifted students.
Hannah Jones (64)
Faculty Advisor/Collaborator: Catya von Kàrolyi
*Teachers’ Purposes for Taking Field Trips and Student Body Economic Status*

Do teachers’ purposes for and expectations of field trips differ in schools serving more economically disadvantaged students than in schools serving fewer economically disadvantaged students? In order to explore this question (as part of a larger study), we administered the Teacher Feedback Form (FTM-T) to teachers working in the Eau Claire school district. The Teacher Feedback Form (FTM-T) is made up of a series of questions relating to expectations and preferences for resources, exhibits, special programs, and field trip history. Teachers also provided information about their teaching experiences and answered demographics-related questions. Teacher response allowed us to examine the relationship between teachers’ purposes for taking field trips (academic versus pleasure or reward) and the economic status of the school’s student body (as measured by incidence of free and reduced lunch applications). We predicted that lower economic status would be associated with less emphasis on academics during field trips. Results will be discussed.

Lindsay Matteson, Brittany Gragg, and Corey Stocco (110)
Faculty Advisor/Collaborator: April Bleske-Rechek
*Getting Both Sides of the Story: Sexual Attraction and Sexual Events between Opposite-Sex Friends*

Substantial debate exists on whether opposite-sex friends experience sexual attraction to one another and, if so, whether that attraction adds spice or strife to the friendship. Little systematic research has evaluated these questions; however, of the studies that have been conducted, none has aimed specifically at asking both members of opposite-sex friendship pairs for their perceptions of one another. In the current study, 89 pairs of young adult opposite-sex friends (mean friendship duration = 2 years) reported on their friendship. Men reported more sexual attraction to their friends than did women, and this sex difference endured after controlling for men’s greater sexual unrestrainedness. Men overestimated, and women underestimated, their friends’ attraction to them. Approximately 25% of friendship pairs had romantically kissed, and over 10% had “fooled around.” Attraction to friend was not related to friendship duration, and sexual events occurred at various time points in the friendship, suggesting that attraction to friends isn’t necessarily something that is “overcome” with time. We discuss our findings in the context of mainstream literature suggesting that opposite-sex friendships are inherently platonic.

Libby Melsness and Joseph Milburn (106)
Faculty Advisor/Collaborator: Blaine Peden
*Ethical Considerations in Undergraduate Teaching Assistants*

Keith-Spiegel et al. (2001) noted that graduate teaching assistants (GTAs) have an ambiguous role within higher education because they are neither just students nor independent educators. Assessment of graduate teaching assistants has found that there is a high level of risk for unethical behavior for teaching assistants at the graduate level (Branstetter & Handelsman, 2000). However, research in this area is limited and there has been no parallel research at the undergraduate level to assess the ethics and ethical considerations of undergraduate teaching assistants (UTAs). Our research examines this unexplored area of ethics for undergraduate teaching assistants. Our results indicate some of the ethical considerations and sensitivities of undergraduate teaching assistants. Our discussion suggests ways to promote ethics and an ethical understanding of UTAs for both faculty and teaching assistants at the undergraduate level.

Robin Panske and Rebecca Ringersma (130)
Faculty Advisor/Collaborator: Lori Bica and April Bleske-Rechek
*Undergraduate Students’ Beliefs about Eight Core Issues of Personality*

Forty undergraduate students enrolled in Theories of Personality participated in this study of beliefs about eight core issues of personality (e.g., behavior as driven by situation vs. inherent dispositions, conscious vs. unconscious). At the beginning and end of the semester, students completed a questionnaire designed to measure beliefs about the eight core issues. At mid-semester, participants completed the Multidimensional Personality Questionnaire (Tellegen, 1982). We were specifically interested in students’ scores on the trait absorption, which serves as a marker of the big five personality factor, from openness to experience. Individuals high on openness are imaginative, creative, and curious. We investigated whether changes in thinking about the eight core issues of personality occurred over the course of the semester and whether students with higher absorption scores were more likely than those with lower scores to reason relativistically about the issues.

Relativistic reasoners are willing to give up the possibility of absolute truth in favor of multiple truths, each relative to its context (Perry, 1970). Dualistic thinkers have a greater tendency to divide information, values, and authority into right and wrong, and good and bad. We discuss the potential influence of personality on the way one reasons about personality.
Karin Rasmussen and Andrea Lueck (83)
Faculty Advisor/Collaborator: Blaine Peden and William Frankenberger
Effects of Information on Perceived Efficacy of Antidepressants: Possible Interventions

Previous research indicates that antidepressant advertisements produced by pharmaceutical companies depress college students (Frankenberger et al., 2004). In addition, students who read advertisements about antidepressants were significantly more likely to recommend antidepressants for themselves and, in some cases, for others (Frankenberger et al.). The present study replicates and extends the Frankeberger et al. (2004) study by using more adequate samples and investigating interventions that counter the depressing effects of antidepressant advertisements. This study will utilize interventions that most likely reflect available real-world information. Participants were given the Beck Depression Inventory II (BDI-II) to control for possible confounding effects related to participants who are clinically depressed. This study utilized four groups of participants. The first group acted as a control, the second group received an intervention, the third group received antidepressant ads, a handout containing information about the side effects of antidepressants, and the opinion survey, whereas the fourth group received the antidepressant ads, a lecture about the side effects of antidepressants, and the opinion survey. We anticipate that those participants who received the interventions containing information about the side effects of antidepressants will be less depressed and also view antidepressants as less appropriate for themselves and others.

Mark Remiker, Jonathan Baker, Allison Pike, and Erica Bodenstab (132)
Faculty Advisor/Collaborator: April Bleske-Rechek
Assortative Mating among Dating Couples: The Case Against Phenotypic Convergence

Research on married couples has documented positive assortment on intelligence, attractiveness, values, and, to a lesser degree, personality; further, marital assortment has been linked with marital satisfaction. In the current study, we extended past research on assortment in three ways. First, we tested the hypothesis that if partners mate assortatively (rather than converge over time), then assortative mating coefficients for dating couples should be similar in magnitude to those found for married couples. Second, we investigated couple assortment on individual difference variables not previously studied, including sociosexual orientation and jealousy. Third, we investigated links between assortment and dating partners’ relationship satisfaction. Thus, 50 heterosexual dating couples completed a variety of self-report measures and had their pictures taken for outsider attractiveness ratings. We found moderate assortative mating coefficients that endured after controlling for relationship duration, thus furthering the case that individuals select similar others as mates. Partners also were moderately similar on sociosexual orientation and physical attractiveness. We discuss the importance of distinguishing between self-perceived similarity in attractiveness and other-rated similarity in attractiveness for predicting relationship satisfaction. Overall, our findings suggest that assortment is one of the most common systematic mating patterns among humans.

Chelsey A. Sutton, Emily J. Mack-Olson, and Karin Rasmussen (111)
Faculty Advisor/Collaborator: Gregory J. Madden
Process Improvement in a Clinic Setting: An Application of OBM

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

Sarah Szynanski (184)
Faculty Advisor/Collaborator: Susan Turell
LGBT Language Use to Describe Intimate Partner Violence

Many individuals in the world today classify intimate partner violence (IPV) as a heterosexual problem, including language. Our convenience and snowball sample was the LGBT communities in the state of Wisconsin. Participants completed an online survey on LGBT violence and language and were asked to complete a demographic section asking questions of age, gender identity, sexual orientation, and zip code. Four different scenarios depicting gay male, lesbian, bisexual, and transgender IPV were given. Participants entered words they would use in a search engine (e.g. Google, etc.) to make an inquiry for help. The words chosen will be qualitatively analyzed to find the best word choices for each vignette situation. We distributed this survey via Internet on Survey Monkey.
Arienne Walker and Wendy Wagner (107)
Faculty Advisor/Collaborator: Blaine Peden
*Parental Involvement in the Lives of Millennials in College: Progress Report*

The idea for this study originated with a member of Counseling Services who attended a conference discussing the Millennial generation and new problems facing institutions of higher education related to parental involvement. Some of these problems include increasing numbers of parents contacting university staff about students’ grades, housing problems, peer issues, etc. Previous research suggests that problems like these may be due to a conflict of interest between the Millennial and Baby Boomer generations. This study will measure the level of parental involvement in the lives of millennial students in college and will compare this measurement to the expectations Millennials and parents have of appropriate parental involvement. Researchers will conduct an analysis of the Millennial generation (consisting of recent college graduates to today’s college freshman) and the Baby Boomer generation (the Millennials’ parents). Researchers will analyze the differences between these generations and how these differences affect the perceptions and expectations of both groups. In addition, researchers will analyze how the problems caused in institutions of higher education (as a result of this generational conflict) may be approached and solved. The researchers hypothesize that Millennials will desire less actual parental involvement in their academic lives and more general parental support overall.

Jason Wiebelhaus, Adam Dunn, Travis Smith, Tracy Schweiner, Emily J. Mack- Olson, A.J. Kwilasz, Lindsay Johnson, Rachel Tham, Natalie Kramer, Eric Ewan, and Matthew Wagener (105)
Faculty Advisor/Collaborator: David Jewett
*Effects of Corn Oil on Reports of “Hunger”*

Obesity is a leading preventable cause of death among humans. We developed a preclinical model of “hunger” to help identify potential treatments for obesity. We trained subjects to discriminate between the stimulus effects produced by 22 hours food restriction (e.g., “hunger”) and 2 hours food restriction (e.g., “satiation”). Previously, in subjects food restricted for 22 hours, 20 minutes food consumption induced “satiation” responses, while saccharin consumption did not. Consumption of larger sucrose concentrations resulted in a partial decrease in the stimulus effects produced by 22 hours food deprivation. This study examined the effects of corn oil (15% and 100%), sucrose (10% and 32%), and food on the stimulus effects produced by 22 hours food deprivation. Sucrose and food produced effects similar to those previously reported. After 20 minutes consumption, the larger concentration of corn oil (100%) produced a partial decrease in the reports of “hunger,” whereas 15% corn oil did not alter reports of “hunger.” After 2 hours consumption, both concentrations partially reduced the effects of 22 hours food deprivation. To date, our results indicate that consumption of liquids is less effective than food in reducing the discriminative stimulus effects of acute food deprivation.

**Psychology/Biology**

Jennifer Reinke and Elizabeth Hanson (82)
Faculty Advisor/Collaborator: Allen Keniston, Psychology, and Susan Krueger, Biology
*Self-Efficacy and Locus of Control as Predictors of the Efficacy of Teaching about Nutrition*

Recent research has demonstrated that lifestyle interventions are successful at reducing health risks associated with dietary habits. Researchers have used combinations of direct instruction, coaching, and counseling to help participants lose weight and make other lifestyle changes. Our project sought to learn (1) whether a classroom approach to nutrition education produces similar results, and (2) whether students’ success depends on having a personal sense of self-efficacy and an internal locus of control. One hundred and eighteen university students enrolled in a human nutrition course completed a dietary analysis twice during a semester and completed measures of self-efficacy and locus of control. Analyses evaluated whether those who had strong senses of health self-efficacy and locus of control initiated more pronounced improvements in their daily diets. Preliminary results indicate small but not statistically significant associations between the personality measures and dietary changes. Our final report will include a new sample of data collected recently and refined analyses of the personality measures and their relationships to dietary changes.
Psychology/Economics/Sociology/Curriculum & Instruction/Nursing Systems

Hannah Jones, Michelle Curci, Katie Keller, Beth Lutz, Amanda Lonsdorf, Amelia Brandt, Anne Marie Wilhelmy, and Alex Woita (112)
Faculty Advisor/Collaborator: Lori Bica, Psychology, Pamela J. Forman, Sociology, Eric Jamelske, Economics, Winnie Morse, Nursing Systems, and Deb Pattee, Curriculum & Instruction

Adventure Girls: A Holistic After-School Program for Pre-Adolescent Girls

This after-school program provides an intervention for vulnerable 4th & 5th grade girls at Longfellow Elementary school, which serves the largest percentage of low-income families and English language learners in the county. The program offers a holistic approach to their physical, intellectual, social, and moral needs. The goal is to address these needs and foster their team building and leadership skills as they transition into middle school. The wellness program addresses physical fitness, nutrition and health, study skills, team building, self-esteem, and self-image building. We will collect quantitative data in a pre- and post-test format with an assessment of self-esteem and body image. Our qualitative research will consist of participant observation, which involves taking field notes based on our observations, and a concluding focus group with the girls, which we will videotape and transcribe. We will combine these sources of data with additional baseline data on nutrition and wellness on children in the Eau Claire School District to apply for extramural grants on obesity and nutrition. We plan to present our study results at regional and national education meetings and hope to publish in journals in nutrition, well-being, and/or curriculum for elementary school children.

Katie Keller, Hannah Jones, Michelle Curci, and Beth Lutz (129)
Faculty Advisor/Collaborator: Lori Bica, Psychology, Eric Jamelske, Economics, Pamela J. Forman, Sociology, Deb Pattee, Curriculum & Instruction, and Winnie Morse, Nursing Systems

A Statewide Evaluation of the USDA Fresh Fruit & Vegetable Program in Wisconsin

Wisconsin was recently selected to participate in the United States Department of Agriculture Fresh Fruit and Vegetable Program. Twenty-five Wisconsin schools will be able to provide fresh fruit and vegetable snacks to students every day for one year. Additionally, the program includes various educational components designed to promote fresh fruits and vegetables as healthy food alternatives. In partnership with the WI Department of Health and Family Services, our project will evaluate student outcomes of the Fresh Fruit and Vegetable Program. In particular, we will document the effectiveness of this program in increasing fruit and vegetable awareness and consumption through increased exposure and education. Approximately 7,900 children in grades 4, 7, and 9 will participate in the evaluation including both treatment and matching control schools. We will measure: 1) fruit and vegetable consumption (behavior), 2) awareness of different fruits and vegetables (knowledge), 3) willingness to try new fruits and vegetables (attitude), and 4) consumption of less healthy foods (behavior). Our results will ultimately be compiled into a report to the U.S. Congress in support of permanent and expanded funding for this project in Wisconsin.

Sociology

Casey Anderson (84)
Faculty Advisor/Collaborator: Jeff Erger

Constructing Face in Faceless Communities

Erving Goffman’s Impression Management theory states that people present themselves as whatever is deemed appropriate to others in a group. Through a random sample of USENET postings including clichés, this study tests the effects of 1) the nature of the group type on cliché qualification, 2) differences in the use of the presentation strategy called “idealization” in different group types, and 3) the effect of “idealization” on qualification of clichés in communication. Clichés are seen as a repository of “cultural wisdom” and will be more in keeping with values underpinning traditional groups, thus qualification is expected more in nontraditional or “individualistic” groups. Analysis of Variance was used to test for these effects, and qualitative methods were used to expand on the quantitative findings. In general, the hypotheses are supported. Goffman’s theory explains how the group has strong effects on the impression management of individuals, and this research shows that these effects exist even in the world of text communication of USENET.
Paul Nikstad (62)
Faculty Advisor/Collaborator: Pamela J. Forman
“Look Honey! Our Waitress Is a He”: Gender Relations in Restaurant Serving

Despite women’s inroads into many occupations that were formerly male-dominated, serving at low-prestige restaurants continues to be primarily performed by women. Because women have conducted many of the prior qualitative studies, we devised a study primarily conducted by a man with both experience as a server and a cook. Nikstad’s informants knew that he was interested in a sociological perspective of the serving industry as he conducted one month of participant observation at the family-style restaurant where he worked. Then, he conducted focus groups with three groups of servers, which were videotaped. We used a grounded theory approach (Glaser and Strauss 1967) to code the transcriptions of the focus groups using a qualitative analysis program called Atlas.ti. We evaluate how low-level restaurant employees negotiate their gender and sexual identities in their positions as servers. Our case study of the strategies used by female and male servers raises interesting points about the construction of gender, sexuality, and power in restaurant serving.

Jennifer Thuente (61)
Faculty Advisor/Collaborator: Jianjun Ji
Assessing the Life Satisfaction of the Chinese Rural Elderly

Though studies on life satisfaction are not new, research on the life satisfaction of the Chinese rural elderly is rare. Using the 1992 China National Rural and Urban Elderly Survey Data, this paper attempts to explore the status and the determinants of the life satisfaction of the rural Chinese elderly. Applying the methods of descriptive statistics, Chi-square, and Multiple Linear Regression analysis, this study explores four areas of the determinants of life satisfaction in terms of demographic characteristics, economic status, social aspects, and psychological wellbeing. The findings show statistically significant and consistent support to the underlying hypotheses. Of particular interest, among the four areas of determinants psychological well-being has the strongest effect on the degree of life satisfaction perceived by the rural elderly.

Women’s Studies/Psychology

Nicole Mifek and Jill Greising (81)
Faculty Advisor/Collaborator: Susan Turell
Perceptions of Rape Responsibility and Support as It Relates to Alcohol Use

Previous literature has demonstrated gender differences regarding perceptions of responsibility surrounding sexual assault and coercion, which are highlighted when alcohol use is present during the rape. This study examined this phenomenon at UW-Eau Claire. Participants (college students at UW-EC) were given one of four scenarios, which varied alcohol use (or non-use) across a female victim and a male perpetrator of a rape. They were then asked to rate the degree of responsibility of both victim and the perpetrator for the sexual assault. They were also asked to indicate what they would give to the victim (their “friend”) about what to do next. Choices included reporting to police, seeking medical attention, seeking counseling, telling friends and family, and seeking other sources of support and/or referral. We hypothesized that men would assign a greater degree of responsibility for the incident than women if the victim is drinking, regardless of the drinking behavior of the perpetrator. We also predicted that women would assign more responsibility to the victim if she has been drinking, although not to the same degree as the men. We also predicted that victim drinking would change the advice given by both genders in the direction of keeping the incident more private. That is, we predicted that participants would be less likely to advise reporting or seeking any institutional services if the victim had been drinking. We also assessed perceptions about the impact of advice given if there is the potential that the victim will be charged for underage drinking. Given the climate of permissiveness regarding alcohol use in Wisconsin, and the prevalence of sexual assault among college students (estimated at 1/6 women in college), this study gathered data of importance relevant to education and prevention programs targeting both issues.
Business & Professional Studies

Accounting & Finance

Crystal Otto (171)
Faculty Advisor/Collaborator: D'Arcy Becker
Gender Differences in Student Ethics: Are Females Really More Ethical?

Investigations of gender differences in student ethics have yielded conflicting results. Some studies show no gender differences and others show significant differences. This study seeks to determine whether gender effects persist when a student’s major, school type (religious-affiliated or public), or overall level of religiosity are included in the analysis. Prior research has considered these variables by themselves, and each one would theoretically align students’ ethics, which would cause gender differences to disappear. Students at two universities participated in our research. Results from over 1,014 students reveal significant gender differences that do not fade as the three additional variables are included in the analysis.

Adult Health Nursing

Kristin Bieber, Kelsey Woychik, and Sarah Bruhn (152)
Faculty Advisor/Collaborator: Joan Stehle Werner
Daily Spiritual Experiences of People with Chronic Mental Illness

The aim of the present analysis is to describe Daily Spiritual Experiences as reported by approximately 30 people with various chronic mental illnesses (data collection is ongoing). Data analyzed is from a larger descriptive-correlational, not yet completed, study to explore spirituality, health, and quality of life of people with chronic mental illness. The instrument used is the Daily Spiritual Experiences Scale (DSES), developed by the Fetzer Institute in response to a report by the National Institute of Aging and the Fetzer Institute’s Working Group on religion, health, and aging. Daily spiritual experience is defined as a person’s involvement with God or the transcendent in daily life and encompasses behaviors, thoughts, and feelings in everyday life that relate to spiritual matters. The DSES is composed of 16 items representing nine dimensions: Connection with the Transcendent, Sense of Support from the Transcendent, Wholeness, Transcendent Sense of Self, Awe, Gratitude, Compassion, Mercy, and Longing for the Transcendent. The first 15 items are responded to in terms of frequency of experience. The final item is responded to using intensity. This presentation will include a description of responses to DSES items. Frequencies, percentages, and measures of central tendency will be reported.

Cassidy Phillips and Susan Karlman (151)
Faculty Advisor/Collaborator: Debra Jansen, Tiffany Ankeny, and Melissa Boellaard
An Evidence-Based Practice Approach to Assessing the Teaching of Gerontology Content in an Undergraduate Nursing Program

Elders are a rapidly growing segment of our society and are expected to constitute one in five Americans by the year 2030. The growing number of elderly clients is a concern since few nurses receive specialized education in the care of older adults. The Hartford Foundation Institute for Geriatric Nursing published a curriculum guide detailing essential gerontologic content for baccalaureate nursing education to assist programs in meeting the American Association of Colleges of Nursing recommended competencies and guidelines for geriatric nursing care. The Nursing Undergraduate Curriculum Committee at the University of Wisconsin-Eau Claire recently evaluated the undergraduate nursing program and raised concerns regarding the adequacy of the courses in addressing essential aging content. A recommendation was made to map the gerontology content in the curriculum. The purposes of this scholarship of teaching and learning project are to identify the specific gerontological content and the methods by which it is being taught in the undergraduate nursing program. Data from the content map will be compared to the Hartford Foundation curriculum guidelines, the literature, and other research-based recommendations for teaching gerontology. An evidence-based approach will be used to make recommendations regarding potential changes in the curriculum.
Jackie Rahm (162)
Faculty Advisor/Collaborator: Rita Sperstad
Exploring the Growth of Planted Seeds: Cultural Competence in Practicing Nurses

By the year 2050, almost 50% of the U.S. population will be ethnically diverse (U.S. Bureau of Census, 2004). This reality has created the necessity and professional mandate for culturally competent care. Meeting the health care needs of a culturally diverse society by culturally competent practitioners requires forward thinking and visionary leadership to courageously confront the assumptions that shape our individual and organizational cultures (Well, 2001). Critics ask how the education of health professionals is contributing to or improving this issue. This qualitative research study will explore the phenomena of cultural competence with the purpose of seeking to explore graduates’ perceptions of the effect of participation in an undergraduate cultural care course on their nursing practice. Purposeful sampling will be used with a total of 10-15 participants. Approval by IRB will be obtained. Data will be collected using the following tools. The subjects will be mailed and asked to complete: 1) a demographic data sheet, 2) the Transcultural Nursing Immersion Experience Questionnaire (TNIEQ), (Ryan & Twibell, 2002) and 3) a Critical Incident from Practice (Brookfield, 1990). A scheduled 30-60 minute tape-recorded interview with the participant will be done to discuss the critical incident. Anonymity and confidentiality will be maintained. Analysis of the data, discussion of the results, and implications to nursing education, research, and practice will follow in the future.

Communication Sciences & Disorders

Andrea Boh, Emily Csiacsek, Rachel Duginske, and Theresa Meath (173a)
Faculty Advisor/Collaborator: Linda Carpenter
Counseling Parents of Children with Childhood Apraxia of Speech

The purpose of this study was to examine the type of counseling parents perceive as most effective in helping them when their child is diagnosed with childhood apraxia of speech (CAS). CAS is a motor speech disorder characterized by severe deficits in the articulation of speech sounds, but with no obvious paralysis or weakness in the speech mechanism. CAS is a difficult diagnosis, and progress, although noted, may be slow. As a result, the diagnosis of this disorder may cause families to experience guilt, confusion, anger, and shock, which ultimately increase stress in families. A survey consisting of both open-ended questions and checklists was distributed to the members of the Apraxia-Kids list-serve. The survey asked specific questions about the feelings parents experienced when their child was diagnosed with CAS and the type of support they received from their speech-language pathologist after the diagnosis. Data analysis is currently in process and involves both qualitative and quantitative methods. The results of this survey will make a substantial contribution to understanding the methods of counseling that speech-language pathologists use.

Nicole Brantner, Molly Johnson, Stephanie Wilson, and Cora Sorenson (165)
Faculty Advisor/Collaborator: Linda Carpenter
Performance Equivalencies across Two Measures of Phonology

This study was designed to determine performance equivalencies for preschool-aged children between phonological deviancy scores on the Assessment of Phonological Processes – Revised (APP-R) and total of major phonological deviations on the Hodson Analysis of Phonological Patterns – Third Edition (HAPP-3). Preschool-aged children from the Eau Claire Area School District were tested in the Fall of 2005 on both measures; data analysis involved linear regression to determine equivalencies between performances on the tests. Results provided equivalency tables for scores on the two measures.

Kathleen Kuzma, Adam Slota, and Corinn Severson (173b)
Faculty Advisor/Collaborator: Larry Solberg
Acoustic Analysis of Pressed vs Resonant Voice

The purpose was to determine whether the Soft Phonation Index (SPI) and the Voice Turbulence Index (VTI) measures differ in vowels produced with resonant vs. pressed voice and to determine whether formant frequencies associated with tongue position differ in vowels produced with resonant vs. pressed voice. Voice samples of 26 college-aged females with normal voices were recorded in a sound-treated booth and analyzed using the Computerized Speech Lab and the Multi-Dimensional Voice Program. Subjects were trained in simulating resonant and pressed voice with the syllable string maaamamamamamamaamaaaa. The data analysis revealed significant differences in the acoustic measures between the two voice conditions suggesting that during the production of a pressed or strained voice the vocal folds are more tightly adducted and the tongue is in a lower position in the mouth. The results also suggest that the acoustic measures of SPI, VTI, and first formant frequency may be useful to clinicians in documenting change in voice quality in patients with disordered voices.
Lauren Winter, Ashley Gonyo, Courtney Ruffert, Jill Lyche, and Lauren Margolies (164)
Faculty Advisor/Collaborator: **Linda Carpenter**
*District and CESA Support for School-Based SLP’s Literacy Roles*

This study examined the ways Wisconsin’s school districts and CESA agencies support school-based speech-language pathologists (SLPs) in their literacy roles. Wisconsin SLP Program Support Teachers (PST) responded to survey questions about their perceived role in facilitating literacy, continuing education needs of school-based SLPs in the area of literacy, continuing education opportunities focused on literacy provided for school-based SLPs by their districts and/or CESA, and additional avenues of continuing education support for literacy recommended by PSTs for school-based SLPs. Data analysis is in process; results will show perceived roles, continuing education needs and opportunities, and additional continuing education recommendations by geographic region in the state.

**Kelly Yaeger, Rebecca Johnson, Chrissy Ross, and Nicole Stangler (172)**
Faculty Advisor/Collaborator: **Linda Carpenter**
*SLP’s Literacy Roles, Responsibilities, and Practices*

This study will examine Wisconsin school-based SLPs’ beliefs about their professional roles and responsibilities as well as their practices concerning literacy in kindergarten through grade 12. Subjects will be all SLPs employed in Wisconsin public schools (N= 1,817). Data will be collected via a web-based survey. Using a 5-point Likert scale, subjects will indicate agreement with statements about their literacy roles and responsibilities and their practices to carry out those roles. Questions will also address demographics. Descriptive statistics will be used to calculate mean ratings for each survey item. Inferential statistics, such as t-tests, will be used to determine differences in understanding of and beliefs about roles and differences in practice as a function of geographic location, years of experience, grade levels served, and case load size. Correlations also will be examined between reported beliefs and practices. Results will inform pre- and in-service educational experiences for SLPs in Wisconsin’s schools.

**Curriculum & Instruction**

Christine Dussault (149)
Faculty Advisor/Collaborator: **Ken Schmidt**
*Professional Learning Communities*

Professional development in schools has always been considered a high importance in America’s public education system. However, it was not until recently that there has been a shift in focus of professional development. The National Staff Development Council indicated that far too many schools devote attention to the activity of staff development (seminars, conferences, etc.), than to how it will benefit students (2001). Due to the many definitions of the term Professional Learning Communities (PLCs), many districts feel that they have implemented it within their school district. We contacted school districts in the Chippewa Valley (CESA 10) and asked about staff development in their districts/buildings. Over 80 schools were contacted and invited to respond to a short survey about the activity of PLCs. There was a follow-up questionnaire for the schools that indicated PLCs were indeed active in their district. An analysis of the data showed that the schools who responded to the study did not have students as the top priority for staff development. The research team is putting together a packet of information to the schools who participated that perhaps will help guide them towards making strides with the effectiveness of their professional development.

Erin F. Quinlan and Phong Xiong (140)
Faculty Advisor/Collaborator: **Robert Hollar**
*Community Case Studies in Collaborative Leadership*

The Community Case Studies in Collaborative Leadership project is designed to provide in-depth portraits of the leadership orientation and practices of Chippewa Valley region leaders in the Education and Human Sciences arena. The knowledge, skills, dispositions, and professional practices demonstrated by collaborative leaders at the local level serve as important models for undergraduates and new professionals as they develop their own professional identities. The subject in this study is an area middle school administrator working with a diverse school population. Using a case study methodology guided by grounded theory perspectives, we identified (a) diplomacy, (b) encouraging creativity, (c) embedding collaboration into daily activity for all students and staff, (d) facilitating a shared vision, and (e) advocacy for students and staff as five central dimensions of leadership-in-action valued by the administrator. The leadership characteristics demonstrated by the administrator are consistent with core “leaderful actions” and personal dimensions of collaboration identified in other
research settings. Contextual variables such as district mission and vision, school goals, and administrative policies act as filters influencing the implementation of collaborative practices and suggest dimensions for further study of leadership systems.

**Hannah Stander** and **Amy Koecheler (126)**  
Faculty Advisor/Collaborator: **Robin Umber** and **Lucianne Boardman**  
*Reading Partners: Building Success of English Language Learners*

The Reading Partners and Literacy Leaders programs are a collaborative effort between the Eau Claire Area School District and UW-Eau Claire. University students act as mentors for elementary school students in the Reading Partners Program, and Literacy Leaders are middle school students who meet as a group with a university student. Ninety percent of the children being served by the program are English Language Learners. The university students and the children meet each week to read together and engage in other literacy activities. The program has had good participation by university students and children over the years. The purpose of this descriptive study is to learn more about the benefits and challenges encountered by all groups impacted by the program. These groups include the university students, the children, their family members, and their teachers. Interviews and surveys were used to gain information from these groups.

**Family Health Nursing**

**Susan Karlman, Nicole Lange, and Kristin Brandenburg (161)**  
Faculty Advisor/Collaborator: **Susan D. Moch**  
*Public Health Content in Baccalaureate Nursing—Alaska, Minnesota, and Wisconsin*

The purpose of this study was to identify public health content and teaching processes important for baccalaureate nursing education in three different states. Information was solicited from faculty and public health providers, and syllabi from the nursing schools were reviewed. The impetus for this study was a curricular assessment of public health content and processes in one nursing program. In fact, the nursing program faculty was in the process of engaging in dialogue with local and regional public health department staff about curricular revision in public health content. This study was undertaken to provide more information for future curricular revision. The design for the study was descriptive and involved an open-ended, researcher-designed interview tool for use with both nursing faculty and public health providers. The data were analyzed by summarizing content and teaching processes described through the interviews and through the syllabi. A summary of the findings is presented along with reflections of the undergraduate student involvement in the process. Sharing the student experience may provide insight into the process of increasing interest in public health nursing.

**Foundations of Education**

**Lynn Emmons (139)**  
Faculty Advisor/Collaborator: **Dale Gable**  
*Best Practices in Teaching and Assessing Somali K-12 Learners*

Our school district in Barron, WI, has had an influx of Somali and Kenyan refugees within the past seven years. The community has banded together to provide services for these refugees as they adjust to Midwestern American culture and education. The focus of our research has been the difficulties and challenges faced by the Somalis in our educational system, their successes, and improvements we can yet make in their education. Research has been completed in what is currently working with the Somali populations in Wisconsin, Ohio, and Minnesota. The focus is on what works most successfully in teaching and assessing these students.

**Kinesiology**

**Melissa Paulson (145)**  
Faculty Advisor/Collaborator: **Lance Dalleck**  
*Comparing Cardiac Rehabilitation Outcomes in a Traditional versus Contemporary, Internet-Based Telemedicine Program*

**Purpose:** To determine potential significance of the outcome changes from baseline (BL) to 12-wk in a traditional program in Albuquerque, New Mexico (ALB) and a telemedicine internet-based program in Gallup, New Mexico (GAL). **Methods:** The patients in GAL had telemedicine appointments with the ALB cardiologist at both BL and 12-wks. Independent t-tests were performed to compare BL to 12-wk changes in outcome parameters between ALB (n = 152, 66.4 yrs) and GAL (n = 28, 64.8
yrs). Results: Comparisons of mean BL to 12-wk changes showed no significant differences (P > 0.05) between ALB vs. GAL programs: exercise (755 vs. 656 kcal/wk), SSP (-0.4 vs. -7.7 mmHg), DBP (-0.9 vs. -5.0 mmHg), Total Cholesterol (-10.1 vs. -8.6 mg/dL), HDL (+3.6 vs. +1.4 mg/dL), LDL (-12.5 vs. -7.8 mg/dL), Triglycerides (-8.9 vs. -16.3 mg/dL), and BMI (-0.1 vs. -0.3). Conclusion: Our data indicate that patients in an internet-based, telemedicine cardiac rehabilitation program have comparable results to patients participating in a traditional program.

Heidi Pederson (146)
Faculty Advisor/Collaborator: Lance Dalleck
Development of a Metabolic Equation for Elliptical Crosstrainer Exercise

PURPOSE: To develop an accurate metabolic prediction equation for elliptical crosstrainer (ECT) exercise. METHODS: Forty male and female subjects (age: 30 yrs; height: 173 cm; weight: 72.3 kg; body composition: 18.3 %) completed two randomized testing sessions. Steady-state oxygen uptake (VO2) was measured while subjects exercised on the ECT at nine separate workloads during each testing session. Steady-state VO2 measurements from the last 2 min of each workload were used to develop a metabolic prediction equation for ECT exercise. RESULTS: Multiple regression analysis was used to predict steady-state VO2 from: ECT resistance, ETC cadence, and subject body mass. These resulted in the following model: (R2 = 0.783): Steady-state VO2 = 3.5 + 1.5(Cadence) + 1.22(Resistance) – 0.11(Weight). Both the standard error of the estimate (SEE) and total error (TE) for the prediction of steady-state VO2, under all ECT workload conditions combined, was 2.8 mL/kg-1/min-1. The correlation coefficient between predicted and measured steady-state VO2 values was r = 0.89. CONCLUSION: SEE and TE values for the developed ETC metabolic equation are similar to those reported in previous studies investigating the accuracy of metabolic equations for other exercise modalities.

Management & Marketing

Zhanyi Chen (170)
Faculty Advisor/Collaborator: Rama Yelkur and Chuck Tomkovick
Chinese Consumers Country-of-Origin Preferences of Skin Care Products

After nearly three decades of market development, the Chinese marketplace today is complex, massive, and evolving at an amazing pace. The emergence of the Chinese market, potentially the world’s largest by the century’s end, has attracted significant investment from multinational companies around the world. This paper reports a study of Chinese consumers’ relative attitudes towards domestic skin care brands versus brands originating from five major trading partners—Britain, France, Germany, Japan, and the United States. Consumer attitudes toward various product-related dimensions, namely, quality, value, and image are linked with the brands’ countries of origin. The study also tests for relationships between country image and the product related dimensions for each country as perceived by Chinese consumers.

Amanda Sutherland (169)
Faculty Advisor/Collaborator: Chuck Tomkovick and Rama Yelkur
Does Hollywood’s Gamble with Super Bowl Ads Pay Off?

Super Bowl advertising receives considerable media attention each year, in part because of the large TV audience the event attracts. In 2006, 141.6 million viewers watched Super Bowl XL. This study examines Super Bowl advertising effectiveness from the Hollywood movie industry’s perspective and is an extension of Yelkur, Tomkovick, & Traczyk’s 2004 study. Movies studied included every movie released from 1998 to 2005 that cracked the U.S. Box Office Top 10 at least once. Comparisons are made between the U.S. Box Office results achieved from Super Bowl promoted movies vs. non-Super Bowl promoted movies. Conclusions are drawn and future research directions are outlined.

Mathematics

Matt Rasmussen (150)
Faculty Advisor/Collaborator: Halcyon Foster
Availability and Use of Technology in Mathematics Classes In and Around Eau Claire, Wisconsin

This project addressed factors that contribute to the use, or lack of use, of available technology in mathematics classes in middle schools and high schools in the Eau Claire area. The project was in two parts: the first was to ascertain what technology is available to local area schools, and the second was to discover what contributes to teachers’ choices in using this technology. Questionnaires were sent to area teachers investigating their knowledge and use of technology in the classroom. Results show that rural schools had less access to technology, and teachers were less trained in its appropriate use.
Teachers in larger districts had more access, but still did not use technology regularly in their classes. Many teachers were unaware of the variety of ways technology can be used in the mathematics classroom for applications other than simple computations.

**Nursing Systems**

Amy Junio and Sara Tinker (137)
Faculty Advisor/Collaborator: Lois Taft
*Teaching Pharmacology in Nursing: An Evidence-Based Practice Approach*

Nurses in hospital settings protect patients from complications of medications. Nurses not only administer medications, but they assess therapeutic and adverse effects and also educate patients about medications. The nursing licensing exam for registered nurses has recently increased the number of applied pharmacology questions. This makes pharmacology an important educational outcome. A task force of faculty and students was formed to evaluate pharmacology teaching/learning through the UW-Eau Claire nursing program. The purpose of this project is to analyze the evidence on teaching/learning strategies that support student learning about medication management and education for patients and families. This project includes a review of literature on teaching pharmacology in undergraduate nursing curricula, a content analysis of pharmacology in the current nursing curriculum, and a survey of baccalaureate and associate degree nursing programs in Wisconsin. The survey will document information about teaching strategies and integrated versus separate course offerings. Data from these sources will provide the basis for recommendations for potential changes in the current undergraduate nursing curriculum.

**Nursing Systems/Adult Health Nursing**

Jenna Meier, Kristin Seeger, Laura Slowiak, and Patricia Peterson (138)
Faculty Advisor/Collaborator: Cathy Cooper, Nursing Systems, and Winnie Morse, Adult Health Nursing
*Teaching End-of-Life Care: An Evidence-Based Approach to Nursing Curriculum Development*

To achieve the goal of providing high-quality care at the end of life requires that health care professionals have adequate educational preparation to meet the needs of patients and families at that time. An American Association of Colleges of Nursing document reported the conclusions of experts on the knowledge and attitudes required to provide high-quality end-of-life care to patients and families. Generally speaking, current education efforts are recognized as inadequate (Ferrell, Grant, & Verani, 1999; Mallory, 2003; Robinson, 2004). A review of the literature on teaching end-of-life care in nursing curricula was conducted to identify best practices in end-of-life education for nursing students. The goals of this study were to analyze the adequacy of end-of-life content in an undergraduate nursing curriculum, compare existing content with recommendations for end-of-life competencies, and use the data to strengthen integration of end-of-life content across the curriculum. Current end-of-life content met the majority of AACN competencies, although curricular content often lacked visibility, and opportunities for clinical application of end-of-life knowledge and skills are unpredictable. Findings will be summarized and recommendations for curricular change, outcome measurement, and further research will be presented.

**Psychology/Communication Sciences & Disorders**

Jennifer McCombs (163)
Faculty Advisor/Collaborator: Blaine Peden, Psychology, and Tim Lippold, Communication Sciences & Disorders
*Cochlear Implants: Medical Miracle or Cultural Destruction*

This research on cochlear implants focuses on whether or not it is ethical to implant a person with a cochlear implant. The Deaf culture believes that implants are nothing less than a form of cultural genocide, whereas the medical world looks at these devices as a way to “cure” a “disability.” This debate is one that is not going to go away any time soon; with technology advancing the debate is only going to keep growing.
**Public Health Professions**

Daniel Hehli and JonPaul Dragseth (127)
Faculty Advisor/Collaborator: Lee Anna Rasar

*Music and Oxygen Saturation Levels in Physical Therapy Patients*

Oxygen levels are often low in patients going through physical therapy in an inpatient setting. All data for this study were collected at an inpatient physical therapy center at a local hospital. The study was intended to determine whether exposure to music during physical therapy sessions would increase oxygen saturation in comparison to patients who were not exposed to music. Results showed no significant difference between the groups. Further research needs to be conducted to address variables not controlled in this study.

**Social Work**

Vanessa Hodgson (128)
Faculty Advisor/Collaborator: Ardyth Krause

*Social Work Services for Persons with Mental Health Disabilities: A Consumer Perspective*

The purpose of this study was to examine the quality of social work practice with persons with psychiatric disabilities from a consumer perspective. This qualitative study employed a semi-structured interview measure with a snowball sample of eight individuals with mental health disabilities. The instrument was created using questions used in earlier research, the researchers’ own questions, suggestions from social work practitioners, and a consumer. The findings indicated the most frequent themes were the roles of a social worker, the social work value of Dignity and Worth, the practice skill of active listening, and the ethical issue of boundaries. The roles most frequently referred to were enabler and broker. Self-determination, a component of Dignity and Worth, was viewed by this sample as not being enacted at all. Forming an equal partnership was viewed as occurring 50% of the time. Active listening skills were largely noted as being enacted in ways that were not helpful to the participants. Six of the eight times themes involving boundaries surfaced, the stories indicated inappropriate boundary maintenance. It was concluded that while consumers appear to hold the same ideals as the profession of social work, this vision is not always occurring in actual practice.
Natural & Physical Sciences

Biology

Tom Anderson (93)
Faculty Advisor/Collaborator: Chris Floyd
The Influence of Habitat Quality on Biparental Care in Red-naped Sapsuckers

Biparental care is a common feature of avian breeding systems. However, theoretical work suggests that of the two parents, the male generally has less to gain from parental care. We investigated parental care in red-naped sapsuckers (Sphyrapicus nuchalis), a woodpecker that nests in aspen (Populus tremuloides) woodlands and feeds on sap from nearby willows (Salix spp.) in the western United States. We measured the rate at which parent sapsuckers fed their nestlings at nests located at various distances (close [< 25 m], medium [25-100 m], far [>100m]) from willows. Previous work suggested that sapsuckers prefer nesting in aspens near willows; i.e., quality of sapsucker habitat decreases at greater distances from willows. Thus, we predicted that the ratio of male-to-female parental care (measured as number of feeding trips to the nest per hour) would be higher at nests located further from willows, because males would have more to gain from parental care investment through greater offspring survival (i.e., male help at the nest is needed more in poorer habitat sites). Our results indicate no significant relationship between male parental care and nest-willow distance. Averaged over all sites, females fed young more frequently than did males.

Tom Anderson (94)
Faculty Advisor/Collaborator: Chris Floyd
Testing the Influence of Willow Proximity on Breeding Success in a Keystone Species: The Red-naped Sapsucker

Woodpeckers are considered “keystone engineers” because they excavate nest cavities that eventually become available to other bird species. In the aspen woodlands of western North America, red-naped sapsuckers (Sphyrapicus nuchalis) are the dominant primary cavity excavator, providing essential nesting habitat for several secondary cavity nesting bird species. The sapsuckers also excavate wells in willows (Salix sp.), providing a rich resource for > 40 species, including hummingbirds, chipmunks, and bees. Previous work found no sapsucker nests in aspen groves located > 1km from mature stands of willows, suggesting that distance between nest cavity and willows influences nest-site selection by sapsuckers. In a study of sapsuckers in Gunnison County, Colorado in the summer of 2005, we found a negative relationship between distance to willows and the rate at which nesting sapsuckers were fed (number of feeding bouts per hour). Our results suggest that increased travel time between willows and the nest negatively influences reproductive success in red-naped sapsuckers; consequently, sapsuckers may preferentially select nest sites close to willows.

Anthonia Arikawe and Amanda Bretl (71)
Faculty Advisor/Collaborator: Winnifred Bryant
Role of Environmental Estrogens in Breast and Uterine Cancer

The steroid hormone estrogen (17 beta estradiol, E2) is produced by the ovaries and targets a number of tissues in the body. Of particular interest to these studies, it maintains the structure of the breast and uterus and governs the process of growth in both of these tissues. The actions of E2 in reproductive tissues are mediated primarily by the protein estrogen receptor alpha (ER alpha), although other isoforms of the estrogen receptor exist. The actions of E2 may be mimicked by a number of compounds, including phytoestrogens (found in plants) or xenoestrogens (common components of industrial pollutants). In many instances, the amount of the estrogenic compounds required to activate ER differs from that of 17 beta estradiol. E2 mimics may also employ a unique mechanism of action at the target tissue that differs from that of 17 beta estradiol. These studies measured the expression of ER alpha in a breast cancer cell line (MCF-7) and uterine cancer cell line (HEC-1B) using Western blotting techniques. In addition, HEC-1B cells were transiently transfected; reporter assays were used to measure transcriptional activity stimulated by 17 beta estradiol and the phytoestrogen genistein.

Brett Buckley (95)
Faculty Advisor/Collaborator: Todd Wellnitz
Prey Capture by Dragonfly Nymphs across a Light Gradient

We examined how nymph predation is influenced by light intensity and whether tactile senses influence prey choice and capture rates. It is clear that dragonfly nymphs use their large compound eyes for prey capture; however, the extent to which
predation success depends on vision has not been quantified. Preliminary experiments conducted in light and dark revealed that nymphs do capture prey in the dark; however, success rates appear to be related to prey characteristics such as size, mobility, and mode of movement. For example, dragonfly nymphs consumed approximately 4X as many Daphnia magna in the light as compared to dark (p = 0.006), whereas for water boatmen (Corixa sp.), there was a trend for greater consumption in the dark (p = 0.07). Continued experiments in the laboratory will examine 1) how prey selection and capture success varies across a gradient of light intensity, and 2) the role of tactile sensory modalities (e.g., water pressure waves) on prey capture. Field studies will examine how dragonfly nymphs are distributed along natural light gradients and whether light levels correlate with prey choice.

Kevin Buffington (123)  
Faculty Advisor/Collaborator: Paula Kleintjes and Evan Weiher  
Response of Ground Dwelling Invertebrates to Changes in Prairie Community Composition

The objective of our project is to investigate the response of ground-dwelling invertebrates to changes in prairie plant species community composition as a result of reductions in fungal mutualists, interspecific competition, and available soil resources. The project is part of a long-term NSF-REU sponsored project that involves an experimental prairie located in Brackett, Wisconsin. The design entails 45 randomized replicates of four treatments: control, fungicide, fertilizer, and fungicide/fertilizer. We used one pitfall trap within each treatment to assess invertebrate richness (n=45). Traps were activated on 15 and 30 August, and samples were collected after 48 hours. Samples were identified to the lowest taxonomic level and analyzed by taxa and functional group. Species richness and abundance were lowest in the fungicide/fertilizer treatments in comparison to the control and fertilizer only treatments. Fungicide treatments alone had variable effects. The insect Orders Colembola, Hemiptera, Coleoptera, Diptera and Hymenoptera had the greatest taxonomic representation.

Ellen Christensen and Miranda Myers (70)  
Faculty Advisor/Collaborator: Sasha Showsh  
The Characterization of Novel Azo Dye-Degrading Bacteria

Azo Dye degradation is an increasing environmental concern about the appearance of color in wastewater generated from textile and paper companies. This has made the bio-treatment of dying effluents increasingly attractive to the industry. Azo dyes are reactive effluents and are generally considered to be recalcitrant against biodegradation. Azo dyes are characterized by the presence of one or more azo groups (-N=N-). Current methods for removing azo dyes are physiochemical techniques, such as absorption, chemical oxidation, photodegradation, or membrane-filtration; they are all expensive and unfeasible. Removal of dye compounds from wastewater is an important issue for dye manufacturers. Most of the microorganisms that have been shown to degrade azo dyes are anaerobic fungi and bacteria. We have isolated several aerobic bacteria that are able to degrade azo dyes. One of the isolates has been characterized as an endospore forming Gram-positive bacterium. This particular isolate is capable of degrading µg dye/ml. We are currently in the process of identifying the by-products of azo dye metabolism by this isolate as well as isolating the genes responsible for the metabolism of azo dye.

Amy Croswell and Alison Obr (72)  
Faculty Advisor/Collaborator: Lloyd Turtinen  
Gene Expression in Monocytic Cells Treated with Anti-Fungal Drugs

Membrane arrays representing 128 inflammation related or 128 signal transduction related genes were used to assess mRNA expression in THP-1 monocytic cells exposed to three different formulations of the anti-fungal drug, Amphotericin B (FZ, ABCD, ABLC). Arrays spotted with DNA from these genes were probed with biotinylated RNA from control or drug-treated monocytic THP-1 cells. FZ and ABCD, but not ABLC, substantially increased mRNA levels of a number of important inflammatory cytokines including Gro-B, MIP-1b, IL-8, and IL-1B above control levels. A second membrane array measured mRNA levels from 128 signal transduction related genes representing 18 different pathways. The drug FZ activated the most signal transduction pathways, while drugs ABCD and ABLC caused less modulation of gene expression. Nevertheless, there were some clear differences among drug treatments. The NF-kB pathway was activated with FZ and ABCD but not with ABLC, whereas the Protein Kinase C pathway was activated with all drug treatments. These results provide rationales for drug-induced side effects observed in patients taking FZ or ABCD and reduced side effects with ABLC.
Plant traits can influence species performance and therefore ecosystem function; however, we know little about how functional plant traits vary as a result of altered resources and interactions with fungi. Within an experimental grassland in which we altered the history of species arrival, the availability of nitrogen (by fertilizing) and the influence of mycorrhizal fungi (by applying fungicide that reduced MF colonization of roots by 50%), we sampled functional leaf traits in 76 species, and we had sufficient replication for statistical analyses for the most common 22 species. We found that leaf area, leaf percent dry matter content, blade percent dry matter content, specific leaf area, specific blade area, and chlorophyll content varied between taxa. Chlorophyll content was reduced by both nitrogen and fungicide. When fungi were suppressed, both SLA and SBA increased, while blade percent dry matter content decreased. Increased SLA with no change in absolute leaf area suggests that plants are allocating less energy to production of the structural components of the leaves as a result of stress. A lack of significant interaction between fungicide and taxa indicate that species are responding to fungicide in parallel.

Michael Davey (76)
Faculty Advisor/Collaborator: Daniel Herman
The YPD1 Protein of Candida albicans May Be Essential for Survival

Candida albicans is the most frequently isolated fungal pathogen in humans. It has been demonstrated that its ability to cause systemic infections is dependent on undergoing morphogenesis, the morphological change from yeast to filamentous growth. Morphogenesis occurs in response to a variety of environmental stimuli, including pH, temperature, and reduced nitrogen availability. Signal transduction pathways are used to detect environmental stimuli and transmit a message to the nucleus where differential gene expression ensues resulting in morphogenesis. We have previously identified the YPD1 gene, which encodes a phosphotransfer protein involved in a signal transduction pathway. We have attempted to create null mutants using two different methodologies but have been unsuccessful. The mutants isolated have all undergone a gene conversion event in which the mutants are now trisomic at the YPD1 allele. This suggests that the YPD1 protein may be essential for the survival of the yeast.

Josh Dumke (96)
Faculty Advisor/Collaborator: David Lonzarich
Removal of Small Woody Debris and Effects on Salmonid Spawning Habitat

Logging in past centuries has had an enduring impact on streams of Northern Wisconsin. Many streams of this region retain sand eroded from barren landscapes, covering formerly abundant gravel substrate. Spawning habitat scarcity is recognized as an impediment to salmonid production in these streams; consequently, a focus of stream management has been to restore spawning habitat by creating conditions that promote the mobilization and removal of accumulated sand. In this paper, we present the findings of a study on habitat recovery associated with restoration efforts undertaken by the WI DNR. Our goal was to describe habitat conditions (e.g., velocity, substrate) prior to and at different times (one month, one and two years) following restoration in three streams. The streams selected were narrow, shallow, and sandy bottomed. From each stream, reaches from 400-1200 meters in length were cleared of small debris, tall alders (Alnus incana) and embedded beaver dams. Surveys conducted both pre- and post-restoration revealed that habitat work caused significant erosion of stream channel material and exposure of underlying gravel. These changes occurred rapidly (8 weeks) and more importantly, appeared to be sustainable.

Michael Fell (117)
Faculty Advisor/Collaborator: Tali Lee and Evan Weiher
The Effects of Competition on Two Native Plant Species during Prairie Restoration: Results from Year One

Competition is an important process in natural environments, and it can greatly impact organism success. The goal of this experiment was to assess the effects of both above- and below-ground competition on plant performance, and it is part of a larger experiment assessing the effects of fertilizer and fungicide on community assembly during prairie restoration. The experiment was done using a factorial design where fungicide (18 mg chlorothalonil m-2 yr-1) and fertilizer (15 g N m-2yr-1 as NH4NO3) were each applied in 15 plots. Each plot had three competition treatments (no competition, below-ground competition, and full competition) in which two phytometers were grown (Heliopsis helianthoides and Andropogon gerardii). In A. gerardii, both size and flowering were reduced by root competition while only size was reduced by shoot
competition. In H. helianthoides, a reduction was seen in size and flowering with root competition only. Flowering was reduced more by competition when fertilizer was added. Competition similarly affected net photosynthetic rate per unit area (Area = μmol m-2 g-1) and specific leaf area. This experiment will continue for a second growing season.

Chelsea Gudgeon, Megan A. O’Brien, and Emily Watts (74)
Faculty Advisor/Collaborator: Julie Anderson
From Genes to Ecosystems: A Molecular View of Microbial Diversity in Different Plant Communities

Many activities that affect plant community assembly and species diversity can potentially affect the microbial communities in the soil. Understanding the responses of microbial communities to different drivers of plant communities is crucial since all organisms in the biosphere depend on microbial activity for continued cycling of nutrients and for driving above-ground ecosystems. In this study we propose to measure the diversity of soil microbes across the study plots in a large prairie restoration project. Molecular biological techniques provide a way to study bacterial diversity in natural environments. Soil DNA was extracted from soil samples, and part of the bacterial ribosomal RNA gene was amplified by PCR. The variation in sequence length is an indicator of the diversity of bacteria present in the soil. This variation was initially assessed using denaturing gradient gel electrophoresis, and data from those experiments will be presented. With the recent acquisition of an automated DNA fragment analyzer, we are now using a technique called automated ribosomal intergenic spacer analysis (ARISA), to assess fragment length variation, and initial results using this technique will also be presented.

Ryan T. Hietpas and Sam Jensen (69)
Faculty Advisor/Collaborator: Daniel Herman
Creation of an MBP1 Null Mutant Strain of Candida albicans

Candida albicans is the most commonly isolated fungal pathogen in humans. C. albicans is capable of causing a wide variety of diseases from superficial cutaneous and mucocutaneous diseases to life-threatening systemic infections in immunocompromised patients. The capacity to cause systemic infections has been linked to the ability of C. albicans to undergo morphogenesis, which is the conversion from a single-cell yeast to a filamentous morphology. Differential gene expression is required for morphogenesis to take place in C. albicans. Differential gene expression is achieved through the use of transcription factors that enable the expression of genes required for filamentous growth, while genes required for growth in the yeast morphology are inhibited. The MBP1 gene of C. albicans encodes a potential transcription factor that may play a role in morphogenesis. To assess the role of the MBP1 protein in morphogenesis, a null mutant strain of C. albicans in which the MBP1 gene has been disrupted is being constructed. The ability of the MBP1 null mutant strain to undergo morphogenesis will then be compared to that of the wild-type strain to determine if the MBP1 protein does play a role in differential gene expression resulting in morphogenesis.

Bill Hintz (99)
Faculty Advisor/Collaborator: Chris Floyd
Home Range of the Wedges Creek Wolf (Canis lupus) Pack

In this study I describe the home range and territory size of the Wedges Creek wolf (Canis lupus) pack located in west-central Wisconsin. The pack has no defined home range according to the Wisconsin Department of Natural Resources, and only a rough estimate exists of the range in which this pack conducts its normal activities. I used this estimate as a starting point to begin my research on measuring and mapping the home range and territory size of the pack beginning early December 2005 to May 1, 2006. I followed the pack’s activity using GPS to map the trails and points of activity; I found over 40 points covering roughly 25-30 square miles. My data, along with observations of resource availability to the wolves, suggest that the home range and territory size is about 25-30 square miles, covering much of the Clark County forest. I also determined the pack has four adult members and observed several RLUs with blood in the urine suggesting that the alpha pair was breeding. My data and pack size has led me to conclude that the pack may only need the 25-30 square miles I estimated to breed and survive “comfortably.”

Sarah Ivory (141)
Faculty Advisor/Collaborator: Kristina Beuning
Vegetation History of Lake Malawi, Africa over the Last 1.5 Million Years

Identification of fossil pollen deposits preserved in lake beds can provide a superlative record for the reconstruction of past climatic change in an area. Utilizing this technique, preserved pollen in sediment from Lake Malawi south-east Africa was used to delimit local vegetation shifts over the last 1.5 million years. Because of the dominance of grass (Poaceae) pollen in these sediments (> 50% in most samples) and the differential preservation of non-grass pollen and spores, we utilized the shifting ratio of Poaceae grains to that of montane taxa (Podocarpus, Ericaceae, Hagenia spp., Asclepias spp., and Olea
as a proxy for moisture and temperature change. Our results indicate identifiable shifts in this ratio that may be correlative to periodic changes in the magnitude of solar insolation in the southern sub-tropics. Such changes in solar insolation have been strongly implicated as a driver of regional and inter-hemispheric patterns of paleoclimatic changes throughout the terminal Pleistocene.

James Kasper (148)
Faculty Advisor/Collaborator: Daniel Janik
*Stimulation of Nonphotic-like Circadian Clock Resetting by Methamphetamine*

Previous work has shown that blocking beta-adrenergic receptors blocks circadian clock resetting induced by nonphotic stimulation in hamsters. As a complement to that outcome, we searched for pharmacological agents that stimulate adrenergic receptors and also induce nonphotic-like clock resetting. Of the various adrenergic stimulants we screened, only methamphetamine induced nonphotic-like circadian clock resetting. In the present study we tested whether methamphetamine acts similarly to other known nonphotic resetting agents. To do this we attempted to reduce clock resetting by administration of propranolol, haloperidol, and by exposure to a nest box.

David Koslov, Maria Paulina Duarte, Yaron Fireizen, and Ernest Ruiz (97)
Faculty Advisor/Collaborator: David Lonzarich
*Effects of Birth Date on the Growth and Survival of Juvenile Coho Salmon*

Birth date can be an important correlate to fitness in fishes. One common argument is that early hatching fish are larger and better competitors for limited space and food. Despite what might appear to be strong selective pressure for early emergence time, many species have prolonged emergence periods. One explanation is that the growth advantages of early birth date are balanced against increased risk of predation. In this study, we explore the relationships between birth date and growth and survival in juvenile coho salmon from streams in Washington and Wisconsin. From fish collected in spring and late summer, we use daily growth rings accrued in otoliths (ear bones) to estimate birth date. By comparing age-frequency curves for spring and summer samples we will generate age-specific mortality estimates. Size measurements taken for all fish will be divided by age to determine daily growth rates (mm/d). Our goal is to answer two questions: 1) are there differences in the growth or survival of early and late emerging coho salmon, and 2) how similar are patterns of growth and survival of coho salmon in two regions with very different environmental conditions.

Fong Lee (147)
Faculty Advisor/Collaborator: Daniel Janik
*Reduction of Nonphotic Resetting with Nest Box Confinement and a Beta Adrenergic Blocker*

Light-to-dark transitions cause clock-resetting of about 2 hours in hamsters. Propranolol, a beta adrenergic blocker, causes reductions in circadian clock resetting. Confinement to a nest box can also reduce resetting due to light-to-dark transitions. We asked whether a combination of nest box restriction and propranolol would further reduce resetting. At zeitgeber time 4.5, male Syrian hamsters were given either propranolol or vehicle with and without restriction to a nest box during a light-to-dark transition. Animals that had both restriction and propranolol showed a larger reduction in circadian clock resetting than animals with propranolol alone. The results indicate that nest box restriction enhances the reduction in clock resetting caused by propranolol, while propranolol does not enhance the reduction in clock resetting caused by confinement to a nest box.

Ka Lor (142)
Faculty Advisor/Collaborator: Kristina Beuning
*Holocene Shifts in Grass Community Composition along the Prairie-forest Ecotone in South-central Minnesota*

This study examined the carbon isotopic composition of charred grass (*Poaceae*) cuticle preserved in Holocene deposits within Kimbell Lake, south-central Minnesota. Kimbell Lake lies in a critical location along the current prairie-forest ecotone. As such, *Poaceae* fossils preserved in the sediments of this lake provide an outstanding record to test hypotheses regarding changes in grass community composition associated with climatically-driven longitudinal shifts in this boundary throughout the Holocene. Preliminary results indicate a mixed C3/C4 grass community from 10,000 BP to present with bulk delta 13C values ranging from -17 to -24 per mil. Surprisingly, an approximate 1000 year periodicity is evident in these results within shifts from more C3 (-24 per mil) to more C4 (-17 per mil) grasses occurring about every 500 years. These carbon isotopic shifts mirror closely changes in total charcoal influx to the basin. Thus, at present it is unclear whether our results represent real changes in grass community composition or reflect differential flammability of grass species biomass, with C3 species only burning extensively during periods of increased fire intensity.
Pat Murack (73)
Faculty Advisor/Collaborator: David Lonzarich
Relating Swimming Velocity to Tail-beat Frequency in Juvenile Salmonids

Brook trout is the only native salmonid in Wisconsin streams, but throughout this range it has been displaced by non-native brown trout, coho salmon, and steelhead. It is thought that interactions with exotics have contributed to brook trout declines, but the mechanisms responsible remain unclear. We report on the findings of a study whose long-term aim is to quantify the energetic costs of swimming and foraging in these co-occurring species. Employing a swim tunnel and video, we determined swimming behaviors in juvenile salmonids at different water velocities. The principal focus of our observations was the quantification of tail-beat movement, which can be used as a crude measure of swimming cost. Our specific objectives were to describe the relationships between swimming speed and tail-beat movements in all four salmonids and to determine whether morphological characteristics could explain tail-beat movement patterns. We continue to collect data, but thus far there does appear to be a difference among species in swimming performance. Ultimately, we anticipate that the results of this and future experiments on metabolism will yield insights into the kinds of habitats that are energetically favorable for brook trout and that might promote their coexistence with non-native salmonids.

Megan A. O’Brien (75)
Faculty Advisor/Collaborator: Joseph R. Rohrer
Molecular Systematics of Native American Plums: Tying Up the Loose Ends

For the past four years our research lab has been studying the relationships among the native plum species of North America using nuclear and chloroplast DNA sequences. In this last year of the project we tried to solve a few remaining problems before publishing our results. 1) Prunus alleghaniensis: We compared sequences of the rare Allegheny plum from populations on shale barrens in the Allegheny Mountains of Pennsylvania and from deep sands of central Michigan. 2) Prunus americana: Our earlier sequencing of the s6pdh nuclear gene in P. americana had revealed two different alleles in nuclei of three out of four samples. Over the summer more material of wild American plum was collected in Pennsylvania and Wisconsin to test the frequency and distribution of this polymorphism. 3) Prunus texana: Commonly known as peach bush or Texas almond cherry, P. texana had always been considered most closely related to other hairy-fruited species of Prunus, such as peaches and almonds, until recent evidence from chloroplast DNA placed it among the plums. We sequenced parts of two nuclear genes, and our results support its placement within the native American plum clade.

Amanda Plain (143)
Faculty Advisor/Collaborator: Kristina Beuning
Floral Survey of Boyd Park Nature Preserve, Chippewa County, Wisconsin

In 2004 the Chippewa County Land Conservancy (CCLC) began stewardship of a 24.45 acre (9.89 hectare) parcel, the Boyd Park Nature Preserve. Boyd Park is located next to Lake Wissota in Chippewa County. The objective of our research was to conduct biotic surveys to be used by the CCLC for guiding future management for the Preserve. We designed a size-appropriate network of transects and sized sampling plots. The research provides a baseline of semi-quantitative measurements of floral diversity in Boyd Park Nature Preserve to be used for developing a management plan for the acreage. Non-native or invasive species currently living within the Nature Preserve boundaries were recognized, and relationships between species were analyzed.

Lindsey Raymond and Paul Wratkowski (121)
Faculty Advisor/Collaborator: Paula Kleintjes
Foraging Patterns of Leaf Cutter Ants: Atta cephalotes

Leaf cutter ants, Atta cephalotes, are eusocial insects found in the tropics. They live in large nests (~20,000 ants) where they cultivate various fungi for food. The fungi are cultivated underground on leaves cut from nearby trees. Each colony contains a caste system in which each ant has a specific role. We studied various parameters of one colony in La Leona on the Osa Peninsula, Costa Rica, June 2005. We asked three main questions for our study: 1) Is there a correlation between speed and ant size on two different substrates? 2) Is there a correlation between leaf cutter ant length and leaf size carried? 3) What is the proportion of the various ant castes present on the foraging trail? We found that ant speed was nearly twice as fast on smooth, level substrates than on rough, rocky substrates. There was a slightly positive correlation between ant size and ant speed and no correlation between ant length and surface area on the leaf carried by the ant. We observed three castes (carriers, hitchhikers, and non-carriers) with a significantly greater proportion of carriers found on the trail compared to non-carriers.
Michael Schicker and Matthew Renkas (98)  
Faculty Advisor/Collaborator: Todd Wellnitz  
Influence of Tidal Pool Characteristics on Species Richness and Abundance along a Shoreline Elevation Gradient

Physical gradients are an important aspect of habitat structure that can establish species’ distribution and abundance. In tidal habitats, gradients of pool size and ocean connectivity may be important determinants of species richness. To test this, we examined 48 tidal pool communities over two days on San Salvador Island, Bahamas. Pools were located on high-tide or low-tide transects that ran parallel to the shoreline. Physical parameters measured were pool depth and perimeter. Pool depth ranged from 1 to 18 cm and perimeter ranged from 65 to 1226 cm. Species richness and abundance were determined by visual counts. Eight invertebrate and five fish species were found; the most abundant species were four-toothed snails (Netra spp) and gobies (Gobiidae), respectively. A t-test indicated that perimeter was highly correlated with species abundance (p<0.05) in both upper and lower tidal pools. Transect location was a significant determinant of species richness. Although total species richness was significantly correlated to depth in lower transect pools (p<0.05), it was not in upper transect pools (p=0.28). Fish richness and abundance were strongly correlated to both the depth and perimeter of the pool (p<0.05). Overall, pool perimeter was the most important determinant of species richness.

Michael Schicker, Alison Welin, and Matthew Renkas (118)  
Faculty Advisor/Collaborator: Tali Lee and Evan Weiher  
Associations with Soil Bacteria and Fungi Interact to Affect the Physiology and Growth of Red Clover in a Prairie Restoration Experiment

We are only beginning to understand the functional roles of species and the often underappreciated organisms with which they are associated, such as soil microbes. These interactions can exert controls on community aspects such as resource availability through nodulation (N2-fixing bacteria) and mycorrhizae (fungi). The objectives of this research were to investigate the response of a common prairie legume, Trifolium pratense (red clover) to fungal mutualists by determining how its growth and nodulation varied in response to reductions in mycorrhizae and increased nitrogen (N). We evaluated biomass distribution to aboveground parts and root nodules, percentage of roots colonized by mycorrhizal fungi, and photosynthetic rates to determine clover dependency on mycorrhizae. Fungicide significantly reduced mycorrhizal colonization by 39% compared to the controls. An increased proportion of biomass distributed to nodules in fungicide-treated plants suggests a compensation response to the potential loss of effective nutrients available to the plant due to reduced mycorrhizae. This compensation lessened with increased N. Reduced photosynthesis appeared to lead to reduced biomass in fungicide-treated compared to ambient grown plants. These results reinforce that mycorrhizae play an important role in legume growth and that plant associations with soil microbes can impact their functional roles in communities.

Michele Skahaug (122)  
Faculty Advisor/Collaborator: Paula Kleintjes  
Aquatic Invertebrates Associated with Macrophytes after the Elimination of the Winter Drawdown in Little Lake Wissota, Chippewa Falls, WI

Beaver Creek Citizen Science Center conducted a study during the summer of 2005 on distribution and abundance of aquatic plants (macrophytes) in Lake Wissota as a result of winter drawdown elimination. We examined the distribution and abundance of macroinvertebrates associated with macrophytes in the littoral zone of Little Lake Wissota. Plants and invertebrates were sampled at four depth zones (I:0-1.5 ft, II:1.5-5 ft, III:5-10 ft, and IV:10-20 ft) along 25 transects established around the lake perimeter. Collection of 12 species of macrophytes, with 11 species each presented in depths I and II and < 3 in depths III and IV combined during August 9-17. Elodea sp., Najas flexis, Potamogeton richardsonii and Vallisneria americana comprised the greatest frequency of zones I and II transects. Elodea sp. was found in all four depth zones and served as the substrate for the majority (42%) of invertebrate taxa. We collected a total of 6140 invertebrates that represented nine classes. Insecta (22%) and Crustacea (32%) were the most abundant classes across depths I-III. Order Diptera (primarily chironomid midge larvae) comprised the greatest number of the Insecta (93%) and all taxa combined. Orders Ostrocooda (36%), Amphipoda (56%) and Isopoda comprised the majority of Crustacea.

Artur Stefaniski, Michael Fell, Christine Dahlheimer, Kevin Buffington, Mary Jo Klinker, Christina Chalk, and Michael Schicker (119)  
Faculty Advisor/Collaborator: Tali Lee and Evan Weiher  
Multiple Controls on Grassland Plant Community Assembly, Diversity, and Ecosystem Processes: Effects of History, Mycorrhizal fungi, and Nitrogen in Year Two

While it is well known that a wide variety of factors can affect community composition, diversity, and ecosystem processes, we have a poor understanding of the relative importance of these factors. To begin developing a comparative approach, we
altered the history of plant species arrival (by altering the planting mixtures, from 6 to 31 native prairie species), the availability of nitrogen (by fertilizing), and the influence of mycorrhizal fungi (by applying fungicide that reduced MF colonization of roots by 50%) in an experimental grassland. After two growing seasons, we found that fungicide effects were generally stronger than nitrogen addition and seeding history. Primary production (biomass) decreased when fungi were suppressed, but added nitrogen had no effect. An alternative model showed that mycorrhizal fungal colonization of plant roots and location on the 4.5 ha site were principally affecting production. Analysis of covariance showed that species richness (at 250 m²) was reduced under fungal suppression, increased nitrogen, when no forbs were planted, and where production was increased. Similar results were observed for species density and plant community composition.

Matt Troia (120)
Faculty Advisor/Collaborator: Todd Wellnitz
Effects of Microsporidian Parasites on Life History Characteristics of Gammarus pseudolimnaeus

Microsporidian parasites are known to affect host fitness and may alter the ecological roles host populations play in their communities. Here we examine the effects of a microsporidian parasite on life history characteristics of the freshwater amphipod, Gammarus pseudolimnaeus, in Willow Creek, Eau Claire Co, WI. A 10-day feeding experiment showed that microsporidian-infected amphipods consumed fewer dead leaves than non-infected amphipods, and suffered higher mortality. A mate selection experiment determined that uninfected male amphipods paired more frequently with uninfected females when given a choice between infected and uninfected females. These data suggest that microsporidian parasites negatively influence feeding, survivorship, and mate selection in G. pseudolimnaeus. Future work will explore other aspects of this host-parasite relationship. In the laboratory, we will examine the parasite’s role in amphipod activity by quantifying the movement of uninfected and infected amphipods over the course of 24 hours. In the field, we will compare drift patterns of infected and uninfected amphipods to determine if this parasite influences upstream and downstream migration. Lastly, we will document microsporidian infection rates of G. pseudolimnaeus in Willow Creek to determine if parasite distribution varies along stream gradient.

Chemistry

Daniel Bates (47)
Faculty Advisor/Collaborator: Michael Carney
The Effect of Ligand and Metal Complex Geometry on Catalyst Performance

Chromium catalysts are used commercially to produce billions of pounds per year of high-density polyethylene and selected grades of linear-low density polyethylene. Attempts to model and improve upon these commercial catalysts have led many research groups to synthesize discrete organochromium complexes. Our research interests center on expanding the family of chromium catalysts to include those supported by neutral tridentate ligands. We previously noted reactivity differences for chromium complexes supported by facially (fac) and meridionally (mer) coordinating bis(2-pyridylmethyl)amine (BPA) ligands, with fac complexes displaying 40-50 times greater polymerization activity than their mer analogues. More recent work has focused on other fac and mer coordinating ligands to determine whether the activity differences noted above are observed for other tridentate ligand families. Selected x-ray crystallographic and magnetic susceptibility data as well as polymerization testing results will be presented.

Damon Campbell and Vinay Rao (50)
Faculty Advisor/Collaborator: Scott Hartsel and David Lewis
Environmental Effects on Newly Synthesized Probes

Newly synthesized probes have been developed at UW-Eau Claire and may ease the work involved in studying certain cellular organelles. Past work with these probes has revealed intense, punctuate fluorescent spots when put into live cells. Our results showed a quenching of probe fluorescence when located in buffer compared to solutions of membranes. In the presences of sphingolipid and cholesterol-rich “lipid-raft” domains, there were minor increases in fluorescence as well as a blue shift in emission (which may be due to environmental changes). Titration studies revealed variation in fluorescence when placed in different compositions of lipid mixtures, as well as variation in fluorescence in solvents of different polarity. Through incrementally adding water to the solvents, a marked decrease in fluorescence was noted. These results may indicate that these probes could be used to measure water content in cells.
Frank Emmert and Brian Hon (53)
Faculty Advisor/Collaborator: Alan Gengenbach
Metalloporphyrin Catalyzed Oxidation of Azo Dyes

Azo dyes are chromophoric aromatic compounds with conjugated ring systems linked together by an azo (-N=N-) group. They are often used in textile production as coloring agents and are very hard to break down into safer products. We are currently trying to oxidize azo dyes into more environmentally friendly chemicals by catalyzing the reaction using metal porphyrins. We are developing a way of breaking down the dyes Methyl Yellow, 4-phenylazophenol, 4-phenylazoaniline, Sudan II, Methyl Red, and para-N-methylaminobenzene using iron and manganese porphyrins as catalysts. We have been experimenting using many different oxidants to determine which one reacts most readily with our dye and our oxidant. Most recently, we have used bleach, hydrogen peroxide, MCPBA, and PHIO as oxidants. We will show in this poster that a metal porphyrin will work as a catalyst in the presence of low concentrations of oxidant and dye.

Deidra Gerlach and Laura Balow (48)
Faculty Advisor/Collaborator: Michael Carney
Synthesis, Structures, and Ethylene Polymerization Reactivity of Late Transition Metal Complexes Incorporating Tridendate Imine-Based Ligands

Transition metal catalysts are used commercially to produce billions of pounds per year of various polymers, including ethylene-based oligomers, polyethylene, and polypropylene. In an attempt to model and improve upon commercial systems, discrete organometallic complexes incorporating various bi- and tridendate ligands have been explored as polymerization catalysts. In particular, late transition metal (Fe, Co, Ni, Pd) compounds incorporating pyridinebis(imine) or bis(imine) ligands have proven to be especially effective for producing a broad spectrum of products, ranging from oligomers to highly branched polymers. We have sought to expand the family of late metal catalysts by supporting these metals with tridentate, imine-based ligands that incorporate additional heteroatom (N, O, P, S) donors. Synthetic schemes have been developed for the ligands and for the resulting manganese(II), iron(II), and cobalt(II) complexes. Selected x-ray crystallographic, spectroscopic, and magnetic susceptibility characterization data as well as polymerization results will be presented.

Amber Hertz and Matthew Giese (52)
Faculty Advisor/Collaborator: Warren Gallagher
FTIR Studies of the Structure and Dynamics of Proteins in Solution

Fourier transform infrared spectroscopy (FTIR) is a method that can be used to identify secondary structures in peptides. We are using FTIR to monitor the secondary structure of small peptides derived from a longer peptide that forms amyloid fibrils in Alzheimer’s disease. The secondary structure of peptides is known to be β-sheet. We have used FTIR to look at four peptides we have synthesized. One is the wild-type peptide, Aβ(25-35)WT, which has the same amino acid sequence as residues 25 through 35 of the full-length Alzheimer’s peptide. Two others are the same as Aβ(25-35)WT, but with one of their two isoleucines amino acids switched for a lysine: Aβ(25-35)I31K and Aβ(25-35)I32K. The fourth has the same amino acid composition as Aβ(25-35)WT, but scrambled: Aβ(25-35)SCRAM. We have observed that all four of these peptides form a β-sheet structure when dried as films onto the surface of a ZnSe crystal and exposed to water vapor. The rate of β-sheet structure formation varies markedly among the four peptides, from instantaneously for the Aβ(25-35)SCRAM peptide, to minutes for the Aβ(25-35)WT and Aβ(25-35)I31K peptides, to hours for the Aβ(25-35)I32K peptide. Our goal is to devise a method to monitor amyloid fibril formation in real-time.

Justin Kumpfer and Paul Riedel (46)
Faculty Advisor/Collaborator: Kurt Wiegel
Naphthoic Acid Derivatives as Hydrogen Bond Donors in Supramolecular Materials

A series of main-chain supramolecular liquid crystalline polymers constructed from 6-hydroxy-2-naphthoic acid have been synthesized and characterized. These associative chain structures have enantiotropic nematic and smectic phases. The materials were analyzed through differential scanning calorimetry and thermal optical microscopy. The clearing temperature of the complexes increased as the length of the rigid bispyridyls and decreased as the length of the flexible chain increased. Additionally, a series of supramolecular polymers were assembled using linear, non-rigid bis(thiopyridyls). These materials were non-mesogenic but produced long, stable fibers when pulled from the isotropic melt.
Robyn L. Laskowski, Leah L. Groess, and Andrew J. Wagner (51)
Faculty Advisor/Collaborator: David Lewis
Synthesis of New Fluorescent Naphthalimides

The synthesis of fluorescent N-alkyl-4-alkylamino-1,8-naphthalimides carrying a carbohydrate in the side chains may provide key new compounds for labeling a wide range of biologically important molecules for use in fluorescence microscopy. These compounds will be prepared by the reaction between a suitable carbohydrate derivative and a suitable naphthalimide precursor. The synthesis of new N-alkyl-1,8-naphthalimide derivatives carrying a sulfonylaziridine group will be described, and progress towards using these compounds to incorporate the carbohydrate group will be discussed.

Theran Riedel, Kimberly Kranski, and Peter Shafe (45)
Faculty Advisor/Collaborator: Marc McEllistrem
Cu(II) Binding to Methanobactin

Methanobactin is a copper-containing “chromopeptide” that is involved in the function of the enzyme methane mono-oxygenase (MMO). It also works to collect and transport Cu(II) ions from the environment into the host bacteria, as well as sequester and detoxify copper ions inside the bacteria. The study carried out here examines the oxidation state of the copper ions and elements comprised in methanobactin using X-ray Photoelectron Spectroscopy. We verify the reduction of Cu(II) to Cu(I) upon incorporating into methanobactin and examine this reduction as a function of copper to chromopeptide ratio. The study also provides insight into the binding of the metal ion to the chromopeptide.

Chemistry/Biology

Lori Scardino (49)
Faculty Advisor/Collaborator: Scott Hartsel and David Lewis, Chemistry, and Lloyd Turtinen, Biology
They’re Not Dead Yet: Fluorescent Probes for Visualizing and Imaging Live Cells

We have developed a series of fluorescent probes based on the naphthalimide fluorophore, which label a variety of intracellular structures and domains. Many of the organelle probes currently available involve long, laborious preparations, and most can only be used in fixed cells. Our series of fluorescent probes works well in live cells and can be visualized and imaged after only 10-30 minutes of incubation. InstantLipo Sep-1 has been used to label cholesterol inclusions in cells with deranged cholesterol metabolism. It has also been colocalized with a known cholesterol and sphingolipid-rich lipid rafts labeling kit in THP-1 leukemic monocytes. InstantLyso LLT-1 labels acidic organelles including lysosomes and the Golgi apparatus. Its labeling of the Golgi apparatus may also involve an affinity for cholesterol and sphingolipid-rich microdomains. InstantMito LMT-1, LMT-2, and LMT-3 have been colocalized with a commercial mitochondrial probe. Our probes have many advantages over current methods. They are highly fluorescent, non-cytotoxic, and rapidly taken up by live cells. They have a purple/blue excitation, green emission, and are appropriate for epifluorescent, confocal, and two-photon microscopy. Additionally, they have large Stoke’s shift, high quantum yield, and exhibit very little self-quenching.

Computer Science

Chris Andringa and Josh Burton (24)
Faculty Advisor/Collaborator: Charles Morrison
Developing a Software Application for Peer Reviewing

Studies of computer science classes show that using peer reviews for programming assignments can have a number of benefits. One benefit is that students can learn from seeing how their peers solved the problems. In addition, they often get more detailed feedback than is possible from their instructor in a shorter time span. Administering a peer review system can be challenging, however. Methods for assigning reviews to students, supporting anonymous reviews, encouraging timely and accurate reviews, and more must be resolved. A number of solutions to these issues have been tried. For example, sometimes students are required to copy their solutions to folders on a Web server. Controlling access to the solutions, assigning reviews, and preserving anonymity are problems, however. A number of years ago, a web-based system named Prism was developed to address these sorts of issues. It was successfully used for six years to support peer-reviewed programming assignments. This research project was started to redesign and redevelop Prism taking advantage of new web technologies and incorporating the best ideas from other code-oriented peer review systems and from the researchers’ personal experiences.
Yu Fan (198)
Faculty Advisor/Collaborator: Joline Morrison
Design Patterns for Database Applications

Students often struggle with visualizing database application interfaces and designing appropriate interfaces for specific application tasks. To address these issues, this paper describes a research project that develops design patterns for a common database application through implementing a website. This website supports the online shopping process. A customer is able to create and update his or her profile, view products by category or by price, add products into a shopping cart, and proceed to check out. The system will then insert, modify, or delete from the database according to the customer’s request. We have applied associated database and application-specific patterns with the website. The main functions we are able to achieve include the Login/Logout process, shopping history display, and adding to, updating, and deleting from the shopping cart. The project demonstrates issues such as applying CSSs to Web pages, creating cookies to save temporal information, using JavaScript within JSPs, and validating data before accessing the database. The purpose of this project is to help student visualize common issues in database application and web application. Students can use the web pages as templates to meet their specific needs.

Matt Giuliani and Eric Lobner (22)
Faculty Advisor/Collaborator: Paul Wagner
Investigating Database Security in a Networked Environment

Database and network security have traditionally been separate fields within the realm of computer security. Currently, there is very little work done to understand the security of data flowing between client and database systems. Although vendor-specific information is available for many database systems, there are very few comparative studies that analyze multiple database systems. In this study, five database systems were analyzed and subjected to tests from three separate platforms. The testing platforms included two software applications and one vendor-supplied administration/query tool. The security of each system was analyzed for five criteria that represent the relative security of data being transmitted to and from the database system. While passwords were always encrypted, other information such as password length, usernames, and query content were sometimes exposed. This research suggests the need for increased usage of encrypted protocols such as SSL in database applications.

Lindsey M. Lepisko and Mark J. De Neve (23)
Faculty Advisor/Collaborator: Daniel E. Stevenson
Building a Portable Interactive Whiteboard

Over the years interactive whiteboards have become more popular, most of which use sensors in the board to take input from the user. Our project will use an off-the-shelf web camera to capture human interaction with objects on a projected screen. The goal is to make a highly portable, low-cost tool that can be expanded upon in future projects.

Thomas Richmond and Julie Wielenga (25)
Faculty Advisor/Collaborator: Michael Wick
Solving the Course Scheduling Problem with Genetic Algorithms

The primary objective of our research is to design and implement a configurable decision support system for the classic course scheduling problem that harnesses the power and flexibility of genetic algorithms. We postulate that while a genetic algorithm is not guaranteed to find the optimal schedule, the schedule produced will be acceptably close to the optimal. Further, a genetic algorithm possesses the speed and flexibility necessary to construct a dynamically configurable system that can be tailored to the needs of individual scheduling problems.

Benjamin Smith (26)
Faculty Advisor/Collaborator: Jack S.E. Tan
Efficient Adaptive Resource Management for Linux Systems

Adaptive resource management is a method of improving the performance of computers by allowing the operating system to change its settings to better fit real use requirements. Any set of tasks will have different resource needs and settings that will provide the best performance. In addition, users have varied needs, and each may value performance measures differently. This research explores ways to enhance the Linux operating system to efficiently analyze system usage in real time and find settings that provide better performance. The prototype created measures the performance of the system by using existing measures for analysis and adjustment of parameters. These include memory usage and the time a process spends waiting. The design allows for turning off analysis when an adequate set of parameters is found, which can then be used without a penalty.
A framework is provided for any parameter used by an operating system to be managed by the system itself. As long as performance criteria can be measured and parameters can be adjusted quickly, new performance measures and adjustable parameters can be added. This avoids the need for time-consuming performance analysis yielding results that may not be as usable.

**Geography & Anthropology**

**Jenifer Bode (114)**  
Faculty Advisor/Collaborator: **Harry Jol**  
*GPR Investigation of the Nuestra Senora La Blanca Church Site, Burgos, Spain: Preliminary Results*

In northern Spain, the city of Burgos served as a center for Jewish life during the early and high Middle Ages. Historians have documented that there were two Jewish communities within Burgos: one on top of a hill near the Castillo de Burgos and a second at the bottom of the hill. To serve the upper Jewish community, a synagogue probably existed near the Castillo. But the only textual documentation suggests that the synagogue existed in the place where the Christian church known as Nuestra Senora la Blanca stood. A ground penetrating radar (GPR) survey was carried out to map the subsurface structures that may be associated with the remains of the Nuestra Senora la Blanca church and/or a Jewish synagogue. The data from 2-D profiles and 3-D cubes both reveal hyperbolic and mound-like reflection patterns, which are interpreted as former walls of the church. A continuous horizontal reflection pattern at approximately 1.0 – 1.5 m in depth (below which the signal is attenuated) is interpreted as the foundation of the church.

**Jenifer Bode (115)**  
Faculty Advisor/Collaborator: **Harry Jol**  
*Ground Penetrating Radar and Electrical Resistivity Tomography Investigation of a Coastal Archeological Site: Preliminary Results from Yavne Yam, Israel*

Archeological excavations are expensive and time-consuming endeavors. With geophysical tools, such as ground penetrating radar (GPR) and electrical resistivity tomography (ERT), archeological digs can be made more effective and efficient by aiding in identifying locations that show unique subsurface anomalies, which appear to be anthropogenic in nature. During the summer of 2005, GPR and ERT data were collected at Yavne Yam, Israel. This archeologically significant city, located south of Tel Aviv on the Mediterranean Sea, has a history that goes back thousands of years. A dense GPR grid (6 by 9 m) was collected adjacent to present excavations with both 225 and 450 MHz antennae. One ERT line, 40 meters long, was collected along a peninsula extending from the site to the Mediterranean Sea. Preliminary analysis of the GPR and ERT data reveals several interesting anomalies that are interpreted as walls. The interpretation of the collected geophysical data will be used by site archeologists to guide excavations in 2006.

**Jenifer Bode, Rodney Kouba, and Linda Hur (103)**  
Faculty Advisor/Collaborator: **Harry Jol** and **Doug Faulkner**  
*Laser Leveling along Hapuna Beach, Hawaii*

Hapuna Beach is one of the more pristine and heavily visited beaches on the northwestern shore of the Big Island, Hawaii. Within close proximity are several large resorts that rely on Hapuna Beach to bring tourists to the area. In recent years, beach erosion has become a major concern. Laser leveling surveys were conducted on Hapuna beach to measure beach profiles. Laser leveling is a fast and effective way of collecting topographic data. The process involves a laser that rotates 360° and a receiver that is attached to a survey rod on which elevation measurements can be recorded. Seven profiles were recorded along the length of the beach. The beach profiles varied from south to north with changes in elevation along the profiles of up to 1.815 meters. On the South end of the beach there was a noticeable dip in the topography. On the North end of the beach the topography was dominated by a mound, or in some places, a ledge of accumulated sand very near the beach/ocean interface. The results from this study will aid in better understanding the erosional problems at Hapuna Beach.

**Brandon Cramer, Casey Farrell, Jake Henderson, Sarah Knabel, Michael Molnar, Mark Nelson, Derek Pirkl, James Strong, and Britta Suppes (89)**  
Faculty Advisor/Collaborator: **Doug Faulkner** and **Harry Jol**  
*Paleoflood Research in Honokoa Gulch, Hawaii*

The Honokoa Gulch is a deeply incised V-shaped valley and is located on the arid southern flank of Kohala Volcano. The perennial Keawewai Stream begins in the upper moist climate of Kohala and flows down into the lower arid region. The Honokoa Gulch has been entrenched into basalts about 460,000 years old in the lower region of the Keawewai Stream.
creating an ideal place to reconstruct paleofloods. The purpose of our research included: (1) find paleoflood deposits; (2) calculate the peak streamflow needed for a flood to reach the identified flood deposit sites; and (3) compare our discharge data with other recorded floods on the Big Island. Field observations such as imbricated boulders and fine-grained flood deposits led us to believe that massive floods have occurred. Using a total station we surveyed a valley cross-section 427 m from the valley mouth and recorded the heights of fine-grained flood deposits. We then used the Manning equation to calculate discharges capable of depositing the flood debris at our measured high water mark, about 12 m from the channel bottom. The resulting discharge, > 3,400 cms, is 40% larger than the highest recorded flood on the island, which demonstrates its catastrophic nature.

**Philip Holleran (92)**
Faculty Advisor/Collaborator: Sean Hartnett
*Bathymetric Mapping of Tainter Lake*

Tainter Lake is an impoundment on the Red Cedar River, a few miles north of Menomonie, Wisconsin. Prior to this project, the only bathymetric map of the lake dated back to 1960, and it possessed many inaccuracies and generalizations of the lake shore and bottom. In addition, large amounts of sedimentation had collected in the upper reaches of the lake over the past 25 years, but no information was present to quantify and measure the accumulation of alluvial deposits. The Tainter Menomin Lake Association, in conjunction with the Wisconsin DNR, desired a new map to study this problem. For them a new, more accurate, bathymetric map was created by integrating GPS, GIS, and cartographic technologies. The lake was surveyed using a dGPS and a depth sounder. This information was then taken into a GIS environment and used to create a 3D model (TIN) of the lake. From this 3D TIN, and aerial imagery of the area, a new bathymetric map of Tainter Lake was drafted using Adobe Illustrator.

**Susan Johnson and Mike Schwartz (116)**
Faculty Advisor/Collaborator: Harry Jol and Doug Faulkner
*Vegetation Survey of Hapuna Beach, Hawaii*

Hapuna Beach is one of the most spectacular places in all of Hawaii. It is part of the state park system and is located on the North West side of the big island off Highway 19. Hawai‘i’s economy is almost entirely controlled by the tourism industry, and Hapuna is one of the greatest draws to the Kona area. Due to the influence that this beach has on the community and the state’s economy, people are concerned about its future. The aim of this study was to continue the long-term monitoring of Hapuna in order to assess its condition. One of the biggest factors that contribute to beach erosion is the status of vegetation on the primary dune. Vegetation holds sand in place and stabilizes the beach. On October 27, 2005, a biological survey was conducted in Hapuna Beach to record the species present and assess the condition of the primary sand dune.

**Michael Molnar, Susan Johnson, and Theresa Lenon (101)**
Faculty Advisor/Collaborator: Harry Jol
*Ground Penetrating Radar Investigations of the Tahquamenon River Basin, Michigan: Preliminary Results*

The Tahquamenon River is fed by a large watershed and courses east and north through eastern Upper Michigan to Lake Superior. The Tahquamenon displays several anomalous characteristics: 1) from source to mouth (110 km), the river drops less than 20 meters; 2) south of Betsy Lake, the northward trending drainage is diverted 90 degrees to the east, leaves its entrenched valley, and cuts through higher topography. Taken together, these characteristics beg questions with regard to the River’s history: How did deglaciation of Lake Algonquin and destruction of Lake Minong influence local topography and influence drainage of the proto-Tahquamenon? Ground penetrating radar (GPR), a geophysical technique, was extensively used to investigate the subsurface stratigraphy of the landforms in the study area. Three separate GPR lines were collected and a 100 MHz pulseEKKO GPR system was used for data collection. The profiles were processed, plotted, and preliminary interpretations show buried channels and glacial outwash. While the modern Tahquamenon River basin may be the product of an unusual array of events, investigation of its history can demonstrate an interaction of geomorphic processes that may be mirrored elsewhere along the Upper Great Lakes.

**Mark Nelson (102)**
Faculty Advisor/Collaborator: Garry Running
*Dunes, Forests, and People during the Late-Holocene: Evidence from Buried Podzolic Soils in the Crepeele Dune Field, Southwestern Manitoba*

The Crepeele Dune Field (CDF) is one of 18 late-Holocene dune fields in the Glacial Lake Hind Basin. Previous research has shown that such dune fields are characterized by comparatively greater geomorphic and ecological complexity and were important loci of pre-contact human activity. Buried soil profiles with weak podzolic morphology were observed within the
CDF. The purpose of the research is to determine the distribution of these buried podzolic soils and to characterize the spatial relationship between them and archaeological material. Soil profiles were described from the walls of 13 archaeological excavation units. A total station was used to create a topographic map of the area around the units. Soil and topographic data were then combined in GIS for analysis. Based on preliminary analysis, buried podzolic soils are widely observed in intermediate-elevation positions on dunes. Drainage on dunes permits podzolization to occur but podzolic morphology is not preserved in high landscape positions. Evidence for past human activity follows the same spatial pattern. The presence of buried podzolic soil profiles strongly suggests the forest communities that dominate the CDF today were present throughout the late-Holocene and that forest-related resources were an important factor in attracting humans to the CDF.

Craig G. Sternberg and Matt Nier (104)
Faculty Advisor/Collaborator: Harry Jol and Doug Faulkner
GPS Data From Hapuna Beach, Hawaii

Hapuna Beach is one of the most visited beaches in all of Hawaii. The beach is about 0.8 kilometers long and roughly 61 meters wide. The width of the beach varies in part due to rock outcrops, ephemeral streams, and vegetated sand dunes. A major reason for the popularity of Hapuna Beach is its location. Hapuna Beach is located about 40 minutes north of Kona, and the surrounding hotels have shuttle services that bring people right to the beach. In order to prevent the erosion of Hapuna Beach, it is very important to understand its physical make-up. This poster’s main focus is on the use of Global Positioning System (GPS). Using GPS we mapped the natural features of the beach itself, lines taken from the Ground Penetrating Radar (GPR), Laser Leveling lines, and vegetation analysis to further understand the effects of erosion on Hapuna Beach.

Craig G. Sternberg and Neil R. Trombly (113)
Faculty Advisor/Collaborator: Harry Jol and Doug Faulkner
Geomorphic Analysis of Historical Sedimentation in Half Moon Lake, Eau Claire, WI

Half Moon Lake, a Chippewa River oxbow, was used as a log-holding pond during the late nineteenth and early twentieth centuries. It contains unknown quantities of phosphorus-rich organic sediment, such as bark and sawdust from mills that operated along its shore. The lake suffers from severe eutrophic conditions from phosphorus cycling. Rehabilitation plans by city and state presently focus on ways to reduce phosphorus cycling from the lake bed into the water column. For such efforts to be effective, the volume and distribution of organic sediment within the lake should be known. To this end, we conducted detailed bathymetric surveys of the lake and noninvasive investigation of lake-bed sediments using ground penetrating radar (GPR). We discovered that the lake bottom is primarily organic muck, but also contains gravel and bark bars, old mill foundations and building materials. Initial GPR results indicate organic sediment ranges from 0 to 2 meters thick and some possible buried logs. These findings provide a basis for a more focused GPR survey, including vibracoring of lake-bed sediments to confirm GPR results and determine the sediment composition. This research will facilitate a focused response to the lake’s eutrophic condition.

Kin-Yan Wong, Jenifer Bode, and Theresa Lenon (90)
Faculty Advisor/Collaborator: Harry Jol and Doug Faulkner
GPR Investigation of Hapuna Beach, Hawaii:

Since erosional coastlines have devastating effects on tourism, there is a need for understanding coastal deposits and how the associated processes influence local beaches. On the Big Island of Hawaii, we investigate Hapuna Beach State Recreation Area with GPR transects that were collected on the beach complex. Near the beach/water interface to approximately 50 m inland, the GPR signal was attenuated due to salt water intrusion. Inland along a reentrant along the northern portion of the beach GPR data shows reflections to 30 ns (approximately 1.5 m). The 450 MHz antennae provide significant resolution so that the stratigraphy could be imaged. The interpretation of the reflection patterns show that the both coastal and fluvial processes are at play in this unique coastal deposit.

Geology

Cale Anger (44)
Faculty Advisor/Collaborator: Katherine Grote
Characterizing Soil Texture using Geostatistical Methods with Geophysical Data

Many agricultural, environmental, and engineering activities require accurate characterization of soil texture over large areas. While point measurements of soil texture are easy to obtain, natural environments often have heterogeneous soil textures,
where acquiring enough point measurements to characterize large areas is usually prohibitively expensive. This project investigates the potential of geostatistical analysis of large geophysical data sets and sparse point measurements of soil texture to improve soil texture estimation. GPR groundwaves were used to generate high-resolution grids of near-surface soil water content over a heterogeneous field site. Geostatistical methods were then used to correlate the water content values collected with GPR to soil texture measurements. Maps of soil texture were generated using the sparse point measurements of soil texture and extensive geophysical measurements. Assessment of estimation accuracy showed that including geophysical data significantly improved soil texture estimation. This investigation indicated that point measurements of soil texture are necessary for accurate soil texture classification, but statistical analysis of geophysical data can indicate the soil texture distribution even without soil texture measurements.

**Anna Baker and Treven Wisz (54)**  
Faculty Advisor/Collaborator: Katherine Grote  
*Development of a Petrophysical Model to Monitor Nitrate in the Unsaturated Zone*

Nitrate contamination is the most widespread groundwater quality problem in Wisconsin, and excessive application of fertilizers is one of the leading causes of this contamination. To reduce the occurrence of nitrate contamination, fertilizers should not be applied in amounts greater than crops can absorb. However, determining how much nitrate is available to crops through soil water is difficult, so farmers typically over-fertilize to ensure adequate nitrate availability. This research investigates the practical application of time domain reflectometry (TDR), a simple probe-based geophysical technique that measures dielectric constant and electrical conductivity, to quickly estimate nitrate concentrations in the soil water. Previous research conducted under controlled conditions has indicated that TDR has potential for this application, but further research conducted on a range of soil types and nitrate concentrations is needed to determine whether this technique can be practically applied in the heterogeneous soil conditions commonly encountered in natural environments. Our research focuses on quantifying the relationship between the parameters measured with TDR and nitrate concentrations for different soil moisture and soil texture conditions.

**Brandon Barber (32)**  
Faculty Advisor/Collaborator: Robert Hooper  
*TEM Analysis of Metal Sequestration in the Coeur d’Alene River Valley, Idaho*

This project utilizes the Transmission Electron Microscope (TEM) and ion-milled thin sections of epoxy mounted sediment from the lower Coeur d’Alene (CDA) fluvial system to examine the sequestration of various metals, including Pb, Zn, As, Cd, Ag and Sb in stream transported mine-tailings downstream from the CDA mining district. Major element and trace element analysis on the TEM is supported by wet chemical analysis using a five-step sequential extraction procedure with extracts measured using the new Inductively Coupled Plasma Mass Spectrometer in the Department of Geology. This project is currently focusing on samples from the reducing environments of the Lower CDA river system, with plans to extend the research into the oxidizing environments as time permits. Most of the metals in the reduced environments are associated with microbial coatings and occur as colloids, nano-crystalline, or amorphous nano-particulate phases. The nano-particulate phases display considerable chemical variation outside of normal mineral compositions including a large variety of metal-rich non-stoichiometric compounds. We are continuing to develop appropriate laboratory methods for dealing with the wide variety of samples found in the Lower CDA river valley.

**Ryan Bartingale (42)**  
Faculty Advisor/Collaborator: Colin Shaw  
*Paleomagnetism of the Wissota Dike*

We analyzed a gabbro dike intruding Precambrian granite below the Lake Wissota Dam in western Wisconsin for flow patterns and age. Chan and Meyers (1991) interpreted previous results as consistent with a Keeweenawan age (1.1 Ga) for the dike. However, similar dikes in the upper Midwest have been reinterpreted to be related to the 2.07 Ga Kenora-Kabetogama Dike swarm based on moderately-SE-plunging paleomagnetic directions. This study was designed to test the age interpretation of the Wissota dike and magma flow patterns. Data consisted of alternating field demagnetization and anisotropy of magnetic susceptibility measurements. Flow foliations indicate horizontal flow patterns near the contact and vertical flow in the center. This suggests the concentrations of feldspar phenocrysts on the northern contact were formed near the present level, possibly being fed by the vertical flowing magma. Paleomagnetic poles in several have a characteristic remnant magnetization direction plunging 28° to 289° (WNW). Samples have a N-directed overprint we interpret as recent. Plotted on an apparent polar wander path for North America, the poles plot near latitude 24° and longitude 176° consistent with ages of approximately 1.1 Ga. We conclude that the Wissota dike is probably Keeweenawan in age.
Lynn Galston (68)
Faculty Advisor/Collaborator: Karen Havholm
Re-evaluation of Depositional Environment of Devils Island Sandstone in Northern Wisconsin

The Proterozoic Devils Island Sandstone of Northern Wisconsin is currently interpreted as a nearshore lacustrine deposit formed in the Keweenawan rift. This same interpretation had been given for the correlable Hinckley Sandstone in eastern Minnesota until recent study showed that the depositional environment more closely represents a braided stream, dune, and interdune setting. The purpose of this project is to determine whether the Devils Island Sandstone also needs re-interpreting. Over the past year, exposures along Lake Superior and the Brule and Siskiwit Rivers have been measured and described. Three sandstone facies have been identified: 1) trough cross strata, 2) low-angle, tangential cross strata, and 3) planar rippled beds. These are similar to the facies of the Hinckley Sandstone and indicate eolian and fluvial environments. Limited exposures of a fourth facies, not observed in the Hinckley Sandstone, comprise centimeter to decimeter scale sandstone beds interspersed with silty laminae that display ripples and mud-cracks. This represents a partially subaqueous environment not yet fully delineated. Further examination of more extensive exposures on Devils and Sand Islands in the Apostle Islands is needed to develop a better understanding of these facies.

David J. Kawatski (56)
Faculty Advisor/Collaborator: Phillip Ihinger
Quantifying Crystal Growth Rates in the Natural Environment

Quantifying the time involved in geologic processes is central to the mission of earth scientists. Large-scale hydrothermal fluid systems control the thermal evolution of the Earth’s crust. The lifetimes of hydrothermal systems can be measured by the time involved in sealing the fluid-filled fractures that comprise them. In turn, the lifetime of an individual fracture is governed by the growth rate of quartz crystals that precipitate from their host fluids. Recently, hydrothermal quartz crystals from the natural environment have been shown to contain systematic variations in defect abundances that reflect their morphologic evolution (Ihinger & Zink, 2000). High-resolution FTIR measurements showed that natural quartz crystals are composed of six sector zones characterized by distinct concentrations of impurities. In this study, we use measured diffusion profiles of impurities to document evolving thermal histories within different regions of a single natural quartz crystal. Profiles from successively younger regions document progressively lesser diffusive loss for each species, suggesting that impurities diffused out of the crystal while it continued to grow. We are seeking accurate knowledge of the temperature dependence of the diffusivity of impurities, which will constrain quantitatively, for the first time, the growth rate of a natural hydrothermal quartz crystal.

A. R. Kjos and C. I. MacLaurin (79)
Faculty Advisor/Collaborator: J. Brian Mahoney
Eruptive Activity of Montserrat: Examination of Deposits and Eruption Style

The island nation of Montserrat, a strato-volcano located in the Caribbean Sea, is part of the Lesser Antilles. The Lesser Antilles is an island arc resulting from the episodic west dipping subduction of the North American plate beneath the thick Caribbean plate. The Caribbean plate is a rigid remnant of the subducted eastern margin of the Pacific plate. This study looks at ancient and modern pyroclastic stratigraphy of the Island of Montserrat in order to document variations in eruptive style. Montserrat has had four eruptive phases producing a distinct north to south progression. The most southerly, youngest, volcanic center, Soufriere Hills, started erupting in 1995 and by 1998 forced the evacuation of the southern two-thirds of the island and destroyed the capital Plymouth. The well exposed pyroclastic stratigraphy on the island permitted comparison of ancient and modern stratigraphy. Mixed pyroclastic and gravity driven dome collapse flows with variable phreatic components, similar to that of the previous eruptive phase (31,000-22,000 years B.P.), characterize the current eruptive phase.

A. R. Kjos and C. I. MacLaurin (80)
Faculty Advisor/Collaborator: J. Brian Mahoney
Geologic Evolution of the Whitesail Lake Map Area: Structure, Geochemistry, and Geochronology

The southwestern Whitesail Lake map area (NTS 093E) straddles the boundary between the Jura-Cretaceous Stikinia Terrane and the Jurassic to Tertiary Coast Plutonic Complex. Comprehensive assessment of the local and regional geologic setting is facilitated by detailed field mapping (1:50,000), petrography, geochemistry, and U-Pb geochronology. The widespread Lower to Middle Jurassic Hazleton Group, deposited in an offshore arc, is a bi-modal volcanosedimentary package with associated coeval flows and intrusions, including the Trapper Pluton and Chatsquat layered mafic intrusion. The Stick Pass, Tenaiko Suite, and associated plutons mark a Late Jurassic magmatic pulse, approximately coeval with accretion of the arc. There were major changes in the regional stress field during Late Cretaceous to Paleocene time, initially manifested by
pronounced uplift and unroofing of Late Jurassic plutons. Development of this contractional environment created Cretaceous(?)/northwest/southeast trending fold thrust systems that cross-cut Jurassic rocks. Paleocene(?)/development of a transtensional stress regime, possibly overlapping contraction, produced north-northwest/south-southeast trending shear zones. The Central Gneiss Detachment, a large-scale low-angle normal fault, exposed high-grade, deep-seated metamorphic rocks. The Detachment is cut by Paleocene(?)/epidote-bearing intrusive rocks, indicating a major unroofing event, probably related to orogenic collapse. Voluminous undeformed Eocene plutons cross-cut all major structures.

Christopher A. Kohel (66)
Faculty Advisor/Collaborator: Phillip Ihinger and J. Brian Mahoney
Structural and Magmatic Evolution of the Helena Salient, New Mapping and Spatial Geochemical Analysis in the Devil’s Fence Anticlinorium

The Disturbed Belt of western Montana describes a series of east-vergent Late Cretaceous folds and thrust faults imbricating Precambrian strata of the Belt Supergroup with Paleozoic miogeocline strata and Mesozoic sedimentary rocks of the Rocky Mountain foreland. Deposition of the Elkhorn Mountain volcanics and emplacement of the coeval Boulder Batholith and associated satellite plutons were roughly synchronous with structural deformation. In order to document the genetic relationship between Late Cretaceous contractional deformation and magma emplacement, we have undertaken a detailed geochemical and geochronological study of the Devils Fence anticlinorium, a thin-skinned deformational system within the hanging wall of the Lombard thrust plate of the Helena salient within the Disturbed Belt. The deformed sedimentary strata is intruded by a compositionally diverse suite of stocks, dikes, and sills, presumably related to the Cretaceous Boulder Batholith. New geochronologic constraints on the timing of deformation and magmatism are provided by U/Pb ages from the Doherty Mtn and Sagebrush Park stocks as well as the basal member of the Elkhorn Mountain volcanic package.

Gillian Krezoski (77)
Faculty Advisor/Collaborator: Karen Havholm
Environments of Deposition of the Mississippian Loyalhanna Formation in Southwestern Pennsylvania

Sedimentologic characteristics of a 15-meter thick section of the Mississippian (Chesterian) Loyalhanna Member of the Mauch Chunk Formation, a mixed carbonate-siliciclastic unit, were examined in the Keystone Quarry near Springs, Pennsylvania. Outcrop studies have revealed four facies: (1) a medium-grained to silty sandstone with alternating packages of mm-scale low-angle laminations (some of which coarsen upwards) and cm-scale high-angle cross-strata that downlap onto the low-angle laminations, (2) a medium-grained sand to silt sandstone with mm-scale discontinuous laminations, (3) a basal coarse-grained sandstone with granules that fines upward to a coarse-grained sand to silty sandstone, and (4) a 30-50 cm thick poorly sorted coarse-grained sandstone to siltstone with 0.5-1 cm thick micrite-rich laminae and nodules with carbonate cement. Interpretations of these units indicate the Loyalhanna Member was deposited in a semi-arid to arid climate in, respectively, eolian dune, sabkha and fluvial (wadi) sedimentary environments and a paleosol with calcrete (Bk horizon). Petrographic studies indicate decreasing siliciclastic content from fluvial to eolian to sabkha facies.

Gillian Krezoski, Michele Skahaug, Amanda D. La Gesse, Matthew Hysen, Krystina Engebos, and Jeremy Hinke (78)
Faculty Advisor/Collaborator: J. Brian Mahoney and Lori D. Snyder
Geologic History and Carbonate Systems of Antigua in the Lesser Antilles

The Lesser Antilles represent an island arc system formed by subduction of the Atlantic plate under the thicker Caribbean plate. The subduction created volcanic seamounts and eventually islands, which are located along the collision zone in an arcuate north-south chain along the eastern edge of the Caribbean Sea. Approximately 30 million years ago, a shift in the vector of plate convergence, probably resulting from a ridge collision, caused volcanism on Antigua to cease; a younger, currently active, arc system began forming 15 million years ago west of the older arc. The older islands, such as Antigua, developed extensive fringing reefs surrounding the original volcanic center. These reefs consist largely of carbonate-trapping skeletal organisms that co-exist with photosynthetic algae and are home to a wide diversity of marine life. This project focused on the geology and biology of the fringing reef system and examined the impacts of reef systems on island culture. Reefs offer the islands protection from pounding waves and storms as well as an abundant supply of food for the residents. Reefs have a positive impact on island economies, but the health of the reef is endangered due to overfishing, development, tourism and disease.
Amanda D. La Gesse (67)
Faculty Advisor/Collaborator: J. Brian Mahoney
*Materials Analysis for the Production of Glass*

Cardinal Glass Company, one of the nation’s leading glass manufacturers, uses a variety of materials in the process of manufacturing glass. The chemical composition of the raw materials is critical to the process. Cardinal Glass requested help analyzing materials that they wish to use in production of glass, and throughout this year the Department of Geology has been working with them to analyze these various raw materials. These materials include quartz sand, dolomite, and limestone. Each material is analyzed for elemental composition, including SiO2, CaO, MgO, Fe2O3, and TiO2. Elemental abundance is determined by X-ray fluorescence spectroscopy. For each sample, five separate beads are created and run five times using 100-second count time to minimize instrumental error. Standard values are consistent within 0.05 percent. Replicate analyses of different batch samples, including 12105(99.4 ± 0.08%), 5405(99.7 ± 0.05%), 9205(99.7± 0.02%), and 12405(99.7± 0.07%), demonstrate the accuracy and precision of the technique.

Shawn Lyman (55)
Faculty Advisor/Collaborator: Colin Shaw
*The Grizzly Creek Brittle/Ductile Shear Zone: Paleomagnetic Insights into Deformation Chronology*

Paleomagnetic testing on samples of megacrystic granite and psuedotachylytes (pst) from Grizzly Creek shear zone(GCSZ) in Colorado was used as a preliminary test to determine whether plastic deformation observed in the granite was part of a progressive deformation that also produced brittle earthquake faulting recorded by psuedotachylytes (frictional melts generated during earthquakes). GCSZ is an E-W trending N-dipping reverse fault (recording N-S shortening). Paleomagnetic results for the pst indicate a strong similarity with the known 1.4 Ga paleopolles. Virtual Geomagnetic poles for the pst with a typical WSW plunging trend allow preliminary correlation of tectonism with the ~ 1.4Ga shear zones of the Colorado mineral belt, which display a similar deformation style. However, preliminary data for the megacrystic granite is difficult to interpret; thus, we cannot currently assign an age of plastic deformation. The GCSZ likely formed during 1.4 Ga intercontinental tectonism, but the age of the ductile deformation of the granite is undetermined. Therefore, whether a single progressive deformation event linking both the brittle shearing of the pst with the plastic shearing of the granite is inconclusive and cannot be definitively linked in this location.

C. I. MacLaurin, Christopher A. Kohel, A. R. Kjos, Joe Nawikas, and John Stoltz
Faculty Advisor/Collaborator: Phillip Ihinger and J. Brian Mahoney (65)
*Structural and Magmatic Evolution of the Helena Salient New Geologic Mapping in the Devil’s Fence Anticlinorium*

The eastern margin of the North American Cordillera is characterized by an east-vergent Late Cretaceous fold and thrust system that involves imbrication of Precambrian, Paleozoic, and Mesozoic sedimentary rocks of the Rocky Mountain foreland. The deformed sedimentary strata is intruded by a compositionally diverse suite of satellite stocks, dikes, and sills of the Cretaceous Boulder Batholith and Elkhorn Mountains Volcanics. The origin of the structural deformation and its relationship to the magmatism is currently a matter of debate. We aim to constrain the timing of deformation and magmatism within the well-exposed Devil’s Fence anticlinorium, a thin-skinned deformatinal system within the hanging wall of the Lombard thrust plate of the Helena salient within the Disturbed Belt of western Montana. Under the auspices of the USGS EDMAP program, in association with Montana Bureau of Mines and Geology, we present new 7.5 minute quadrangle maps, detailed cross sections, and field and geochronologic constraints that characterize the spatial and temporal relationship of folds and thrusts to the magmatic intrusions within the anticlinorium.

Michael Molnar, Jeremy Hinke, and Michele Skahaug (43)
Faculty Advisor/Collaborator: Katherine Grote
*Identification and Characterization of Springs in West-central Wisconsin*

Springs with high discharge rates may be important sources of water supply for both municipal utilities and high-quality surface waters. In some areas of Wisconsin, recent population growth or economic development has increased local demand for water supplies; additional water is often provided through high-capacity pumping wells. When these wells are located within the recharge area of springs, the spring discharge can be significantly reduced, sometimes resulting in negative environmental or economic consequences. To protect springs from high-capacity pumping wells, adequate data describing the location, discharge rate, and recharge area of springs must be obtained. This project focuses on characterizing springs in west-central Wisconsin, a portion of the state experiencing very rapid population growth and thus high vulnerability to groundwater exploitation. The project began with an intensive field investigation to locate springs and measure the discharge and water quality parameters for each spring. The remainder of the project involves analysis of these data to determine the
recharge areas of the large springs and the residence time of spring water. This information can be used to restrict installation of high-capacity pumping wells within the recharge areas of significant springs.

**Travis Pickering (41)**  
Faculty Advisor/Collaborator: **Phillip Ihinger**  
*Geochemical Characterization of Tertiary OIB Magmas in the Central Montana Alkaline Province*

Geologic activity in the North America Cordillera (NAC) during the Late Cretaceous and early Tertiary was unusual for its tectonic setting. The subduction-related structural deformation and associated magmatism extended well into the North American craton, including Montana, throughout this time. The Central Montana Alkaline Province (CMAP) exhibits many of the unique features of the NAC, including emplacement of magmas that are both calc-alkaline (having characteristics of typical arc magmas) and alkaline (having characteristics of typical oceanic island hotspot magmas, or OIB) in nature. The ultimate mechanism of melting and the true nature of the source of these two magma types remain controversial. In this study, we compare the geochemistry of a variety of OIB magmas from CMAP and show their affinity with oceanic hotspot magmas. Similarities include enrichment in high field strength elements (HFSEs) and binary mixing between radiogenic isotope end-member sources (EM1 and FOZO). Differences include their tectonic setting (emplacement above a subduction zone) and a lack of linear, time-progressive, magmatic centers. We use these observations to test a recent model of plume magmatism for the origin of unusual Cenozoic tectonic behavior of the NAC (Ihinger et al., 2005).

**Andrew H. Thompson (31)**  
Faculty Advisor/Collaborator: **Kent Syverson**  
*Origin of the Blue Hills State Natural Area #74, Rusk County, Wisconsin*

A felsenmeer exhibits angular boulders of uniform size resting on low-angle slopes formed by intense freeze-thaw processes. The aim of our study is to determine if this site is a true felsenmeer (rocks frost-shattered in place) or if it is a talus deposit (associated with falling rocks). The valley at the site is 25 m deep, 300 m long, and trends east-west. Valley walls are covered by angular quartzite boulders with an average diameter of 0.7 m. Typical valley-wall slopes are about 25 degrees, higher than reported for other felsenmeers (<10 degrees). The block fields are indented slightly below bedrock benches on the valley wall. This might indicate the deflection of falling rocks around the bedrock benches and suggest a rock-fall (talus) origin for the boulders. Angular quartzite blocks on gently sloping uplands around the site might represent a true felsenmeer. The steep slopes and indentations suggest a gravity-fall origin for the block fields within the valley and a feature that is a talus, and not a true felsenmeer. A ground-penetrating radar survey is planned for spring 2006 to determine the depth to bedrock below the boulders in the valley. This will help determine the genesis of the site.

**Geology/Geography & Anthropology**

**Kin-Yan Wong and Mark Nelson (91)**  
Faculty Advisor/Collaborator: **Karen Havholm**, Geology, and **Garry Running**, Geography & Anthropology  
*Late Holocene Landscape Development, Atkinson Site, Glacial Lake Hind Basin, Manitoba*

Stratigraphic sequences exposed by the modern Sours River in the glacial Lake Hind Basin (GLHB), southwestern Manitoba, show that Holocene geomorphic processes in the GLHB have primarily been eolian and fluvial. The major objective of this study is to refine understanding of late Holocene (~ last 4000 years) stratigraphic relationships of sediments, soils and cultural artifacts within the youngest sedimentary unit (Unit D). We measured a series of soil profiles/stratigraphic sections and described soil characteristics and sedimentary structures in the Atkinson cut bank. Prior work at a different exposure indicated dunes of unit D formed around 3000 ka with only minor later modification. A hearth charcoal sample from just above a prominent buried soil in unit D yielded an unexpectedly young radiocarbon date of 200+/- 40 years ago (1640 A.D. or younger), indicating that a second major phase of dune development occurred very recently. Previous work also indicated that Unit D has different grain-size characteristics than older eolian units. Grain size analysis is underway to determine whether such differences also characterize sub-units of Unit D. Finally, 2005 stratigraphic profiles are correlated with previously-measured profiles to illustrate how Unit D components relate to the overall physical and cultural site stratigraphy.
Mathematics

Brandon Barrette (17)
Faculty Advisor/Collaborator: Alex Smith
Visualizing Lightlike and Timelike Geodesics in Black Hole Solutions

In this project, we make use of Maple to compute surfaces of revolution in Euclidean space to model geodesic paths encountered in black hole solutions to Einstein’s general relativity equations. By using advanced methods from the differential geometry of surfaces, we take geodesic equations encountered in black hole solutions and produce surfaces of revolution in an abstract, three-dimensional Euclidean space whose natural geodesics correspond in specific ways to black hole geodesics. Frequently black hole solutions possess symmetry. For example, the Schwarzschild solution has spherical symmetry, and a particle set in motion will stay in a fixed plane as it falls, just as a planet stays in a fixed plane as it rotates around the sun. Given this type of “reduction” from three space variables to two space variables, we can find ways to visualize geodesics by focusing on particles trapped in such a plane. A critical direction that we pursue in our project is to find surfaces of revolution in an abstract, three-dimensional Euclidean space for which there is a natural correspondence between geodesics on the surface of revolution and either lightlike or timelike geodesics confined to move in an ecliptic plane inside the Schwarzschild space.

Tarek M. Elgindi (30)
Faculty Advisor/Collaborator: James S. Walker
Comparison of Image Compression Methods

We compare the new still-image compression standard, JPEG2000, with two competing algorithms based on the Wavelet Difference Reduction (WDR) technique of encoding. Our comparison will be based on objective (numerical error) and subjective (surveys of human comparisons). Our comparison shows that these WDR methods provide far simpler encoding while also providing essentially the same performance as JPEG2000 at moderately high to very high compression ratios. They provide useful alternative algorithms for applications where high compression ratios are needed and/or further processing of the compressed images is needed.

Garrett Jones (18)
Faculty Advisor/Collaborator: R. Michael Howe
The Orbits of Sp(2n) x GL(n) Acting on 2n x n Complex Matrices

A group action, on a set, X, is a homomorphism from a group, G, into the group of invertible maps on X. Given a group action, *, the orbit of an element, x, is the set of all g*x such that g is an element of the group. The goal of this research is to find the orbits of the group Sp(2n) x GL(n) acting on the 2n by n complex matrices, with a group action defined as (s,g)*x=stgx, where, s is an element of Sp(2n), g is an element of GL(n), and x and element of the 2n x n complex matrices. We will demonstrate some partial results.

Carolyn Otto (28)
Faculty Advisor/Collaborator: Michael Penkava
Deformations of Low Dimensional Lie Algebras

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

Carolyn Otto and Jacquelyn Dumin (27)
Faculty Advisor/Collaborator: Carl Schoen
Alcohol Consumption in Price County Wisconsin

The population of Price County, a rural county in northern Wisconsin, resides primarily in three towns: Prentice, Phillips, and Park Falls. This research investigates the consumption of alcohol by individuals within these towns, with special attention paid to individuals under the age of 21. By obtaining census data from government sources, Wisconsin Blue Books, and local newspapers for the past 20 years,a mathematical model will be created predicting whether drinking, especially underage, will increase, decrease, or stay constant with time. A comparison of the three towns was created with models that portray the data
gathered about underage drinking. Researching these towns provides valuable information that allows comparisons to other rural communities. The knowledge about the effectiveness of alcohol education in the rural small town can be enhanced from these findings.

Carolyn Otto and Cassandra Lawler (21)
Faculty Advisor/ Collaborator: Simei Tong
Transportation Model for Emergency Flooding Situations

Flooding is a significant annual problem for Wisconsin. Although the floods of Wisconsin are not on the level of Hurricane Katrina, we felt inspired by this disaster to investigate flooding in Wisconsin using mathematical methods. Our research focuses on building a mathematical model for transporting sandbags in an emergency flooding situation. Using the Simplex Method, we obtained an optimal solution to minimize the time to collect and distribute sandbags. While we built a generic model to be used in any flooding situation, we specifically used the model for Dane and Price County to note the differences of the sandbag issue in a heavily populated area verses a less populated area.

Ryan Steinbach (20)
Faculty Advisor/ Collaborator: Matt Bloss
The Permutation Representation $S_n$ modulo $S_k$

The aim of this project was to understand how the symmetric group $S_n$ acts on the cosets $S_n$ modulo $S_k$. An interesting aspect of this project was how to choose the coset representatives so that the action was easy to understand. Depending on how the representatives are chosen, one obtains different formulas for the action. In one case the action is straightforward, and in another the action is somewhat mysterious and not fully understood.

Ryan Steinbach and Carolyn Otto (29)
Faculty Advisor/ Collaborator: Michael Penkava
Deformations of Associative Algebras

A deformation of an associative algebra is a continuous change in its algebraic structure. The space of these algebra structures is called the moduli space. We are interested in studying how elements in this moduli space deform to other elements in the space. The first step in understanding the deformations is to classify the moduli space. We have been using linear algebra and Maple software to determine the structure of moduli spaces of low dimensional associative algebras.

Julie A. Theobald (19)
Faculty Advisor/ Collaborator: James S. Walker
Applications of the Analysis of Infinities

This paper surveys applications of Cantor’s analysis of infinities to important problems in a wide variety of fields. Using Cantor’s diagonal method, proofs are given of the unsolvability of the Halting Problem in computer science, and of an Incompleteness Theorem in logic. Examples are given of applications of Cantor’s idea of different sizes of infinities in the fields of biology, linguistics, economics, and philosophy.

Physics & Astronomy

Casey Abing (5)
Faculty Advisor/ Collaborator: Nathan Miller
Computer Modeling of X-ray Emission and Absorption in the Context of Hot Star Winds

In support of ongoing studies of the X-ray emission from hot stars, we have been working on simulations of the X-ray output from mixtures of plasmas at wide ranges of temperature. These simulations have been carried out using the Spect3D, Spect3D Visualizer, and Plasma Grid Generator programs developed by Prism Computational Sciences. The Spect3D code allows construction of a plasma of arbitrary geometry and composition, and can then be used to calculate the observed spectrum for any direction of observation. Our initial studies have concentrated on simple geometric situations to build the foundations for more complicated spherical geometries. While the initial simulations used a mixture of hydrogen, helium, and oxygen, later simulations are including all important elements in their astrophysical abundances. We acknowledge support from Research Corporation, NASA grant GO4-5015B, and the University of Wisconsin-Eau Claire.
Rachel Anderson (197)
Faculty Advisor/Collaborator: Kim Pierson
Fabrication of Copper Integrated Circuit Interconnects

The purpose of this research is to develop a method of fabricating copper integrated circuit interconnects on silicon wafers by a process to be used in industry. To increase the speed of circuits, industry is replacing aluminum with copper due to its lower electrical resistance. Furthermore, to increase the density of components on an integrated circuit, the interconnects are designed as large aspect ratio trenches etched into the substrate. To create these micro wires, the trenches are filled with copper using a unique thin film deposition system. This system has dual argon plasma arcs, which not only allow the copper to be deposited, but also “resputter” the deposited film. Both the Scanning Electron Microscope (SEM) and the Transmission Electron Microscope (TEM) have been used to analyze the samples, allowing the quality of the deposition and crystalline structure of the films to be assessed. Results show that this project has been successful in replicating the promising results of collimated sputtering and long throw distance sputtering, with fewer complicated steps, fewer system components, and a higher deposition rate.

Nathan Hall (6)
Faculty Advisor/Collaborator: Nathan Miller
Modeling Temperatures in Out Flowing Stellar Winds

In this project we used the computer programs Chandra Interactive Analysis of Observations (CIAO) and Interactive Spectral Interpretation System (ISIS) to analyze the temperature patterns found in the hot gas of out flowing stellar winds of stars. The focus of the study was Spica, a B1 IV star with a radius of 7 solar radii and mass of 15 solar masses. We used data gathered by NASA’s Chandra X-Ray project that was filtered through a Low Energy Transmission Grating. Using this software, we developed both one and two temperature fits for the stellar out flowing winds. These fits try to find one characteristic temperature for all of the out flowing gases. Taking the fits given by the software and the X-Ray spectrum, we were able to investigate and search for the presence of various elements, including highly ionized forms of oxygen, nitrogen, and iron among others.

Steven F. Henke (4)
Faculty Advisor/Collaborator: Paul J. Thomas
Hydrocode Simulations of Impacts in the Outer Solar System

Imaging of the icy surfaces of outer solar system bodies by the Voyager, Galileo, and Cassini missions reveals an extensive history of bombardment, predominantly by comets. To analyze the detailed physics of such events, a Smoothed Particle Hydrodynamics (SPH) model was used to simulate the impact of a comet on an icy surface. The simulations permitted the analysis of impacts with varying speed, impactor size, and trajectory angle. One particular focus of this study was the extent of pyrolysis of pre-existing organic material in the icy target resulting from the impact shock. The role of impact destruction of organics in outer solar system bodies will be discussed.

Jonathan Jay (1)
Faculty Advisor/Collaborator: Kim Pierson
Wood Product Testing Collaboration with Local Company

This project was a research and development collaboration with the local lumber company, Northern Crossarm, Inc. The goal of this project was to construct a system that allowed accelerated weathering of pressure treated wood. This accelerated weathering system allowed us to determine how well a wood preservative remained in the wood after the weathering cycle. The company, prior to contacting the university, was spending significant money sending the materials away to be tested. This collaboration with the university allowed the company to speed up the testing while saving development costs.

Carolyn Otto, David Kincaid, Steven F. Henke, and Joe Kane (3)
Faculty Advisor/Collaborator: Paul J. Thomas
Modeling Subsurface Melt-through Events in the Oceans of Europa

There is strong evidence that the Jovian satellite, Europa, is covered by an icy shell overlaying a liquid water ocean. Because typical surface temperatures in this region of the solar system are 100 K, the surface waters exist in a frozen state. Basal heating and heat generated by ice flexures balance freezing resulting in a steady-state ice thickness, which has been estimated to be between 8 and 16 km. Surface features found in the Conamara Chaos region suggest underwater melt-through events are common in the oceans of Europa. These events may be caused by thermal plumes rising from the sea floor. In our research, we consider a typical section of this ice-ocean system found at steady state thickness. As a thermal jet on the ocean
floor convects hot liquid water towards the ice shell, we will investigate how plumes of different temperatures affect the icy layer above.

**Benjamin J. Sykora (2)**
Faculty Advisor/Collaborator: **Kim Pierson**
*Transmission Electron Microscopy of High Aspect Ratio Integrated Circuit Interconnects*

Integrated circuit interconnects are the micrometer or nanometer sized wires used to send electrical signals between various components of an integrated circuit. The continual demand for smaller and more powerful electronic devices force engineers to place more and more components on a smaller integrated circuit, thus limiting the space available for interconnects. To accommodate these spatial constraints, high aspect ratio interconnects are used (aspect ratio = depth/width). A number of techniques have been developed to aid in the successful fabrication of interconnects, each having advantages and disadvantages. Such techniques include collimation and Ion Beam Assisted Deposition (IBAD). The materials science center at UW-Eau Claire is currently investigating a simple and cost-effective method of fabricating high aspect ratio interconnects. Our method utilizes a physical vapor deposition (PVD) system with IBAD. Tantalum or Titanium boundary layers are also used to limit diffusion and reaction of materials. Overall interconnect profile is demonstrated with scanning electron microscopy. Higher resolution images from transmission electron microscopy are used to determine grain boundaries and to verify the thickness of boundary layers.

**Public Health Professions**

**Jared Balkman** and **Darin Mohr (144)**
Faculty Advisor/Collaborator: **Crispin Pierce**
*Tertiary-Butyl Alcohol in Breath as a Biological Indicator of Methyl Tertiary-Butyl Ether Exposure*

Methyl tertiary butyl ether (MTBE) is a fuel additive used to reduce some harmful tailpipe emissions, pursuant to the 1990 Clean Air Act Amendments. The US EPA classifies MTBE as a possible human carcinogen, and its presence in gasoline and groundwater nationwide has led to widespread exposure through inhalation at production facilities and during refueling, and through ingestion of contaminated drinking water. The quantification of risk under various exposure scenarios requires better understanding of MTBE toxicokinetics. We conducted ten controlled human exposures to a nominal concentration of 2.5 ppm 2H-12-MTBE for two hr, and examined blood and breath levels of MTBE and its metabolites for efficacy as biological indicators of MTBE exposure. Tertiary-butyl alcohol (TBA) proved to be a better indicator than parent MTBE, methanol, or acetone by virtue of its relatively higher consistent breath concentration and its longevity in the human body. Physiologically-based toxicokinetic models for MTBE and TBA were developed using individualized values of body weight, adiposity, and MTBE exposure concentration. The models were fitted to the data and applied to published regulatory standards for MTBE in air and drinking water. Corresponding predicted steady-state levels of TBA in breath ranged from ranged from 0.011–150 µmol/m3.
Graduate Entries

Communication Sciences & Disorders

Jodi Budd and Rebecca Zeiter (176)
Faculty Advisor/Collaborator: Lisa La Salle
Preschoolers’ Phonological Encoding and Stutter Loci during CVC-in-Utterance Imitation

According to the Covert Repair Hypothesis, children may stutter due to a phonological encoding impairment. Phonemes uniquely selected have a slower-to-rise activation than those re-selected. The hypothesis that imitating CVC words embedded in utterances with different C (onset), V (nucleus) and C (coda) would elicit more stutters than embedded words with same onset, coda, onset+nucleus, and nucleus+coda was confirmed. La Salle and Bender (2004) presented results from 34 normally fluent children (3- to 6-yr-olds) who imitated five types of CVCs embedded in the same story frames. The purpose of the present study was to use the same experimental paradigm of La Salle and Bender, testing the hypothesis that peers who stutter will stutter more when imitating CVC words in which each C,V,C differs. Five 2- to 4-year old children who stutter showed significantly (X2=11.82;p=0.0187) more stutters in the CVC-differ “Nick & Bob” story condition than in the other story conditions.

Laura Hurd (174)
Faculty Advisor/Collaborator: Kristine Retherford
A Comparison of Language Production, Language Comprehension, and Cognitive Functioning in Identical Twins with Williams Syndrome

Although many authors have noted that language expression is superior to language comprehension in individuals with Williams syndrome (WS), the results of research have been contradicting. Individuals with WS comprise a heterogeneous population; therefore, generalized statements regarding their language and cognitive abilities may not be representative of all individuals diagnosed with WS. In addition, few studies have looked at individuals who do not have the chromosome deletion typical in the diagnosis of WS. This research provided an in-depth look at language expression, language comprehension, and cognitive functioning in identical twins with WS.

Rebecca Zeiter and Jodi Budd (175)
Faculty Advisor/Collaborator: Lisa La Salle
Phonological Encoding and Stutter Loci during CVC-in-utterance Imitation

The Covert Repair Hypothesis (CRH) states that children stutter because of a temporal impairment in their phonological encoding ability, and stutters are side-effects of an error-detect-repair process (Kolk & Postma, 1997). Children who stutter make phonemic error repairs, either covert or overt. According to the CRH, they stutter as a symptom of adapting to the slow activation rise time of target phonemes and early mis-selection of unintended phonemes (Wijnen, 1991). Phonemes uniquely selected have a slower-to-rise activation than those re-selected or primed, thus leading to mis-selections, resulting in stutters. Bender and La Salle (2004) presented results from 34 normally fluent children (3- to 6-yr-olds) who imitated CVC words embedded in same story frames. Bender and La Salle found no differences in overall stutter-like disfluency frequency across conditions in these normally fluent children. We used Bender and La Salle’s paradigm to test the hypothesis that children who stutter will produce more stutters in the Different CVC (highest phonological encoding demands) than in the Same Rime (lowest phonological encoding demands) conditions, and to explore stutter loci in these imitated utterances.

History

Melisa Cushing Davis (183)
Faculty Advisor/Collaborator: James Oberly
The Electronic Atlas of Wisconsin Indian Land Cessions

The signing of the 1825 Treaty of Prairie du Chien began a new era in Wisconsin Indian history by establishing Indian title to the land, the first step in the transference of land from its Native American stewards to Euro American settlers. Over the next 34 years, the United States would negotiate eighteen land cessions with the Indian Nations of Wisconsin. Conceived to further study of Wisconsin Indian History, the Electronic Atlas of Wisconsin Indian Land Cessions unites the Wisconsin
The treaty cession map of Charles Royce, first published in 1896-1897, with the 1903 treaty compendium of Charles Kappler, into one comprehensive online reference tool. In addition, users of the Electronic Atlas can access treaty journals, senate ratification debates, and biographical sketches of select treaty signers. Not simply the story of the disposition of Wisconsin’s first people, however, the Electronic Atlas also documents the retro-cessions in which the U.S. returned some of the ceded territory to “Indian Country” in the form of reservations, and the landmark federal and state cases involving Wisconsin Indian ceded territories and the reserved rights still enjoyed by tribes on those land and waters.

**Human Development Center**

**Jason Penry**, graduate student, **Stephanie Pahl**, and **Courtney Wood**, undergraduate students (177)
Faculty Advisor/Collaborator: **William Frankenberger**

*Using Stimulant Medication to Treat ADHD: How Secondary Regular Educators Perceive Its Effectiveness on Improving Behavioral and Academic Performance*

According to the American Psychiatric Association (APA), 3% to 5% of school-aged children are diagnosed with Attention Deficit/Hyperactivity Disorder (ADHD). To combat this growing epidemic, many health and educational professionals are recommending that parents consider using stimulant medication (i.e. Ritalin) to alleviate the major symptoms of ADHD. Although no conclusive evidence has been found to validate the long-term effectiveness of stimulants (i.e. improved academic performance), educators widely believe that the short-term effects (i.e. reduced hyperactivity, attentiveness, etc.) are more than sufficient to justify their continued use both within and outside the classroom setting. This research project will examine both the knowledge and the attitudes that high school teachers have regarding stimulant medication and its effects on children.

**Jennifer Stroh**, graduate student, and **Tessa Root**, undergraduate student (178)
Faculty Advisor/Collaborator: **William Frankenberger** and **La Vonne Cornell-Swanson**

*The Use of Stimulant Medication and Behavioral Interventions for the Treatment of Attention Deficit Hyperactivity Disorder: A Survey of Parents’ Knowledge, Attitudes, and Experiences*

The study examined parents’ knowledge and attitudes of Attention Deficit/Hyperactivity Disorder (ADHD) and its treatment, the information sources parents rely on, the initial referral source for ADHD and a comparison between parents of children with ADHD and parents of children without ADHD. Participants were parents of elementary age children in a school district of Wisconsin. Results indicate parents who had a child with ADHD rated the effects of stimulant medication more positively and side effects as less severe than other parents.

**Management and Marketing**

**Julia Welch** (168)
Faculty Advisor/Collaborator: **Kristy Lauver**

*A Review of Individual Differences and Organizational Safety*

The relationship between individual differences and several key work-related outcomes has been well documented. General mental abilities have been found to be predictive of job and training performance across different types of jobs and settings (Schmidt, Hunter, & Pearlman, 1981). Recent meta-analyses have consistently reported a positive relationship between the personality traits of conscientiousness and emotional stability with job performance across all types of occupations and nations (Barrick & Mount, 1991, Salgado, 1997). In light of these findings, it is surprising that research has not taken a more systematic look at the role of individual differences in predicting another important outcome—employee safety. Safety has become one of the highest operational priorities facing organizations due to both the human imperative, stemming from the millions of disabling injuries each year, and the financial costs to organizations of safety failures causing at least millions of days lost from work and costing employers billions of dollars each year (NSC, 2002). Thus, organizational safety appears to be a very important, but oft-neglected criterion in the individual differences literature.
Management Information Systems

Julia Welch (166)
Faculty Advisor/Collaborator: Ruidong Zhang
Common Industry Practice in Securing Enterprise Wireless Networks

As wireless technology has become an integral part of any major organization’s computer network, the demand for wireless solutions has grown rapidly, and a variety of niche markets are springing across the field of wireless communications. WiMAX has already left its niche and is becoming a widespread technology. Other wireless technologies on the cusp of widespread application include downloadable, customized mobile phone content, wireless home theater networking, and interactive directory services for cellular telephones. This paper discusses wireless technology’s role in both the corporate world and public institutions like universities, as well as possible issues of future wireless applications and expansion. A special emphasis will be given to security issues inherent to transmitting data over thin air and the implications of such truly ethereal networking for businesses. Recent field studies suggest that many businesses have reservations regarding the deployment of wireless technologies due to security vulnerabilities associated with the technology. More security concerns rise when mission-critical applications are in question. This paper discusses the current industry practice in securing wireless networks for corporate use. Lastly, an analysis of news reports related to the field of wireless communications will be provided and predominant trends will be identified within the field.

Julia Welch (167)
Faculty Advisor/Collaborator: Ruidong Zhang
Wireless LAN Deployment at UWEC: A Case Study

As wireless technology has become an integral part of any major organization’s computer network, the demand for wireless solutions has grown rapidly, and a variety of niche markets are springing across the field of wireless communications. Unfortunately, the rapidity and scope of wireless technology deployment have resulted in industry standards trailing behind technology application. Such uncoordinated expansion may result in interoperability problems between devices due to the lack of standardization. This paper discusses wireless technology’s role in both the corporate world and public institutions like universities, as well as possible issues of future wireless applications and expansion. A special emphasis will be given to security issues inherent to transmitting data over thin air and the implications of such truly ethereal networking for businesses. Recent field studies suggest that many businesses have reservations regarding the deployment of wireless technologies due to security vulnerabilities associated with the technology. More security concerns rise when mission-critical applications are in question. This paper discusses the current industry practice in securing wireless networks for corporate use. Lastly, an analysis of news reports related to the field of wireless communications will be provided and predominant trends will be identified within the field.

Psychology

Ellen Alslieben, graduate student, and Katie Schultz, undergraduate student (179)
Faculty Advisor/Collaborator: William Frankenberger
The Pharmacological Treatment of Attention-Deficit/Hyperactivity Disorder: A Survey of Pharmacists’ Knowledge, Perceptions, and Experiences

This project uses a questionnaire to (a) identify current trends in the medical treatment of childhood ADHD, (b) examine pharmacists’ knowledge and perceptions of possible adverse drug interactions among children receiving one or multiple psychiatric medications, (c) assess pharmacists’ attitudes and experiences with regard to the use of medications to treat ADHD in school age children, and (d) explore the impact pharmaceutical company promotion advertising has on prescribing patterns. Participants consist of 800 pharmacists randomly sampled from the state pharmacy boards of Wisconsin and Iowa. Through the use of a survey format, the study assesses pharmacists’ knowledge, perceptions, and experiences with the medical treatment of ADHD. These issues are of interest for several reasons. First, the use of medications to treat childhood ADHD has been dramatically increasing. Second, pharmacists’ knowledge and perceptions of ADHD treatment have not been thoroughly examined; this is important because pharmacists are accessible professionals who play a role in ADHD medication distribution, consultation, as well as offer advice. Third, pharmaceutical companies direct-to-consumer advertising may be affecting parental beliefs and prescribing patterns. Finally, public awareness and understanding of ADHD medications, including potential impacts medications may have on children, is minimal.
Alexandra Clausen (181)
Faculty Advisor/Collaborator: Barbara Lozar
Evaluation of the Effectiveness of a Reading Recovery Program

Purpose of the Presentation: The purpose of this presentation is to present information regarding the effectiveness of a Reading Recovery program, such as 1) whether children who receive Reading Recovery are reading at grade level or above the lowest 20%, 2) if the gain in reading is maintained, 3) whether classroom grades in reading improved, and 4) whether standardized test scores improved. Discussion: Data will be presented on the Reading Recovery program, past Reading Recovery program research, and the effectiveness of a Reading Recovery program. Benefit to Participants: The presentation will increase awareness of Reading Recovery and the need for program evaluations. Data will aid school professionals in understanding the effectiveness of one Reading Recovery program. This information will allow school professionals to make more informed decisions regarding the implementation of Reading Recovery programs.

Ann M. Staby (180)
Faculty Advisor/Collaborator: Marie K. Crothers
An Evaluation of Programs Training Teachers to Identify Warning Signs of Mental Illness

The Minnesota Board of Teaching recently adopted a rule mandating that all teachers seeking relicensure must be trained to identify the warning signs of early onset mental illness. Several entities will be providing training sessions to meet the requirements of this mandate. The present study will examine the effectiveness of such teacher training sessions. Specifically, this research will assess participants’ knowledge of mental illness warning signs immediately before and immediately following training sessions. Data collection will occur at training sessions presented by South of the River Learning Academy in Minnesota.

Student Development & Diversity/English

Michelle J. Clark, Daniel P. Hardy, and Stephanie A. Birdd (182)
Faculty Advisor/Collaborator: Jodi Thesing-Ritter, Student Development & Diversity; Karen Welch, English
Academic Integrity Assessment Project at UW-Eau Claire

Concern about academic dishonesty across the country has led to studies designed to explore its nature, prevalence, and causes. This project engages a group of students and faculty in a study of academic integrity on the UW-Eau Claire campus: its status, its barriers, and the extent of need for improvement. It includes a review of literature that defines academic integrity and provides support for efforts to improve it on college campuses: an incidence-rate study of academic misconduct at UW-Eau Claire with a nationally used instrument from the Center for Academic Integrity, and a series of focus groups and interviews with students and faculty to assess perceptions of academic integrity and institutional response. The study will result in the development of academic resources and policies that will encourage students’ commitment to academic integrity.
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