

# Center of Excellence

for Faculty and Undergraduate Student Research Collaboration

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## Proceedings of the 15<sup>th</sup> Annual University of Wisconsin-Eau Claire Student Research Day

April 23 and 24, 2007



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

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



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

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# Schedule of Events

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## Monday, April 23, 2007

<b>Time</b>	<b>Event</b>	<b>Location</b>
7:00 - 9:30 am	Students set up posters	Zorn Arena
9:00 - 9:30 am	Judges' orientation	Gold Room, Zorn Arena
9:30 am - 3:00 pm	Judging	Zorn Arena
Noon - 5:00 pm	Poster session open to University community	Zorn Arena
3:30 - 5:00 pm	Student Research Day reception	Tamarack Room Davies Center
4:15 pm	<i>Reception welcome address:</i> Chancellor Brian Levin-Stankevich <i>Program:</i> Announcement of UWEC Student Research Day awards and Kell Container Corporation Collaborative Research Scholarship	Tamarack Room Davies Center

## Tuesday, April 24, 2007

<b>Time</b>	<b>Event</b>	<b>Location</b>
8:00 a.m. - Noon	Poster Session open to University community	Zorn Arena
Noon - 1:00 p.m.	Students remove posters	Zorn Arena

# Judges

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## Arts and Humanities

Ray Schultz, Department of Theatre Arts, University of Minnesota, Morris

## Behavioral & Social Sciences

Herb Childress, Director of Liberal Studies, Boston Architectural College

Bob Freymeyer, Professor of Sociology, Presbyterian College

## Business & Professional Studies

Sue Dunn, Chair, Department of Nursing, Hope College

Carol Mooney, Professor of Marketing and Business Education, University of Wisconsin-Stout

## Natural & Physical Sciences

Kelly McConaughay, Professor of Biology, Bradley University

Tom Hickson, Chair, Department of Geology, University of St. Thomas

Rebecca Hoye, Department of Chemistry, Macalester College

Jim Madsen, Chair, Physics Department, University of Wisconsin-River Falls

# Acknowledgments

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Many people helped to make this event possible, and we heartily thank them for doing their part cheerfully and efficiently:

**Karen Stuber and Event Services staff**—for helping us make the last-minute venue change to Zorn Arena when we realized we had outgrown all spaces in Davies Center.

**Provost Steve Tallant**—for finding funds to help buy the additional poster boards needed to accommodate this year's over 250 poster presentations.

**Gene Olson**—for carefully transporting poster panels to the arena from three different localities.

**Andy Gutshall and crew**—for setting up the Arena.

**Terri Knudtson and the Catering staff**—for producing delicious victuals for the judges and for the reception.

**Betty Feia, Shawn Seuferer, and Rachel Zollpreister**, ORSP office staff members—for helping with myriad organizational details.

**Josiah P. Peebles IV**, Graduate Assistant—for compiling this abstract booklet and keeping track of participants and poster locations.

*From Learning and Technology Services*, **Gene Leisz**—for providing training in poster design and creation; **Jamison Schmidt and his student crew**—for managing the increased load of poster printing with apparent ease; and **Rick Mickelson and Bill Hoepner**—for recording the event with their cameras.

Lastly, we thank student participants and their faculty mentors for all the hard work that led up to the polished presentations that are displayed at this 15th Annual UW-Eau Claire Student Research Day.

# Arts & Humanities

## Art and Design

### **Anne Jensen (111)**

Faculty Advisor/Collaborator: **Michael Christopherson**

*Historical/Recreational Wooden Batteaux Building Business*

A positive inquiry into the historical significance of the wooden bateaux has led me to researching the idea of building a custom bateaux as a product for consumer use. The School of Business has collaborated with the School of Art and Design in order to accomplish a plausible study of a product that could foster a future business enterprise. The custom wooden boat design would be based on the particular Stillwater model that was used on Wisconsin rivers during the logging era.

### **Dana Reck (112)**

Faculty Advisor/Collaborator: **lia Johnson**

*Using Art to Study Collaboration: Adaptive Art, an Enriching Experience*

What should be in place for successful collaboration? Who benefits from collaboration? What does productive collaboration look like? Through art, I studied collaboration between teachers. A unit-writing project for my coursework turned into collaboration with a local art teacher who also teaches Adaptive Art. I chose this route of collaboration to gain experience and insight into working with students with special needs in an art room setting. I used self and peer reflection to keep track of learning and growth while teaching. In addition to reflection, I kept a detailed diary of my thoughts, feelings, and actions. I shared my writing with a group of researchers: another student and a faculty advisor, Dr. lia Johnson. We discussed our data and received feedback on the process and writing. We plucked themes and recurrent threads from our research during and after the collaboration to answer the research questions we formulated. In this study, I found that a few important attitudes contribute to fruitful collaboration. These include: a willingness to invest time, an attitude that promotes patience and flexibility, and the readiness to communicate and keep communication open between collaborators. Collaboration between teachers leads to highly effective teaching geared toward specific student needs.

### **Teri Sisulak (109)**

Faculty Advisor/Collaborator: **lia Johnson**

*Using Art to Study Collaboration: Helping Students with Learning Disabilities Express Themselves*

This research involved my collaboration with several parties to provide ongoing support for a group of students at a local area middle school with learning disabilities. To assist these students, a group of students from the University of Wisconsin – Eau Claire, also with learning disabilities, went to help out the students and talked about personal advice to the students and served as role models. The goal was for the middle school students to learn to express themselves in an appropriate way through an art project. My research focused on what needs to be in place for a collaboration to be successful, who benefits from collaboration, and what a successful collaboration process looks like. There were obstacles to overcome including: communication, planning, organization, and personal investment. From this process, I strengthened and developed qualities necessary for my future profession as well as felt how others were impacted. For a successful collaboration, it really takes time where the collaborators can sit down together and plan things out and clearly sort out some of the details with the collaboration. The more people that you have trying to work together, the more communication and the more time is necessary in collaboration.

### **Zach Stensen (110)**

Faculty Advisor/Collaborator: **Sandra Starck**

*The Augusta Portrait Series: Capturing the Essence of Experience Etched in Age*

After painting a portrait of my grandfather, I became interested in how an older person's face can describe much more than their physical appearance. As a person ages, I believe certain aspects of their character come to the fore. This series

of paintings explores the relationships between age, identity, and environment in the faces of elderly people selected from my home town and surrounding area. By painting their portraits I not only wanted to capture the essences of wisdom and longevity beyond their physical appearance, but to also create something to serve as homage to their long life, that they, their families, and my community could enjoy.

## Biology

### Jeffrey Hornung (91)

Faculty Advisor/Collaborator: **Todd Wellnitz**

*Biological Illustration: Creating Scientific Drawings for Dissections in Invertebrate Zoology*

Commercially available laboratory manuals used for teaching zoology are overpriced, contain unnecessary text, and are often poorly illustrated. Poor illustrations hamper the learning of animal form and function and make dissections difficult. I set out to create an affordable, concise, accurately illustrated manual for teaching invertebrate zoology that focuses on internal structures for guiding student dissections. By creating new illustrations made directly from dissected animals, and then transferring these illustrations to a computer using Adobe Illustrator, I am assembling a library of high-quality digitized illustrations to be used in teaching invertebrate zoology at UW-Eau Claire. This project has provided me with hands-on experience as a biological illustrator and taught me that the discipline requires feedback from the users of the final product as well as an ability to draw well. Peer interaction with students enrolled in Invertebrate Zoology, has helped me to make the illustrations more effective for learning animal structures and more useful to the students. This project has allowed me to combine my passion for science with my skills as an illustrator and graphic designer to produce a product that effectively teaches others.

## English

### Jared Balkman (255)

Faculty Advisor/Collaborator: **Erica Benson**

*Verging on Merging or Niftily Shifting?: The Low Vowels of Eau Claire*

By investigating low vowel behavior in Eau Claire, this pilot study examines current dialect tension in west-central Wisconsin stemming from the simultaneous geographic approach of two major sound changes. The Northern Cities Shift, a chain shift triggered by the raising of /æ/ (the vowel in hat), occurs in Great Lakes metropolitan areas and is already found in southern Wisconsin. The Low Back Merger, involving the loss in distinction of the vowels in Don~Dawn, is a widespread and rapidly moving change currently reigning in Minnesota and trending eastward into Wisconsin. Seven women and 6 men, lifelong Eau Claire residents ages 18-85, took part in sociolinguistic interviews. Acoustic analysis of 564 vowel tokens showed some evidence (strong in one case) of the Low Back Merger among younger speakers. Additionally, raising of /æ/ across all speakers may be a sign of early Northern Cities Shift influence. Patterns suggest both sound changes may be in their preliminary stages in Eau Claire, potentially complicating accounts which describe their co-occurrence as unlikely (e.g. Labov, Ash, & Boberg 2006: 128). These findings warrant further study of speech in west-central Wisconsin, a largely unattended region in dialect research yet a potentially rich resource for understanding what can happen when phonological changes intersect.

### James Boland (128)

Faculty Advisor/Collaborator: **Robert Nowlan**

*Faceless Fascism: A Collaborative Composition of a Feature-Length Film Screenplay Focused on Issues of Fascism and Resistance in the US Today*

We have collaborated on this text, supported by a UWEC student-faculty collaborative research grant. This is also James' senior English capstone project. Our screenplay depicts a fascist takeover in small Midwestern US city, much like Eau Claire, in 2012, as well as the initial emergence of resistance to this development.

**Kyla Bressler (134)**Faculty Advisor/Collaborator: **Erica Benson***“With” Without: The Use of “With” Sans Object*

This pilot study investigates the constructions of “come with” and “go with,” sans object, in Wisconsin and Minnesota. For example, one may ask “Will you come with?” or “Do you want to go with?” instead of “Will you come with me?” or “Do you want to go with them?” Although many prescriptive grammarians find such usage odd, and language scholars suggest it is somewhat commonplace in the Midwest (Flaten 1900, Holter 1931, Doyle 1997, Salmons 2006), no empirical studies have examined the constructions. Data from the questionnaires and interviews of thirty-four lifelong Wisconsin and Minnesota residents reveal that the use of “with” sans object is quite common in these areas. In addition, the high usage rates (75-100% reported use of experimental tokens) and apparent level of comfort respondents had with the construction suggest that it is not stigmatized in Wisconsin or Minnesota. To better understand the regional and social distribution, as well as the degree of stigma, of “with” sans object, a larger study encompassing a larger geographic area and a wider range of social groups is needed.

**Bridget Brevik (127)**Faculty Advisor/Collaborator: **Erica Benson***“Once” as an Emphasis Word in Wisconsin Dialect*

One feature of the Wisconsin dialect is the use of “once” as an emphasis word. This unique use of “once” is primarily found in imperatives for questions such as “Come here once!” and “Can you help me out once?”. Although “once” as an emphasis word is mentioned in articles on Wisconsin dialect—for example the Dictionary of American Regional English states that this use of “once” started in Milwaukee and is spreading throughout the rest of the state—there has been little empirical research on this construction. In my pilot study, thirty-four people from Wisconsin and Minnesota were surveyed about whether they use or have heard “once” used in this manner and what they thought “once” means in the examples. Forty-one percent report using “once”, while 71% have at least heard “once” used in this manner. Furthermore, respondents from eastern Wisconsin were more likely to have heard “once” used or use it themselves. In addition, respondents gave three main definitions for “once”: one time, for a short period of time, and now or quickly. Further research is needed to better understand the use of “once” in the Upper Midwest.

**Jessica Janiuk (256)**Faculty Advisor/Collaborator: **Audrey Fessler***Concepts of Transgender Identities and Experiences*

As a transgender person, Jessica Janiuk finds current academic language and common tropes for transgender identities, experiences, and perspectives inadequate to convey the complexities of transgender life or of the very concept of gender itself. As an instructor of Women’s Studies, Audrey Fessler agrees. The immediate outcome of this three-part project will be a co-authored article that notes current best practices in educating the general public on transgender identities, experiences, and perspectives, and that proposes in detail new approaches to providing such education. We anticipate that the approaches we develop should arise organically from the ways in which transgendered people themselves conceive of and describe gender.

**Jacqueline Lockerby (148)**Faculty Advisor/Collaborator: **Ruth Cronje***User Testing in Scientific Writing: Testing Chapters from Patient Power*

User testing is one of the primary methods of determining whether a document is useful and appropriate to the audience that a writer is trying to reach. With scientific writing, this is an especially important concept, as science writers often address complex topics that can easily confuse a general audience. We will address one of the most common types of user tests, a simple survey to measure reader comprehension and interest in several pieces of scientific writing. The writings tested will be several chapters of *Patient Power*, a book in progress by Dr. Ruth Cronje and Dr. Jim Freeman. We will design and administer the user tests, including a pilot test given to an English 305 class and an online test, refined from the results of the pilot test, administered to members of the general public that fit within the projected audience of the book. The information gathered in these tests will allow us to make the tested chapters of *Patient Power* more comprehensible and appealing to their audience.

**Heather Sommer (147)**Faculty Advisor/Collaborator: **Erica Benson***Use of “them” and “those” as Plural Determiners in WI/MN Dialects*

Little linguistic attention has focused on the use of “those” and “them” as plural determiners such as “Can I see them/those ones?” My motivation for studying this construction came from hearing it often from customers in retail service encounters (such as “get me those ones” and “I bought those ones last week”). This pilot study explored the use of “those” and “them” as plural determiners in WI and MN by surveying and interviewing 34 life-long residents of the area. A staggering 94% of respondents recognized the construct, whereas only 23% had admitted to using it. Strong evidence supports the hypothesis that use of the construct is socially stigmatizing in some groups, suggesting that the construct may stem from a social dialect rather than a regional one. This pilot study has laid the groundwork for further research into the use of “those” and “them” as plural determiners, including its possible origins, social class and regional distribution, and attitudes towards the construction.

## Foreign Languages

**Brandon Barrette (90)**Faculty Advisor/Collaborator: **Analisa DeGrave***Salvador Dalí and his Fascination with the Mathematical Sciences*

Salvador Dali was intrigued by the sciences and this is truly evident in his work. Such pieces as The Swallowtail, Crucifixion, and The Persistence of Memory all show a mathematical knowledge that Dali developed from working with mathematicians, physicists and other such scientists. Toward the end of his life he even attended science conferences to grasp the ideas of mathematics, relativity, even biology and chemistry. His work is a true reflection of science and mathematical breakthroughs of the twentieth century.

**Erin House (72)**Faculty Advisor/Collaborator: **Martina Lindseth***Development of Oral Proficiency During a Study Abroad Program*

This research project assesses how students develop their oral proficiency during a semester abroad in Germany: how much they improve and in what stages they improve. The tool for this analysis is the Oral Proficiency Interview (OPI), which assesses the functional ability of a speaker in a foreign language with a rating of Novice, Intermediate, Advanced or Superior. Although OPIs are typically holistically evaluated, Dr. Lindseth and I looked deeper into the interviews as a tool to find subtle evidence of improvement in oral proficiency. We looked specifically for occurrences of inversion and verb-final constructions, Stages 4 and 5 in German language acquisition. Our research questions are as follows: Is there a correlation between hours of instruction (high school + college) and OPI level (pre-study abroad)? How much did OPI levels of individuals improve during the semester? What are the average numbers of Stage 4/5 obligatory contexts per level and the average/median percentage of accuracy for each word order rule per level? How do these numbers compare for pre- and post-study abroad? Is there a correlation between stage 4 & 5 and OPI levels?

**Kristin Schuck and Jacqueline Lockerby (89)**Faculty Advisor/Collaborator: **Anne Cummings***Foreign Language Teachers' Technology Use*

Previous studies have determined that foreign language teachers use technology less than teachers in any other discipline. Our research further examined this claim, focusing especially on the reasons behind this lack of technology use. An Internet survey was deployed to 132 foreign language teachers in Wisconsin, examining their access to, familiarity with, current use of, and interest in various technological teaching tools. Our findings indicated that while the majority of teachers have access to teaching technology, it is used primarily for administrative rather than teaching purposes. These teachers expressed interest in learning about technology tools and their use in the classroom, demonstrating the need for further technology training opportunities.

# Geography and Anthropology

## Aaron Schasse (92)

Faculty Advisor/Collaborator: **Jeff DeGrave**

*Geografitti: The Mapping of Handwritten Public Expression*

This project will consist of the collection, documentation, cataloguing and mapping of informal handwritten public expression (a.k.a. graffiti) around the Chippewa Valley. Aaron Schasse will investigate a diverse assortment of public structures and spaces for significant artistic and/or intellectual expression that he will photograph, catalogue, and map with a GPS locator. Data and samples collected will then be organized and formatted to create a flip book for presentation through the utilization of design software. The final product will be presented as a collection of photographs providing contextual descriptions of the images.

## History

### Joseph Carlson, Meghan Fisher, Jason Gilgen, Nicholas Halter, Kyle Hudick, Paul Huset, Katrina Kane, David Kumar, Sarah Nienow, Rachel Ogletree, Adam Otto, Allen Ramsey, Jack Brooks, and Hollie Lawless (130)

Faculty Advisor/Collaborator: **Jim Oberly**

*"The climate in June will force the enemy to retire": Morbidity and Mortality of a Sample of Wisconsin Men in the Civil War*

In May 1863, Confederate General Robert E. Lee advised his secretary of war and president not to send any reinforcements to the Confederate garrison at Vicksburg, not because he doubted the importance of holding that strategic location, but because he stated that "the climate in June will force the enemy to retire." In other words, Lee made a calculation that the illness and death that a Union army force would face in the Mississippi swamps would be more of a deterrent than any number of new Confederate soldiers. Of course, we know that history proved him wrong. The Union forces besieged Vicksburg throughout the month of June and it was the Confederates who broke, not the Union. This project examines individual-level soldier data on morbidity and mortality of Wisconsin soldiers in the Civil War to see how they fared in the Mississippi theater in 1863, as well as in other fronts of the war. The data comes from a large sample compiled by University of Chicago Professor Robert W. Fogel and accessed by our research group through Inter-University Consortium for Political and Social Research (ICPSR) Study No. 6837.

## John Grochowski (251)

Faculty Advisor/Collaborator: **Teresa Sanislo**

*The Portrayal of the Holocaust in Latvia as told by the National Occupation Museum of Latvia*

The project will examine how the Latvian Nation responded to the history of the Holocaust within their own country. This project will look at the exhibits within the National Occupation Museum of Latvia that focus on the Holocaust and discuss how they portray its occurrence. Questions that will be addressed are: Who are the victims that the museum chooses to focus on? Who does the Museum portray as the perpetrators of the Holocaust? What role does the Museum describe the Latvian people as having? This information will then be compared with other scholars' interpretation of the event.

## Erin Pevan (129)

Faculty Advisor/Collaborator: **Matthew Waters**

*"Hic Facet Arthurus, Rex Quondam, Rexque Futurus": The Analysis of Original Medieval Sources in the Search for the Historical King Arthur*

The stories of Arthurian literary tradition have provided our modern age with gripping tales of chivalry, adventure, and betrayal. King Arthur remains a hero of legend in the annals of the British Isles. However, one question remains: did King Arthur actually exist? Early medieval historical sources provide clues that have identified various figures that may have been the template for King Arthur. Such candidates such as the second century Roman general Lucius Artorius Castus, the fifth century Breton leader Riothamus, and the sixth century British leader Ambrosius Aurelianus hold high esteem as possible candidates for the historical King Arthur. Through the analysis of original sources and authors such as the Easter Annals, Nennius, Bede, Gildas, and the Annales Cambriae, parallels can be established which connect these historical figures to aspects of the Arthur of literary tradition.

## Latin American Studies

**Eric Duwe (71)**

Faculty Advisor/Collaborator: **Analisa DeGrave**

*Creating ESL Opportunities in Rural Wisconsin*

This project seeks to investigate the specific challenges of creating English language learning opportunities for Hispanics in rural Wisconsin. This is a setting where resources traditionally have been very limited in meeting the needs of Hispanic immigrants. The focus is to create a template for an effective and sustainable English as a Second Language program which incorporates a high level of multicultural interaction and opportunities for community service.

## Music and Theatre Arts

**Courtney Doyel, Stephanie Holte, Katie Lebrun, and Allison Wells (252)**

Faculty Advisor/Collaborator: **Mitra Sadeghpour & Barbara Wimunc-Pearson**

*“Try Me, Good King: Last Words of the Wives of Henry VIII”: The Art Song Cycle on Stage*

The four student researchers and two faculty mentors collaborated to research the song cycle “Try Me, Good King: Last Words of the Wives of Henry VIII” by composer Libby Larsen and applied that research to create an innovative, semi-staged performance of the cycle that included elements of historical costuming, artwork in the form of rear projections, and theatrical lighting. Each student and Dr. Sadeghpour, who sing the roles of the queens, conducted in-depth research on one of the five songs—each set to the last words of five of Henry VIII’s wives—its music, text, character, and historical context. The collaborators also researched historical costuming, the role of women in the court, lute songs, and marriage in sixteenth-century England. The research was then compiled in a written performance guide for the cycle, and the project culminated in both a public performance of the songs by all six collaborators and a paper in the form of an extensive program booklet to be distributed at the recital. This project explores and pushes the boundaries of the traditional song recital by including visual and theatrical elements rather than solely the traditional aural element.

# Behavioral & Social Sciences

## Communication and Journalism

### **Katie Atherton and Lisa Morehouse (78)**

Faculty Advisor/Collaborator: **Martha Fay**

*Stop Telling Me What to Think About: Examining Diversity through Agenda Setting Theory at the University of Wisconsin—Eau Claire*

The face of diversity has changed over the last thirty years (Giroux, 2006). What was once limited to affirmative action and issues of race is no longer valid on today's campus. Using Maxwell McCombs and Donald Shaw's concept of Agenda Setting Theory, one can think critically regarding the attempts to operationalize an accurate definition of diversity for the University of Wisconsin—Eau Claire. Through individual interviews with gatekeepers at the university, one can determine the existing definitions of diversity in Eau Claire and recognize the constraints that exist in regard to discourse surrounding subsequent issues. Further survey asks students to move outside these parameters in the hope of creating a new definition of diversity to move our campus into the 21st century.

### **Nicole Bever, Lindsay Lutzke, Bonnie Maczka, and Erin Punzenberger (77)**

Faculty Advisor/Collaborator: **Martha Fay**

*Cross-Generational Friendships in the Workplace*

Friendship studies in the workplace have been conducted, but little research has been done on how generations are relating to each other in the workplace. Developing relationships in the workplace seems to benefit individuals in a variety of ways, but how does it happen, which factors matter most? As multiple generations are interacting with one another in the workplace, organizations must look at ways to adapt to these changing demographics. With this new challenge, questions about employee interaction arise regarding how generations communicate with one another at work. We will be using a questionnaire approach to explore the following questions: How do perceptions of similarity affect cross-generational friendships in the workplace? What is the largest contributor to positive cross-generational relationships in the workplace?

### **Steve Dus, Dylan Lidgard, and Steve Ranta (250)**

Faculty Advisor/Collaborator: **Martha Fay**

*Body Image Effects from Reality Television*

This research project examines potential effects that reality television has on body image among college students ages 18 to 24. Previous research on media and body image has shown that men wanted to bulk up while women wanted to be thinner and lose weight (Vartanian et al.). Most existing studies have concentrated on idealized body images in fictional television portrayals (Bissell and Vartanian et al.). A recent increase in reality television programming, however, suggests that the depiction of "real life" in these new television shows is also important to study. That is, if relatively benign magazine images negatively affect young adults' images of themselves, the depictions built as reality may be even more damaging. This study uses social comparison theory to examine whether the type of social comparison (up/down) made by 18-24-year-olds to a reality television show is associated with perceived body image, using the body esteem scale of appearance and weight by Mendelson, White, and Mendelson. Participants will view a reality show and complete a post-test questionnaire. Results will be compared to what is known about the effect of a media image on body esteem.

### **Darrik Erikstrup and Jamie Daley (83)**

Faculty Advisor/Collaborator: **Martha Fay**

*Transformational Leadership and The Management of Conflict*

This research project seeks to extend findings from an earlier study comparing Transformational and Transactional leaders on preferred Conflict Management Strategies (O'Neil, Fay and Kline, 2004). Using a 360 design with matched supervisor/subordinate dyads, this study seeks to further substantiate results of an earlier study in which transformational leaders were found to prefer the collaborative strategy of conflict management. In addition, the core communication elements defining

transformational and transactional leaders will be examined. Participants will be asked to respond to a scenario reporting the exact words they would use in the conflict situation described. Responses will be coded for specific elements of each leadership style, which will provide a more precise, communication-centered definition of the constructs. The Management of Differences Exercise (Thomas and Kilmann, 2001) and the Multi-Faceted Leadership Questionnaire (Bass, Avolio and Jung, 1995) will be incorporated in a questionnaire and administered to supervisor/subordinate dyads at various organizations.

**Michelle Forgette (117)**

Faculty Advisor/Collaborator: **Won Jang**

*Effects of Alcohol Advertisements on University of Wisconsin—Eau Claire Students and the Correlation between Media Exposure and Alcohol Perception*

The purpose of this study is to determine the effects of alcohol advertising on alcohol perception of UWEC students. Alcohol advertising is a constant presence for college students, especially on television, on-campus newspapers, and radio. On-campus newspapers are an especially pervasive medium, with drink specials and bar advertisements commonly advertised. Our study will focus on not only campus newspapers but additional media to determine its effects on UWEC students' drinking behaviors. We plan to analyze a survey containing 77 questions relating to drinking and the effects of various media. Within these media we will further narrow our research to see if there are certain variables (gender, illegal/legal drinking age, year classification, residency) that shape students' perception and habits surrounding alcohol. SPSS computer program will be used to analyze the data and give us a large range of options of data to compare to understand any correlation that might exist between media exposure and alcohol perception. Funds will be provided as well as background information through an on-campus organization, Center for Alcohol Awareness Education (CASE). By the end of our study we hope to understand what role alcohol advertisements play on college students and their intentions to drink.

**Jeff Gallager, Lucas Tork, and Luther Flagstad (84)**

Faculty Advisor/Collaborator: **Martha Fay**

*Creating Consumption?: Examining the Effect of Study Abroad on College Students' News Media Consumption*

Colleges and universities encourage students to study abroad to expand their knowledge and interest in events taking place all over the globe. Research supports the importance of current events knowledge (Garramone, 1986; Lucas & Schmitz, 1988; McCoy & Spratt, 2004; Vincent & Basil, 1997), examines college students' motives for news consumption (Lucas & Schmitz, 1988; Al-Obaidi & Lamb-Williams & Mordas, 2004; Diddi & LaRose, 2006; Terkla & McKnight, 1999), and describes the overall effects of study abroad (Armstrong, 1984; Billigmeir & Forman, 1975; Hadis, 2005; Nash, 1976; Opper, 1991; Yager, 1998). However, there is little research that establishes a link between these three interrelated topic areas. This study will examine these interrelationships by administering a questionnaire to college students, and controlling for expected media use increases with age. Participants in this study will respond to a newly designed questionnaire and report their current media usage. Results of this study will help to bridge the gap between research on the topics of college students' consumption of news media and the effects of a study abroad experience. If a positive correlation can be established between study abroad participation and news media consumption, this study will suggest another benefit of study abroad.

**Briana Hartsough (98)**

Faculty Advisor/Collaborator: **Martha Fay**

*The Effects of Verbally Aggressive Messages from Followers on Leadership Communication Practices*

Although the effects of verbally aggressive messages from leaders to followers has been a subject of study by communication scholars, little research has addressed how leaders' communication is influenced by verbally aggressive messages from their subordinates. This project will first establish the leaders' management style and then examine their response to being the target of verbal aggression from a subordinate, using the Management of Difference Exercise site and the Verbal Aggressiveness Scale site. Using a contingency approach, leaders' expressions toward verbally aggressive subordinates will be examined through comparing the leaders' standard leadership style (as measured by the Management of Difference Exercise) and the leadership style that emerges after they experience verbal aggression from a subordinate (measured by the Verbal Aggressiveness Scale). Results of this research will contribute to the body of literature on leader communication by illuminating communication behavior in an understudied context. Greater understanding of this particular leadership challenge will help both leaders and organizations to be more effective, profitable and create a higher employee satisfaction rate.

**Karen Legler and Sean Jones (97)**

Faculty Advisor/Collaborator: **Martha Fay**

*Diversity on the UW-Eau Claire Campus*

Individuals have unique ideas of what “diversity” represents. For some, it may be an issue of ethnicity. For others, it may be about sexual preference or gender. For others still, “diversity” may be a declaration meant to encompass ethnicity, sexual preference, gender, economic class and other categories in which American society and cultures group people in. However diversity may be defined, college campuses in the United States are having difficulties generating this ambiguous item. From the students enrolled, to the professors who teach, to the janitors who keep the campus looking clean and professional, colleges seem to have problems creating an atmosphere of diversity. Many colleges express this regularly, and strive to attain a higher level of something they have trouble defining. Our research examines how one mid-western university “recruits” unique people to create a more diverse campus. Also, we examine who defines the word “diversity” on this campus and how they promote it. Finally, after reviewing their definition of diversity, how they promote it, and how our university recruits other individuals, we will examine why these practices seem to be unsuccessful and suggest new ideas to make our campus a more welcoming place for all different types of people.

**Christina Masar, Lindsey Faust, Wendy Mathson, and Gina Maahs (103)**

Faculty Advisor/Collaborator: **Martha Fay**

*Media Exposure and Body Esteem: Perceived Homophily with Unrealistic and Realistic Advertising Images and Young Women’s Body Image*

An ideal of unhealthy thinness dominates beauty product ads (Media Awareness Network, 2007). Researchers have documented the negative effect that exposure to such media images has on young women, and whether perceived homophily mediates the effect (Bessenoff, 2007). The Unilever Company recently began a campaign using more realistic body types, but the effect of these ads, based on perceived homophily, is not known. This research project will test for effects among 60 women, ages 18-21: half of these will be shown an ad picturing a model with an unrealistic ideal body image and half will be shown an ad picturing a realistic body image from the Dove Campaign. Similarity with the pictured model will be measured using the perceived homophily scale (McCroskey, Richmond & Daly, 1975). These responses will be compared to the participants’ reports of body esteem, using the body esteem scale (Mendelson & White, 1993). Results will establish whether a link between body esteem and homophily with particular media images exists when the image is more realistic.

**Clare Peter, Amy Oldakowski, Jason Grebe, and Samantha Parks (104)**

Faculty Advisor/Collaborator: **Martha Fay**

*In the Absence of Gender Expectation: Examination of Women’s Leadership Styles in the Small Group Setting*

Significant research has been conducted on how gender affects the styles and actions of the leader in a small group setting. However, researchers have measured women’s leadership using criteria of male-oriented leadership style measures, even though extensive literature suggests that men and women possess unique communication skills. For example, Kent and Moss’ report, “Effects of Sex and Gender Role on Leader Emergence” (1994) not only differentiated between feminine and masculine communication styles, but suggested that only women exhibiting masculine communication styles would emerge as successful leaders. As a result, existing studies examine female and male leaders’ styles using the same constructs. This study examines female leadership styles in groups of varying gender composition. The results should offer a new perspective on the way in which gender composition of a small group affects the leadership style that a female small group leader portrays.

**Kathleen Torpen and Todd Sauve (118)**

Faculty Advisor/Collaborator: **Martha Fay**

*Communicator Styles and Evangelism*

This is a case study focusing on the relationship between communicator style and evangelism on the UW-Eau Claire campus. It examines two research questions: What is the relationship between communicator style and evangelism? What factors affect choice of a particular evangelism style? Both survey and interview methods will be employed. Surveys will be administered to campus ministry staff leaders and student leaders at UW-Eau Claire, and interviews will be conducted only with the campus ministry staff leaders. The Communicator Style Measure (CSM) will be used to measure communicator styles and the Communicative Competence Scale (CCS) will be used to measure communicator competence. After the research is gathered

the results will be statistically analyzed to determine the relationship between communicator style and evangelism, and also to look at the factors affecting a person's choice to use a particular evangelism style. This study will help promote better communication between those who engage in evangelism and the people with whom they converse. Results of the research will be distributed to campus ministry leaders who can then disseminate the findings as they deem appropriate.

## **Economics**

### **Levi Funk, Michael Garten, Christina Hansen, and Leslie Sutton (106)**

Faculty Advisor/Collaborator: **Eric Jamelske**

*Local and Regional Economic Snapshots*

This project is being performed for the Chippewa Valley Center for Economic Research and Development in the Department of Economics. We have partnered with the Leader Telegram and UW Extension Chippewa/Barron Counties to collect data and prepare a series of economic snapshots for presentation in the newspaper. An economic snapshot is a simple graphic that conveys a basic point of economic interest to readers. We have prepared an initial series of snapshots for the local area that will begin appearing in the newspaper on a regular basis. We present these initial snapshots in a poster using graphs in combination with tables and brief descriptions to highlight some interesting local economic issues. This project not only provides useful information on local economic activity, but it also provides excellent hands-on experience in data collection, management and presentation for my student assistants.

### **Mara Hennen (116)**

Faculty Advisor/Collaborator: **David Schaffer**

*An Analysis of Low-Wage Workers in the U.S.*

Recent data on the U.S. suggest that workers with relatively low levels of education are earning lower real wages than they did 35 years earlier. This may be due to some combination of changes in technology, immigration, increased labor force participation of women, and the decreasing real value of the minimum wage. Among economists, the most prevalent view is that the declining wages are due to changes in technology. However, some economic research specifically focused on this question has yielded quite different conclusions. In addition to the standard explanations, we consider alternative ones suggested by our use of unique data on detailed occupations. In particular, this data allows us to evaluate the technology argument much more thoroughly. Our data comes from the U.S. Census Bureau Current Population Surveys and includes detailed information on more than one million individuals in 500 different occupations spanning the years 1971 through 2004.

### **Adam Meyer and Ron Rowlett (96)**

Faculty Advisor/Collaborator: **Eric Jamelske**

*Local Wage Analysis: An Initial Look at Data from the Eau Claire Chamber of Commerce*

This project is being performed for the Chippewa Valley Center for Economic Research and Development in the Department of Economics. We have partnered with the Eau Claire Chamber of Commerce to work on an existing project that surveys local businesses regarding their employees and the wages they are paid. We have data from 6 years of past surveys which we have organized to tell a story about the number of employees and wage rates occupation by occupation for the local area. Although we are just beginning this project our analysis will be used to guide the direction of this survey in the future. The Chamber will then provide this information to its clients to guide their decision making in the hiring process. Our poster presents an initial characterization of trends in the wages paid by occupation between 2000-2006 for the local area. This project not only provides useful information on local economic activity, but it also provides excellent hands-on experience in data collection, management and presentation for my students.

### **Thomas Michels (95)**

Faculty Advisor/Collaborator: **Eric Jamelske**

*Local Home Construction and Home Sales Analysis*

This project is being performed for the Chippewa Valley Center for Economic Research and Development in the Department of Economics. We have collected data on residential building and also on home sales for the local area. There are often

scattered reports of this information in the local news and there is a great deal of interest among the public in these areas of economic development. We present an organized look into both the building of residential homes and also the sale of existing homes in the Eau Claire area. Our poster consists of both graphs and tables and a brief synopsis characterizing recent trends in these variables. This project not only provides useful information on local economic activity, but it also provides excellent hands-on experience in data collection, management and presentation for students.

**Robert Peterson (115)**

Faculty Advisor/Collaborator: **David Schaffer**

*Wages and Education: A Comparison of Low-Wage and High-Wage Workers Over Time*

Over the last 30 years the wage-gap between those workers with and without a college degree has increased. In addition, the real value of hourly wages has actually decreased for workers with only a high-school education. This suggests some important questions. Why have the large increases in U.S. average wages not lead to higher real wages for low-wage workers? How and why do the determinants of wages differ across gender and race? We use Current Population Survey data from the U.S. Census Bureau, for the years 1971 through 2005. Our approach utilizes a relatively new statistical method called “quantile regression.” This allows us to analyze how the effects of education differ between low-wage and high-wage workers.

**Laura Pierce (105)**

Faculty Advisor/Collaborator: **Edward Young & Fred Kolb**

*Rural Population Effects on Incomes in Eau Claire and Other Wisconsin MSAs*

The Eau Claire Metropolitan Statistical Area (MSA) income has ranked near the bottom among Wisconsin MSAs for at least the past 30 years. The purpose of this project is to identify the factors that may explain the low measured income in this MSA. This project uses variables to measure labor quality (supply), job quality (demand) and statistical anomalies that may explain this consistently low income ranking. The anomaly that we focus on in this project is the percentage of an MSA that lives in a rural area. The project uses data from various sources and a statistical regression technique to measure the importance of each of these three types of factors. The results are presented as statistical results, verbal explanation and graphical presentation.

**Dan Platta, Sally Merrill, and Ryan Tessmer (85)**

Faculty Advisor/Collaborator: **Eric Jamelske**

*Eau Claire Stock Basket: A Comparison of Investment Alternatives*

This project is being performed for the Chippewa Valley Center for Economic Research and Development in the Department of Economics. We have partnered with the Leader-Telegram to collect and maintain stock market data for a list of publicly-owned companies that are of local or regional interest and we track the performance of these companies through a simple investment basket called the Eau Claire Area Stock Basket (ECB). We will also compare the performance of these companies to the performance of similar investments in variations of the Dow Jones Industrial (DOGS), the Standard & Poor’s Index (RSP) as well as gold (GLD). We present a comparison of these investments for the first quarter of 2007 relative to the same period in 2006. Our poster consists of both graphs and tables and a brief synopsis characterizing recent trends in these investments. This project not only provides useful information on local economic activity, but it also provides excellent hands-on experience in data collection, management and presentation for students.

## **Economics/Psychology**

**Emily Brown, Jason Haluska, Beth Lutz, Anjali Anand, and John Rodgers (64)**

Faculty Advisor/Collaborator: **Eric Jamelske & Lori Bica**

*Preliminary Findings from the Evaluation of the USDA Fresh Fruit and Vegetable Program in Wisconsin Schools*

In November 2005, Wisconsin was selected to participate in the United States Department of Agriculture (USDA) Fresh Fruit and Vegetable Program. With this program beginning in March 2006, 25 schools in Wisconsin were able to provide daily fresh fruit/vegetable snacks to students for the remainder of the 2005-06 school year and into 2006-07. These schools have also incorporated into their curriculum various educational components designed to promote fresh fruits/vegetables

as a healthy food alternative. We are conducting a statewide evaluation of outcomes associated with this program. The 25 program schools and 15 matched control schools are taking part in this study. We are utilizing student surveys, monthly site coordinator reports, teacher surveys, parent surveys, and student/parent focus groups in our evaluation. The focus of this poster will be to describe preliminary student survey findings from the pretest and first posttest, focusing specifically on program participants' attitudes toward, knowledge of, and willingness to try different fruits and vegetables relative to those in the control group. A companion poster will provide a description of the project design.

## **Geography and Anthropology**

**Craig Braunel, Jacqueline Chambers, Ellen Chase, Nathan Christ, Brian Czech, Andrew Duggan, Derek Hagen, Lawrence Hoffman, Joseph Kelly, Nicholas King, Rachel Kjos, Amy Ledin, Katherine Patterson, Eric Pascal, Jennifer Proctor, Gregory Smoczyk (100)**

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

*Geographic Analysis of New York City Neighborhoods*

The purpose of this project is the definition and analysis of five New York City Neighborhoods, Chelsea, Gramercy Park, Morningside Heights, TriBeCa, and Washington Heights. A neighborhood is a classic example of a vernacular region, based upon the spatial perception of ordinary people. Use of the neighborhood name in businesses and organizations define these regions along with definitions set by city officials and real estate agents. These neighborhoods are also formal regions because they contain traits that are unique to their respective areas and they are somewhat uniform within. The analysis of these five New York City neighborhoods will examine various aspects of their physical and cultural landscape along with the history of the region. Each of the five regions will be compared to the four vernacular regions on the island of Manhattan in order to establish the patterns unique to their boundaries. Through Social Area Analysis we are expecting to draw out a few main factors from a large number of variables and give each neighborhood a factor "score." These factors play a role in shaping the vernacular neighborhoods that encompass New York City today and can be used to determine uniqueness among different regions.

**Clayton Hibbard (119)**

Faculty Advisor/Collaborator: **Daniel Strouthes**

*Internal Religious Conflict among the Kamba of Kenya*

I researched the behavior, and ritual practice of the Kamba tribe in southern Kenya, placing special emphasis on religious conflicts due to the colonial era forced blending of Christianity with the traditional religion of these people. How they are now coping with what has emerged as the aftermath of this clash of ideologies is a prime example of what has occurred in most African countries where similar ideological clashes have occurred.

**Lawrence Hoffman (101)**

Faculty Advisor/Collaborator: **Ingolf Vogeler**

*Landscape of South-Central Mexico: The Road Less-Traveled*

This poster provides a travel itinerary and guide for geographic field research conducted in south-central Mexico. Included are suggested travel items, a detailed itinerary complete with modes of transportation and types of lodgings. A main itinerary map is used to indicate the places that will be visited. The focus is primarily on less-traveled sites including some smaller cities in the region as well as rural mountain villages in the Sierra Madre Oriental range near the eastern border of the state of Veracruz. Some tourist attractions, such as Teotihuacan, will also be visited. Detailed photographs, maps and charts will be used to illustrate the itinerary.

**Lawrence Hoffman (102)**

Faculty Advisor/Collaborator: **Paul Kaldjian**

*The Changing Face of Wisconsin Dairy: Culture Change & Local Livelihoods in Western Wisconsin*

As Wisconsin's traditional family farms are challenged by an increasingly competitive national market, area dairy farmers are being forced to consider global realities. Increasingly, dairy farmers are tapping foreign labor resources in the face of

disappearing local labor. As a result, Western Wisconsin's dairy sector is becoming increasingly dependent upon a growing Latino work force. Realization of this dependency has led to the exploration and creation of innovative approaches, including novel cultural and social programs aimed at facilitating relationships between Latino labor, dairy farmers, and local communities. As immigration debates rage, evidence suggests that, on a local scale, acknowledging the importance of migrant labor to the regional economy and building local/Latino relationships improves the viability of Western Wisconsin dairy farms and their communities as well as the working conditions and livelihood prospects of Latino dairy workers. Questions remain as to what changes to the traditional family farm and languishing state-wide milk production mean to the identity of Wisconsin as "Dairyland."

### **Rachel Kjos (81)**

Faculty Advisor/Collaborator: **Lisa Theo**

*Obesity in the US: A Cartographic State to State Comparison*

Concerns with obesity have plagued America for the past decade. It is often seen as a national problem, but is generally addressed at the state level. This study analyzes obesity based on the Body Mass Index for the United States. Data were obtained from the Center for Disease Control and Prevention's Behavioral Risk Factor Surveillance System for the years 1990-2002. My study is focused on anomalous states that far exceeded national averages. Changes in levels of obesity at the state level over the study time period reveal both a rising rate nationally over time and an increasing spatial concentration in the poorest states and metropolitan areas, especially in the South. A more detailed analysis was conducted for the contiguous states of Mississippi, Arkansas, and Louisiana.

### **Rachel Kjos, Jacqueline Chambers, and Brandon Miller (82)**

Faculty Advisor/Collaborator: **Brady Foust**

*Using Street Intersection Density to Model Urban Sprawl: The Case of Las Vegas*

This project investigates the use of street intersection density to model urban sprawl in Las Vegas from 1992 to 2006. The methodology is based on four premises: 1) streets are a necessary prelude to development; 2) intersection density is a bellwether of development at the edges of a city; 3) intersections can be derived from Census TIGER files using data processing routines; and 4) the updating cycle for TIGER is useful for measuring change on an annual basis. We derived street intersection points (latitude/longitude) for the Las Vegas area for 1992, 1999, and 2006 for this project. The points were loaded into a Geographic Information System for analysis. Intersections per square mile were calculated for a grid generated within the GIS that was used to produce a Geostatistical surface (kriging) for each of the test years. Results show that the methodology produces a pattern of urban sprawl over time acceptable for visualization and analysis. Change over time was analyzed with the best-fit curves of the relationship between distance from the center of Las Vegas and intersections per square mile. Anomalies were found to be a function of terrain, protected areas, and major transportation arteries.

### **Amy Ledin (99)**

Faculty Advisor/Collaborator: **Lisa Theo**

*Queer Wisconsin: Spatial Distribution and Analysis of Queer Friendly Locations*

The past thirty years have seen a significant rise in Queer visibility throughout the state of Wisconsin. Previous research on Wisconsin's Lesbian, Gay, Bisexual and Transgender communities demonstrated a diffusion of Queer focused business and/or organizations from predominantly mid-size cities and large urban areas to rural regions and smaller towns (Theide and Theo, 1997). Data were collected on the type and location of businesses and/or organizations advertising in publications marketed towards Queer individuals such as Damron Travel Guide, Gayellow Pages, Quest, and Instep. The number, type, and distribution of Queer focused and/or friendly businesses and organizations are compared to data collected for the years 1979, 1985, 1990, 1995, and 2005. This paper observes the spatial distribution of these "Queer friendly" areas and explains possible reasons for their existence at particular locations.

**Tyler Moe (79)**Faculty Advisor/Collaborator: **Ingolf Vogeler***South Africa: A Field Research Itinerary*

The Republic of South Africa is going to be used as an example to illustrate how geographers organize a field research study. A detailed itinerary of a route from Cape Town to Durban will indicate which hotels, hostels, restaurants, and activities will be supplied. Guide books, atlases, websites, and my own personal experiences will complement the itinerary provided. The route is illustrated using maps, photographs, diagrams.

**Tyler Moe (80)**Faculty Advisor/Collaborator: **Timothy Bawden***The Cultural Atlas of Wisconsin: A Prototype*

This poster displays a sample of the work that has been done in an ongoing research effort to produce the Cultural Atlas of Wisconsin. The Cultural Map of Wisconsin, upon which the atlas is based, was published in 1996 by the University of Wisconsin Press and drew national attention and acclaim. In general, the map displays 1200 important cultural and historical places in the state with 400 descriptive text blocks and 800 icons identified in an accompanying booklet. The initial goal of the project was to produce a companion guide to the Cultural Map of Wisconsin, but in the summer of 2003 the University of Wisconsin Press agreed to publish it as a stand-alone cultural atlas. The Cultural Atlas includes more in-depth coverage of these places in addition to graphics, such as maps, tables, and historic photographs. The Atlas is organized into six individual chapters, representing six regions in the state: The Northwoods, The Driftless Area, the South Central region, the Eastern Ridges and Lowlands, the Southeast, and the Central Plains.

**Jessica Sager (62)**Faculty Advisor/Collaborator: **Ingolf Vogeler***Eau Claire City Council Historical Representation*

This project will assess how well the Eau Claire City Council has represented city neighborhoods since 1910. Eau Claire has had different forms of local government—mayor, council president, ward, districts, and at large—which may have influenced the effectiveness of neighborhood representation. Some individuals have repeatedly been elected and therefore have dominated local government. The evolution of government forms and their effectiveness in the City of Eau Claire is compared to national trends. The review of the literature will include local government forms and spatial representation.

**Amy Wichlacz (120)**Faculty Advisor/Collaborator: **Ingolf Vogeler***Meanings and Forms of Sustainability in the U.S.*

This project examines sustainability. The first goal was to define sustainability, including environmental, economic, and social sustainability and how they are all connected. Additionally, sustainable architecture and construction methods in the U.S. was compared with other countries, specifically the developing world. A comprehensive guide of products, methods, and companies providing sustainable services will be included.

## **Music and Theatre Arts/Psychology**

**Courtney Doyel (68)**Faculty Advisor/Collaborator: **Mitra Sadeghpour & Allen Keniston***Alcohol Use Among Music Majors at the University of Wisconsin-Eau Claire*

College students in particular and creative people in general are often seen as having difficulties with alcohol. Knowing this, we wanted to know about the culture of alcohol use among music majors at the University of Wisconsin – Eau Claire in comparison to students of another major at the same university. We sought to know if the use of alcohol before or after performance is an indicator of performance anxiety. In order to answer these questions, we asked volunteer students to complete Chesky's performance anxiety test, the UWEC College Alcohol Inventory, and questions we formulated regarding

students' personal alcohol use around the time of a musical performance or classroom presentation. These surveys were administered in lower and upper division music theory classes and psychology classes. Pending analyses of our completed data set, we expect to find patterns of alcohol use associated with music performance that are different from patterns of use associated with classroom presentations, suggesting that performance anxiety plays an important role in music majors' alcohol use. Our data will also bear on the question of whether there is a local 'culture of alcohol' use unique to a creative college student population.

## Political Science

### **Stephen Hilger (113)**

Faculty Advisor/Collaborator: **Obika Gray**

*Colonial Influence on Civic Values in Post-Colonial Africa: A Study of Mali, South Africa, and Nigeria.*

The post-colonial state, regardless of efforts made by the native citizenry to change to the contrary, has been deeply affected by the policies of its previous colonial power. This paper investigates the intangible effects that the former colonial power's administrative policy has implemented onto the held values and beliefs in contemporary African civic society. Three different colonial policies are investigated, French colonial policy in Mali, traditional British African colonial policy in Nigeria, and British Dominion policy in South Africa. Six questions that cover a wide array of civic society subject matter and corresponding data provided by the Afrobarometer Research Group are tested with quantitative formulas, such as Cramer's V, for relationships between prior colonial power and African civic opinion. The results of the research advocate that relationships between African opinion and prior colonial policy do exist, particularly in the rejection of traditional rule, and who is thought to be responsible for providing housing in society. The findings of this paper assist in identifying the causes of problems facing democratization and development in contemporary post-colonial Africa.

### **Rebecca Mathias (114)**

Faculty Advisor/Collaborator: **Justin Patchin**

*Quantitative Analysis of MySpace and the Changing Domain of Adolescent Social Development*

Online social networking has exploded into popularity in recent years. Adolescents and young adults have flocked to these sites, such as MySpace.com, and embraced the technology into their social lives. With adolescence being such a crucial time in the development of personality this sudden change in social networking has led to many questions about how it may influence social development. MySpace profiles were randomly selected and adolescent profiles were analyzed for certain information. The information sought included, but was not limited to, first names, last names, birthdates, telephone numbers, addresses, and any indications of adult-like behaviors. The information gathered from approximately 1500 adolescent MySpace profiles indicated that many adolescents divulged gender, pictures, and adult-like behaviors on their public profiles. These findings were compared with classical social and personality development theories, coming to a conclusion about the changing trends in the development of today's adolescents. These results may help explain why youth tend to flock to online social networking sites. They may also give answers, information, and advice for parents to protect their children, while still allowing them to use this new form of social interaction.

## Psychology

### **Claire Anderson, Sara Weinkauff, Corey Stocco, and Jennifer Bechtold (38)**

Faculty Advisor/Collaborator: **Kevin Klatt**

*Decreasing Inappropriate Vocalizations of a Child with Autism Using Self-Monitoring and Differential Reinforcement*

This study examined the efficacy of a treatment package used to reduce the inappropriate vocalizations of a 5-year-old boy with autism. The treatment package consisted of training sessions where the participant learned how to discriminate between inappropriate and appropriate vocalizations using a self-monitoring device. A modified differential reinforcement of incompatible behavior (DRI) procedure was then applied in conjunction with the self-monitoring device. A multiple baseline across settings single subject experimental design was used to demonstrate the effectiveness of the procedure. Results showed a decrease in inappropriate vocalizations across all three settings.

**Elizabeth Aspinwall and Amy VerBurg (40)**

Faculty Advisor/Collaborator: **Blaine Peden**

*The Use of Linguistic Inquiry and Word Count (LIWC) to Understand How Undergraduate College Students Learn the APA Style*

This study will measure how undergraduate college students learn to write in the American Psychological Association writing format. Comparisons will be made between the classes Psychology as a Discipline and Profession (PSYC 100 level psychology course), Research Methods (200 level psychology course), any 300 level Psychology course, and Senior Research Seminar (400 level psychology course). Psychology as a Discipline and Profession is where students first learn how to write in the APA format. We are interested in studying how students learn APA format through text analysis. To assess how linguistics specifically improve, a text analysis software program will be used. LIWC (Linguistic Inquiry and Word Count) developed by James W. Pennebaker, Roger J. Booth, and Martha E. Francis will be used to compare linguistic patterns of students. LIWC is a computer program which measures the amount of positive and negative emotion words, as well as hedge words, which will allow us to measure the proficiency in writing in the APA format as we expected that fewer emotion words in addition to hedge words would be present in upper-level APA papers. This study expands the findings for learning sociology studied by Kathleen McKinney and we expect to find similar learning strategies.

**Ross Auna and Andie Lueck (39)**

Faculty Advisor/Collaborator: **Blaine Peden**

*Rates of Information Disclosure on Internet Social Networking Sites: MySpace and Facebook*

This study was designed to see how much personal information users of two social networking sites (Facebook and MySpace) actually disclosed. It was thought that females would disclose significantly more information than males, Facebook users would disclose significantly more information than MySpace users, and female Facebook users would have the highest rate of disclosure. The sample consisted of 50 MySpace users and 50 Facebook users between the ages of 18 and 23, and each profile was observed to determine if the users listed their name, age, address, birthdate, city, state, telephone number, place of employment, school, e-mail address, class schedule, maintained a web diary, or posted a picture of themselves. Disclosure of this information was analyzed with regard to gender and networking site. Pieces of information were assigned a risk value (one to three) and data were analyzed to determine the summed risks. Overall, Facebook users disclosed significantly more information than MySpace users. Female Facebook users disclosed significantly more information than male Facebook users, however there was little difference between male and female MySpace users.

**Allison Bailey, Jessica Bondhus, and Kathryn Lorenz (1)**

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

*Deception and Personal Enhancement at Point of Friendship Initiation*

Past research has shown that women and men initiate friendships with the opposite sex because of an attraction to them or a desire to date them. For men, this romantic motive operates regardless of current romantic involvement (Bleske-Rechek & Buss, 2001). Research also has shown that men and women deceive their opposite-sex friends about their current relationship involvement (Bleske-Rechek, Matteson, Gragg, & Stocco, 2006). We designed the current study to investigate whether men and women perceive potential opposite-sex friends as potential romantic partners, and thus enhance their personal appearance and fail to report their own current romantic involvement at point of friendship initiation. In Session 1, participants reported on themselves and their current relationship involvement. Each participant arrived at Session 2 prepared to engage in a “friendship formation task” with an unknown student of the same or opposite sex. We asked the participant to brainstorm in writing a list of specific topics they would be willing to discuss with the person they expected to meet, and we photographed the participants. Our results focus on comparisons of the information they disclosed, and their perceived effort to look attractive, as a function of the sex of the person they expected to meet.

**Jonathan Baker and Mark Remiker (2)**

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

*(Male) Narcissists Don't Just Think They're More Attractive—They ARE More Attractive*

Narcissism is characterized by an inflated sense of beauty and dominance and a willingness to exploit others. Accordingly, narcissistic individuals have a more unrestricted sexual strategy and lower levels of commitment to their romantic partners.

Further, they enjoy looking at themselves more than others do. Given the links between narcissism, self-aggrandizement, and the pursuit of an unrestricted sexual strategy, which men can pursue more easily if they are highly attractive, it is possible that narcissistic men actually are more sexually attractive than other men are. We tested this prediction with a sample of 51 dating couples. Men who scored high in narcissism rated themselves as more attractive and as more desirable sex partners, but not as more desirable long-term partners. These men also scored higher on behavioral measures of sexual unrestrictedness. As predicted, narcissistic men (but not narcissistic women) were rated by outside judges as more attractive.

### **Jennifer Bechtold (3)**

Faculty Advisor/Collaborator: **Daniel Holt**

*Dyadic Choice: Delay and Probability Discounting of Gains*

Individual choice behavior under conditions of uncertainty and choices involving delayed outcomes are very well described by a hyperbola-like mathematical function (e.g., Holt, Green, & Myerson, 2003). The present study sought to extend previous research from individual choice behavior to dyadic choice behavior. The present study tested, in part, the external validity of the previous research. Each participant completed a computer based decision-making task, working once as a singleton and once as a dyad. Participants also completed a demographics sheet that provided information about the management of different types of household expenses, as well as specified the relationship between each individual and his or her dyadic partner.

### **Megan Bell, Daniel Calderon, Casey Gresback, and Jennifer Johnson (61)**

Faculty Advisor/Collaborator: **Blaine Peden**

*Gender and Computer Activity*

Two similar studies were conducted independently of one another and then the results were compiled together. The purpose of these two naturalistic observation studies was to examine the relationship of gender on internet activity in campus computer labs. Both studies functioned under slightly different designs and had comparable results. For both studies, participants were college students from a Midwestern University and observations were recorded at different times of day in various computer labs on the university campus. When merged, both studies indicated a statistically significant correlation between gender and internet activity. Males showed a greater tendency to spend time exploring items of personal interest, whereas females showed a greater tendency to engage in academic-related activity and online social networking.

### **Sarah Busse and James Dobbe (41)**

Faculty Advisor/Collaborator: **Blaine Peden**

*Acceptability of Child Discipline: Passive Versus Aggressive Punishment and Child Deviancy*

The current study seeks to determine the most appropriate form of child discipline while eliminating the social desirability factor. Participants are given one of four scenarios depicting either aggressive (spanking) or passive (time-outs) forms of discipline directed towards a child who has misbehaved aggressively, kicking or screaming, or passively, taking a cookie or turning on the TV without permission. Participants vary in age and location throughout the upper midwest. Results will show a significant trend towards accepting aggressive punishment with aggressive behavior from the child. The study encourages future applied research in the best form of child discipline.

### **Amanda Conley and Megan DeRusha (42)**

Faculty Advisor/Collaborator: **Blaine Peden**

*Peer Pressure in the Potty?: The Relationship Between the Presence of Others and an Individual's Decision to Wash Their Hands*

The effect that the presence of others has on the decision of a female to wash her hands in a public restroom was studied at a Midwestern university. The researchers studied females (N = 53) in four different campus restrooms and made discreet observations to ensure that participants believed they were alone when no other participants were in the restroom. There was a large effect size  $V = .635$  between the presence of others and the level of hygiene practiced. There was a moderate effect size  $V = .354$  between the location of the facilities and the level of hygiene. The results indicated that the presence of others has a significant association with a female's choice to wash her hands.

**Brittany Gragg, Lindsay Matteson, Corey Stocco, Jonathan Baker, Kara Kneisl, and Mark Remiker (20)**

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

*Charting the Course of Opposite-Sex Friendship*

Past research has demonstrated that a significant proportion of young adult opposite-sex friends experience sexual attraction to each other and that a minority have engaged in sexual events at some point during their friendship. Because previous samples have consisted of enduring friendship pairs, it is unclear how exactly sexual events or expressions of sexual attraction between friends impact the course of the friendship. For example, how frequently do sexual events between friends lead to a move to dating status, to a decline in closeness, or to complete dissolution? The present study investigated both current and dissolved opposite-sex friendships. Through structured interviews, approximately 70 men and women described four of their recent opposite-sex friendships, two current and two dissolved. A number of men and women had expressed sexual attraction to, or engaged in a sexual act with, a current or past opposite-sex friend. Friends often felt that expressions of sexual attraction altered the level of closeness in their friendships, for better or for worse. Friendships dissolved for various reasons, including misperceptions of the friends' relationship status and a failed attempt at a dating relationship. We discuss the difficulties associated in attempting to chart the path of opposite-sex friendships.

**Thomas Hahn, Elizabeth Schinke, Britta Fiksdal, Aimee Kruser, Rachel Tham, Travis Smith, Katelin Lair, Karen Flashinski, Rebekah Kaletka, Kerrie Dols, Kaia Cliff, Sarah Richling, and Jason Wiebelhaus (24)**

Faculty Advisor/Collaborator: **David Jewett**

*Do Diet Drugs Really Affect "Hunger"?: Assessment of Sibutramine and Rimonabant in an Animal Model of "Hunger"*

Obesity is a leading cause of premature illness and death in the United States. Sibutramine (the active drug in Meridia) is a medication that is approved by the Food and Drug Administration (FDA) to treat obesity. Rimonabant is a drug currently undergoing Phase III clinical trials that has shown promise as a potential obesity medication. Both drugs decrease food intake, but their effects on "hunger" are unclear. The purpose of this study was to determine the effects of sibutramine and rimonabant in an animal model of "hunger." Rats were first trained to discriminate between 2 ("relatively full") and 22 hours ("relatively hungry") food restriction. During test sessions, rats that were 22 hr food restricted ("hungry") received sibutramine (or water control) orally or rimonabant (or control) by injection in doses of 0.32 to 10.0 mg/kg. Sibutramine decreased the internal hunger state in a dose dependent manner; sibutramine (3.2 mg/kg) produced about a 50% reduction in reports of "hunger" and 10 mg/kg eliminated responding and significantly reduced food intake. Rimonabant did not alter hunger reports but did decrease eating and decreased response rates in a dose dependent manner. This study provides evidence that sibutramine may treat obesity by reducing, but not eliminating, hunger. Rimonabant decreases food intake, but has no effect on hunger indicating rimonabant affects other ingestive processes. These findings indicate our animal model can successfully identify drugs that significantly reduce "hunger" and can be used to predict the effectiveness of new medications on "hunger."

**Ian Halberg and Johnathan Chase (59)**

Faculty Advisor/Collaborator: **Kathryn Hamilton & Allen Keniston**

*PowerPoint as a Lecture Aide Has No Effect on Immediate Recall of Lecture Information*

PowerPoint (PPT) is a widely used lecture/presentation computer slide presentation application that has become standard among academic instructors. However, there is concern that presenters put too much information on their slides. Such a practice may impede the success of presentations. We looked at whether placing much information on PPT slides enhances or hinders student learning and satisfaction with a presentation. Fifty-one students from General Psychology classes were randomly assigned to one of three teaching conditions: 1) complete PowerPoint slide notes (all content recorded on the slides); 2) partial PowerPoint slide notes (major headings and key words recorded on the slides); and 3) no PowerPoint slide notes. Each condition was exposed to the same video taped lecture. Students then evaluated the lecture using items from the Purdue Cafeteria Instructor and Course Appraisal Survey, and responded to a 20-item multiple choice test. We hypothesized that although students would prefer complete PowerPoint slides during lecture over the other conditions, students who received partial PowerPoint slides would perform better in a multiple-choice quiz following the lecture than students in the other conditions.

**Sarah Hubert and Stephanie Maves (19)**

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

*Friend Matching: A Test of Genetic Similarity Theory*

Genetic similarity theory (Rushton, 1989) predicts that people prefer those individuals who are more likely to share genes. In accord with this theory, same-sex friends, in general, are similar in attitudes, values, and (particularly for males) level of attractiveness. We designed the current study to determine whether outside raters can match pairs of same-sex friends at above-chance levels on the basis of their physical appearance. We took a facial shot and a full-body shot of each member of various same-sex friendship pairs. Then, raters attempted to match pairs of female same-sex friends and pairs of male friends, in either a full-body or face-only condition. Raters subsequently judged each person's picture for attractiveness and apparent friendliness, intelligence, and attention to appearance; hence, we will report on the information judges used to attempt to match friends. We predict that raters will be able to match friends at above-chance levels, that raters will perform better with full-body shots than with facial shots, and that raters will match on the basis of similar levels of attractiveness and clothing choice.

**Megan Jablonski and Andrea Leisen (57)**

Faculty Advisor/Collaborator: **Mary Beth Leibham & Lori Bica**

*Evaluation of a Kids' Weekend Meals Program at Longfellow Elementary School*

This project is an evaluation of the effectiveness of the Kids' Meals Program at Longfellow Elementary School (Eau Claire Area School District). Students who regularly attend the 21st Century Community Learning Center (CLC), an after school academic program, had the option to participate in Kids' Meals. Longfellow has the highest number of students who qualify for free/reduced school meals of all the Eau Claire elementary schools. Many of these students go with little to no food over a weekend period. Backpacks containing enough food for weekend breakfasts/lunches were distributed at Longfellow during the dismissal process on Thursdays. A pretest-posttest research design was used to examine the impact of the program. Teachers' ratings on the Student Behavior Survey (Lachar et al., 2000) were analyzed to determine whether there were significant differences between elementary students who received the weekend meals (n = 36) and a matched group of control students (n = 38). More specifically, we examined the impact of the program on students' academic habits, social skills, and health concerns. We will discuss findings from the project, including the importance of identifying meaningful ways of examining the impact of a meals program.

**Mark Remiker and Jonathan Baker (21)**

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

*Couple Similarity and Perceptions of Relationship Quality: Predictors of Relationship Stability Over 11 Months*

We report on the results of a prospective study of assortative mating among dating couples. In accord with the proposal that humans seek relationship partners who are similar to themselves, rather than converge over time, at Time 1 we found that dating couples are as similar to each other as are married couples. Further, stronger couple assortment on political and religious attitudes, self-esteem, envy, and sexual strategy was associated with individuals' commitment to the relationship. At Time 2, 11 months later, we obtained data on 47 of 51 couples. Over 40% of the couples were no longer dating. We report on individual predictors of couple status at Time 2, including narcissism, sexual strategy, self-esteem, and dispositional jealousy. Further, we investigate the utility of (1) couple assortment on enduring personal attributes and (2) couple agreement on sexual satisfaction and relationship commitment as predictors of couple dating status at Time 2.

**Kira Sahlhoff and Matthew Newquist (4)**

Faculty Advisor/Collaborator: **Daniel Holt**

*Delay and Probability Discounting of Gains and Losses in Gambling and Non-Gambling College Students*

Using a decision-making task, previous research has found that college-aged gamblers treat probabilistic outcomes differently than their non-gambling peers. That is, the gamblers were more risk-taking (Holt, Green, & Myerson, 2003). That same research found that college-aged gamblers and their non-gambling peers' choices were indistinguishable in terms of delayed outcomes. Taken together, these findings suggest that 'impulse control' problems do not necessarily include both an inability to delay gratification and a tendency to take more risk. The current study extends this research to choices involving losses as

outcomes. Both gambling and non-gambling college students completed a computer-based decision-making task where they chose between hypothetical monetary payments that differed with respect to delay or probability. Results from the current study (losses) will be compared to results from the previously published research (gains) with regard to our understanding of ‘impulse control’ problems.

**Darci Sorensen (60)**

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

*Inter-Student Courtesy: An Investigation of the Motivations for Passive Cheating*

Technological advances have enabled instructors to offer academic examinations online resulting in increased opportunities for cheating. When one student—an active cheater—asks another student for help during a test, what motivates the helper—a passive cheater—to provide assistance? To begin to answer this question we investigate the relationship between active and passive cheaters in terms of (1) their social connectedness (i.e., friends or just classmates, etc.), (2) the perceived academic worthiness of the active cheater (i.e., generally prepared or not prepared for class, etc.), and (3) the passive cheater’s social desirability needs (i.e., wanting approval, admiration, etc). In this pilot study, we also measure (4) inter-student courtesy to investigate whether politeness motivates passive cheating. We hypothesize that passive cheating increases with higher levels of social connectedness, academic worthiness, social desirability and inter-student courtesy. Motivations for active cheating have often been studied whereas little is known about motivations for passive cheating.

**Corey Stocco (17)**

Faculty Advisor/Collaborator: **Kevin Klatt**

*A Review of Three Prompting Procedures Used to Teach Skills to Children with Autism*

This project reviews peer-reviewed, experimental studies that implemented either a constant prompt delay procedure, a progressive prompt delay procedure, or a simultaneous prompt procedure to teach skills to children with autism. Seventeen articles met the five criteria set at the beginning of the study. Analysis of articles showed most research with children with autism has implemented the progressive prompt procedure, compared to the other two procedures. The least research with children with autism has implemented the simultaneous prompt procedure. Ninety-two percent of the participants were males. Though the possible age range was 1 to 12 years old, 79% of the participants were between the ages of 5 and 10. Implications for those who teach skills to children with autism are discussed.

**Corey Stocco (18)**

Faculty Advisor/Collaborator: **Daniel Holt**

*Monetary Rewards Contingent on Abstaining from Alcohol*

College students completed a choice procedure on an online tool, SurveyMonkey.com. Participants were given the choice between receiving a monetary reward for alcohol abstinence and consuming alcohol. A systematic honing procedure located the lowest monetary amount students require to abstain from alcohol for 3 different lengths of required abstinence: 1 wk, 2 wks, and 4 wks. Results are reported and the feasibility of a monetary-based incentive program to increase alcohol abstinence is discussed.

**Rachel Taran (44)**

Faculty Advisor/Collaborator: **Mary Beth Leibham**

*An Exploration of Eight-Year-Old Children’s Career Aspirations*

Although career development is often associated with late childhood/early adolescence, there is growing evidence that career development is a lifelong process that begins in early childhood. The current study contributes to the existing career development literature by investigating the social value, fantasy/reality distinction, and sex-type of 8-year-olds’ career aspirations. This study included 121 middle to upper-middle class children (68 boys; ages 7.9 to 9.1, M = 8.4). Children’s career aspirations were measured through the question “What would you like to be when you grow up?” and were coded using Holland’s six occupational codes (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional). Most of the children (106) were able to provide at least one career aspiration. Fifteen children either did not know what they wanted to be when they grew up, or provided a response that was unable to be coded (e.g., “someone who puts together legos”) and were

excluded from subsequent analyses. Results indicated that Realistic (36%) and Investigative (27%) occupations were aspired to most often. Thirty percent of children provided fantasy career aspirations (e.g., professional athlete), and 50% of children aspired to sex-typed careers (e.g., teacher, truck driver). Eighty percent of children aspired to prestigious (high social value) careers.

**Rachel Tham, Travis Smith, Thomas Hahn, Rebekah Kaletka, Aimee Kruser, Britta Fiksdal, Andrew Kwilas, and Jason Wiebelhaus (23)**

Faculty Advisor/Collaborator: **David Jewett**

*Pharmacological Assessment of the Effects of Opioid Agonists and Antagonists in an Animal Model of Hunger*

Opioid agonists (drugs that mimic the effects of endorphins and enkephalins) increase food consumption; conversely, antagonists decrease food consumption. The present study examined the effects of opioid agonists trained to discriminate between 2 and 22 hours food deprivation in a two lever operant chamber. In this model of “hunger,” rats were food restricted for 2 hours and injected with the opioid agonists butorphanol, DAMGO, DSLET, or orphanin; each drug did not produce a “hunger”-like response in our model. We also evaluated the ability of the opioid antagonist naltrexone to modify “hunger” (the stimulus effects associated with 22 hour food deprivation). Naltrexone did not affect the stimulus effects of 22 hour food deprivation or the effects produced of neuropeptide Y (NPY), a neurochemical we previously found to induce “hunger” responses in our model (Jewett et al., 2006). Our findings so far indicate opioid agonists do not induce “hunger” like NPY or ghrelin in our model of “hunger” and opioid antagonists do not reduce “hunger” suggesting opioids do not influence food intake through “hunger” mechanisms. Opioids likely affect food intake by altering meal duration and the palatability or pleasure associated with eating.

**Sarah Tillman and Julie Ackerlund (22)**

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

*Explicit and Implicit Measures of Sexual Attraction in Personal Relationships*

In studies in which men and women are asked explicitly how sexually attracted they are to their opposite-sex friends, men report more sexual attraction than do women. It is possible that women deceive themselves and others - consciously or unconsciously - about their feelings of attraction toward their friends. The current study reports on the preliminary development of an implicit measure to assess men’s and women’s implicit sexual attraction to their opposite-sex friends and romantic partners. If women are deceiving, the difference in explicit sexual attraction toward an opposite-sex friend should disappear in the context of the implicit task. Among dating partners, in which attraction is presumably high for both sexes, a sex difference should not occur in either implicit or explicit responding. A total of 173 men and women were primed to think vividly about either a close opposite-sex friend or their romantic partner. They then viewed 20 letter-strings that could be completed sexually or non-sexually, and completed the letter strings under a time constraint. As expected, the sexes did not differ in explicit or implicit attraction to romantic partners; further, they differed in explicit but not implicit sexual attraction to opposite-sex friends.

**Nicholas Vanselow, Corey Stocco, Sara Weinkauff, Matthew Newquist, and Jodi Ogle (37)**

Faculty Advisor/Collaborator: **Kevin Klatt**

*Comparing the Effects of Single Target and Multiple Target Trials on Acquisition, Generalization, and Maintenance*

Children with autism frequently have difficulty labeling objects, people, or places in their environment. Therapists working with these children must make decisions on how to teach children to label items. Research does not suggest whether multiple labels should be taught at the same time or one label at a time. The current research focuses on two procedures frequently used in clinical practice. The first is to teach one label until it is mastered before beginning to teach a second label. The second is to teach multiple labels at the same time. The purpose of this study is to compare the rate of acquisition, generalization, and maintenance of labels learned either in single or mixed target trials.

**Jason Wachsmuth (58)**Faculty Advisor/Collaborator: **Mary Beth Leibham***The Relationship between Metacognitive Strategies and Epistemological Beliefs among College Students*

This project addresses the question of whether there is a correlation between UWEC students' metacognitive awareness (i.e., awareness of their own thought processes) and their epistemological development (i.e., their beliefs about the nature of knowledge). Additionally, it explores possible links between certain demographic variables (e.g., age, class status, grade point average, etc.) and metacognitive and epistemological development. Participants currently enrolled in psychology courses will complete Schommer's Epistemological Questionnaire (EQ) and the Metacognitive Awareness Inventory (MAI). We hypothesize that students with more academic experience and higher achievement will show more developed metacognitive strategies and epistemological development than will students who are less academically experienced and report lower achievement. We also expect that students who have taken a previous study skills course and those currently enrolled in an educational psychology course will show more advanced awareness and beliefs than will students who have not had either. Such results may imply that metacognitive awareness and epistemological development are related to study habits and academic achievement.

**Sara Weinkauf, Claire Anderson, Jennifer Bechtold, Nicholas Vanselow, Corey Stocco, Carrie Haessly, and Savannah Swiecichowski (43)**Faculty Advisor/Collaborator: **Kevin Klatt***The Use of Prompting Strategies to Teach Skills to Children Diagnosed with Autism*

Recent research has shown that both the simultaneous prompting and the constant prompt delay procedures can be used to teach skills to children with autism. The simultaneous prompting procedure involves the teacher providing an immediate prompt on all teaching trials, whereas the constant prompt procedure requires the teacher to give the child an instruction, followed by a prompt to help the child respond correctly, and then the prompt is faded across trials until the child responds independently. Data presented last year showed children with autism learned skills in fewer trials with the constant prompt delay, but made fewer errors with the simultaneous prompt procedure. The purpose of the current research is to investigate whether a procedure that combines features from both the simultaneous prompt and constant delay can be used to teach new skills, and whether the new procedure will result in learning in fewer trials and with fewer errors than either the simultaneous prompt or constant prompt delay procedures.

## **Psychology/Economics**

**John Rodgers, Emily Brown, Jason Haluska, Beth Lutz, and Anjali Anand (63)**Faculty Advisor/Collaborator: **Lori Bica & Eric Jamelske***Evaluation of the USDA Fresh Fruit and Vegetable Program in Wisconsin Schools: Project Description*

In November 2005, Wisconsin was selected to participate in the United States Department of Agriculture (USDA) Fresh Fruit and Vegetable Program. With this program beginning in March 2006, 25 schools in Wisconsin were able to provide daily fresh fruit/vegetable snacks to students for the remainder of the 2005-06 school year and into 2006-07. These schools have also incorporated into their curriculum various educational components designed to promote fresh fruits/vegetables as a healthy food alternative. We are conducting a statewide evaluation of outcomes associated with this program. The 25 program schools and 15 matched control schools are taking part in this study. We are utilizing student surveys, monthly site coordinator reports, teacher surveys, parent surveys, and student/parent focus groups in our evaluation. The focus of this poster will be to provide a description of the project design. A companion poster will describe preliminary student survey findings from the pretest and first posttest, focusing specifically on program participants' attitudes toward, knowledge of, and willingness to try different fruits and vegetables relative to those in the control group.

# Sociology

## **Stacy Bonneville (94)**

Faculty Advisor/Collaborator: **Jeff Erger**

*Social Structural Effects on Evaluations of the Ethics of Medical Decisions*

This research investigates the evaluation of the ethics of medical decisions. Through a quasi-experimental design, a survey employing vignettes presented a variety of medical ethical dilemmas, and then asked subjects to evaluate the ethics of the decisions made by health care providers. The results show that 1) doctors are seen as more ethical when following organizational rules or professional codes of ethics, 2) the transferral of agency to a spouse against a patient's express instructions is seen as ethical while the transferral of agency to a same sex partner or neighbor is not, and 3) denial of pain medication is seen as unethical regardless of health care provider reasoning. The results of this study indicate that the contextual details of medical situations can have a significant effect on how decisions in those situations are evaluated, and that small differences in the communication about medical decisions has the potential to greatly affect judgments by lay people about the ethical nature of those decisions.

## **Nicole Borchardt (108)**

Faculty Advisor/Collaborator: **Jianjun Ji**

*Differentiations on Life Satisfaction between Rural and Urban Chinese Elderly*

Based on the findings from previous research, this study compares the dissimilarities and similarities in perception on life satisfaction between rural and urban Chinese elderly in terms of demographic characteristics, economic status, social aspects, and psychological wellbeing. The results show that despite minor similarities, there are great disparities between the two elderly groups. These findings reveal the gaps between rural and urban elderly, but more importantly, they disclose the imbedded social inequality and unjustness in the structured Chinese society.

## **Emily Cooper, Ashley Vacha, and Amanda Albert (107)**

Faculty Advisor/Collaborator: **Melissa Bonsted-Bruns**

*The Role of Expectations for Future Family Obligations in Career Choice for Men and Women*

Women are still entering careers that have traditionally been dominated by males, even though they now have a greater opportunity to enter more male-dominated careers. One possible explanation might be the continued impact of traditional gender role expectations—specifically the persistence of the belief that women should be tied to the domestic sphere. If so, then it is likely that women's career decisions will still be guided by the expectation that they will have career-related needs associated with having a family and time to raise children. An online survey was used to ask questions about respondents' current family, major, and future plans for career and family. It also includes a set of vignettes designed to get subjects' views about the relationship between future family plans and career choice applied more broadly. That is, looking at their gender-related views about career and family as they relate to men and women in general, which may or may not vary from the personal choices they make for themselves. We expect that women will be more likely to consider future family plans when choosing a major and making future career plans both for themselves and for other women, in general, than their male counterparts.

# Business & Professional Studies

## Adult Health Nursing

**Michele Carnahan, Pam Petri, Jennifer Steif, and Megan Wertjes (12)**

Faculty Advisor/Collaborator: **Robin Beeman & Joan Stehle Werner**

*Spirituality, Adjustment to Illness, and Health in Women with End-Stage Renal Disease*

The purpose of the final phase of this study was to add additional data from Caucasian women receiving hemodialysis (HD) for end stage renal disease (ESRD) to data previously collected for the thesis research of Ruth Tanyi. The aim of this overall descriptive-correlational study is to investigate the role of spirituality as a resource for adjustment to illness in community-dwelling women with ESRD by examining levels of and relationships among spiritual well-being, adjustment to illness, and self-perceived health status, using survey methodology. Instruments include the Spiritual Well-being Scale (SWBS), the Psychosocial Adjustment to Illness Scale (PAIS), an investigator-developed instrument measuring self-perceived health, and a Demographic Questionnaire. For this final portion of the study, an additional instrument, the Daily Spiritual Experiences Scale, is being used. Results will be reported in descriptive statistics, measures of central tendency, and correlations. Nurses can play a pivotal role in patients' adaptation and adjustment to end stage renal disease while they are receiving hemodialysis. But, in order for them to assist patients to adjust, it is important they understand the role that factors such as self-perceived health and spirituality play in the adaptation process.

**Allison Rosch and Thy Tran (10)**

Faculty Advisor/Collaborator: **Rita Sperstad**

*Cultural Competence in Practicing UW-Eau Claire Nursing Alumni*

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 suggest that cultural education in nursing is ethnocentric by failing to advance beyond differentiation of the self from the other (Duffy, 2001), failing to examine underlying issues of discrimination related to gender, class, or sexual orientation (Abrums & Leppa, 2001), stereotyping by using the 'menus approach' (Serrant-Green, 2001), and failing to transform the self with limited critical reflection (Duffy, 2001). This faculty/student research study will explore the phenomenon of cultural competence. The purpose will focus on nurses' lived experience with cultural competence as a practicing nurse and the meaning of their participation in a cultural care course and immersion clinical experience in their undergraduate education. Purposeful sampling will be used with a total of 8-10 participants. Data will be collected by asking participants to complete and return by mail the following tools: 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 60-90 minute tape recorded interview with the participant will be done to discuss the critical incident. Anonymity and confidentiality will be maintained. Data from the interviews will be transcribed in written format for analysis. Results of data analysis will be shared and discussion of implications for nursing education, leadership, research and practice will be summarized.

**Kristin Seeger (9)**

Faculty Advisor/Collaborator: **Cheryl Brandt**

*Effectiveness of an Evidence-Based Nursing Clinical Project on Increasing Nursing Students' Knowledge of Evidence-Based Practice*

Nurses are encouraged to engage in evidence-based practice (EBP) and nursing faculty must prepare students to do so. This educational intervention study, with a pre-test/post-test one-group design, was conducted to measure the impact of an evidence-based practice clinical project on nursing students' knowledge of a process of EBP. Study participants were a group of seven second-semester junior nursing students. The EBP project was conducted in an acute-care setting; its aim was to apply the Iowa Model of Evidence-Based Practice to a selected patient care issue, oral care. Participating students worked as a group to conduct a literature search with assistance from a biomedical librarian, review retrieved literature for oral care best

practices, develop a protocol for assessing patients' oral condition and delivering oral care interventions, and formally present this protocol to nurses in an acute care setting. Students' knowledge of EBP was measured, using open-ended questions, before and after the EBP project. Content analysis of students' responses on the pre- and post-tests indicated that students as a group were better able to describe the process of evidence-based practice and identify nurse behaviors indicative of EBP after completing the project. The EBP project is a useful teaching-learning tool.

**Kang Yang, Maryanne Krueger, Ashley Nilssen, Emily Geissler, and Alicia Ogle (11)**

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

*Quality of Life in People with Chronic Mental Illness*

The aim of this descriptive-correlational study was to explore quality of life in people with chronic mental illness. Instruments included a demographic questionnaire and the Quality of Life Profile (6 items in each of 9 domains, scored on 'importance' and 'satisfaction'). The conceptual model for this study is the Centre for Health Promotion Model, consisting of three constructs: Being, Belonging, and Becoming. Data from 48 volunteers have been collected. Forty-four percent of respondents had one primary mental illness diagnosis, while 48 percent had more than one. Allowing for multiple responses, 21 % of the diagnoses were schizophrenic/psychotic disorders, 35 % were mood disorders, and 23 % were anxiety disorders. The most common diagnosis was bi-polar disorder. Thirty-one males and 12 females participated. Ages ranged from 27 to 63 years; 82 percent had high school or higher education. Analyses, currently underway, focus on a description of quality of life in the domains of: physical, psychological, and spiritual being; physical, social, and community belonging; and practical, leisure, and growth becoming. Exploratory analyses will include relationships of quality of life variables with demographics. Hopefully, results will help to answer the question, "What makes life worth living for people with chronic mental illness?"

## **Communication Sciences and Disorders**

**Emily Axelson, Ashley Gordon, and Brittany Graves (32)**

Faculty Advisor/Collaborator: **Kristine Retherford**

*Linguistic Forms Critical for Academic Success in Preschool-Aged Hmong Children*

The purpose of the present study is to investigate the semantic and syntactic skills of young children learning Hmong as a first language and English as a second language. The preschool period of development is noteworthy for the acquisition of grammatical forms and structures necessary for success in academic pursuits (Paul, 2001). Most children come to school with an understanding of the grammatical forms and structures of the language of instruction as well as a great proficiency in production of such forms. These oral language skills lay the foundation for literacy and academic success (Hart & Risley, 1995). Unfortunately, not all children come to school with the same linguistic knowledge and proficiency. Ascertaining linguistic proficiency of children in multilingual classrooms is difficult at best and impossible in many circumstances. This project will develop a series of tasks for eliciting grammatical forms and structures relevant in language acquisition in typically developing English-speaking children. Normative data for this population will be used to develop a Minimal Competency Core (MCC) for children learning Hmong as a first language and English as a second language in this region of the state.

**Kathryn Borgmann, Emily Axelson, Erin Ellis, and Rebecca Derrick (51)**

Faculty Advisor/Collaborator: **Timothy Lippold**

*Phonological Awareness and Phonological Acquisition in Children with Cochlear Implants: A Pilot Study*

This study was designed to compare phonological acquisition and phonological awareness of prelingually deafened children with cochlear implants to normally developing age-mate peers. Twelve subjects were tested using the Goldman-Fristoe Test of Articulation (2nd Edition) (GFTA-2) and the Phonological Awareness Test. GFTA-2 results also were analyzed using the Khan-Lewis Phonological Analysis (2nd Edition). Data are being analyzed. It is anticipated that children with implants will show significant delays compared to their normally hearing peers.

**Dustin Bronsdon (52)**Faculty Advisor/Collaborator: **Timothy Lippold***Auditory Brainstem Implants*

When people think of restoring hearing to a person who was either born deaf or has become deaf, they most often think of cochlear Implants. What some may not realize, however, is that cochlear Implants can only be used when an individual's cochlea is intact. For individuals who have had a portion or all of their cochlea is damaged or removed during removal of an acoustic neuroma, such as with Neurofibromatosis Type II (NF2), cochlear implants are not an option. As such, Auditory Brainstem Implants (ABIs), or devices that are surgically implanted directly into the brainstem, have been designed to address this problem. This poster will address the literature pertaining to auditory brainstem implants, providing the history, present status, and future of these devices.

**Adie Presto and Emily Krahn (49)**Faculty Advisor/Collaborator: **Kristine Retherford***Children's Comprehension of Kinship Terms for Blended Families*

The purpose of this study was to examine children's comprehension of kinship terms relating to blended families. Specifically, this data determined when children acquired the following blended-family kinship terms: step-mother, step-father, step-sister, step-brother, step-daughter, step-son, half-brother, and half-sister. Children, ages five to nine, first were pre-tested on their knowledge of the following nuclear family kinship terms: mother, father, sister, brother, daughter, and son. Then they were tested on their knowledge of blended-family kinship terms. A combination of a cloze procedure responses and open-ended questions with visual support of doll families were used for both inventories. Lastly, a questionnaire was completed to determine participants' family compositions.

**Chandra Tauer, Chelsea Lamb-Vosen, and Megan Hayden (50)**Faculty Advisor/Collaborator: **Linda Carpenter***Evidence-Based Practice with Autism Spectrum Disorder: A Literature Review*

This literature review analyzes six major treatment techniques for children with autism spectrum disorder (ASD). The techniques covered include Applied Behavioral Analysis (ABA), Developmental, Individual-Differences, Relationship-Based (DIR)/Floortime, Learning Experiences... an Alternative Program (LEAP), Picture Exchange Communication System (PECS), Relationship Development Intervention (RDI), and Treatment and Education of Autistic and Communication Handicapped Children (TEACCH). An overview of ASD is provided and, more specifically, how each technique applies to speech-language pathology. Within each section, the history and description of the technique is discussed. In addition, several studies are reviewed and evaluated. The critical synthesis addresses the role each technique plays in the development and remediation of child communication skills. Each approach is critically assessed based on the design of the intervention and the evidence base for practice.

## **Curriculum and Instruction**

**Colleen Bender (47)**Faculty Advisor/Collaborator: **Tamara Lindsey***Classroom Stories in the Aftermath of Katrina*

In this study, we explore the stories of twenty-six elementary teachers and counselors from a southwestern school district, professionals who accommodated substantial numbers of children displaced by the ravages of Hurricane Katrina. We place primary emphasis upon the everyday stories in these schools by examining the narratives of the prosaic events of these teaching/learning lives. This approach allows the accounts of the teacher/witnesses to help us understand the myriad ways in which they came to care for these refugee children. We also examine how the telling and retelling of such professional and personal stories can evolve into powerful fairytales that seduce, charm, and sustain, in ways both positive and negative, those who teach and learn in today's schools.

**Colleen Bender (48)**Faculty Advisor/Collaborator: **Tamara Lindsey***Teachers Tending Children through Crisis: Classroom Experiences in the Aftermath of Katrina*

In this study, Dr. Lindsey and I gathered and analyzed classroom stories from the elementary teachers in the Aldine Independent School District in Texas who accommodated children that were displaced by Hurricane Katrina. We listened to the many ways these teachers acclimated the children to their classrooms while simultaneously attempting to help them overcome devastation in their personal lives. These stories were collected by conducting individual interviews and at the same time keeping personal journals. We have looked at the aspects of caring and how we perceive and retell stories in our own way, often subconsciously changing or reshaping them.

**Kendra Congdon (36)**Faculty Advisor/Collaborator: **Deborah Pattee***Teaching and Learning About the Hmong*

This research project examined resources available to teachers wanting to learn and teach about Hmong culture. Most resources that address aspects of Hmong culture are produced for advanced scholars, but very few are available for schooled children. Included in this project is a biography of the available books, videos, articles, and websites concerning the Hmong. After searching for curriculum that could be used to teach about the Hmong, and finding very little available for K-12 educators, further research was done to create an interdisciplinary thematic unit on Hmong culture. Subjects included in this unit are Music, Visual Arts, Social Studies, and Family and Consumer Education.

**Nancy Dohr (46)**Faculty Advisor/Collaborator: **Robert Hollon***Community Case Studies in Collaborative Leadership*

The Community Case Studies in Collaborative Leadership project is designed to be an extension and comparison of the 2005-2006 study that took in-depth portraits of leadership orientation and practices of Chippewa Valley region leaders, who are involved in the Education and Human Sciences area. The understanding of the knowledge, skills, dispositions, and practices taken by these individuals are guidelines that are crucial to undergraduates and new professionals in their development of leadership styles. The subject in this study is a retired teacher, administrator, and a currently active liaison in promoting workshops/programs for current educators around Wisconsin. The leadership characteristics demonstrated by this individual will be compared to other core "leadership roles/actions" found in other research settings. Data sources include structured interviews, observations of professional activity, and samples of materials used by subjects in their professional leadership capacities.

**Hannah Jones and Anne Marie Wilhelmy (54)**Faculty Advisor/Collaborator: **Deborah Pattee***Adventure Girls: A Holistic Approach for At-Risk Adolescent Girls*

Our research project extends the Adventure Girls program at Longfellow Elementary School to students at DeLong Middle School over 2007-2008. During Spring and Fall 2006, we conducted an activity-based afterschool program for two cohorts of vulnerable 5th grade girls at Longfellow to build self-esteem and leadership and teaming skills; we plan a third cohort for Spring 2007. Focus groups confirmed the efficacy of the Longfellow program and expressed enthusiasm for a similar program at the middle school level. Expanding Adventure Girls to DeLong will allow us to continue developing developmentally appropriate curriculum. Currently, we have a Center for Alcohol Studies and Education (CASE) grant to create a holistic curriculum on physical, intellectual, emotional, social and moral developmental areas. Through this focus we plan to incorporate other age-relevant topics that will increase each student's ability to express her sense of self and others in relationship to these five areas. UWEC undergraduates are mentors for the girls at DeLong, facilitate weekly afterschool activities, and assist with research. The connections between these developmental areas necessitates an interdisciplinary team that consists of an educator from the College of Education and Human Sciences and a sociologist from the College of Arts and Sciences.

**Kara Lor, Michelle Olson, and Khoua Vang (248)**

Faculty Advisor/Collaborator: **Sherry Macaul**

*Exploring Classroom Management: Approaches that Ensure Success for Student Teachers while Enhancing Student Learning in the Classroom*

This study examined the current research literature on classroom management. Pre and post surveys were given to senior elementary/middle level majors before and after their first quarter of student teaching to learn their perceptions of their preparedness and effectiveness in managing classrooms. A sample of teachers and administrators from elementary and middle schools in three local school districts were surveyed to find out which classroom management philosophies, programs and practices they applied and to seek advice they offer to preservice teachers. In March, a classroom management mini-conference was held at UWEC for elementary/middle level majors featuring classroom management presentations by teachers and administrators from the local schools.

**Karsten Powell and Marie Gosse (45)**

Faculty Advisor/Collaborator: **Deborah Pattee**

*Queen Bees and Wannabes: Gender Equity in the Classroom*

This project revolves around the world of boys and girls in middle level classrooms. Differences abound in the way that boys and girls learn, think, and socially interact with one another. The research examines these differences and offers insight into how best to embrace the differences in middle level education. Original research involved interviewing/observing middle level educators as well as students in both rural and urban settings. Findings will be presented along with up-to-date research regarding the psychology behind learning at the middle level. These findings are used to develop gender-conscious lessons that can be easily implemented into any middle school classroom.

**Michael Slowinski (33)**

Faculty Advisor/Collaborator: **Susan McIntyre**

*Reading, Writing and Study Skills for Native American High School Students*

American Indians are the most underrepresented cultural group in America's colleges and universities. They find more success in being admitted to than being successful in continuing at institutions of higher education (Williams, 1999; ECLS-B, 2005). Given that Native Americans and Alaskan Native infants do not differ significantly from their peers in early developmental skills, "the challenge for ... schools ... is to maintain their level of progress. Poverty should not be an excuse for letting these children fall behind." (Russ Whitehurst, Director of the Institute of Educational Service). This project researched and identified developmental skills in reading, writing and study skills that students, regardless of ethnicity, gender and class, need to be successful in American schools. Further, the project focused on 27 middle and high school Wisconsin Native American and African American youths participating in the "Strengthening our Nations" Pre-college Institute at UW-Eau Claire during the summer of 2006. A survey was developed to assess reading and study skills at the beginning of a two-week program. A curriculum was designed based on the population's demonstrated needs, and a post test was administered to examine gains. Finally, a performance assessment was used to assess writing skills.

**Michael Wendland, Jesse Wetzel, Shane Leonard, and James Hollman (56)**

Faculty Advisor/Collaborator: **Robin UMBER & Susan McIntyre**

*Boys and Reading*

One growing area of current research in literacy education focuses on finding ways to enhance the motivation and ability of boys in the area of reading. Some educators have suggested that boys become less engaged in reading as they reach upper elementary and middle school because they are asked to read novels that hold little interest for them. However, other educators note that reading behaviors and resistance by some girls is similar to that of the boys that are labeled as "disengaged" readers. In this study, we observed in middle school classrooms, interviewed boys and girls, and interviewed teachers in order to determine how reading is taught in local middle school classrooms and how boys and girls respond to the instruction. The purpose of this study is to help us answer questions about how disengaged readers view reading in and out of school and how teachers may be better able to motivate and engage students during reading class.

## English

### **Michael Slowinski (34)**

Faculty Advisor/Collaborator: **Carmen Manning**

*Peer Luck: How Gender Differences Affect Student Success with Peer Revision*

Our study explored gender differences in peer revision feedback by students in one freshman composition course. Previous research shows that boys tend to dislike and struggle with the peer revision process and their feedback is often limited to short comments on mechanics, rather than content. On the other hand, girls have lively conversations that focus primarily on the content of the writing. Our results are confirming of this previous research, but we also found that the least successful combination for peer revision in this class was mixed gender pairs. We report on both the nature and content of the peer revision conversations over the course of a semester.

## Family Health Nursing

### **Sarah Anderson, Tiffeny Swenby, Touger Thao, and Patricia Elliot (29)**

Faculty Advisor/Collaborator: **Susan Moch**

*Wisconsin Students Secure Scientific Evidence for Nursing Practice in Alaska*

A partnership for learning has been established through Wisconsin nursing students traveling to learn with staff at the Alaska Native Medical Center (ANMC). This project creates a partnership by having students in Wisconsin work directly with ANMC staff members in obtaining important scientific literature for evidence-based practice. Staff members include Rebecca Hamel, RN, BSN, CPAN; Rona Johnson-Kurzejeski, RN-BC, BSN; Casie Williams, MEd, RN-BC; and Karen Wainwright, RN. This application research study involves a diverse research team including students of nursing/non-nursing, older/younger, freshmen-senior, men/women, and culturally diverse backgrounds. The team works together to communicate and provide information to the staff. Initially, ANMC administrators identified projects and requested student assistance in obtaining and summarizing scientific evidence for use in possible policy changes. The projects include palliative care, stroke care in rural areas, and an online journal club. The application research study will be evaluated through a staff, student, and administrative survey. Thus far, the team collected evidence on the topics, planned the evaluation process for the projects, and communicated with staff. This project has potential for encouraging interest in evidence-based practice among students, assisting ANMC staff in using evidence in practice, and identifying strategies for effective research teamwork.

### **Jessica Branson, Julie Brandt, Karen Crowley, Elizabeth Harelstad, and Nicole Ness (30)**

Faculty Advisor/Collaborator: **Susan Moch**

*Student-Led New Knowledge Discussion Groups*

The goal of the project is to describe and evaluate staff and undergraduate student involvement in the New Knowledge Discussion Group process. The New Knowledge Discussion Model involves a contract with health care participants to read articles on a topic selected by the staff and to attend three of four group discussion sessions held two weeks apart. Undergraduate student involvement in the New Knowledge Discussion Group process has been previously evaluated through summaries showing that both students and staff were positive regarding student involvement. Previously, undergraduate student/faculty teams worked together to find literature and discuss articles on a topic of interest to the staff. However, leadership of the groups by undergraduate students has not been evaluated. Through collaboration with staff nurse on two specialty units, undergraduate students co-lead New Knowledge Discussion Groups. The undergraduate students are involved in locating, presenting and leading the group discussion about the articles. The undergraduate students and nurses will complete an anonymous survey at the end of the four sessions evaluating their participation and student involvement in the groups. Summaries of each of the meetings will also be synthesized and analyzed for evaluation purposes.

## Foundations of Education

**Kathryn Stevens (35)**

Faculty Advisor/Collaborator: **Jill Prushiek**

*Identifying the Needs of Student Teachers*

Jill and I decided to create a survey with which to identify the needs of student teachers. We used an online program called Zoomerang to create a survey based on the Ten Wisconsin Teaching Standards. Via an e-mail survey, students identified their level of confidence in applying each teaching standard to their lessons. Some of the standards were split up into more than one question, and there were several open-ended questions which allowed students to elaborate on their answers or make suggestions. The survey was introduced and e-mailed to all current student teachers on the day of the first seminar. Jill and I then analyzed all the results and looked for common themes. We were also able to sort the results by major, which allowed us to find more themes. We then met with volunteer student teachers in focus groups. We used the focus groups as a chance to hear students expand on their needs and what they think could be done to meet those needs. Jill plans to present the results of the survey at faculty meetings, and hopefully some changes will be made in order to better meet the needs of student teachers!

## Geography and Anthropology

**Andrew Duggan, John Gasner, Lawrence Hoffman, Thong Moua, Rachel Kjos, Scott Lutgen, William Steinbrecker, and Tyler Moe (25)**

Faculty Advisor/Collaborator: **Brady Foust**

*A Feasibility Analysis for a Supermarket in the Phoenix Redevelopment District*

This project is a feasibility analysis for a new supermarket to be located in the Phoenix Redevelopment District in the North Barstow area of downtown Eau Claire. The recent closing of Kerm's on Water Street left the inner city without a supermarket. Our analysis examined: 1) population density, 2) potential spending on groceries, and 3) total income density of the site in relation to the same measures for peripheral existing supermarkets. This analysis measured the neighborhood or market area potential of the site. The "neighborhood" market area was assumed to be a Thiessen polygon generated around the sites in relation to existing competitors. The literature suggests that survival would require the store to also be a destination site and attract people from beyond its neighborhood market area. Destination potential was derived by Geographic Information Systems processing to determine the number of "high-end" households for a series of distance buffers beyond the neighborhood market area. Results indicate that a small footprint, high-end supermarket would have an excellent chance of success in this location.

## Information Systems

**Rachel Glinski (26)**

Faculty Advisor/Collaborator: **Jean Pratt**

*Correlaton Between Information Technology Implementation and Non-Profit Organization Contributions*

Non-profit organizations are starting to recognize the Internet as a powerful outreach medium. Fundraisers know that those who volunteer are more likely to donate. Of those who volunteered, the largest percentage (34.5%), were persons aged 35-44—the same age category that comprises the largest percentage of Internet users. We tested a hypothesis that there is a high correlation between information technology implementation and magnitude of contributions reported. Methods used were visual inspection of SIC 8641 non-profit organizations according to five levels of information technology implementation and further analysis of non-profit contributions reported to IRS. Research is in progress, but we expect a positive correlation. Although correlation research precludes identification of cause and effect, we think we will be able to recommend the implementation of web-based information technology as a means to connect organizations to stakeholders.

## Kinesiology

**Erica Borresen, Jeanna Wallenta, Kyle Zahler, and Eugene Boyd (74)**

Faculty Advisor/Collaborator: **Lance Dalleck**

*A Moderate-Intensity Exercise Program, Fulfilling the American College of Sports Medicine (ACSM) Net Energy Expenditure Recommendation, Improves Health Outcomes in Premenopausal Women*

The purpose of this study was to quantify the health outcomes associated with a moderate-intensity exercise program designed to achieve the American College of Sports Medicine (ACSM) net caloric expenditure guideline of 1000 kcal/wk. Fifteen, apparently healthy, but sedentary premenopausal women with the baseline characteristics (mean  $\pm$  SD age, height, weight, body composition, and maximal oxygen uptake ( $\text{VO}_2\text{max}$ ): =  $37.4 \pm 6.3$  yr,  $166.2 \pm 6.2$  cm,  $72.1 \pm 11.2$  kg,  $32.5 \pm 5.8$  %, and  $34.8 \pm 5.8$  mL/kg/min, respectively) completed the study. Exercise training was performed 3-4 days per week for 10 weeks at moderate-intensity (50%  $\text{VO}_2\text{R}$ ). It was found that there were significant ( $p < 0.05$ ) improvements in  $\text{VO}_2\text{max}$  (+ 2.5 mL/kg/min), SBP (-13.7 mmHG) and DBP (-6.4 mmHg), HDL cholesterol (+3.2 mg/dL), blood glucose (-4.9 mg/dL), and %BF (-1.6 %). Although the ACSM specifies that the energy expenditure goal should be a net caloric expenditure of 1000 kcal/wk, and classifies relative moderate-intensity as 40-59% of  $\text{VO}_2\text{R}$ , previous investigations have yet to determine the specific health outcomes associated with an exercise program fulfilling these requirements. Results indicate that significant health benefits will be conferred to previously sedentary, premenopausal women that engage in a moderate-intensity exercise program, designed to expend 1000 kcal/wk.

**Jeremy Clements (65)**

Faculty Advisor/Collaborator: **Don Bredle**

*Alcohol Is a Metabolic Bully*

The metabolic fate of ingested alcohol is poorly understood, even by those who are highly educated and otherwise fit, healthy, or athletic. Those who drink heavily, even if 'just on the weekends,' can derive a large portion of their total caloric intake from alcoholic beverages. Indeed, alcohol is a form of energy, but as a 'bully' it sabotages normal energy conversion pathways in the body. Instead of directly fueling muscle contraction or other desirable biochemical processes, the energy in alcohol is first converted to triglycerides and stored as body fat. In that process, a metabolic traffic jam is created as the break down of alcohol takes priority, and chemical entities such as  $\text{NAD}^+$  are snatched away from the productive pathways of glycolysis and the Krebs cycle. Thus, muscle function is limited while the person is fattened - two effects which most college students would not want to promote! The purpose of this project was to review the literature on the metabolic effects of alcohol and synthesize the information into a message that is applicable to college students.

**Sondra DeLap, Brittany Allen, Bailey Hanson, Erica Borresen, and Mary Erickson (73)**

Faculty Advisor/Collaborator: **Lance Dalleck**

*Cardiovascular Fitness and Body Composition Exhibit a Dose-Response Relationship with Exercise Duration in Postmenopausal Women*

The purpose of this study was to see if there is a dose-response relationship between exercise duration and health benefits associated with a moderate-intensity (50%  $\text{VO}_2\text{R}$ ) exercise program following the U.S. Surgeon General recommendation of 30-min/day, 5 days/wk. Sixteen, apparently healthy, but sedentary postmenopausal women with the baseline characteristics (mean  $\pm$  SD age, weight, body composition, and maximal oxygen uptake: =  $57.6 \pm 3.8$  yr,  $76.8 \pm 15.1$  kg,  $35.9 \pm 6.6$  %, and  $22.1 \pm 5.3$  mL $\cdot$ kg $^{-1}$  $\cdot$ min $^{-1}$ , respectively) completed the study. Moderate-intensity (50%  $\text{VO}_2\text{R}$ ) walking was performed 5 days/wk for 12-wks and subjects were randomly placed into groups of either 30-min or 45-min/day. After 12wk,  $\text{VO}_2\text{max}$  increased significantly ( $p < 0.05$ ) in both 30-min ( $M = 2.3$  mL $\cdot$ kg $^{-1}$  $\cdot$ min $^{-1}$ ) and 45-min ( $M = 6.3$  mL $\cdot$ kg $^{-1}$  $\cdot$ min $^{-1}$ ) groups. Body fat was significantly ( $p < 0.05$ ) reduced in both 30-min ( $M = -1.7\%$ ) and 45-min ( $M = -4.9\%$ ) groups. Postmenopausal women that completed a 12-wk, moderate-intensity exercise program, five days/wk for 30-min and 45-min increased their  $\text{VO}_2\text{max}$  values by 11 % and 27 %, respectively. In a similar dose-response manner, percent changes in body fat from baseline to post-program for the 30-min and 45-min groups were -4.7 % and -13.8 %, respectively.

**Gray Johnston (87)**Faculty Advisor/Collaborator: **Lance Dalleck***The American College of Sports Medicine Exercise Intensity Guidelines: Theoretical or Practical?*

Purpose: To quantify the misapplication of the current ACSM exercise intensity guidelines, based on %VO<sub>2</sub>R, which replaced %VO<sub>2</sub>max in 1998. Methods: A literature review (2001-present) was completed to identify studies conducted on the effects of exercise training on cardiovascular fitness in adults. Results: Studies (N=26) were identified in which exercise intensity was prescribed by %VO<sub>2</sub>max rather than %VO<sub>2</sub>R (misapplication). Nine instances of misinterpretation were identified; referencing the current ACSM guidelines, but citing intensity in terms of %VO<sub>2</sub>max. Conclusions: According to Swain and Franklin (2002), the utilization of %VO<sub>2</sub>R allows for equal adjustments from rest to target VO<sub>2</sub> among individuals with unequal fitness levels. In comparison, when prescribing the same exercise intensity to individuals among different fitness levels at %VO<sub>2</sub>max, the results will be an unequal adjustment from rest to target VO<sub>2</sub>. Consequently, researchers prescribing intensity in terms of %VO<sub>2</sub>max are introducing error. Continued use of exercise intensity prescribed by %VO<sub>2</sub>max perpetuates an out-of-date recommendation and results in dissimilar training stimuli. Based on the current findings, we conclude that there is considerable misinterpretation and misapplication of the current ACSM exercise intensity guidelines. We recommend exercise professionals integrate the current intensity guidelines into both research and practice.

**Stephanie Lopez (86)**Faculty Advisor/Collaborator: **Mary LaRue & Jeff Janot***Burnout Levels in Athletic Training Students across a Semester*

Purpose: The purpose of this study was to determine the level of burnout among athletic training students (ATs) at various points throughout the Fall semester. Methods: The sample consisted of 63 athletic training students enrolled in one of the two Midwestern CAATE accredited undergraduate athletic training education programs selected for this study. The Maslach Burnout Inventory (MBI) and an additional questionnaire were used. Both instruments were given three times (start of semester, during season overlap, and before finals). Descriptive statistics were used to summarize survey data and MBI differences were analyzed using a 2-way ANOVA (school and administration). Results: Significant differences were observed in emotional exhaustion scores on the MBI between the first two administrations. Significant differences in MBI depersonalization scores between administrations one and two and one and three were also observed. No significant difference was found in MBI subscale scores between schools. Conclusion: Burnout appears to be a problem for athletic training students. Levels of burnout are increased during season overlap and at the end of the fall semester. Programs need to be aware of these burnout levels and work to minimize them. Future studies could investigate potential ways to decrease these levels of burnout.

**Anna Nicholson and Joshua Mathews (66)**Faculty Advisor/Collaborator: **Don Bredle***Physical Assessment of Youth Ski Jumpers*

Ski jumping has a long, rich tradition in the Eau Claire area; recently, kinesiology faculty were approached by the coach of the United States Ski Jumping Association – Central Division Junior Team to begin to track formal fitness assessments of the athletes. The goals were: 1) to encourage the young athletes to maintain their workouts in the off-season, 2) to help design individualized training programs based on each athlete's needs, and 3) eventually to determine which fitness parameters best correlate with success on the ski jumping hills. Eight ski jumpers, age 10-17 were tested in April 2006 for aerobic capacity, body composition, explosive power, and flexibility/balance. At the second round of testing in November 2006, 10 athletes were tested. Nineteen kinesiology students have helped in the assessment of the jumpers. We hypothesized that the athletes would surpass the general population on some, but not all, of the fitness parameters. Indeed, eight of the ten showed high aerobic capacity (>70th percentile, NCYFS normative data, 1985). However, no athletes exceeded the 50th percentile in the low-back and hamstring flexibility. In future testing sessions, we will assess whether changes in training based on these fitness variables has been effective in improving ski-jump performance.

### **Jennifer O'Brien (76)**

Faculty Advisor/Collaborator: **Jeff Janot**

*The Acute and Prolonged Effects of Static and Dynamic Stretching on Measures of Muscular Power and Strength*

**Purpose:** The purpose of this study is to determine the acute and prolonged effects of static and dynamic stretching on muscular power and strength performance. **Methods:** The study sample consisted of 20 physically active subjects. Subjects participated in a baseline trial where 10- and 30-yard dash time, vertical jump, and maximal squat were measured. Within 1 week of baseline, subjects participated in two stretching performance trials: 1) static and 2) dynamic. Trials consisted of a 5-min warm-up on a treadmill followed by a pre-stretch sit and reach test followed by a 15-min, static or dynamic stretching protocol and a post-stretch sit and reach test. The dash times, vertical jump, and maximal squat tests were performed at 5-min, 15-min, 30-min, and 1-hr time periods following each stretching protocol. Data were analyzed using a 2-way repeated measures ANOVA. **Results:** Preliminary results showed an improvement in squat at all time periods for both trials, vertical jump at 5 minutes following dynamic, and no improvement for dash times following both protocols. **Conclusion:** Unlike sprinting, strength performance is more greatly improved by dynamic stretching. Vertical jump can be influenced by dynamic stretching, but static stretching prior to power activities should be avoided.

### **Corey Reyment and Jacob Lundquist (75)**

Faculty Advisor/Collaborator: **Lance Dalleck & Jeff Janot**

*Effects of a Four-Week Plyometric Training Program on Measurements of Power in Male Collegiate Hockey Players*

The purpose of this study was to examine the effects of plyometric training following a 4-wk training program on vertical jump height, 40-yd dash, 10-yd dash, and anaerobic power. Subjects were 17 in number, healthy, Division 3 male hockey players (age:  $20.9 \pm 2.0$  yrs, ht:  $181.9 \pm 5.4$  cm, wt:  $85.3 \pm 5.4$  kg, % body fat:  $10.2 \pm 3.5$  %). All subjects were tested in the vertical jump, 40-yd dash, 10-yd dash, and anaerobic power using the Wingate Bike test prior to starting the plyometric program. The subjects then completed a 4-wk plyometric training program and were retested. There were significant differences ( $p < .05$ ) in the mean anaerobic power drop percentage ( $p = .020$ ), peak relative power ( $p = .046$ ), peak power ( $p = .005$ ), right foot vertical jump height ( $p = .046$ ), left foot vertical jump height ( $p = .001$ ). Overall, the findings indicated that two days/wk of plyometric training for 4-wks is sufficient to elicit improvements in single leg vertical jump height and overall power endurance. In conclusion, plyometric training significantly improves anaerobic power and single leg vertical jump height independent of one another.

### **Lance Valiquette (88)**

Faculty Advisor/Collaborator: **Lance Dalleck**

*U.S. Surgeon General's Recommendation for Physical Activity Elicits Positive Health Outcomes in College-Aged Adults*

**PURPOSE:** The purpose of this study was to quantify the health outcomes associated with participation in a university physical activity course designed to fulfill the U.S. Surgeon General Physical Activity recommendation. **METHODS:** Twelve college-aged students (mean  $\pm$ SD, age  $22.0 \pm 3.7$  yrs, height  $176.0 \pm 8.0$  cm, and weight  $72.0 \pm 18.5$  kg) completed a 4 week physical activity course, which entailed walking or jogging 5 days/wk at a moderate intensity of 40-60% heart rate reserve (HRR). **RESULTS:** A comparison of mean BL to 4-wk values revealed significant improvements ( $P < 0.05$ ) in systolic blood pressure (-3.8 mmHg;  $P = .026$ ) and  $VO_2$ max ( $6.7 \text{ mL}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ ;  $P = 0.000$ ). No significant differences ( $P > 0.05$ ) were found for body mass (-0.8 kg;  $P = 0.080$ ), body mass index (-0.2 kg/m<sup>2</sup>;  $P = 0.093$ ), diastolic blood pressure (0.5 mmHg;  $P = 0.735$ ), fasting blood glucose (-3.5 mg/dL;  $P = 0.193$ ), and waist circumference (-.955 cm;  $P = 0.092$ ). **CONCLUSION:** Our findings suggest that a short physical activity course designed to meet the U.S. Surgeon General recommendation for physical activity is effective at eliciting positive health outcome changes to systolic blood pressure and cardiovascular fitness.

## **Management and Marketing**

### **Sonya Arendt (14)**

Faculty Advisor/Collaborator: **Scott Lester & Kristina Bourne**

*Why Should I Take this Exam?: Exploring the Impact of Professional in Human Resource (PHR) Certification on Early Student Career Success*

The purpose of this study is to evaluate the impact of the Professional in Human Resource (PHR) certification on early

career success. Data were gathered from alumni from two midwestern universities. The survey was designed to measure early career success in terms of securing an HR-specific job, higher starting salaries, frequent promotions, and job satisfaction. Analyses revealed that passing the PHR certification is positively associated with receiving an HR-specific job upon graduation. Furthermore, although not statistically significant, the relationships between PHR certification and starting salary and number of promotions received were in the expected (positive) direction. Lastly, however, PHR certification did not impact job satisfaction. Implications, study limitations, and suggestions for future research are discussed.

### **Christine Hayward (5)**

Faculty Advisor/Collaborator: **Kristy Lauver**

*Alcohol and the Workplace*

This study will explore students' perspectives on drinking in the workplace. We will be looking into company policies and find out if students feel these policies are enforced. Additionally, we will inquire as to whether or not students have ever gone into work drunk/hung over, and if they feel this is an acceptable thing to do. We also will be comparing these results to whether the students feel differently depending on the type of job they are in (related to a major or just a job to make some extra money). Surveys will be distributed randomly to classes in order to obtain different views on this subject. By conducting this research, we hope to gain a better understanding of students' views on this topic. Further understanding in this area should be valuable to students in the workforce and seeking future employment, current employers of students and college recruiters, and to professors as they prepare students for current and future positions

### **Brooks Lockwood (15)**

Faculty Advisor/Collaborator: **Ronald Decker**

*Migration of Retail Store Locations*

We researched the movement of retail store locations. Initially we did background research on the type of studies done to determine retail locations, what direction retail locations are headed, and how they have migrated in the past. Our poster board was made to represent the original retail locations in Eau Claire and illustrate the movement of store locations from one central location to the next. We also made a prediction for what direction retail locations are headed in the future.

### **Curtiss Mayenschein (28)**

Faculty Advisor/Collaborator: **Tim Vaughan**

*Alternative Control Mechanisms for Cyclical Scheduling Systems*

This paper investigates the relative performance of three mechanisms for controlling the cycle length in a cyclical scheduling system. A policy of controlling cycle length using a fixed idle time at the end of each cycle has been previously characterized. An alternative mechanism is a variable idle time, determined by the time of cycle completion relative to the scheduled start time for the next cycle. The variable idle time is shown to generate significantly smaller variance in the length of the production cycle for the first item in the production sequence, compared to that under the fixed idle time policy. However, cycle length variability accumulates along the production sequence, in some cases to the point where items at the end of the production cycle experience cycle length variability greater than that realized under the fixed idle time policy. A policy of allocating schedule-dependent idle time between individual production runs, rather than using a single schedule-dependent idle time at the end of the cycle, is shown to eliminate this accumulation of variance, preserving the advantage of the variable idle time policy throughout the cyclical production sequence.

### **Shelley Piontek (6)**

Faculty Advisor/Collaborator: **Kristy Lauver**

*Exploring a Connection Between Students' Majors and Alcohol Consumption*

Alcohol consumption on campus remains a top concern of both students and administrators. The question of what aspects of the academic culture could actually help reduce drinking among students therefore is a highly important one. If there is a difference among drinking in different majors this can potentially alert departments to this area of concern in order for it to be addressed. Additionally, an exploration of the impact of potential factors related to the various majors, such as student organizations, on students' drinking may also bring to light potential sources that departments have to resolve some of the

drinking issues.

### **Roger Schwarz (27)**

Faculty Advisor/Collaborator: **Terry Wells & Abe Nahm**

*Certified in Production and Inventory Management (CPIM) Certification Research Project*

For the past ten years UW-Eau Claire has required that all Operations/Materials Management Majors complete one CPIM exam, besides the Basics, to graduate. We wanted to back this decision up with hard facts to determine if this requirement is worthwhile for the students after graduation. The purpose of this research project is to find out if CPIM Certifications will give students a greater chance of getting hired, start out at higher salaries, and get promotions quicker, compared to individuals that don't have certifications. We also wanted to find out how supportive companies are of helping their current employees get CPIM Certified. Based on the results, we found out that CPIM Certifications help students get hired faster, get paid more, and be more likely to get a job promotion. We also found out that the majority of companies not only pay for certifications, but also provide materials for their current employees to get certified. This information provided enough facts to realize that the requirement to pass one CPIM exam should, and will be kept for all future Operations/Materials Management Majors.

### **Amanda Sutherland and Daniel Rozumalski (246)**

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

*Super Bowl-Promoted Movie Success: An Empirical Study*

UW-Eau Claire research identified release date as the best predictor of movie success for films that advertise during the Super Bowl, followed by USA Today's Ad Likeability scores, production budget, and star power. Super Bowl-promoted movies from 1991-2006 were reviewed and the predictive powers of factors that drive box-office revenue were analyzed.

### **Rebecca Westbrook (16)**

Faculty Advisor/Collaborator: **Jennifer Johs-Artisensi & Douglas Olson**

*Development of a Self-Assessment Tool to Facilitate Decision-Making in Choosing a Major in Health and Aging Service Administration*

Health and Aging Services Administrators must have a broad base of knowledge, skills and interests to provide leadership and be successful in managing a fiscally responsible, quality health care organization. Researchers developed a self-assessment tool to help determine whether a health and aging services administration major is a compatible fit for someone. With input from professionals in the field and in context with the literature, an initial tool has been developed that focuses on the following 10 characteristics necessary for effective leadership: Organization, Critical Thinking, People Skills, Attitude, Confidence, Communication, Visionary Leadership, Sense of Caring, Change Agent, and Business Sense.

## **Mathematics**

### **Eric Weber (69)**

Faculty Advisor/Collaborator: **Marc Goulet**

*Female/Male First Year Student Attitudes Towards Majors in STEM Fields*

The percentage of women obtaining degrees in science, technology, engineering and mathematics has increased 10% over the last decade. However, the percentage of women obtaining degrees in Computer Science, Engineering Technology, and Physics has decreased. At the elementary level, girls and boys achieve equally in math and science, and they claim to be approximately equally confident in their abilities [AAUW report]. When these students reach high school, female students are less likely to "like math" and claim they are "good at" math [NSF, 2002]. Further, this decline in confidence in their abilities precedes the decline in overall performance by female students in advanced math courses [Linn and Hyde]. It has been argued that low numbers of women in STEM is not necessarily an issue of retention at the undergraduate level but rather due to low interest and confidence in math and science skills upon entering college, lack of encouragement by teachers, counselors and parents and inadequate preparation in higher level math, physics and computer science in high school [Fencl, Goulet and Sandrin, 2006]. Here we analyze first year student attitudes for both women and men at UW-Eau Claire and UW Oshkosh and find differences among men and women.

## Music and Theatre Arts

### **Courtney Doyel (67)**

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 one's 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 two-part online survey was created. The first section was compiled from a literature review and asks volunteers to mark the frequency of their use of different singing techniques that employ either a visual, kinesthetic, or aural learning style. The second section of the survey assesses the volunteer's learning style. Voice teachers at universities around the country were asked to have their students log on to the site to take this survey. In comparing the data from the two parts of the survey we will then be able to see if there is a correlation between the students' learning styles and the techniques they use to practice.

## Nursing Systems

### **Amber Brunn, Melissa Lauber, Nicole Hooper, and Amanda Jackson (31)**

Faculty Advisor/Collaborator: **Lois Taft & Elaine Wendt**

*Pharmacology in Nursing Education*

Trends in medical care are marked by increased use and complexity of pharmacological therapies, increased acuity of hospital patients, and aging of the population. In this environment, knowledge of drugs, their side effects and interactions is increasingly important to nurses. Nurses not only administer medications, but they assess both therapeutic and adverse effects. Media attention to medical errors, specifically medication errors in nursing practice (Berens, 2000), has focused increased attention on pharmacology in nursing education. Knowledge of clinical pharmacology is an important educational outcome for nursing education. The purpose of this study is to evaluate the usefulness of pharmacology modules on students' acquisition of knowledge, and strengthen the ability of new graduates at UW-Eau Claire to provide competent, safe nursing care. In this evaluation research, two cohorts of graduating seniors in the nursing program took the NLN Pharmacology Achievement Test to evaluate their pharmacology knowledge. One group took the test prior to the pharmacology modules, the other group tested after. Qualitative data were also collected to describe the perceptions of students and faculty who used the modules. This research will provide data to strengthen the pharmacology content in an integrated curriculum in baccalaureate nursing education.

## Physics and Astronomy

### **Amy Raplinger (70)**

Faculty Advisor/Collaborator: **Matt Evans & Doug Dunham**

*Student Response Systems and Test Outcomes*

Student response systems (SRS) have been used for the past three years in our introductory physics classes. These systems have been shown to increase student interaction within the confines of large lecture classes. Our research looks at two areas dealing with the use of SRS; the first being the enthusiasm for using the SRS in a class. We show how students' attitudes change after using the technology in our classes, and we are also able to show how attitudes change for people who have previously used SRS. Secondly we will show data dealing with the reinforcement of concepts through the use of SRS and compare it to more traditional reinforcement methods, such as through questions posed to large lecture classes without individual feedback.

## Public Health Professions

**Hana Dehtiar, Jessica Mumford, and Megan Hoffman (53)**

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

*Clinical Applications of Percussion Techniques*

For the last year and a half we have been creating a percussion techniques course specifically designed for music therapy majors. We have created a syllabus of course content, projects, and exams. This is the first semester it is being taught. The students are in the classroom one day a week and on the second day, students are in the community using the techniques learned in class with one of three populations: geriatrics, developmental disabilities, or at the juvenile detention center. Our research material has been presented at three national music therapy conferences (Detroit, Kansas City, and Cleveland). The course will be critiqued and revised at the end of the semester.

## Social Work/Foreign Languages

**Marcy Reynolds (249)**

Faculty Advisor/Collaborator: **La Vonne Cornell-Swanson & Analisa DeGrave**

*Examining Latin American/Latino Community Interactions with Social Service Providers*

This project is designed to gather and analyze information about the experience of seeking social assistance for Latin Americans and Latinos living within the southwestern United States. Specifically the research team will examine the concepts of identity, perceptions of the social service system, barriers to receiving services, strengths in the provision of services, types of services being utilized by these communities, interactions with social workers, and informal forms of assistance being used within these communities. The student researcher will work in collaboration with both faculty members to translate, transcribe, analyze, and disseminate the qualitative data generated from participant interviews.

## Sociology/Curriculum & Instruction

**Hannah Jones, Anne Marie Wilhelmy, Laura Simon, Michelle Curci, and Stephanie Birr (55)**

Faculty Advisor/Collaborator: **Pamela Forman & Deborah Pattee**

*The Effects of an After-School Program on Self-Esteem: Preliminary Results from Two Cohorts of the Adventure Girls*

Teachers at Longfellow Elementary School and an interdisciplinary team of UWEC professors and undergraduates collaborated to form the Adventure Girls, an after-school program for fifth grade girls. With the support of community members, we held two programs for groups of eight girls in Spring and Fall 2006. Our third cohort is in progress. These children may face obstacles in that their schools serve the largest population of low-income families and English Language Learners in the district. This program provides a holistic approach to their physical, intellectual, emotional and social needs. They learn various skills such as leadership, teaming, and building self-esteem through reflecting on learning goals. Our preliminary results demonstrate the efficacy of an after school program in positively influencing well-being. Our data, which we are coding using Atlas.ti, a qualitative analysis program, come from participant observation recorded in field notes and transcriptions of focus groups with the girls. They noted making friends, taking more chances, and becoming aware of their own strengths and weaknesses through their weekly "adventures." These results encouraged us to conduct longitudinal research by extending our after-school program for these same girls at DeLong Middle School and continuing our Longfellow program in Fall 2007.

## Special Education

**Jamie Hoffman (7)**

Faculty Advisor/Collaborator: **Joseph Morin**

*Making it Real: Fostering Interdisciplinary Collaborative Assessment Practices in Pre-Service Teacher Preparation*

The link between quality teacher preparation and adequate supervised field experience has been reported in the literature for some time (Darling-Hammond & Bransford, 2005). Finding authentic pre-service clinical experiences prior to student teaching

is often difficult. This presentation describes the benefit derived by 4 pre-service special education majors working with an inter-disciplinary assessment team. The students, from a senior-level special education assessment course provided client-based academic and behavioral information to the assessment team. Combining the resources of multiple disciplines these students obtained experience in integrating their test results with those from other disciplines in order to generate valid and relevant recommendations. Additional experience in reporting oral and written assessment results to parents was also obtained by these students. Participants will see, firsthand, the benefits to these students including the value of 1) participating in assessment development that is real and purposeful, 2) experiencing an authentic IEP-type model prior to student teaching, 3) developing a pragmatic understanding of the roles other professionals play in the assessment process and 4) of consolidating and integrating a broad spectrum of information to produce balanced assessments.

**Matt Vande Berg (13)**

Faculty Advisor/Collaborator: **Vicki Snider**

*Effectiveness of Corrective Reading with High School Students in Special Education*

Corrective Reading (CR) is a remedial reading program that uses a Direct Instruction method to help struggling adolescents learn to read. This study investigated the progress of twenty 9th and 10th graders at a small high school in Western Wisconsin. Each of these students had a mild disability and an active IEP. During the 2005-06 school year, one minute timed reading checks were conducted using a novel that was part of the 9th grade curriculum. Their scores were compared to a control group consisting of 9th and 10th graders with low reading scores on the 8th grade WKCE test who had never been referred for special education. Results indicated that students in the CR group began to “close the gap” in reading skills.

**Lauren vanDoorn, (8)**

Faculty Advisor/Collaborator: **Rosemary Battalio & Todd Stephens & Renee Chandler**

*Double Jeopardy: Adolescents with Disabilities—Teachers’ Perceptions and Strategies*

Adolescents with disabilities may experience increased difficulty socially and academically when characteristics of their disability and of a typical adolescent coexist. Adolescence is a developmental period with a multitude of changes that impact their relationships with adults and peers, and academic growth. It is important to recognize a student as both an adolescent and a student with a disability in order to best identify and meet their needs. Adolescents with disabilities may encounter more difficulty when their disability inhibits their ability to develop as an average adolescent. In-service secondary teachers provide information on how they perceive their ability to instruct adolescents with and without disabilities. They specifically provide insight into how they address the nature of adolescents and mild disabilities through instruction. Teachers identify strategies they use to mitigate any negative effects that adolescents and mild disabilities have on their students.

## **Student Development and Diversity**

**Ashley Borman (93)**

Faculty Advisor/Collaborator: **Peggy O’Halloran & Sarah Harvieux**

*I Did WHAT Last Night?*

The goals of this project focus on educating students at the University of Wisconsin-Eau Claire (UWEC) about the difference between blacking out and passing out, the potential consequences of blacking out, and how to prevent an alcohol-induced blackout. This report will define and explain the alcohol-induced blackout as well as suggest the statistical significance of studying this topic. By the completion of this project, UWEC will have a better understanding of its students’ social behaviors and have a measurable way of tracking behavioral changes. Eventually, we want to see an environmental change at the University in order to avoid the negative consequences of high-risk drinking, including blackouts, in its student population.

## Biology

### **Anthonia Arikawe and Sarah Korb (226)**

Faculty Advisor/Collaborator: **Winnifred Bryant**

*Xeno/phytoestrogens Stimulate Transactivation in Estrogen Sensitive Genes in the Pituitary Gland*

The steroid hormone estrogen (17  $\beta$  estradiol, E2) is produced by the ovaries and targets a number of tissues in the body. Physiologically significant roles of E2 include regulating the growth of reproductive structures, including the breast and uterus. However, E2 also regulates the cyclic release of anterior pituitary hormones that drive the mammalian reproductive cycle. The anterior pituitary gland expresses an appreciable level of ER $\alpha$ , the receptor protein through which E2 elicits its effects. The actions of E2 may be mimicked by a number of compounds, including phytoestrogens (found in plants) or xenoestrogens (common components of industrial pollutants). GH3 cells, a somatolactotrope cell line that expresses endogenous ER $\alpha$  were transfected with various complex promoters in the presence and absence of the transcription factor Pit-1 and treated with a panel of estrogenic compounds that included xeno/phytoestrogens. Luciferase activity was measured as an index of transactivation. In addition, ER $\alpha$  expression was measured using Western blotting techniques. Promoter constructs were variably affected by the estrogen mimics and the transcription factor Pit-1 generally enhanced those responses.

### **Ryan Boley and Matthew McCann (209)**

Faculty Advisor/Collaborator: **David Lonzarich**

*Quantifying Foraging Behavior with Increasing Water Velocity in Creek Chub (*Semolitus atromaculatus*)*

High water velocities influence foraging opportunities in aquatic organisms. Fish are especially vulnerable to these influences because of their constant residence in the water column. In this study, we are quantifying the effects of increasing water velocity on reaction distance, visual angle, pursuit speed, and visual range in two different size classes of creek chub (*Semolitus atromaculatus*). This experiment was performed within a recirculating flow chamber. Each size class was subjected to six velocities while food was uniformly dispersed into the chamber. Reaction distance is classified as the distance each fish swims to eat the food, while visual angle is the angle at which the fish see the food. Pursuit speed is classified as the velocity the fish accelerated towards the food and visual range is the theoretical feeding range of each fish at a given velocity. Our results thus far show a negative effect of water velocity on reaction distance but a positive effect on pursuit speed for large chub. Visual angle of attack is not correlated with velocity. As water velocity increases, creek chub become more selective foragers, only pursuing food close to their holding position. Our results promise to help better understand foraging behavior in stream fish.

### **Matthew Brewer (233)**

Faculty Advisor/Collaborator: **Darwin Wittrock**

*Infection Patterns of *Cryptosporidium* spp. in Dairy Calves of Western Wisconsin*

*Cryptosporidium* is a genus of protozoan parasites that live on the surface of epithelial cells in the digestive tract. They infect a wide range of vertebrates, including humans. Bovine cryptosporidiosis, primarily caused by infection with *Cryptosporidium parvum*, has long been associated with neonatal calf scours. When a major human outbreak occurred in Milwaukee in 1994, surface water contaminated by agricultural runoff was identified as the source of infection. While *Cryptosporidium* has been reported worldwide, there have been no reports documenting the prevalence of this parasite in Wisconsin cattle. Sampling 11 different dairy farms, we analyzed fecal samples from a total of 99 pre-weaned calves. We found that 42 of the calves were infected with the parasite, and calves 8-14 days of age were most likely to be infected. We suggest that contaminated soil and maternity pens are reservoirs for calf infections. Our results may indicate the widespread nature of cryptosporidiosis in Wisconsin dairy cattle. Consequently, veterinarians should consider *Cryptosporidium* when assessing herds that experience chronic calf scours.

**Matthew Brewer, Yaron Fireizen, Tim Morschauser, William Hintz, Paulina Duarte, Ernest Ruiz, and David Koslov (234)**

Faculty Advisor/Collaborator: **Mary Elger Lonzarich & David Lonzarich**

*Birth Date and Growth Rates of Wisconsin and Washington Coho Salmon (Oncorhynchus kisutch) as Inferred from Otolith Microexamination*

Birth date can be an important correlate to evolutionary fitness because birth timing can profoundly influence growth and survival. As part of an ongoing study, we report here on birth date and growth patterns for two populations of coho salmon (*Oncorhynchus kisutch*) exposed to different stream environments; one from Washington (where salmon are native) and the other from Wisconsin (where this species was introduced in the 1960s). Fish ear bones (otoliths) were used to measure fish age (in days) and from microscopic examination of 400 fish, we have thus far generated results concerning birth date and growth patterns for each system. Both populations show long hatching seasons (>6 wk), but fish from Wisconsin hatched approximately 3 weeks later, emerging from nests at least one month following the spring flood season. Wisconsin fish also grew at a much slower rate (nearly 40% slower) and had a longer nest residency than Washington fish, findings that probably reflect the existence of warmer, more productive stream conditions out west. To date, our examinations have shown that birth date is a poorer predictor of growth than birth size or metabolism (both of which can be inferred from otolith morphology).

**Kevin Buffington (192)**

Faculty Advisor/Collaborator: **Paula Kleintjes-Neff**

*Fire, Elk, and Aspen Population Dynamics in Bandelier National Monument: Recommendations for Post-Fire Aspen Sustainability*

The influence of browsing by elk (*Cervus elaphus*) on aspen (*Populus tremuloides*) and other woody shrubs in Bandelier National Monument has been a controversial topic throughout the last decade. Using two seasons of observational and statistical data we examined the hypothesis that physical barriers such as fallen trees help to protect aspen and other woody shrubs from ungulate browse. In 2005, we explored randomly selected sites in our search for refuged trees. In 2006, we traversed the entire study area searching for definitively refuged trees. Our findings suggest that refuges of fallen trees with a height greater than 80 cm allowed aspen to escape ungulate browse and attain heights above 2 m.

**Anna Carey (214)**

Faculty Advisor/Collaborator: **Todd Wellnitz**

*Density and Diversity of Intertidal Invertebrates in Southeast Alaska*

Environmental gradients are important for determining the distribution and abundance of organisms, and in the rocky intertidal, tide level is a key gradient influencing habitat choice for marine invertebrates. To examine how tidal level affected invertebrate community structure, a study was conducted on the rocky intertidal shoreline adjacent to the Tongass National Temperate Rainforest, Alaska. After tidal level was measured over a 24-hour period, 12 transects were established. Each transect ran perpendicular to the shore and had seven, 30 x 30 cm quadrants spaced 1.5 m apart along their length. Within each quadrant, the percentage barnacle coverage and the diameter of 10 randomly selected barnacles were recorded; all other invertebrates were counted and photographically recorded. Over 50 species of invertebrates were identified during the study, but the acorn barnacle, *Balanus glandula*, dominated all quadrants. *Balanus* size and coverage differed along the tidal gradient. Barnacle size was greatest in the middle tidal zone (4.5 m asl), whereas percent cover peaked higher at 6 m asl. Species richness was greatest between 3 m and 6 m asl; however, species diversity was greater in quadrants located closest to the low tide mark.

**Christina Chalk (241)**

Faculty Advisor/Collaborator: **Chris Floyd**

*Influence of Plant Community Composition on Small Rodents in a Prairie Restoration Site*

I investigated the influence of plant community composition on small rodents in a prairie restoration site near Brackett, Wisconsin. The project was embedded within the Weiher/Lee prairie restoration experiment, in which 0.1 ha plots were manipulated in terms of fungal mutualists and nitrogen availability. My objective was to determine how plant functional diversity and species richness influenced patch occupancy, measured as likelihood of finding a given rodent species in a plot.

**Ellen Christensen (235)**Faculty Advisor/Collaborator: **Sasha Showsh***The Isolation of Plasmid pAM369 from a Bacteriocin-Producing Strain of Enterococcus faecalis*

Certain strains of bacteria are able to produce lethal chemicals called bacteriocins. These bacteriocins are proteinaceous toxins that inhibit the growth of similar bacterial strains and generally exhibit a narrow spectrum of antimicrobial action. Because of these antimicrobial qualities, bacteriocins have potential applicability in the medical field as treatments for infectious diseases and can also act as food preservatives. Our study focused on *Enterococcus faecalis* SAS58, which contains a conjugative plasmid (pAM369) that codes for the production of a particular bacteriocin and is resistant to the antibiotics erythromycin and gentamicin. Analysis of the bacteriocin reveals that it is an extracellular protein with a molecular weight of about 66K da. The protein is heat labile, active over a wide pH range, and exhibits bacteriostatic activity against a non-producer strain of *E. faecalis*. We attempted to clone the bacteriocin gene into an expression vector. However, we were unable to obtain sufficient amounts of pAM369 from *E. faecalis* because the plasmid is large and is a low-copy number plasmid. We present the optimized procedure for obtaining sufficient amounts of pAM369 for the purpose of cloning the gene and studying its structure and regulation.

**Amy Croswell (195)**Faculty Advisor/Collaborator: **Lloyd Turtnen***Stimulation of Signal Transduction Pathways by Treatment with Different Amphotericin B Formulations*

Amphotericin B (AmB) is an important drug used in the treatment of invasive fungal infections. THP-1 monocytes were incubated up to 1 hour with either Amphocin (FZ), lipid formulations ABLC and ABCD, or medium alone. FZ stimulated the most signal transduction pathways, while ABCD and ABLC caused less stimulation. Western blots were then used to determine levels of key proteins (ERK, p38, and NF- $\kappa$ B) involved in inflammatory signal transduction pathways. The proteins were extracted, blotted, and probed using HRP-labeled antibodies. Pathway activation was determined by taking the ratio of the phosphorylated protein versus total protein (phosphorylated and non-phosphorylated). There were some clear differences among the treatments. Phosphorylated ERK increased only in FZ treated cells, but not ABCD or ABLC, indicating activation of the ERK pathway. The traditional NF- $\kappa$ B pathway was not stimulated by any of the three treatments, suggesting a secondary NF- $\kappa$ B pathway is being activated. All three AmB formulations activated the p38 pathway. These results provide rationales for drug induced side effects observed in patients taking FZ and reduced side effects with ABCD and ABLC.

**Brett Deml, Kari Gullickson, Andy Lee, Shannon Pechauer, Lori Scardino, Lacy Loos, and Kimberly Walter (206)**Faculty Advisor/Collaborator: **Wilson Taylor***Ultrastructure of Middle Devonian Spores from New York State*

Fossil plant spores from the Middle Devonian of New York state were extracted using standard palynological techniques, including a final sieving through a 100 $\mu$ m nylon mesh. Individual images of approximately 200 spores were captured using the scanning electron microscope (SEM). The principal sculpture on these spores consists of spines. A scatter plot of spine density vs. spine length revealed a broad degree of variation. Subsequent measurements uncovered a size range of 141-206 $\mu$ m. A previously reported spore size range from nearby deposits of 86-166 $\mu$ m was of spores putatively produced by the enigmatic plant *Calamophyton*. The aim of this project is to use transmission electron microscopy (TEM) to: 1) examine selected specimens for variations in wall thickness, layering, staining, and overall substructure, 2) assess the breadth of variation and determine if there may be more than one spore type present, and 3) compare these spores with those previously reported in an effort to determine if they are the same, and may have also been produced by *Calamophyton*. Little is known of the fine structure of spores of this geologic age since none have been examined with TEM. Any information gathered will ultimately contribute to the understanding of plant diversity and evolution.

**Michael Fell (194)**Faculty Advisor/Collaborator: **Evan Weiher***The Effects of Suppressed Mycorrhizal Fungi and Increased Nitrogen on Above- and Below-Ground Competition Intensity in Two Native Plant Species During Grassland Restoration*

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 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 of added fungicide (18 mg chlorothalonil /m<sup>2</sup>/yr) and fertilizer (15 g N /m<sup>2</sup>/yr as NH<sub>4</sub>NO<sub>3</sub>). Within each of 15 plots, we had three competition treatments (no competition, below-ground competition, and full competition) in which two phytometers were grown (*Andropogon gerardii* and *Heliopsis helianthoides*). In both *A. gerardii* and *H. helianthoides* the below-ground relative interaction intensity (RII) was significantly increased with the addition of fungicide by about 4-fold and 2-fold respectively, while no change was seen in above-ground RII. Total RII also showed an increase in both species when fungicide was added, however the relationship was only marginally significant in *A. gerardii*. Both species had highly similar levels of mycorrhizal fungal colonization in both control (24.6%) and fungicided plots (16%). Added nitrogen did not significantly affect competition intensity.

### **Glen Fisher and Traci Griffith (213)**

Faculty Advisor/Collaborator: **Todd Wellnitz**

*Comparison of Benthic Community Structure in East- and West-Facing Mountain Streams of the Big Horn Mountains*

Two streams on the East- and West-facing slopes of the Bighorn Mountains in Wyoming were compared to assess benthic diversity across a gradient of elevation. Because of the rain shadow effect, East- and West-facing slopes differ markedly in vegetation, and we predicted this would result in different zonation patterns of the benthic community. Beginning at the headwaters, invertebrates and periphyton were sampled at five sites of different elevation for each stream. Shannon diversity, taxonomic richness, total abundance and biomass were used to compare streams and sites within streams. For each stream, certain taxa were found throughout the stream gradient (e.g., the mayfly, *Baetis spp.*), whereas others were restricted to certain elevations (e.g., the stonefly, *Claassenia sp.*). In the East-facing stream, Shannon diversity increased as elevation decreased, as did richness which went from 3 to 10 taxa. In the West-facing stream, by contrast, diversity and richness was greatest at the headwaters and low elevation sites, and least at the intermediate elevation sites. The data obtained suggests that the amount of rainfall due to the watershed orientation increases total biomass and supports higher species diversity at higher elevations.

### **Kristin Haider, Michael Fell, Christine Dahlheimer, and Tyler Bunton (193)**

Faculty Advisor/Collaborator: **Evan Weiher**

*The Effects of Planting Mixture, Mycorrhizal Fungi, and Nitrogen on Grassland Restoration: Native vs. Non-Native Richness, Functional Composition, and Floristic Quality*

We have been investigating the multiple controls on community assembly and restoration in 4.5 ha grassland restoration. The planting mixtures included three C3 graminoids and three C4 grasses randomly chosen from a pool of 10 species. We factorially added zero, eight, or 16 forbs (from a pool of 20) and zero, four, or eight legumes (from a pool of 10) to yield nine functional mixtures planted into 45 0.1 ha plots. We nested a factorial combination of chlorothalonil fungicide (which reduced mycorrhizal fungi [MF] colonization by 40%) and nitrogen (as ammonium nitrate). After three growing seasons, native and non-native species richness was positively correlated at both 1 m<sup>2</sup> and 246 m<sup>2</sup> grain size. MF suppression and nitrogen decreased the richness of both native and non-native species at both grain sizes. They also decreased the cover by both native species and target (planted) species. Target legumes rarely established. Even though target forbs had strong establishment, there was no major difference between planting 8 or 16 species. This led to an overall reduced floristic quality in the MF suppressed and added nitrogen communities. In these communities, functional composition was strongly dominated by non-native C3 grasses.

### **Ryan Hietpas (230)**

Faculty Advisor/Collaborator: **Daniel Herman**

*Phenotypic Analysis of MBP1 Null Mutant Strains of Candida albicans*

We have recently cloned the MBP1 gene of *Candida albicans*. A BLAST analysis revealed that the Mbp1 protein of *C. albicans* is 28% identical and 45% similar to the Mbp1 protein of the yeast *Saccharomyces cerevisiae*. The Mbp1 protein of *S. cerevisiae* is a known transcription factor, suggesting the homologous protein in *C. albicans* may also function in the same capacity. To begin elucidating the function of the Mbp1 protein in *C. albicans*, we have constructed MBP1 null mutant strains using the "URA-blaster" technique. The role of the Mbp1 protein in morphogenesis was determined by inoculating null mutant strains onto SLAD, 10% FBS, and M199 (pH 7.5) agars and comparing filamentation to MBP1 heterozygous and wild-type strains.

While no difference in filamentation between the strains was observed when grown on 10% FBS or M199 agars, a significant difference was observed between the strains when grown on SLAD. The MBP1 heterozygous strains showed reduced levels of filamentation on SLAD compared to the wild-type strain, while the MBP1 null mutant strains exhibited little to no filamentation. These results suggest that the Mbp1 protein of *C. albicans* may function in regulating gene expression necessary for morphogenesis in response to nitrogen limiting growth conditions.

**Katelin Holm and Jessica Kinnally (228)**

Faculty Advisor/Collaborator: **Todd Wellnitz & Evan Weiher**

*The Relative Importance of Plant-Plant Competition, Plant-Insect Herbivory, and Plant-Fungal Mutualism in Two Forbs with Alternative Defenses*

We sought to investigate the relative importance of three major types of interactions: competition, herbivory, and mutualism in a field experiment using bergamot (*Monarda fistulosa*) and ox-eye (*Heliopsis helianthoides*). These plants were chosen because *Monarda* produces qualitative secondary compounds for defense, whereas *Heliopsis* relies on quantitative secondary compounds. The experiment employed a 3x2 factorial design examining above-ground competition (with/without competitors), herbivory (with/without pesticide) and mycorrhizal symbionts (with/without fungicide) within a larger grassland restoration experiment. Herbivore damage was assessed bimonthly as percent of leaves damaged. After 90 days, above-ground plant biomass was harvested and weighed, and leaf chlorophyll was measured. Herbivore damage did not differ between species and was reduced 3X and 1.5X in pesticide and fungicide treatments, respectively. The sole factor affecting above-ground plant biomass was competition, with competitor-free plants having 90% more biomass. By contrast, herbivores caused a 2-fold reduction in leaf chlorophyll whereas competition had no significant effect. The next step will be to assess how plant functional traits and herbivore assemblage structure respond to the factors of competition, herbivory, and mutualism. To date our results suggest that competition and herbivory may each be important for determining plant fitness, but their effects may manifest themselves in different ways.

**Sarah Ivory (188)**

Faculty Advisor/Collaborator: **Kristina Beuning**

*Ecological Consequences of Early Pleistocene Megadrought in Equatorial Africa*

Extremely arid conditions in equatorial Africa occurred in two discrete episodes between 135-90ka, resulting in extraordinarily low lake levels, even in Africa's deepest lakes. Based on well-dated paleoecological records from Lake Malawi, we show here that this aridity had severe consequences for both aquatic and terrestrial ecosystems during this time period. Charred particle and pollen analyses show that during the most arid phase of this drought interval (115-95ka) the Lake Malawi watershed experienced desert conditions comparable to those of northern Kenya today (~200-300mm/yr precipitation). Fossil and sedimentological data show that Lake Malawi itself, currently 706m deep, was reduced to a ~125m deep, highly saline and alkaline lake. This episode of aridity was far more extreme than any experienced in the Afrotropics during the Last Glacial Maximum (~35-15ka), a period commonly viewed as archetypal for prolonged tropical aridity. Aridity in the Lake Malawi region terminated, lake levels rose rapidly after 95ka, reaching near-modern conditions after 60ka. Our findings provide a completely new time frame for the interpretation of intralacustrine evolution of the Lake Malawi fish and invertebrate species flock evolution, and place new constraints on models of Afrotropical biogeographic refugia and early modern human population expansion in and out of tropical Africa.

**Fong Lee, Anthonia Arikawe, and Jenni Mincoff (215)**

Faculty Advisor/Collaborator: **Winnifred Bryant**

*Environmental Estrogens Stimulate Transcriptional Activation Of Estrogen Responsive Genes In Model Systems and Upregulates Estrogen Receptor Alpha*

The steroid hormone estrogen (17  $\beta$  estradiol, E2) is produced by the ovaries and targets a number of tissues in the body. E2 maintains the structure of the breast and uterus and governs the process of growth in the breast and uterus. E2 also regulates pituitary cells over the course of the reproductive cycle. The actions of E2 in these 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). These studies measured the expression of E2 sensitive cell lines using Western blotting techniques.

In addition, cells were transiently transfected and reporter assays used to measure transcriptional activity stimulated by 17  $\beta$  estradiol and a panel of estrogenic compounds. The stimulatory effects of bisphenol A (a xenoestrogen) on E2 sensitive genes was shown to be dose related and antagonist studies demonstrate that these effects are indeed mediated through ER $\alpha$ . Future studies will determine if E2 mimics employ a mechanism of action on target genes that is distinct from natural ligand.

**Andy King Wai Leung and Andrew Kwilas (211)**

Faculty Advisor/Collaborator: **Daniel Janik**

*Methamphetamine Induces Nonphotic-Like Dose Dependent Resetting of the Circadian Clock in the Syrian Hamster*

Photic and nonphotic stimulation can reset circadian clocks. Nonphotic stimuli, such as exercise and gentle handling, are thought to induce arousal in animals and are most effective during an animal's normal sleep phase. Such stimulation usually causes resetting in the range of 2-4 hours. Earlier work has shown that the beta-adrenergic antagonist propranolol blocks nonphotic-like clock resetting. To further test the idea that adrenergic receptors are involved in nonphotically induced clock resetting, we have sought adrenergic agonists that induce resetting in the absence of behavioral stimulation. We found that the catecholaminergic agonist methamphetamine caused dose-specific clock resetting in male hamsters with maximal resetting of about 3 hr at a dose of 40 mg/kg. Methamphetamine is a powerful releaser of both dopamine and noradrenaline, so to examine whether its clock-resetting action is exerted via adrenergic or dopaminergic receptors, we administered it in combination with either the beta adrenergic antagonist propranolol or the nonspecific dopaminergic antagonist clozapine. We found that both these antagonists reduced the clock resetting induced by methamphetamine. These data are consistent with the idea that stimulation of adrenergic receptors is necessary for nonphotic resetting of the circadian clock to occur, but also suggest a role for dopaminergic transmission.

**Lacy Loos (191)**

Faculty Advisor/Collaborator: **Julie Anderson**

*Using Molecular Tools to Assess Microbial Diversity*

Although the chemical balance of the biosphere depends on microbes, little is known about the makeup of the microbial ecosystems responsible for maintaining this balance. This project aims to assess the effects of different plant communities and nutrient availability on the microbial diversity in soil samples from a local prairie restoration project. This will be accomplished using the molecular technique, automated ribosomal intergenic spacer analysis (ARISA). It is a PCR-based method involving the amplification and analysis of an intergenic region of bacterial genomes. This genomic region displays significant heterogeneity in length among bacterial species and can be used to distinguish bacterial strains. DNA has been isolated from over 360 soil samples from various test plots. Optimal PCR conditions were determined and the intergenic region of each sample was amplified. The specificity of the annealing temperature, the number of PCR cycles and the use of a hot start with the Taq polymerase enzyme were optimized to obtain specific PCR products. Successful DNA isolation and PCR were verified using agarose gel electrophoresis. Each PCR product will be subjected to ARISA and the data used to estimate the microbial diversity in the soil from each test plot.

**Ka Lor (187)**

Faculty Advisor/Collaborator: **Kristina Beuning**

*Late-Glacial and Holocene Climate Effects on Grass Community Composition at the Prairie Forest Ecotone in South-Central Minnesota*

Carbon isotopic analyses of charred grass cuticle from two lakes on the prairie forest ecotone in south-central Minnesota show a mixed C3/C4 grass community throughout the Holocene and late-glacial period (12,000 yr BP to present). The  $\delta^{13}\text{C}$  isotopic values of the grass remains fluctuate between -16 per mil (more C4) and -22 to -23 per mil (more C3) with a regular 600-year periodicity, particularly since the beginning of the mid-Holocene climate optimum (~8,000 yr BP). This periodicity continues throughout the last 8,000 years, despite a shift in dominant vegetation type near the lakes from deciduous forest and prairie to oak woodland/savanna around 4,000 yr BP. These results indicate that while the arboreal components of the vegetation may be responding to broad climate trends, the grass species constitute a more sensitive indicator of seasonal moisture variability. We interpret the periods of increased C3 to have wetter, and perhaps cooler, spring months whereas the periods of increased C4 would have prolonged summers with rapid transitions from winter to hot, summer conditions. The factors driving the 600-yr periodicity of these changes are yet to be identified.

**Jessica Lueck and Ruth Weiland (210)**Faculty Advisor/Collaborator: **David Lonzarich***Monitoring Plant Communities in a Relatively Undisturbed Lake in Northern Wisconsin*

Many Wisconsin lake ecosystems are negatively impacted by anthropogenic inputs. Macrophytes are the base of aquatic ecosystems and are affected by disturbances first. Pine Lake, located in northwestern Wisconsin, is deep, meso-oligotrophic, clear, and relatively undisturbed. These unusual limnological qualities allow plants to grow from the shoreline to depths of at least 13 meters (> 40 feet), creating an interest for macrophyte research. Finding the most effective method for surveying these plants is needed because of the range in depth. At sampling locations, GPS, substrate, and depth data were collected. Plants were collected, identified, pressed, and mounted for a University of Wisconsin-Eau Claire collection. Using the collection and data, different methods of surveying aquatic macrophytes were assessed on the lake, including rake toss, snorkeling, transects, and point-intercept. After evaluating the different methods for surveying aquatic macrophytes at Pine Lake the use of a third lung would be the most effective. The data collected during this survey will allow for comparisons to be made from year to year to monitor the quality of the lake. Through intensive and long-term studies, knowledge about Wisconsin aquatic ecosystems will be gained, which will assist in preserving lakes in their relatively undisturbed state.

**Steve Nikolai, James Rauschnot, and William Hintz (231)**Faculty Advisor/Collaborator: **David Lonzarich***Quantifying the Behavior of Juvenile Creek Chub (*Semotilus atromaculatus*) in the Presence of Varying Concentrations of Conspecific Alarm Substance*

This experiment was undertaken to determine the response of juvenile creek chub (*Semotilus atromaculatus*) given varying concentrations of conspecific alarm substance (AS). We conducted lab experiments injecting stock and diluted concentrations of AS into tanks, each containing four individuals (~ 50 mm in length). We hypothesized that diluted concentrations of AS would cause a less magnified response in chub defensive behavior, which we quantified by measuring shoaling, movement, and tank area use. Results from 45 videotaped experimental trials and 180 fish revealed a strong and consistent antipredator response in juvenile chub at high AS concentrations but a more varied response at concentrations ~100 times more dilute. Our findings suggest that creek chub can detect AS concentrations in the parts-per-billion range, but more importantly that chub may have the capacity to use olfactory cues in the assessment of predation risk within their immediate environments

**Alison Obr (189)**Faculty Advisor/Collaborator: **Lloyd Turtinen***Verification of Microarray Gene Expression Levels using Real-Time Polymerase Chain Reaction (PCR)*

Amphotericin B (AmB) is an important drug used in the treatment of invasive fungal infections. THP-1 monocytes were incubated with either deoxycholate AmB (DamB), lipid formulations ABLC and ABCD or medium alone. Of the 219 genes analyzed by microarrays, 61 were up-regulated by one or more of the AmB formulations. Fifty-two genes were up-regulated by DamB while 25 and 18 genes were up-regulated by ABCD and ABLC, respectively. Quantitative real time PCR was used on a subset of proinflammatory genes to verify the results of the microarray gene expression levels (mRNA). The genes chosen include: IL-8, CCL20, CXCL2 and CXCL9. Messenger RNA levels ranged from 3 to 12-fold higher in treated cells compared to untreated cells depending on the AmB formulation. Preliminary results show that the quantitative real-time PCR data for the representative genes for the most part corresponds with the microarray gene expression levels.

**Ann Rentschler (229)**Faculty Advisor/Collaborator: **Daniel Herman***Partial Characterization of YPD1 Null Mutant Strains of *Candida albicans**

*Candida albicans* is the most frequently isolated opportunistic fungal pathogen in humans. In immunocompromised patients, *C. albicans* may switch from a yeast to a filamentous form causing systemic disease, which could lead to death. Morphogenesis, the switching from yeast to filamentous morphology, has been demonstrated to be an important factor in the ability of *C. albicans* to cause systemic infections. The YPD1 gene of *C. albicans* encodes a protein that functions in the transfer of phosphates in a signal transduction pathway that regulates morphogenesis. We have obtained three strains of YPD1 null mutants from Aaron Mitchell at Columbia University. We have confirmed that the YPD1 gene in these strains has been

disrupted using both polymerase chain reaction (PCR) and Southern blot analysis. To characterize the ability of the null mutant strains to undergo morphogenesis, we inoculated the null mutant strains along with a wild type strain of *C. albicans* (BWP17) onto Spider media and M199 (pH 7.5) media. The null mutant strains showed reduced levels of morphogenesis compared to the wild type strain when grown on M199 (pH 7.5) media. These results suggest that the Ypd1 protein may function in regulating morphogenesis in response to pH.

**Dylan Thomas, Christine Dahlheimer, Michael Fell, and Kristin Haider (208)**

Faculty Advisor/Collaborator: **Evan Weiher**

*Linkages between Patterns of Community Assembly and Interactions in an Experimental Grassland*

Assembly rules are limits on which subsets of a species pool can coexist as communities. Evidence for assembly rules can be found by comparing observed patterns of community composition to simulations of randomly assembled communities. Such tests have been performed in natural communities, but there is debate over how assembly rules may vary in nature. We used data from a three year old experimental grassland in order to test how the degree of species checkerboarding and trait dispersion were affected by added nitrogen and fungicide (which reduced mycorrhizal fungi [MF] by about 40%). The control communities did not have significant checkerboard scores ( $p = 0.252$ ), while communities with added nitrogen had marginally significant checkerboard scores ( $p = 0.030$ ) and communities with MF suppression had highly significant checkerboard scores ( $p < 0.001$ ). We also found that MF suppression increased competition intensity by two- to four-fold. These results establish a linkage between increased competition and the expression of community assembly rules. We also found significant alterations in trait-based assembly patterns. MF-suppressed communities had two times the nearest-neighbor distance in leaf dry matter content. This may be the first experimental test showing that increased competition leads to decreased similarity of coexisting species.

**Matthew Troia (227)**

Faculty Advisor/Collaborator: **Todd Wellnitz**

*Functional Diversity and Environmental Context Shape Community Processes in an Experimental Aquatic Ecosystem*

The relationship between biodiversity and ecosystem function has emerged as a vital concept in conservation biology. Elevated biodiversity has been shown to influence critical ecosystem processes; however, the identity of species composing a community may be more important than the absolute number of species. We assessed the effects of consumer species richness on aquatic ecosystem processes under different habitat contexts in a mesocosm experiment. Species richness and habitat substrate were manipulated using a 3x2 factorial design. Substrate was either sand or gravel, and 3 species (amphipods, water boatmen, and snails) were maintained at 0, 1 and 3 species across 54 plastic tubs. After 21 days, increasing richness from one to three species significantly decreased periphytic biomass by 22%, periphytic chlorophyll by 25%, and suspended chlorophyll by 19%. Enhancing richness also resulted in increased leaf breakdown. No single species effect equaled or exceeded the 3-species treatment, suggesting facilitation and complementarity between species. Substrate type caused differences in fine particulate organic matter (FPOM) and turbidity; however, no significant interactions between substrate and species richness were detected. This experiment suggests that increasing species, and more importantly, functional diversity may be important for understanding algal dynamics, primary production, and decomposition rates in aquatic ecosystems.

**Claire Waldvogel (232)**

Faculty Advisor/Collaborator: **Chris Floyd**

*Survey of Breeding Bird and Small Rodent Populations in Boyd Park Nature Preserve, Chippewa Co, WI*

In 2004, the Chippewa County Land Conservancy (CCLC) began stewardship of a 24.45-acre (9.89 ha) parcel, the Boyd Park Nature Preserve near Lake Wissota in Chippewa County. In June-August, 2005, we conducted surveys of terrestrial bird and small rodent populations in Boyd Park; results from these surveys will be used by the CCLC for guiding future management of the preserve. Bird populations were surveyed using 10-min point counts at ten sites within the preserve. Small rodent populations were sampled at the same sites via live-trapping on 60 x 60 m grids (49 traps). We estimated species diversity and population density of birds and small rodents and studied how the variables were influenced by distance to the road surrounding Boyd Park.

**Alison Welin (207)**Faculty Advisor/Collaborator: **Evan Weiher***Plant Traits During Prairie Seedling Establishment*

Knowing about the establishment of certain prairie species could assist in successfully restoring certain ecosystems. By examining the traits of certain non-native species, we hope to be able to utilize this knowledge to successfully introduce them as effectively as possible. Our study seeks to determine whether the establishment rate of seedlings provides them advantages regarding fecundity, competitiveness and health. Seedlings include nine plant species (*Ambrosia artemis*, *Chenopodium album*, *Capsella bursa*, *Acalypha rhomboidea*, *Plantago major*, *Solidago Canadensis*, *Sateria glauca*, *Polygonum scandens*, *Polygonum persicarium*) in disturbed quadrants in an experimental field. The quadrant of 64 m<sup>2</sup> was divided into four smaller sections of 4 m<sup>2</sup> in which there were four replications of randomly placed seedling locations. The quadrant was treated with Roundup and raked to eliminate biomass. Seeds were planted and throughout the summer traits were measured. These included: stem diameter, height, leaf breadth and biomass.

**Carly Wickhem (212)**Faculty Advisor/Collaborator: **Daniel Janik***The Effect of Photoc and Nonphotoc Stimuli on the Circadian Rhythms and Estrous Cycles of Female Syrian Hamsters (Mesocricetus auratus)*

Female hamsters normally have a precise 4-day estrous cycle. We have found, however, that changing the cage of a female hamster in the middle of the day before it ovulates not only resets its circadian clock by about 3 hr, but also delays its estrous cycle by one day. Cage changing in this way arouses the hamster and causes it to engage in locomotor activity. Two experiments were conducted to examine the interaction between clock resetting, locomotor activity and the estrous cycle. In the first experiment, currently underway, we blocked the activity of females after a cage change either by locking their exercise wheels or by restricting them to a nest box. In the second experiment, we asked whether Phenobarbital, an agent known to delay estrous also causes clock resetting. Animals treated with Phenobarbital (100 mg/kg) showed significantly greater resetting than controls. Additionally, as predicted, all Phenobarbital-treated animals showed estrous delay and none of the control animals did. Furthermore, we found that the beta-adrenergic antagonist propranolol (20 mg/kg) blocked circadian resetting induced by Phenobarbital, but did not block the estrous delay. These results support the idea that clock resetting associated with nonphotoc stimulation is not required to induce estrous delay.

## Chemistry

**Danielle Becker (138)**Faculty Advisor/Collaborator: **Scott Hartsel***The Delta Thigh Project*

In today's world, being skinny is in. Numerous non-FDA approved products have been put on the market, claiming instant weight-loss or fat reduction. Among these products are "fat-reducing" thigh creams that claim to get rid of cellulite or adipose tissue buildup. The product's active ingredient, aminophylline, a derivative of theophylline, supposedly leads to this fat reduction. On a molecular level, theophylline potentiates a cellular metabolic signaling pathway which could lead to the release of fats from the adipose tissue. However, there is no published evidence that theophylline can get through the thick dermal of the skin by topical application. The Chemistry 454 class decided to contact a company that sells this product and they agreed to send us enough samples to do some trials of the product for class research. We are doing a non-blinded placebo controlled test on this cream by following the vendor's protocol. The lotion is applied twice daily to the test thigh and a placebo cream to the other. The purpose of our experiment is to test this claim by quantitatively measuring the change in placebo vs. test thigh circumference of 5 volunteers over a period of six weeks.

**Benjamin Carolan (136)**Faculty Advisor/Collaborator: **James Boulter***Measurement of Trace Ammonia Concentrations in Chippewa Valley Precipitation*

Ammonia is an important trace component in precipitation, especially in agricultural areas where it is the principal basic component. Local sources include crop fertilization, dairy and poultry operations. It has become a concern for rural

air quality, because it reacts with common acidic species to form the products ammonium nitrate and ammonium sulfate. These products can form ultrafine haze particles, which can affect the health of susceptible populations. As the first step in comprehensively characterizing the acid/base composition of regional precipitation, ammonia was quantified in rain- and snow-water using the “phenate method,” commonly applied to an extensive range of aqueous matrixes. In this technique, ammonia is reacted with hypochlorite and phenol to form an intensely blue product, indophenol, which is detected by its visible absorbance. Routine calibrations from 50 ppb to 10 ppm have been performed, resulting in sample measurements on the order of 3 ppm. Results of multiple calibrations, and the concentration and variability of several precipitation samples will be presented in the context of other published measurements.

**Ashley Dreis and Andrew Wagner (145)**

Faculty Advisor/Collaborator: **David Lewis**

*Synthesis of Carbohydrates Carrying Fluorescent Naphthalimide Groups*

4-Alkylamino-N-alkyl-1,8-naphthalimides are compounds that couple high fluorescence quantum yields and large Stokes shifts with low toxicity to living cells, resistance to bleaching, and resistance to quenching by paramagnetic transition metal ions or other paramagnetic species. This makes them attractive compounds for use in fluorescence microscopy. With a view to preparing more water-soluble fluorescent dyes that do not rely necessarily on charged groups for water solubility, we have begun the synthesis of dyes containing mono- and disaccharide units covalently bound to the naphthalimide group. The results of efforts to prepare the target aminonaphthalimide dyes by Williamson and Gabriel-type alkylations of halo derivatives of monosaccharides, by the Amadori rearrangement of saccharide iminium ions, and by olefin metathesis of saccharide allyl ethers will be presented.

**Frank Emmert, Brian Hon, and James Thomas (156)**

Faculty Advisor/Collaborator: **Alan Gengenbach**

*Metalloporphyrin Catalyzed Oxidation of Amine-Containing Azo Dyes*

Azo dyes are aromatic compounds that contain one or more azo (-N=N-) linkages and are widely used in the textile industry. Oxidative degradation presents a potential route for remediation that avoids the production of hazardous aromatic amines. Only a few studies of metalloporphyrin catalyzed oxidation of azo dyes exist and they have primarily focused on dyes containing alcohol substituents. We studied the catalytic oxidations of amine containing azo dyes. Our results show that dyes containing primary, secondary and tertiary amines are degraded in multi-step processes and that dyes containing primary amines are degraded faster than the analogous hydroxy substituted dyes. For certain dyes, the catalyzed and uncatalyzed reactions between dye and oxidant produce different products. We will present kinetic data along with UV-visible and GC-MS data for the intermediates and final products observed in these reactions.

**Ben Gelhaus, Daniel Rose, Heather Dekan, and Yaron Fireizen (123)**

Faculty Advisor/Collaborator: **Thao Yang**

*Solid Phase Peptide Synthesis of Mucin Peptides*

In this project we employed the Solid Phase Peptide Synthesis Method to synthesize mucin peptides. The methodology for the synthesis of linear and cyclic mucin peptides is presented here. Mucin peptides are peptide fragments derived from a large mucin protein. The amino acid sequence of these mucin peptides are derived from the central domain of a human mammary or pancreatic tumor mucin called MUC-1 mucin, expressed by cancer cells. The structures of these peptides will be studied by 2D NMR. Subsequent studies will focus on the binding properties of mucin peptides to monoclonal antibody expressed against whole tumor MUC-1 mucin.

**Leah Gross (146)**

Faculty Advisor/Collaborator: **David Lewis**

*Reactions of Amine Nucleophiles with Naphthalimides and Naphthalic Anhydrides*

The synthesis of highly fluorescent 4-amino-1,8-naphthalimides can be effected by sequential imide formation and displacement of the activated halogen from 4-halo-1,8-naphthalic anhydride by suitable primary amine nucleophiles. In an effort to prepare a 4-alkylamino-1,8-naphthalimide carrying an N-(4-aminosulfonylphenyl) substituent, we heated 4-chloro-

1,8-naphthalic anhydride with sulfanilamide. When the resultant 4-chloro-N-(4-aminosulfonylphenyl)-1,8-naphthalimide was treated with hexylamine, the product was not the expected 4-hexylamino compound, but the product in which the aminosulfonylphenyl and chloro substituents had both been replaced by the hexylamine. At lower temperatures, the product was 4-chloro-N-hexyl-1,8-naphthalimide. We have since prepared a series of N-(4-substituted)phenyl-4-chloro-1,8-naphthalimides, and we have studied their reactions with primary amine nucleophiles. The results of these studies will be presented.

#### **Amber Hertz (164)**

Faculty Advisor/Collaborator: **Warren Gallagher**

*Biophysical Studies of the Structure and Dynamics of  $\beta$ -Amyloid Fibril Formation by  $\beta$ -Amyloid Peptides Using Fourier Transform Infrared (FTIR) Spectroscopy and Electron Microscopy*

A potential cause of Alzheimer's disease is associated with the aggregation of  $\beta$ -amyloid peptides to form fibrils. Fibrils, which exhibit a  $\beta$ -sheet secondary structure, form the plaques found in the brains of Alzheimer's patients. Using Fourier-transform-infrared-spectroscopy (FTIR) we have worked to develop a technique for studying the formation of these structures in real-time. We have looked at four peptides that we have synthesized from the longer peptide associated with Alzheimer's disease. The rate of  $\beta$ -sheet formation varies appreciably among the four peptides, from developing instantaneously, to requiring several hours to form. In an attempt to confirm that fibrils are forming, we are using electron microscopy to look at formation in solution. We have looked at two of the four peptides, the A $\beta$ (25-35)WT, which has the same amino acid sequence as residues 25-35 of the full-length peptide, and the A $\beta$ (25-35)I31K, which has one of the amino acids, isoleucine, replaced by a lysine. Our goal is to continue to study the structures formed by these four peptides using solid-state and magic-angle Nuclear-Magnetic-Resonance-Spectroscopy (NMR) and to develop a time-course study of fibril formation using electron microscopy. We will be using these studies to help us interpret the results we have obtained using our FTIR method.

#### **Laura Hoffelt and Mitchell Springer (155)**

Faculty Advisor/Collaborator: **Stephen Drucker**

*Triplet States of Cyclic Enones Characterized by Vibronically Resolved Spectroscopy*

The cavity ringdown absorption spectrum of 2-cyclohexen-1-one vapor was recorded at room temperature. Approximately 25 very weak ( $\epsilon=0.01 \text{ M}^{-1} \text{ cm}^{-1}$ ) vibronically resolved bands were detected in the 403-410 nm region. The vibronic bands are assigned to the T2(n,p\*)  $\leftarrow$  S0 transition. The origin band is tentatively assigned at  $24,620(1) \text{ cm}^{-1}$ . The ring-inversion (n39) fundamental in the T2(n,p\*) state is  $135 \text{ cm}^{-1}$ . This compares to values of  $99 \text{ cm}^{-1}$  and  $122 \text{ cm}^{-1}$  determined previously for the ground and S1(n,p\*) excited states, respectively. The T1(n,p\*)  $\leftarrow$  S0 phosphorescence excitation spectrum of 4H-pyran-4-one vapor was recorded at  $50 \text{ }^\circ\text{C}$ . The origin band is located at  $27,291(1) \text{ cm}^{-1}$ . Attached to it are  $D_v=0$  sequences involving the lowest-frequency (out-of-plane) modes, n18 and n13. The n18 fundamental frequency is  $122 \text{ cm}^{-1}$  in the T1(n,p\*) state. This compares to values of  $149 \text{ cm}^{-1}$  and  $145 \text{ cm}^{-1}$  determined previously for the ground and S1(n,p\*) excited states, respectively.

#### **Matthew Hooper and Kirsten Strobush (135)**

Faculty Advisor/Collaborator: **James Boulter**

*Ethylene Absorption on Crystalline and Amorphous Water Ice*

We present the results of laboratory investigations of ethylene absorption on amorphous and crystalline water ice films. Water films are grown on a cryostat-cooled, gold-plated copper mirror under high-vacuum at 60 K. They are subsequently annealed at temperatures ranging from 60 to 150 K and then an ethylene layer is deposited at 30 K. The interactions between ethylene and the water ice film change depending upon the thermal history of the water ice film and are characterized using TPD (thermal programmed desorption) analysis. Adsorbed films are further characterized by their infrared spectra, which are collected using polarized FT-IRRAS (Fourier transform-infrared reflection absorption spectroscopy) in the spectral range 800-4800  $\text{cm}^{-1}$ . Absolute film thicknesses are also measured using a laser interferometric technique.

**Kaitlin Kronenberg (126)**Faculty Advisor/Collaborator: **James Phillips***Gas Phase Structural and Energetic Properties of Acetonitrile Complexes of Halogens and Interhalogens*

We have examined the effect of condensed phase environments on the structural properties of acetonitrile-halogen and/or acetonitrile-interhalogen complexes. The first step in this process is to characterize the structural and energetic properties of the gas phase systems using density functional theory (DFT) and MP2 calculations. We will present equilibrium structures for six complexes involving acetonitrile and halogen acceptors. The results are consistent across DFT methods and in general intermolecular halogen-nitrogen distances are long. For acetonitrile-ClF, the calculated N-Cl distance is slightly shorter than experiment. Binding energies indicate that the complexes are quite weak; 1-4 kcal/mol for halogen complexes and 6-9 kcal/mol for interhalogen complexes. MP2 results provide additional validation for structural results and more reliable binding energies. Theoretical results for the free halogen and interhalogen species compared favorably with experimental results, indicating that DFT performs well for these species. Frequencies calculated using B3PW91/aug-cc-pVTZ reveal shifts of the C-N and X-Y or X-X vibrational modes, and these will be discussed in light of the strength of the intermolecular bonds. We are also mapping the donor-acceptor bond potentials for these systems and this recent work will be discussed in the context of condensed-phase effects on the structural properties of these systems.

**Vinay Rao, Lori Scardino, and Lee Behling (143)**Faculty Advisor/Collaborator: **Scott Hartsel***Catching the Shape-Shift of a Metal-Scavenger: Methanobactin CD Spectroscopy*

Methanobactin (mb) is a chalkophore produced by *Methylosinus trichosporium* OB3b. Mb has been shown to bind to many metals in addition to Cu(II) and Cu(I). There seem to be two general families of CD spectra associated with different types of metals. The first is common to soft metal ions and includes Au(III), Cu(II), Pb(II), Ag(I), and Hg(II). The second is common to hard metal ions and includes Zn(II), Mn(II), Co(II), and Ni(II). All metals can be displaced by Cu(II) except for Au(III), Cu(I), and Ag(I) which seem to inactivate mb, possibly irreversibly. This may be because mb is known to reduce Cu(II), Au(III), and Ag(I) and the oxidation of mb may impair subsequent metal binding. Pb(II) and all other metals on this list, on the other hand, can be displaced by Cu(II) suggesting that they cannot be reduced. Kinetic CD spectra of immediate and long-term changes in mb may be indicative of metal-reduction processes or changes in ligand binding and aggregation state. We find that most metals bind more rapidly than the dead time of the instrument and lead to stable conformations, but Au(III) and Cu(II) show longer-term changes that may be associated with oxidation and/or alteration of mb ligands.

**Lori Scardino, Vinay Rao, and Lee Behling (137)**Faculty Advisor/Collaborator: **Scott Hartsel***Getting COSY with Methanobactin: NMR Chromopeptide Characterization*

Methanobactin (mb) is a chalkophore produced by *Methylosinus trichosporium* OB3b. This non-ribosomal chromopeptide is a part of the copper acquisition system of these methane-oxidizing bacteria. We have obtained detailed NMR spectra of mb after titration with Cu(II). This is only possible because mb reduces Cu(II) to Cu(I) upon binding and thus becomes diamagnetic and slightly less soluble. We have not yet identified the specific reductant which is also capable of reducing Hg(II), Ag(I) and Au(III). Cu(I) in solution is typically unstable; however, it remains stably in solution when bound to mb. Mb is thought to bind to metal ions using nitrogen and sulfur ligands from its 4-thiocarbonyl-5-hydroxy imidazole (THI), 4-hydroxy-5-thiocarbonyl imidazole (HTI) and possibly tyrosine, methionine and other residues. Our experiments show that there are considerable changes in their environments denoted by significant changes in the proton NMR spectra of mb when it is bound to copper versus copper-free mb. Residue assignments have been made using COSY and TOCSY measurements. Protons on the nitrogens of HTI and THI have been identified using <sup>15</sup>N NMR.

**Elizabeth Smith (125)**Faculty Advisor/Collaborator: **James Phillips***Gas Phase Structural Properties of Nitrile Donor-Borane Complexes*

Previous work has shown that the structural properties of nitrile donor – BF<sub>3</sub> complexes are quite sensitive to chemical environment, and that even inert gas matrices cause a substantial compression of the B-N dative bonds in these systems. Now,

we extend this work to BH<sub>3</sub> complexes, and report computed, gas-phase structural properties of CH<sub>3</sub>CN–BH<sub>3</sub>, FCH<sub>2</sub>CN–BH<sub>3</sub>, F<sub>3</sub>CCN–BH<sub>3</sub>, HCN–BH<sub>3</sub>, and N<sub>2</sub>–BH<sub>3</sub>. These results were obtained using MP2 and several density functional (DFT) methods, including B3LYP, B3PW91, B98, B97-2, and mPWPW91, with the aug-cc-pVTZ basis set. For the nitrile complexes, we find structures with B–N distances that are consistently quite short, about 1.55 Å with DFT, and are a bit longer (1.58 Å) using MP2. This is in great contrast to the BF<sub>3</sub> systems, in which the gas phase structures are quite sensitive to the nitrile substituent, and the results vary greatly between various DFT methods and MP2. In addition, we will present very recent results on the gas-phase structural properties of N<sub>2</sub>–BH<sub>3</sub>, as well as our investigation of the B–N distance potentials of these systems.

### **John Tritzsch (158)**

Faculty Advisor/Collaborator: **Marc McEllistrem**

*Extracellular Binding and Reduction of Au(III) by Methanobactin*

X-ray Photoelectron Spectroscopy data showing the reduction of Au(III) by methanobactin, a chalkophore produced by the methanotrophic bacterium *Methylosinus trichosporium* OB3b.

### **David Witte, Paul Yanzer, and Clinton Cook (157)**

Faculty Advisor/Collaborator: **Kurt Wiegel**

*Heteroatomic-core Supramolecular Liquid Crystalline Polymers*

A series of aromatic heterocycle-core pyridine-containing species have been synthesized. These heterocycles include but are not limited to oxadiazoles and pyrazoles. The pyridyl species will be used as hydrogen bond acceptors for the formation of supramolecular polymers. The rigid core of these species provides a defined shape that could induce liquid crystallinity in some of the polymeric samples. Complexes made using these systems and a series of bisacids have provided supramolecular polymer formation, but thus far have failed to produce liquid crystalline characteristics measurable through either differential scanning calorimetry or thermal optical microscopy. The formation of two of these heterocycles attached to flexible chains will also be synthesized and analyzed to determine if any mesogenic characteristics will be present.

### **Chee Yang and Daniel Rose (124)**

Faculty Advisor/Collaborator: **Thao Yang**

*The Synthesis of RGD Peptides via Solid Phase Peptide Synthesis*

The amino acid sequence Arg-Gly-Asp or RGD is present on several extracellular matrix proteins and known to be a requirement for their binding to integrins, which are a class of cell receptor proteins on cell surface. Some of the well-studied extracellular matrix proteins included fibrinogen, fibronectin, vitronectin, collagen, and laminin, which contain the RGD sequence. Subsequent studies in this project will focus on the conformational structures of the RGD-peptides and their binding properties to integrins. We present here the methodology for the synthesis of two linear RGD peptides using the Solid Phase Peptide Synthesis Method and some preliminary NMR data.

### **James Zook and Lee Behling (144)**

Faculty Advisor/Collaborator: **Scott Hartsel**

*Eating Rocks: Methanobactin's Effect on Minerals*

Methanobactin (mb) is a chalkophore produced by *Methylosinus trichosporium* OB3b. It binds Cu(II) ions at a 1:1 stoichiometry very strongly ( $K_d > 10^{-30}$  M) and many other ions with varying stoichiometries and affinities. It is produced in abundance under conditions of copper limitation and contributes to the activity of membrane-bound methane monooxygenase. Since *M. trichosporium* is widely distributed in the environment and is used in bioremediation of hydrocarbons, it was of interest to see if mb could contribute to mobilization of potentially toxic metals in the environment. In experiments using AA, UV-vis, and ICP-MS analysis, we find that mb can lead to a net extraction of Cu(II) from insoluble Cu(II)-containing substances including Cu(II)oxide and Cu(II)-containing minerals such as tetrahedrite and malachite.

# Computer Science

## **Joshua Burton and John Finnestad (122)**

Faculty Advisor/Collaborator: **Daniel Stevenson**

*Portable Interactive Display*

Technology has led to many recent innovations in on-screen interactions. Precision radio pointers and touch-sensitive screens have allowed for more user interaction than ever before. These technologies have many uses, such as in complex movement acquisition and tracking in games and movies. This project makes use of a simple web camera, a projector, and a computer to make an inexpensive and portable interactive system. Through use of a lit wand we have made an application that allows on-screen user interaction while still maintaining acceptable accuracy and the precision of more expensive implementations. We were able to achieve this by using the following steps: image acquisition, geometric calibration, locating of a light source, and interfacing with a controlling application. Through our research we have also created a flexible application framework that can be easily extended by new or existing programs.

## **Alexander Cobian (121)**

Faculty Advisor/Collaborator: **Daniel Stevenson**

*Creating a Dynamic Stereographical Programming Demonstration*

Visualization of data is becoming significantly more important as the amount of data collected increases. 3D viewing of data is the ideal viewing medium for certain types of data. We have created a hardware/software setup which will allow an inexperienced user to create a unique three-dimensional environment and project a stereographic image of it with a 3D viewer. This viewer consists of two portable DLP projects connected to a laptop, creating a relatively inexpensive and portable device. Matching polarized glasses are worn by the users of the system, allowing each eye to receive only one of the projected images. A special silver screen is used as the projection surface since this surface needs to be able to preserve the polarized light projected onto it. The software consists of the following phases: image calibration, dual virtual camera setup, 3D content creation, and 3D interactivity.

## **Matt Giuliani (140)**

Faculty Advisor/Collaborator: **Mike Morrison**

*Creating a Secure Architecture for a Peer Review System*

In an academic computer science setting, peer code reviews can sometimes help cultivate learning more than the standard submission whereby only a professor sees a student's code and makes suggestions. Since most computer science assignments are already submitted in an online fashion, it would be beneficial to have a network based peer review system available to professors, capable of allowing students to view and critique the work of their fellow classmates. This situation, however, opens a whole realm of possibilities for students interested in plagiarism of their classmate's code and other destructive behavior. To prevent such activities, a secure architecture must be developed on which to build the peer review system. Architectures considered must not only work within the confines of the University of Wisconsin—Eau Claire computing policies, but also be general enough to allow adaptation by other universities in the academic community. In this study, a number of existing architectures were explored to look for possibilities that may already be implemented. After finding no suitable possibilities, our focus shifted to unimplemented possibilities using a number of different technologies. This research results in a secure network architecture which will be used to implement an online peer review system.

## **Erin Johnson and John Koenig (139)**

Faculty Advisor/Collaborator: **Paul Wagner**

*Development and Implementation of a Honeynet on a University-Owned Subnet*

Computer security experts often focus on understanding and improving defensive practices, in an attempt stem the flow of attacks on computer systems. However, a purely defensive approach does not make use of additional information gained by studying attackers and their mindsets as well as the results of attacker methodologies. Honeypot technology utilizes computers whose sole purpose is to be attacked so the tools, techniques, and modus operandi of computer system attackers can be studied. A honeynet is a collection of honeypot systems set up in an isolated network domain to better ensure that all

network traffic is generated by attackers. Our project was to implement a honeynet with limited resources in such a way as to not endanger the University of Wisconsin—Eau Claire (UWEC) network. We have now successfully configured a honeynet in the UWEC network environment, and we are collecting data to help in a nationwide project to better understand and respond to computer system attacks.

**Kevin Spinar (142)**

Faculty Advisor/Collaborator: **Paul Wagner**

*Digitally Signed Transcripts*

Every year, millions of college transcripts are printed and sent through the postal system. These transcripts could be sent almost instantaneously by email with virtually no cost. However, e-mail is generally viewed as an insecure medium of exchange, allowing others to intercept messages and possibly modify their content. The purpose of this research is to develop a method to send transcripts securely over the internet using digital signatures. Digital signatures have successfully been used to validate the authenticity of electronic documents, software, and e-mails. A digital signature is created by applying a private key, known only to the document creator, to the document, generating a unique signature. As long as the private key remains private, only the holder of the key can modify the document, which ensures the integrity of the contents. As long as the transcript has been digitally-signed, even if it is sent over an insecure medium such as e-mail, the receiver can be confident that the transcript itself is secure. The focus of this project is to create a system that will read in student transcript information, generate a document, apply a signature, and transmit the secured document to the intended receiver.

**Aaron Styx and Bjorn Hanson (244)**

Faculty Advisor/Collaborator: **Dan Ernst**

*Using Graphical Toolsets for Enhanced Visual Learning in Computer Organization Courses*

Due to the high cost of computer processor fabrication, the use of detailed cycle-accurate simulation is widespread in both industry and within the learning environments of academia. It is therefore an important topic to expose students to in their undergraduate education. While many simulators exist, very few target undergraduate-level content, and those are either woefully outdated, have very few visual elements, or both. In this project we demonstrate the utility of a flexible logic construction and simulation tool in the classroom and lab environment. In addition, this tool is given an extremely user-friendly graphical interface that will bring a more visual and tactile element to this portion of the undergraduate coursework.

**Andrew Yost (141)**

Faculty Advisor/Collaborator: **Paul Wagner**

*Developing a Dynamic Visualization of the Oracle Query Execution Process*

The complexity of the Oracle database management system(DBMS) query execution process in addition to the lack of available resources detailing the process have historically made teaching this process quite difficult. In response to this difficulty members of our group had developed an application to visually simulate the execution process for certain SQL statements executed against an Oracle DBMS. As an extension to this project we have expanded the previous simulator to include functionality for dynamic SQL interaction with an instance of the Oracle DBMS. By extending previous design patterns as well as incorporating a facade design pattern for data access, the simulator was redesigned to retain the static execution functionality existing previously, but also to provide new dynamic query submission and visualization capabilities. By interacting with an Oracle DBMS instance through Java Database Connectivity, the simulator provides a visual representation of the execution process for user-generated queries within a specific oracle DBMS environment. We have also incorporated the ability for the simulator to extract and display the execution plan developed during the query execution process. These capabilities allow the simulator to visualize both the execution of a broad range of queries as well as changes in the DBMS environment.

# Geography and Anthropology

**Nathaniel Beaver, Ellen Chase, Jackie Ebert, Nicholas King, and Phillip Larson (181)**

Faculty Advisor/Collaborator: **Douglas Faulkner & Harry Jol**

*Geomorphic History of the Chippewa River Valley in the Vicinity of Half Moon Lake, Eau Claire, Wisconsin*

Half Moon Lake (HML), an oxbow lake surrounding Carson Park in Eau Claire, formed when the Chippewa River cut a channel across the narrow neck of a tight meander bend. No evidence presently exists to indicate when this cut-off occurred, although fluvial terraces in Carson Park and surrounding areas record the evolution of the Half Moon meander that preceded it. The highest terrace in the HML area, the Wissota terrace, marks the level of the river during the Late Wisconsin glaciation. Six post-glacial terraces lie below the Wissota, five of which are preserved in Carson Park and adjacent areas. The orientation of these terraces relative to HML suggests that the river experienced at least two episodes of downcutting and floodplain formation before it established the Half Moon meander. After the meander's establishment, four additional episodes occurred. During the second to last episode, the river downstream from the meander apex incised into bedrock. As a result, the downstream arm of the meander became locked in place while the upstream arm continued to migrate laterally, creating a meander that became tighter with time. Eventually, the river cut across the neck of the meander, and Half Moon Lake came to be.

**W. Patrick Dryer, Michael Krupich, Phillip Larson, Jennifer Mikolajczyk, and David Speer (199)**

Faculty Advisor/Collaborator: **Harry Jol**

*A GPR Survey of the Quaternary Beatty Junction Paleolake Shoreline Deposit, Death Valley National Park, California*

Pluvial Lake Manly, located within Death Valley, California, had a maximum extent of ~187 kilometers in length and ~183 meters in depth. Lake levels, however, fluctuated numerous times, usually corresponding with variations in glacial periods in the Sierra Nevada. Today, evidence of this former lake and its lake level fluctuations are observed in paleo-shoreline deposits and/or erosional scarps throughout Death Valley National Park. The purpose of our study was to conduct ground penetrating radar (GPR) surveys of a barrier bar deposit along the Beatty Junction road in Death Valley. This deposit is 50 meters asl and is ~500 meters long, ~100 meters wide, and ~5 meters high. Using a pulseEKKO 1000 GPR system with 225, 450, and 900MHz antennae, we surveyed nine GPR lines to provide stratigraphic images of the barrier interior. Data sets were topographically correlated and georeferenced. The 225MHz antennae were used on each transect to show the framework of the shoreline deposit while higher frequencies were used on the west side of the road for greater detail. GPR results indicate horizontal and dipping reflection patterns as typically seen in barrier bar models. Additionally, exposed stratigraphy where the road-cut bisects the barrier bar deposit correlates with GPR data.

**W. Patrick Dryer and David Speer (200)**

Faculty Advisor/Collaborator: **Harry Jol & Douglas Faulkner**

*GPR Imaging of Subaqueous Deposits within Half Moon Lake, Wisconsin*

Logging was an essential part of western Wisconsin's economy from the 1850s to the 1920s. The logging industry used Half Moon Lake (HML) in Eau Claire as a holding pond awaiting milling at sawmills along the lakeshore. Although the logging industry use of HML ceased decades ago, the effects of the logging industry on HML's water quality can still be observed today. Presently, HML is a valued recreational area for the surrounding community; therefore, returning the lake to a healthy ecosystem is a common interest. During the logging era, industrial wastes, such as bark, sawdust, slabs, and animal waste, were dumped on top of a former natural lake bottom. This organic material is believed to be several meters thick. To investigate these deposits, a pulseEKKO ground penetrating radar (GPR) system with 50 and 100 MHz antennae was used to collect subaqueous stratigraphic data. The 50 MHz frequency penetrated deeper into the lakebed while the 100 MHz had lower penetration with higher resolution. In addition, Trimble ProXR global positioning systems (GPS) was used to georeference GPR transects. The results from this project will further aid local and state agencies in better managing lakes.

**Holly Johnson and Jenifer Bode (222)**Faculty Advisor/Collaborator: **Harry Jol***GPR Imaging of the Subsurface in 3D: Examples from a Coastal Site (USA) and an Archaeological Site (Israel)*

To better understand coastal geomorphic sites as well as archaeological sites, ground penetrating radar (GPR) has become a popular and effective method for imaging the subsurface. Three-dimensional (3D) GPR datasets have been increasingly collected because their results significantly enhance the ability to view, analyze and interpret subsurface stratigraphy. The first site is along the coastline of the Pacific Northwest, USA where large earthquakes pose a significant threat due to the adjacent subduction zone. Coseismic subsidence associated with such earthquakes creates erosional scarps into beach-face deposits. A GPR grid (225 MHz) was collected over one of these scarps north of Long Beach, WA. The 3D cube imaged the erosional scarp, bounded by the associated progradational beach deposits. The 3D views aid in better understanding the extent of erosion due to coseismic subsidence and how the shoreline recovered as the coast rebounded. The second site, Yavne Yam, Israel is an archaeologically significant city, located on the Mediterranean Sea. A dense GPR grid was collected adjacent to present excavations with both 225 and 450 MHz antennae. Analyses of the GPR data reveal several linear subsurface anomalies that are interpreted as walls. These analyses will be used by site archaeologists to guide future excavations.

**Holly Johnson (221)**Faculty Advisor/Collaborator: **Harry Jol***Imaging Tsunami Deposits in Oregon (USA) Using Ground Penetrating Radar*

To better understand tsunami processes associated with Cascadia subduction zone earthquakes, ground penetrating radar (GPR) transects were collected. Multiple mega-earthquakes, which often create tsunamis, have occurred in the Pacific Northwest of the USA and with increased population in the region, these multiple hazards pose a significant threat to the coastal communities. GPR, a geophysical tool used to image the subsurface, was used to investigate the extent of paleo-tsunami inundation and the magnitude of wave run-up. GPR transects were collected at four sites in both Cannon Beach and Seaside, OR using 100, 225, 450, and 900 MHz antennae. These transects ranged from 10 to 690 meters in length and depth of penetration ranged from one to 15 meters. Laser leveling surveys were carried out to gather topographic data, used to topographically correct the GPR transects. Both the 1964 (Alaska earthquake) tsunami and the 1700 A.D. Cascadia tsunami were imaged in the project. The internal stratigraphy of the 1964 tsunami deposits was imaged, showing horizontal to sub-horizontal stratification near or on the surface and the 1700 A.D. tsunami deposits, which lie beneath peat and marsh deposits, were imaged. In addition, tsunami pour over fans from the 1700 A.D. tsunami were also mapped.

**Phillip Larson and David Speer (182)**Faculty Advisor/Collaborator: **Douglas Faulkner & Harry Jol & Garry Running***Late Quaternary Stream Terraces of the Lower Chippewa River Valley, West-Central Wisconsin*

A complex sequence of stream terraces has long been recognized along the lower Chippewa River valley, but these landforms remain poorly understood. Not even the number and spatial extent of terraces are known. The immediate objective of this study, then, is to identify and map stream terraces along the Chippewa River valley between Eau Claire and the Mississippi River. The study's longer range purpose is to lay the foundation for future work aimed at reconstructing the post-glacial geomorphic history of the lower Chippewa River valley. Interpretation of aerial photographs, topographic maps, and digital elevation models reveal that the study area contains seven stream terraces. The highest and most extensive of these is the Wissota terrace. The Wissota, which grades to a terminal moraine of Late Wisconsinan age in the upstream direction, stands approximately 30 above the modern floodplain. The other terraces are inset below the Wissota and exist as scattered remnants. The lowest two, which stand a few meters above the modern floodplain, are characterized by depositional bars and abandoned channels. Thus, the treads of the lowest terraces generally exhibit more relief than those that are higher. An exception is the Wissota, on which large parabolic dunes are locally present.

**Jacob McDonald, Eric Pascal, W. Patrick Dryer, Jennifer Mikolajczyk, and Michael Krupich (201)**Faculty Advisor/Collaborator: **Harry Jol***A Remote Sensing Interpretation of Geomorphic Features in Death Valley National Park, California*

Remotely sensed images aid in the geomorphic interpretation of landscapes, particularly in arid and desert landscapes. Death

Valley National Park, California, presently is an arid desert but during the Quaternary, Lake Manly filled the valley. The lake gradually dried up due to increasing temperatures and lack of in-flowing water. As the lake receded, former shoreline deposits and large playas were left behind, altering the geomorphic landscape of the valley. Today, gravel benches and erosional terraces mark shorelines of the former lake levels and precipitated minerals and salts create unique formations along the valley floor. Aerial photographs and satellite imagery were compiled to allow for a geomorphic interpretation of Death Valley, with special emphasis on shoreline features including a Quaternary Beatty Junction shoreline deposit. To study the internal and external structure of the barrier bar this deposit was surveyed using GPS, GPR, and laser-leveling. The data was collated in ArcGIS 9.2 so that interpretation and analyses could be made. Results indicate the barrier bar under study is one of several shoreline deposits left behind as Lake Manly receded. The distance between shoreline deposits could help in recreating prior Lake Manly lake levels and better understanding its extent.

**Mike Molnar and Mark Nelson (237)**

Faculty Advisor/Collaborator: **Sean Hartnett**

*Developing Shallow River Bathymetric Techniques in the Lower Chippewa River*

The Lower Chippewa River between Caryville and Durand, Wisconsin is one of the most rural sections of a larger river in western Wisconsin. This setting makes it ideal for a study of flow patterns and river migration that are relatively unaffected by urban areas and dams. This project was undertaken to study the formation of sand bars and river migration and to refine river-based bathymetric mapping techniques. Thousands of GPS points were collected along a 9.3 mile (15 km) section of river from a boat in a zigzag fashion while the depth at each point was simultaneously identified. Further analysis involved plotting all GPS points in GIS, digitizing the shoreline to establish a zero depth reference, and creating a triangulated integrated network (TIN) from all the GPS point depth references. A TIN grid was created from the TIN and then was draped onto an aerial photo to complete the map. This bathymetric survey technique proved an effective and efficient method for mapping the river bottom in this section of river, and can serve as a basis for similar studies leading to a complete bathymetric study of the entire Lower Chippewa River.

**Shana Neumann (202)**

Faculty Advisor/Collaborator: **Harry Jol**

*Three-Dimensional Visualization and Analysis of an Aeolian Dune*

Three-dimensional (3D) ground penetrating radar (GPR) imaging can be utilized to understand the stratigraphy of aeolian sand dunes. The 3D software allows for slices to be made in a data cube that can aid in showing continuity of reflection patterns and stratigraphy. Stratigraphy of an aeolian sand dune is often exposed through coring or digging of trenches, GPR data collection can be beneficial since it is a non-destructive, non-invasive technique. A 3D grid was collected from a dune complex within the Early Jurassic Navajo Sandstone located in the Checkerboard Mesa area of Zion National Park, Utah. Using a pulseEKKO 1000 GPR system with an antenna frequency of 225 MHz, a 4m x 10m grid was collected. A 3D cube was created using T3D which allowed for the depositional framework of stratigraphic units of interest to be visualized and interpreted. Findings showed a horizontal reflection at 90 ns (5m) and 200 ns (10.5m), the upper set of dipping reflections was inclined at an angle of 13-15°, and the underlying dipping reflections were at an angle of 18-20°. Interpretations of the 3D cube suggest the inclined reflections are dune foresets and the horizontal reflections are erosional truncations formed by dune migration.

**Eric Pascal (219)**

Faculty Advisor/Collaborator: **Harry Jol**

*GPR Investigation of Two Israeli Archaeological Sites: Preliminary Results from Tel Yavne and Apollonia*

Geoarchaeological excavations are expensive and time-consuming endeavors. With geophysical tools, such as ground penetrating radar (GPR), archaeological 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 2006, GPR data were collected at Tel Yavne and Apollonia, Israel. After the destruction of the temple in Jerusalem in 70 CE, Yavne served as a center of Jewish learning and has subsequently been the site of a Byzantine city, a Crusader castle, and Arab villages. Apollonia existed as a Mediterranean coastal village as early as the 6th Century BCE and was the site of a Crusader fortress. GPR grids were collected adjacent to present excavations at Tel Yavne (7.5m x 13m) and Apollonia (20m x 30m) using 225

MHz antennae. The radar signals penetrated to approximate depths of 1.0m at Tel Yavne and 1.2m at Apollonia and revealed interesting anomalies (archaeological features?) in the GPR images. Preliminary analysis of the GPR data has led to the interpretation of potential walls, collapsed walls, and/or pits in the subsurface. The interpretation of the geophysical data will be used by site archeologists to guide future excavations.

**Eric Pascal, Shana Neumann, and Jacqueline Chambers (220)**

Faculty Advisor/Collaborator: **Harry Jol**

*Topographic Profiles Along a Quaternary Beatty Junction Paleolake Shoreline Deposit, Death Valley National Park, California*

Lake Manly, a Quaternary-aged geomorphic feature was located near Beatty Junction in Death Valley, California. Quaternary Lake Manly was created during the last ice age when glaciers from the Sierra Nevada Mountains drained into the region. As the climate changed, the lake evaporated, leaving behind shoreline markers such as gravel barrier bars which indicate former lake levels. Laser level profiles of a Beatty Junction shoreline deposit were collected in Death Valley National Park during March 2007. Based on data collected by California State University-East Bay, the shoreline is a beach barrier that is approximately 500m long, 50m wide, and 5m high. We collected approximately 100 topographic points using a Topcon RL-HA Laser Level and a Topcon LS-70B sensor on a five meter surveying rod. The data points were collected along nine lines which were parallel and perpendicular to the shoreline deposit. Interpretation of the data shows that the northern edge of the deposit was higher in elevation than the southern edge of the deposit indicating a receding lake. The data collected was also used to aid in topographically correcting ground penetrating radar transects which were collected at the site.

**Bryan Vickroy, Jacob McDonald, and Korah Petrasko (240)**

Faculty Advisor/Collaborator: **Harry Jol**

*Geo-Referenced Base Map of a Quaternary Beatty Junction Paleolake Shoreline Deposits, Death Valley National Park, California*

During the Quaternary Period, Lake Manly existed within present day Death Valley National Park, California. It filled when glaciers in the Sierra Nevada Mountains drained into basins at the end of the last ice age. The water evaporated as the climate changed, leaving behind shoreline markers such as gravel barrier bars. Using a Trimble Pro XR global positioning system (GPS), we conducted a survey of former shoreline deposits along Beatty Junction Road. The north shore barrier bar is approximately 500 meters long and 50 meters wide. We coordinated our research with GPS waypoints collected in 2006 by California State University-East Bay (CSU-EB). After locating the CSU-EB lines, we noted some lines had to be shortened, relocated, or abandoned due to erosion on the barrier bar. In addition, the ground penetrating radar (GPR) lines, laser leveling lines, and other significant local features were surveyed in. Our data helps create a georeferenced base map of the barrier bars and locations of GPR and topographic profiles. This map will allow for future research projects to reoccupy our lines. Possible future research includes mapping portions of bars that were not profiled, as well as other deposits located along the road.

**Ryan Werner (239)**

Faculty Advisor/Collaborator: **Garry Running**

*Soil Geomorphology of Sand Dune Landscapes in the Lower Chippewa River Valley: An Investigation of Upper Putnam Park, Eau Claire, WI*

Upper Putnam Park is located on the Wissota Terrace which is composed of sandy and gravelly glacial outwash. Little is known about the relationship between soils and landscape position, and the origin of low relief hills and ridges in areas of the Lower Chippewa River Valley like upper Putnam Park. Development is encroaching on these areas yet appropriate land use has not been determined. Four pits were excavated in representative landscape positions -- summit, backslope (2), and toeslope. Soil profiles were described, sampled, and photographed. They are formed of quartz-rich, well sorted fine-medium sand except the soil formed in the toeslope position whose sand was coarser and poorly sorted. Sand texture in summit and backslopes are consistent with cliff top sand dunes while the toeslope is consistent with glacial outwash. Soil horizonation and morphology vary systematically with respect to landscape position. Soil profiles in high landscape positions exhibit a thin A and an E horizon. Lower landscape positions exhibit thicker A horizons but no E horizon. Soil profiles exposed in all pits are consistent with the Menahga Soil Series which are comparatively infertile and are drought/erosion prone. We recommend low intensity land use for areas like upper Putnam Park.

## Geography and Anthropology/Geology

### Jacqueline Chambers and Anne Gauer (225)

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

*Post-glacial Stratigraphy, Eolian Activity, and Paleoenvironment: A View from the Atkinson Site, Glacial Lake Hind Basin, Southwestern Manitoba, Canada*

The Atkinson site, located in the Lauder Sand Hills, glacial Lake Hind Basin, SW Manitoba is a multi-component archaeological site. Previous geoarchaeological research at the site revealed a stratigraphic sequence of eolian and fluvial deposits (geomorphic units A-E). Questions about the contacts between units, the number of dune depositional episodes, and dune migration directions remain. Thirty-one stratigraphic profiles were described and added to the data base. Geomorphic units were traced across the site, mapped using a total station, correlated with profiles described in previous years, and the existing topographic site map was expanded by ~15,000 m<sup>2</sup>. Additional sand samples of eolian units (B-E) (analyzed for particle-size distribution) and 37 new cross-strata measurements from unit B were added to the data base. Our results confirm: mid-Holocene dune unit B conformably overlies unit A2 but welds with unit C, both units C and B pinch out downstream near the archaeological excavation block; units A2, D, and E extend across the entire exposure, units D and E each represent two episodes of late Holocene dune activity (dune migration from the NW), the unit B dune migrated from the west, and grain populations from eolian units B-E are distinguishable statistically.

## Geology

### Brandon Barber (184)

Faculty Advisor/Collaborator: **Robert Hooper**

*Calibration of and Quantitative Analysis using the Transmission Electron Microscope*

The Transmission Electron Microscope (TEM) is capable of returning quantitative chemical analyses on the nanometer scale. Prior to use of the TEM for quantification the TEM must be calibrated for image scale, electron diffraction imaging and for chemistry. The preliminary phase of this project involved instrument calibration followed by analysis of standard samples to determine the accuracy and precision of calibration. Image calibration at high magnification was accomplished using crocidolite asbestos. Chemistry is calibrated using well characterized microprobe mineral standards for the elements of interest and diffraction is calibrated using a commercial aluminum TEM standard with known diffraction spacings. Precision of chemical analysis was determined by eleven replicate analyses of the same mineral grain and accuracy of chemical determination was evaluated by performing 32 analyses on individual micron scale grains of the same standard reference material. This project is in the initial phase of using the TEM for two separate research projects, including detailed analysis of the chemistry and crystallography of clay minerals and analysis of colloids and nano-particles from low temperature geochemical environments. Results from the calibration and two research projects will be presented.

### Brandon Barber (183)

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

*Quantitative Analysis of Potential Economically Significant Mineralization Targets in the Whitesail Lake Mapping Area, British Columbia*

In the west-central Coast Range of British Columbia the Coast Plutonic Complex (CPC) borders the accreted island arc of Stikinia. Volcanic arc rocks and both coeval and younger plutonic rocks contain potential for economic mineralization, including Volcanogenic Massive Sulphide, Layered Mafic Intrusion, Cu±Mo±Au porphyry and fault controlled mineralization. The mapping area focused on the southwestern Whitesail Lake map area which is bound on the west by the CPC, and on the east by the Gamsby complex, metavolcanics, metasediments and unmetamorphosed rocks of the Hazelton, Kasalka, Skeena and Mt. Ney units. Multiple intrusive bodies of various age and composition cut through the western side of the map area. During the 2006 field season mapping and sample collection was conducted with the primary focus of assessing the economical mineralization potential of the map area. Assay samples were crushed into very fine powder and dissolved in 12 mL of aquaregia (3:1 HNO<sub>3</sub>:HCL). After being heated for three hours to accelerate dissolution, the samples were brought to a known volume, centrifuged, diluted to a standard dilution factor and analyzed using an Inductively Coupled Plasma-Mass Spectrometer (ICP-MS). Base and precious metals concentrations were collected and these data will be used to assess potential economic mineralization.

**Michelle Forgette (197)**Faculty Advisor/Collaborator: **Stephanie Maes***Magma Flow Patterns and Emplacement of the Mineral Lake Intrusive Complex, Mellen, Wisconsin*

This research will use a number of laboratory tools to help understand the emplacement dynamics of the MLIC. Field mapping of mineral fabrics and the collection of both hand samples and core samples will be done. ArcMap will be used to display the spatial relationships between our samples, as well as to show topography, faults, strikes and slips, and petrologic boundaries determined by previous research. Analyzing these samples will help us identify the presence of fabrics and determine whether the intrusion is a result of one or multiple flows. Anisotropy of Magnetic Susceptibility will assist our research by providing us with data confirming lineation and foliation in the samples. Geochemistry analysis has so far shown a wide variation in major elements of the collected samples. We have a few extraordinary samples that lead us to believe that we have either separation of cumulate phases signifying the bottom of the magma pulse or we have differentiation and iron enrichment within the magma. We have faced several obstacles, including the limited outcrop and heavy vegetation, which makes field mapping difficult, and limited previous research, which limits our information about magma flows.

**Lynn Galston (236)**Faculty Advisor/Collaborator: **Karen Havholm***Re-Evaluation of the Proterozoic Devils Island Sandstone, Keweenawan Rift, 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 identified for the correlable Hinckley Sandstone in eastern Minnesota until recent study indicated the depositional environment was a braided stream, dune, and interdune setting. The purpose of this project is to determine whether the Devils Island Sandstone also needs re-interpretation. Over the past two years, exposures along the shore of Lake Superior, the Brule and Siskiwit Rivers, and Sand and Devils Island of the Apostle Islands National Lakeshore have been measured and described. Four distinct sandstone facies have been identified; trough cross-strata, planar beds with interbedded small-scale cross-strata sets, tangential cross strata, and convolute bedding. The first two of these facies appear to indicate a lacustrine to fluvial environment with large fluctuations in flow energy. The planar beds contain fine-grained to silty laminations and decimeter scale couplets with mudcracks. Packages within the tangential cross-strata suggest a dry to damp environment of deposition, however, further analysis is necessary to pinpoint the environment. Bedding-parallel sinuous burrows were found locally within this facies. Convolute bedding indicates rapid deposition of sand on a saturated substrate.

**Alexandra Guy (217)**Faculty Advisor/Collaborator: **J. Brian Mahoney***Constraining Late Cretaceous Magmatic Evolution in Southwestern Montana*

The Elkhorn Mountain Volcanics are a Late Cretaceous andesitic to rhyolitic package of tuffs to flows exposed in southwest Montana. This deposit is comagmatic with other intrusive bodies in the area, all of which seem to be synchronous with late Cretaceous deformation of the Sevier Orogenic event. In southwest Montana, the Devil's Fence Anticlinorium is a thin-skinned deformational feature containing deformed Precambrian strata of the Belt Supergroup and overlying Paleozoic and Mesozoic strata. Mapping of this area along with sampling of both the volcanic and coeval intrusions will allow us to develop a clear picture of the relationship between the deformational period and occurrence of both the extrusive and intrusive igneous rocks. Geochemical analysis of the Elkhorn Mountain Volcanics is being conducted to assess the magmatic relationship between the volcanics and coeval intrusive rocks. Major and trace element data will be used to determine spatial and temporal differences in regional magmatics. This data will be compared with other intrusions in the region to evaluate regional variation in magmatic source areas, particularly the level of continental crust involvement during magma genesis. Analysis of both the volcanics and their plutonic equivalents will allow us to constrain the regional Late Cretaceous magmatic evolution.

**Jeremy Hinke (218)**Faculty Advisor/Collaborator: **Chad Wittkop***LiDAR-Based Geomorphic Mapping and Terrain Analysis of the Blue Hills Felsenmeer Valley, Rusk County, Wisconsin*

The Barron Quartzite of west-central Wisconsin forms a rolling upland known locally as the Blue Hills. Our study concerns the Blue Hills Felsenmeer State Natural Area in Rusk County, which encompasses a small valley 300 meters long, 100 meters wide, with 25 meters of relief. Underlain by angular quartzite boulders averaging 30 cm long, the valley contains little to no vegetation and contrasts markedly with the surrounding mixed conifer and hardwood forest. This work is part of a larger study re-examining the origin of this valley in an effort to evaluate if the feature is truly a felsenmeer (rocks frost-shattered in place), and determine if other mechanisms, such as talus accumulation, may account for this feature (Thompson and Syverson, 2006). Our mapping and interpretations use a LiDAR (Light Detection and Ranging) base with a two-foot contour interval provided by courtesy of the Barron County Soil and Water Conservation Office. LiDAR data were employed to generate digital elevation models, which can be used to create shaded-relief maps and conduct terrain analysis. Parameters obtained from digital terrain analysis may provide additional insight regarding the mechanism of landscape development by comparing locations of boulder accumulation with slope angle and aspect values using GIS.

**Steven Hoaglund (196)**Faculty Advisor/Collaborator: **Kent Syverson***Potential Meltwater Incision of the Blue Hills Felsenmeer Valley, Rusk County, Wisconsin, During the Late Wisconsin Glaciation*

The Blue Hills Felsenmeer valley contains a high concentration of angular quartzite boulders. The valley has a small modern water-catchment area that heads at an elevation of 1456 ft based on LiDAR data. Cahow (no date) proposed the valley was cut by Chippewa Lobe meltwater during the late Chippewa Phase of the late Wisconsin Glaciation. The purpose of this study is to determine if the Chippewa Lobe ice surface was sufficiently high to supply meltwater to erode the valley. We mapped the maximum extent of the Chippewa Moraine using domestic well logs, the Rusk County soil survey, and aerial photographs. Field observations verified the ice-margin position marked by chaotic hummocks, kettles, and ice-walled-lake plains. Hummock-crest elevations were measured within 2 km of the former ice-margin position near the felsenmeer valley head. Clark (1992) reports that this provides a minimum ice-surface elevation estimate within 30-100 ft of the actual value. Hummock crest elevations between 1400-1410 ft show that the ice surface was within 56 ft of the valley-head threshold. Thus, meltwater from the late Chippewa Phase of the late Wisconsin Glaciation could have eroded the valley.

**David Kawatski (185)**Faculty Advisor/Collaborator: **Phil Ihinger***High Resolution Micro-FTIR Analyses of Co-Crystallizing Quartz Crystals*

Detailed micro-IR analyses of crystals can provide important constraints on the growth dynamics of individual minerals. We have sampled a series of mineral specimens that grew concurrently from a single hydrothermal fracture. The specimens are all elongate, euhedral crystals with aspect ratios greater than 4:1 and have lengths that vary from 18 to 48 mm. Each crystal was sliced perpendicular to the c-axis and polished into several 1 mm-thick wafers. Quantitative IR analyses show a systematic distribution in the concentrations of hydroxyl-bearing impurities. Six sector zones, associated with growth on the six terminal rhombohedral faces, reveal variable growth rates throughout each crystal's morphologic development. In addition, some crystals reveal that a secondary stage of growth occurred on the bounding prism faces. Our analyses will be used to distinguish whether external variables (such as changes in pressure, temperature, and fluid composition) or internal variables (such as lattice defect abundance or the sizes of individual growth faces) controlled the observed variations in growth rate and growth morphology of the crystals.

**Amanda LaGesse, Elizabeth Balgord, Jeremy Hinke, Matthew Chaffee, Crystal Nickel, Shane Peterson, and Aaron Rowland (224)**Faculty Advisor/Collaborator: **J. Brian Mahoney & Chad Wittkop***A Geologic Investigation of Death Valley California*

Death Valley California has a rich geologic history and a landscape shaped by diverse tectonic and volcanic activities. Modern-day Death Valley is the product of extensional tectonism, rhyolitic volcanism, and basin development during Miocene basin

and range extension. Fault scarps, turtleback faults, alluvial fans, eolian processes, and weathering can be observed in an environment which lacks vegetation making this an ideal locale to study geologic relationships. The most recent Miocene extensional basin and range tectonics have produced a series of normal faults which shaped the horst and graben features observed on the floor of Death Valley. Extensive Miocene volcanism produced widespread pyroclastic sheets which dominate most of Death Valley. To gain insight on magmatic partitioning a detailed geochemical investigation was conducted on a compound cooling unit of the Miocene (ca. 9 Ma) Resting Springs Tuff, east of Shoshone, California. The sequence included a basal vitrophyre, slightly welded rhyolitic tuff, strongly welded rhyolitic tuff, rhyolitic tuff, and welded rhyolitic tuff. Major and trace element geochemical stratigraphy analyses were conducted using X-ray fluorescence to assess elemental partitioning during pyroclastic transport.

#### **Amanda LaGesse (223)**

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

*Rare Earth Element (REE) Geochemistry by Plasma Mass Spectroscopy using a High Resolution Inductively Coupled Plasma Mass Spectrometer*

Rare earth element (REE) geochemistry of igneous rocks is critical for constraining igneous petrogenesis. REE chemistry is conserved through most processes, remaining unchanged through metamorphism, weathering, and hydrothermal alteration, and is therefore useful in determining the composition of parent material. The Peninsular Ranges batholith (PRB) located in California and Baja Mexico is one of the largest batholiths in North America. Analysis of REE geochemistry of the PRB provides constraints on both the genesis of the magmatic system and the level of crustal contamination. A new High Resolution plasma mass spectrometer in the geology department has enabled REE analysis at University Wisconsin-Eau Claire. The method developed here involves five steps: (1) 0.15000g of material, 5mL of HF, and 1mL of HNO<sub>3</sub> is added to a Teflon bomb; (2) Bombs are baked at 190°C for 5 days and dried on a hot plate; (3) Sample is reconstituted in 6mL HCl and baked one day at 190°C; (4) Sample is cooled, then 100µL is transferred into a vial with 4.9mL HNO<sub>3</sub>; (5) The remaining sample is transferred to a separate Savillex and dried on a hot plate. Known USGS standards have been evaluated to assess accuracy and precision. Samples from the PRB will be the first analyzed using this technique.

#### **Catherine MacLaurin (198)**

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

*Stratigraphy and Provenance Across the Great Unconformity, Devil's Fence Anticlinorium, Southwest Montana: An EDMAP Project*

In the Devil's Fence Anticlinorium of southwest Montana, the Middle Proterozoic Belt Supergroup has traditionally been divided into three formations: Greyson Shale (green-gray mudstone with stromatalitic horizons) conformably overlain by Spokane Shale (grayish red and green mudstone with minor limestone and sandstone beds), which is gradationally overlain by Empire Shale (greenish-gray siliceous mudstone with minor sandstone interbeds). Previous workers describe a significant unconformity that removed >100's m of section beneath the overlying Middle Cambrian Flathead Sandstone. Detailed geologic mapping and stratigraphic analysis suggests a revision of Belt Supergroup stratigraphy in the region. Two key observations support this revision: 1) the contact beneath the Flathead Sandstone is not a sharp, angular unconformity, but rather a gradational, coarsening upward succession; 2) the north to south lateral transition from dominantly green mudstone ("Empire") to red mudstone ("Spokane") represents lateral diagenetic variation as opposed to a vertical stratigraphic succession. Detrital zircon analyses show that the signature of the Flathead Sandstone is similar to that of the Greyson Formation, but does not contain the same detritus that is found within the Spokane Formation suggesting that the sedimentation source for the Belt Supergroup and Flathead Sandstone is variable over time.

#### **Catherine MacLaurin (204)**

Faculty Advisor/Collaborator: **J. Brian Mahoney & Robert Hooper & Lori Snyder**

*The Magmatic Evolution of the Whitesail Lake Map Area: A Geochemical Analysis*

The Whitesail Lake map area of west-central British Columbia contains the boundary between the Jura-Cretaceous Stikine terrane, an island arc system, and the Jurassic to Tertiary Coast Plutonic Complex, one of the largest batholiths in the world. Volcanic and associated sedimentary rocks along the western margin of the Stikine terrane are intruded by Jurassic to Tertiary plutons. Geologic mapping, geochronology and geochemical analysis have demonstrated that magmatism occurred in four distinct magmatic events between ca. 200-40 Ma. Triassic to Jurassic island arc magmatism is represented by the Hazelton Group, the Chatsquat Complex and the Trapper Peak pluton. A late Jurassic magmatic pulse, represented by the Stick Pass

Suite, the Tahtsa Complex, and the Tenaiko Suite, seems to result from intra-arc extension, perhaps reflecting post-collision orogenic collapse. Cretaceous plutons including the Bulkley Suite, Horetsky Dyke, and the Sandifer Lake pluton may reflect re-initiation of arc magmatism along the accretionary margin. Paleocene to Eocene intrusive rocks reflect magmatism associated with orogenic thickening during a shift from orthogonal to transpressional plate motion and resultant orogenic collapse. Detailed geochemical analysis constrains the spatial and temporal character of magmatism through Jurassic to Tertiary time, and provides insight into magma genesis in a continental arc system.

**Catherine MacLaurin, Adam Kjos, and Brandon Barber (203)**

Faculty Advisor/Collaborator: **J. Brian Mahoney & Robert Hooper & Lori Snyder**

*Geochronological Constraints on the Magmatic Evolution of the Southern and Western Whitesail Lake Map Area (NTS 93E)*

This investigation focuses on detailed bedrock mapping in the Whitesail Lake map area. The primary focus of mapping during the 2006 field season was the western and southwestern portions of the Whitesail Lake map area, including portions of the Kitlope Lake, Tsaytis River, Chikamin Mountain, Troitsa Peak, and Tahtsa Peak 1:50,000 map areas. Mapping in these areas provides linkage to work completed in the southern portion of the Whitesail Lake map area under the auspices of the Rocks to Riches Program (Mahoney et al., 2005; Gordee et al., 2005), and attempts to tie in with pre-existing mapping in the central portion of the map area. This investigation integrates regional bedrock mapping, stratigraphic and structural analyses, geochronology, and plutonic/volcanic geochemistry into a comprehensive assessment of the geological framework of the region. Fourteen U/Pb dates were collected to evaluate the magmatic history of the Whitesail Lake map area. Four discernable magmatic events are evident based on these dates, including magmatism within a Triassic-Jurassic island arc, a late Jurassic magmatic pulse caused by extension of this arc, a late Cretaceous pulse related to a large-scale switch in stress regimes (contractional to extensional), and Eocene magmatism due to continued extension and orogenic collapse.

**Mike Molnar and Jeremy Hinke (238)**

Faculty Advisor/Collaborator: **Katherine Grote**

*Estimating Recharge Areas for Large Springs in St. Croix County*

Springs are important components of natural ecosystems. Increasing populations and economic development may pose a threat to springs as high capacity pumping wells are installed within spring recharge areas. Recent legislation in Wisconsin prohibits the installation of these wells within the recharge area of large springs, if these wells would result in spring degradation. However, the locations and recharge areas of springs are often unknown, so implementation of this legislation is difficult. The main objectives of this investigation were to locate springs within St. Croix County and to delineate their recharge areas. The locations and discharge rates of 87 springs were determined during this investigation. For springs with high discharge rates, chemical data and estimates of groundwater age were used along with geological information to create conceptual models of flow to these springs. Conceptual models varied widely across the county, where some data suggested that flow through fractures or dissolution channels was predominant, while other analyses showed that a significant portion of the spring discharge probably percolated through porous media. The conceptual model developed for each spring provided input for an iterative process of infiltration modeling and flow path prediction to estimate and delineate the recharge area for large springs.

**Travis Pickering (186)**

Faculty Advisor/Collaborator: **Phil Ihinger**

*Origin of Kimberlites and Lamproites from the Central Montana Alkalic Province*

Kimberlites and lamproites represent partial melting of deep mantle sources, and their compositions offer insights into the evolution of the deep Earth. Here, we report the major and trace element geochemistry of 14 dikes and diatremes from the central Montana alkalic province. The observed magmatic variations can be ascribed to variable contributions from two distinct mantle source regions: one resembling that of plume-derived ocean island basalts (OIB) at hotspots in mid-plate oceanic settings, and the other resembling that of calc-alkaline basalts (CAB) at volcanic arcs in subduction settings. Notably, the Montana kimberlites and lamproites were emplaced between 48-27 Ma in a geologic setting not associated with a hotspot and ~ 1000 km east of the adjacent ocean-continent plate boundary. We ascribe the binary mixing observed in the Montana magmas to interaction of an upwelling starting plumehead with the subducting Farallon Plate. Magmas with hybrid compositions were formed when plume material with OIB chemistry leaked through the oceanic plate and interacted with

sub-continental lithosphere with CAB chemistry beneath the North American craton. After dissipation of the plume head at 18 Ma, the plume stem was able to penetrate the overlying oceanic and continental lithosphere and initiate the Yellowstone hotspot track.

### **Emilia Teige (205)**

Faculty Advisor/Collaborator: **Kent Syverson**

*Origin of the Blue Hills Felsenmeer State Natural Area, Rusk County, Wisconsin*

A felsenmeer is a “sea” of angular boulders that has formed *in situ* on a gently sloping surface. The Blue Hills Felsenmeer State Natural Area valley is 300 m long, 25 m deep, and has walls sloping at approximately 25 degrees. The felsenmeer valley has a convex longitudinal profile marked by angular quartzite boulders. The purpose of our study is to better understand the origin of the Blue Hills Felsenmeer and prepare a report for the Wisconsin DNR. Several UWEC undergraduate students (Thompson, Hoaglund, Teige, and Hinke) have studied various aspects of the felsenmeer. Research by Hoaglund and Teige suggests that glacial meltwater was instrumental in eroding the meltwater channel. In addition, it appears that parts of the “felsenmeer” are associated with falling rocks rather than frost-shattering in place. My poster will summarize my work on meltwater incision of the felsenmeer channel; my future plan is to use ground-penetrating radar to determine if rock falls have caused the convex longitudinal valley profile, as well as the results of other UWEC student researchers. This will form the basis for a report to the Wisconsin DNR that will be used to educate interested laypersons about the origin of the Blue Hills Felsenmeer.

### **Treven Wisz, Anna Baker, and Krystina Engebos (216)**

Faculty Advisor/Collaborator: **Katherine Grote**

*Development of a Petrophysical Model to Monitor Nitrate in the Unsaturated Zone*

The goal of this research is to reduce nitrate contamination of surface water and groundwater by developing an easily implemented technique to measure nitrate concentrations in soil pore water using time domain reflectometry (TDR) methods. Farmers could use this technique to determine how much nitrate is available to crops in the soil prior to applying nitrate-based fertilizers and could adjust the volumes of fertilizer applied accordingly. By optimizing the volume of fertilizer applied, excess fertilization can be avoided, and leaching of nitrates into groundwater and surface water can be minimized. To develop a field-based technique for estimating nitrate concentrations using TDR measurements, we are creating petrophysical relationships between parameters measured with TDR (electrical conductivity and soil water content) and nitrate concentrations for different soil textures. TDR measurements can be easily collected in the field, and the petrophysical relationships can be used to estimate nitrate concentrations if the soil type is known. Thus far, we have completed petrophysical relationships for silty sand and silt loam soils, and we have preliminary data to develop relationships for sandy clay and organic soils. Analysis of our data indicates that separate petrophysical relationships are necessary to estimate nitrate concentrations in widely varying soil types.

## **Mathematics**

### **Brandon Barrette (160)**

Faculty Advisor/Collaborator: **Simei Tong**

*Realizations of Subspaces of  $L_p$ ,  $p > 2$ , with Norm Given by Partitions and Weights*

Many of the known complemented subspaces of  $L_p$  have realizations as sequence spaces. Different norms on spaces will give different norms of projections. Hence it will influence our understanding of the complemented subspaces of  $L_p$ . By introducing a norm given by partitions and weights, Alspach and Tong proved a unification of well-known spaces. They proved that this new norm is stable for sums of spaces. The most recent result is that subspaces of  $L_p$ ,  $p > 2$ , with unconditional bases have equivalent partition and weight norms. This poster will introduce the definition of the norm given by partitions and weights. A couple of examples will help us to understand the creation of a norm given by partitions and weights for a vector space. It will be shown that the space with this new norm is isomorphic to some well-known vector space. Finally, a discussion of creating a norm given by partitions and weights for a tensor product of Banach spaces will follow.

**Brandon Barrette (161)**Faculty Advisor/Collaborator: **Alex Smith***Realizing Keplerian Orbits as Geodesics on a Surface of Revolution*

It is well known that in Newtonian physics, the gravitational trajectories in a central gravitational field are conic sections with one focus at the central mass. This is known as Kepler's First Law. We consider those gravitational trajectories that lie in a fixed plane  $P$  (perhaps thought of as an ecliptic plane), and investigate this question: To what extent can  $P$  be embedded as a surface of revolution  $S$  inside an abstract three-dimensional Euclidean space  $E$  in such a way that gravitational trajectories are mapped to geodesics on  $S$ , subset of  $E$ ?

**Brandon Barrette (159)**Faculty Advisor/Collaborator: **Alex Smith***Self-intersections of Light Cones in General Relativity*

In relativity, the light cone of an event  $O$  consists of all events that can be connected to  $O$  by a path of light. In special relativity, the light cone of an event is a nice circular cone. But in general relativity, curvature can cause light cones to have self-intersections. We will follow the work of the physicists Frittelli, Kling and Newman on gravitational lensing, and use Maple to visualize self-intersecting light cones for the Schwarzschild solution.

**Brandon Barrette (162)**Faculty Advisor/Collaborator: **Matt Bloss***The Poincaré Conjecture*

The Poincaré conjecture is one of the most important questions in topology and is included as one of the Seven Millennium Prize problems. The conjecture stated that if a closed 3-manifold has the property that every closed loop can be deformed to a point, then this space is really just a four-dimensional sphere. A proof has recently surfaced and is thought to be mathematically correct. This poster will develop some of the fundamental ideas necessary to understand the conjecture and its proof.

**Tarek Elgindi (180)**Faculty Advisor/Collaborator: **James Walker***A New Cryptographic Scheme Using Iterated Discrete Derivatives*

The problem of secure transmission of information has been a very important problem in Number Theory and Applied Linear Algebra since the second world war, especially during the Cold War. Cryptography has recently become very important to the general public due to the recent boom in online transactions. In this research project we develop a new cryptographic scheme using iterated discrete derivatives as the main tool.

**Zachary Krieger Frye (177)**Faculty Advisor/Collaborator: **Mohamed Elgindi & John Drost***Approximations of the Cross Section of a Membrane Trough that Produces Optimum Flow*

We consider an inclined membrane trough. We assume that there is a fluid flowing down the trough. The objectives of this project are to approximate, both analytically and numerically, the shape of the cross section of the membrane trough that produces optimum flow rate. Since the flow rate depends on trough cross sectional area as well as the flow velocity profile, it is expected that the shape that produces optimum flow rate will differ from the opening that produces maximal cross sectional area. We plan to write a computer program using the Matlab software to: (A) determine the cross sectional shape of the trough, (B) solve the flow equation through the computed cross section and determine the flow velocity profile, and (C) calculate the flow rate by integrating the computed velocity function over the computed cross section. Accurate perturbation approximations of a second order will be developed using the Maple software and an approximation for the optimum opening width for maximum flow will be given. Finally, we will validate the numerical results obtained by comparing them with the results obtained using the perturbation method.

**Heather Goserud (179)**Faculty Advisor/Collaborator: **James Walker***Legendre Polynomials and Spherical Harmonics*

The purpose of this project is to study the background theory of Legendre Polynomials. We treat Legendre Polynomials by using their generating function; and from that obtain a recursion relation to prove Rodrigues' Formula and Laplace's Integral Form. Solving Dirichlet's problem for spheres under spherical symmetry leads to the understanding of spherical harmonics. We use Legendre Polynomials to show Dirichlet's problem can be solved by a series of spherical harmonics.

**David Kincaid (178)**Faculty Advisor/Collaborator: **Mohamed Elgindi***Finite Difference Solutions for the Recovery of Lamé Parameters of a Linear Elastic Membrane*

In this project, we present the mathematical equation that governs the displacement of an isotropic membrane due to a traction force applied to a part of its boundary. This leads to a linear elliptic boundary value problem with two parameters representing the Lamé moduli, which measure the elastic properties of the membrane. The Lamé parameters are constants for homogeneous material but functions of the position otherwise. Since it is possible to measure interior displacements in human tissue (for example using ultrasound), and since cancerous tumors differ markedly in their elastic properties from healthy tissue, it may be possible to detect and locate tumors by solving the inverse problem for the Lamé parameters. The objective of this project is to use the Matlab software to develop a numerical code for estimating the (non-constant) Lamé moduli for a given traction force and a given measurement of the membrane displacement. The numerical results obtained in this project will be compared to those previously obtained and, if possible, with experimental data.

**Stacy Jo Kouba (242)**Faculty Advisor/Collaborator: **Mohamed Elgindi & Robert Langer***Exploring the Mathematical Models for Calculating Alcohol Concentration in the Blood and the Breath*

It is well known that blood alcohol concentration (BAC) is the single most important variable in the quantitative assessment of intoxication. Concerns about the invasiveness requirements of drawing a blood sample led to the development of tests to measure breath alcohol concentration (BrAC). It is well known that a high BrAC indicates a high BAC. However, the quantitative relationship between the BAC to the BrAC has been a long standing problem. Among the factors that affect the BAC are the amount of alcohol consumed, person's weight, gender, health, time over which the drinks are consumed and the time and circumstance at which the estimate is made. In this proposal we plan to explore some of the mathematical models used to estimate the BAC and the BrAC, examine the physical assumptions upon which each model is based and suggest numerical methods for approximating the solution of each model. We will then compare the different models on the basis of their ease to solve as well as on how well their solution fit the experimental data. If possible, we will explore the possibilities of developing mathematical models for estimating the BAC and the BrAC simultaneously.

**Cassandra Lawler and Mitch Phillipson (163)**Faculty Advisor/Collaborator: **Simei Tong & Carl Schoen***Transportation Models for Emergency Situations Phase II*

Last year, we built a transportation model for transporting supplies in an emergency flooding situation. Using the Simplex Method, we obtained an optimal solution to minimize the cost and time to distribute sandbags in Dane County. Now, we're shifting our model to evacuating people. We've built a transportation model to help Clark County evacuate people during floods. In order for transportation models to be of use for Wisconsin, we've built a user-friendly computer package to help counties transport people and supplies in emergency situations. Our model and program will help counties make decisions in emergency situations and hopefully save lives.

**Eric Weber, Chris DeCleene, and Mitch Phillipson (243)**

Faculty Advisor/Collaborator: **Michael Penkava**

*Deformations of Infinity Lie Algebras*

Infinity algebras are generalizations of associative and Lie algebras. They play a role in both mathematics and mathematical physics. We study low dimensional examples of these algebras, and classify the nonisomorphic structures. Deformation theory is concerned with how one structure smoothly changes into another structure, and the object of studying the deformations is to understand how the space of all such structures is glued together. In physics, deformations arise because the algebra of quantum mechanics is a deformation of the algebra of the phase space of classical physics. In mathematics, one is interested in the structure of the space of algebras, which is called a moduli space. We present some examples of low dimensional moduli spaces of algebras, and show how the deformations give a picture of these moduli spaces.

## Physics and Astronomy

**Aaron Anderson, Emily Kopp, and Ben Holmen, (176)**

Faculty Advisor/Collaborator: **Doug Dunham & Matt Evans**

*Analysis of the Chemical State of Chromium in Electronic Components*

X-ray Photoelectron Spectroscopy (XPS) was used to determine the relative concentrations of Chromium III and Chromium VI in a commercially produced electronic component. Chromium is a common element that is essential to human health, but it can also be a health hazard in the wrong state. The oxidation state of the chromium determines whether it is a hazardous substance, with only chromium VI a health hazard. XPS is one of a very few non destructive analysis techniques capable of determining the oxidation states of metals. By combining the total chromium concentration information, provided by X-ray Fluorescence, and the relative concentrations of the III and IV states, provided by XPS, it was possible to determine the Chromium VI concentration level.

**Greg Beranek (245)**

Faculty Advisor/Collaborator: **George Stecher**

*Design and Implementation of an 8-Bit Processor*

The complexity and proprietary nature of modern microprocessors make it difficult to study their basic operations. To overcome these difficulties, I designed and built a single-cycle RISC-style architecture 8-bit general processor using readily available 7400-series logic chips. To allow easy programming of the processor, an assembler and cycle simulator were also developed. An interface controller, which allows data to flow to and from outside devices, was then incorporated into the design. The finished implementation has complete processor functionality yet is simple enough to serve as an educational tool for studying processor design.

**Bryce Cummings, Chris Thompson, and Steven Henke (173)**

Faculty Advisor/Collaborator: **Paul Thomas**

*Devolatilization of Kuiper Belt Objects via Collision*

The solar system's Kuiper belt is likely to contain many objects similar in size to Pluto. Pluto's composition, based on its mean density ( $2030 \text{ kg/m}^3$ ), is 60% rock and 40% ice. This composition is notably more rich in rock than typical outer solar system satellites, which have rock fractions of 40%. This work investigates the possibility that devolatilization (the removal of ice) of typical Kuiper Belt Objects (KBOs) may occur as a byproduct of large impacts. Our target KBO is represented as an object with a 40% rock mass fraction. The impactor is a cometary object composed entirely of ice. We model the collision of the target with a series of impactors, varying the impactor's size and angle. These impacts are simulated using a three-dimensional smoothed-particle hydrodynamics (SPH) code. For each impact, we analyze the fraction of ice thrown off from the target. The impact speed is the escape speed of the target object ( $\sim 1.5 \text{ km/s}$ ). Our simulations will constrain the critical impactor size and impact angle ranges required to increase the final rock mass fraction of the target to the 60% value observed for Pluto.

**Ryan Gengler (154)**Faculty Advisor/Collaborator: **Lyle Ford***N-Body Simulations of the Early Solar System*

Jupiter played a significant role in the formation of the Oort Cloud, a collection of fragments leftover from the era of planet formation. We used a computer program to simulate the interaction of Jupiter with these fragments to determine how effective Jupiter was at moving them to the outer solar system. We found that Jupiter can throw objects out to large distances but not out of the ecliptic plane.

**Steven Henke (166)**Faculty Advisor/Collaborator: **Nathan Miller***An Automated Method for Measuring and Cataloguing O-stars' X-ray Emission Line Properties*

Since its 1999 launch, the Chandra observatory's High Energy Transmission Grating (HETG) has generated volumes of high resolution X-ray spectroscopy of very hot (O-type) stars. We have created software to automate examination of this data, specifically focusing on analyses which reveal properties of the stellar winds emitted by O-type stars. We measure properties of the spectra such as emission line widths and line center shifts, which give us information (using the Doppler effect) about the motions of the X-ray emitting gasses in the winds.

**Steven Henke (165)**Faculty Advisor/Collaborator: **Paul 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 physics of such events, a Smoothed Particle Hydrodynamics (SPH) model was used to simulate the impact of a comet on an icy surface. One focus of this study was the extent of pyrolysis of pre-existing organic material in the icy target resulting from the impact shock.

**Jonathan Jay and Rachel Anderson (168)**Faculty Advisor/Collaborator: **Kim Pierson***Characterization of Copper Films Deposited with Concurrent Electron Bombardment*

This research project is concerned with the fabrication of integrated circuits. Integrated circuits are found in virtually all electronic devices. Our project is specifically directed toward developing a simpler and less costly method to alter the crystal structure of copper films deposited into large aspect ratio integrated circuit interconnect trenches. The electrical signal carrying performance of the interconnects depends on the crystal structure of the deposited films. We will be using a unique thin film sputter deposition system that has been developed here at UW-Eau Claire. This research project is an investigation to determine if electron bombardment during the deposition of copper films used to fill large aspect ratio interconnects can change the crystal structure of the film in a manner that will enhance the electronic performance of the interconnect.

**Andrew Johnson (167)**Faculty Advisor/Collaborator: **Nathan Miller***Computer Modeling of X-ray Emission and Absorption in Hot Star Winds*

The detailed nature of the X-ray emission from hot stars is currently not well understood. In an effort to connect theories of stellar wind structure with high resolution X-ray spectra, we have used the Spect3D program (developed by Prism Computational Sciences) to construct representative models of the stellar winds of massive stars. Our models have been able to reproduce the prominent iron emission lines observed in the spectrum of the supergiant star Capella. We have also used our models to analyze trends in the fractional abundances for oxygen ions in a typical hot star's wind. Currently, we are investigating the locations and effects of shock fronts thought to occur in these winds, regarding not only their role in the observed X-ray emission but also their effect on the ionization structure of the wind as a whole. We acknowledge support from a Cottrell College Science Award from Research Corporation and the UW—Eau Claire Office of Research and Sponsored Programs.

**Joseph Kane, David Kincaid, Steven Henke, and Carolyn Otto (174)**

Faculty Advisor/Collaborator: **Paul Thomas**

*A Thermal Model of the Crust of Saturn's Satellite Enceladus*

The icy terrain of the Saturnian moon, Enceladus, suggests a violent history of bombardment--a history which is actively overwritten by geological mechanisms. Thermal imaging of the southern polar region suggests heat flows beneath the ice may be responsible. Furthermore, an early 2006 flyby of NASA's Cassini spacecraft imaged water ice jetting from Enceladus' south pole. We investigate the effects of these suggested heat flows by modeling the thickness of Enceladus' surface ice layer.

**Emily Kopp, Aaron Anderson, Byron Edgar, and Alyssa Frey (175)**

Faculty Advisor/Collaborator: **Doug Dunham & Matt Evans**

*Chemical State Analysis of Manganese Islands on Semiconductor Surfaces*

Understanding the interface between metals and semiconductors is important for the development of nano-electronics and improving the efficiency of light emitting diodes (LEDs). Manganese growth on silicon is unique in that it tends to form islands instead of growing layer by layer. We are investigating the chemistry of these manganese islands and the interface that forms between the metal and the semiconductor surface as a function of temperature using X-ray Photoelectron Spectroscopy.

**Brett Wingad (153)**

Faculty Advisor/Collaborator: **Scott Whitfield**

*Determination of Chromium 3d Off Resonant Angular Distribution Values*

The direction of emission of photoelectrons from atoms is characterized by the angular distribution parameter beta. Measurements of beta over an extended photon energy region can give insight into the dynamics of the photoionization process. Using synchrotron radiation from the Aladdin storage ring in Stoughton Wisconsin, we have measured the beta values of the 3d photoelectrons from the open-shell chromium atom in the photon energy region from about 20 eV up to 160 eV. The angular distribution values show a steady increase from about 0.2 up to 1.2 at 80 eV where they remain essentially flat.

## **Public Health Professions**

**Megan Arndt (171)**

Faculty Advisor/Collaborator: **Crispin Pierce**

*Population Kinetic Analysis of MTBE and ETBE Exposures*

Millions of people have been exposed to the gasoline additives MTBE and ETBE, while little is known about how quickly the body excretes these chemicals. Our study uses powerful mathematical techniques to estimate how quickly, and with how much variability, a population of volunteers exposed to these chemicals excretes them.

**Michael Checkai and Tola Ekunsanmi (190)**

Faculty Advisor/Collaborator: **Crispin Pierce**

*Survey of Antibiotic-Resistant Bacteria in Soil Treated with Septic System Effluent*

We are interested in the potential generation of antibiotic-resistant bacteria from the human (over)use of antibiotics. To this end, we compared the prevalence of antibiotic-sensitive to antibiotic-resistant bacteria in agricultural soil regularly treated with septic system effluent.

# Graduate Entries

## Communication Sciences and Disorders

### **Andrea Boh (150)**

Faculty Advisor/Collaborator: **Linda Carpenter**

*Mentoring Undergraduates in Research*

This poster addresses the Ph.D. shortage in higher education by describing efforts at the University of Wisconsin–Eau Claire to mentor undergraduates in research. In spring 2005, 20 undergraduates in CSD began a Directed Studies experience with the faculty collaborator; they formed research teams, selected topics, searched the literature, developed research questions, designed projects, and wrote and submitted proposals for university funding. Projects were conducted in fall 2005; data were analyzed in spring 2006. This poster documents the process of this research experience, student learning outcomes derived from a survey at the beginning of the fall 2006 semester, dissemination efforts for each project, and lessons learned in mentoring undergraduate students in research.

### **Heidi Hoerning (131)**

Faculty Advisor/Collaborator: **Kristine Retherford**

*Token Ratio Scores: Establishing Norms for Preschool-Aged Children*

I would like to present the pilot study for my Master's thesis regarding normative data on the diversity of vocabulary within the expressive language of toddlers. To complete my pilot study I collected spontaneous expressive language samples from 6 2-year-old children. With each of the samples I compared the total number of words used and the total number of different words used to the normative statistics on the total number of words used and the total number of different words used in the expressive language samples collected from 3-year-old children, as was reported by Mildred Templin in 1957. The differences were notable. Therefore I was inspired to carry out a Master's thesis on the same topic. Some preliminary results of my Master's thesis will also be presented.

### **Akiko Watanabe and Maureen Sondreal (132)**

Faculty Advisor/Collaborator: **Larry Solberg**

*The Effects of Cryotherapy in the Treatment of Unilateral Facial Weakness Secondary to Stroke*

Unilateral facial weakness is a common symptom of stroke. This can result in reduced clarity of speech, drooling, or problems with swallowing. There is little empirical information available about the effectiveness of treatment methods for treating facial weakness. The purpose of this study is to examine whether cryotherapy (cold application) in combination with oral motor exercises is more effective than oral motor exercises with no thermal application in treating unilateral facial weakness secondary to stroke. Determining the effectiveness of these treatment methods would assist in developing a protocol that Speech-Language Pathologists who work with this population can follow.

## Economics/Management & Marketing/Nursing Systems

### **Kathy German, Ian Hansen, and Carleigh Nelson (152)**

Faculty Advisor/Collaborator: **Eric Jamelske & Jennifer Johs-Artisensi & Lois Taft**

*A Quantitative and Qualitative Analysis of Health Care Coverage and Concerns in Western Wisconsin*

In this project we will report on health care coverage and health care concerns of Western Wisconsin residents by collecting both quantitative and qualitative data reflecting health care experiences of individuals who identify themselves as well-insured, underinsured or uninsured. The Coalition for Wisconsin Health and the American Association for Retired Persons (AARP) have both expressed an interest in the results of this research to guide the policy debate as Wisconsin moves forward with health care reform efforts. We have received permission to use an AARP survey on health care coverage employed by the state of Vermont prior to their recent state health care reform initiatives and have adapted this survey slightly to meet our

specific needs. We hope this process will lead to meaningful comparisons between Vermont and Wisconsin thereby providing valuable information to policymakers. Although we have no initial data to report, our poster describes our research in detail setting the stage for our data collection and analysis in the summer 2007. This project serves to connect the university to the community by ensuring that health care reform decisions are informed by current research, while also providing excellent hands-on experience in data collection and analysis for students.

## History

### **Tabitha Erdey (253)**

Faculty Advisor/Collaborator: **John W.W. Mann**

*“For Admission as a County Charge”:* *County-Provided Tuberculosis Care at Mount Washington Sanatorium, 1913-1974*

Produced for the Eau Claire County Sesquicentennial Commission, this project consists of a paper and poster panels. The paper examines the history of care of tubercular patients at Eau Claire’s Mount Washington Tuberculosis Sanatorium and demonstrates the limited “social safety net” provided by Eau Claire County at Mount Washington. The related panels trace the history of the Eau Claire City-County Health Department from 1856 to present. The paper was presented at Indiana University’s Paul Lucas Conference in Cultural History, March 3, 2007.

### **Tabitha Erdey (254)**

Faculty Advisor/Collaborator: **John W.W. Mann**

*Randall Park History and Architecture Survey*

Since spring semester 2004, students enrolled in History 386/586: Introduction to Public History, have been conducting research in the Randall Park neighborhood documenting the history and architecture of homes in the area. The survey will ultimately be submitted to the City of Eau Claire and the State Division of Preservation and Public History for inclusion on a database of historic structures in the state and to determine whether the existing Randall Park historic districts should be expanded. During the 2006 - 2007 academic year, graduate student Beth Erdey edited and revised students’ work to compile the completed survey.

## Information Systems

### **Adriana Martinez Santa Cruz (247)**

Faculty Advisor/Collaborator: **Bruce Lo**

*Do Different Ethno-Linguistic Groups Exhibit Different Content Preferences among the Top-Ranking Internet Web Sites?*

The Internet has revolutionized the ways we communicate and interact with each other. An intriguing question that has baffled both technologists and social scientists is, “Does the Internet empowers different ethno-linguistic groups to assert their cultural diversity more effectively or does it exert an homogenizing influence that diminishes ethno-cultural uniqueness?”. During the past few years the researchers have been tracking the rise and falls of the top ranking Internet sites. In this project, we examine the contents distribution (or major functional purposes) of these most frequently visited Websites (called the Top 100 Websites) of different language groups. It was found that there were considerable differences in content preference among the different language groups, lending credence to the assumption of a strong heterogenizing influence in Internet-mediated communication.

## Psychology

### **Bob Latterman, Courtney Wood, and Stephanie Pahl (170)**

Faculty Advisor/Collaborator: **William Frankenberger**

*The Effect of Stimulant Medication Warnings on Teachers’ Attitudes and Attention Deficit Hyperactivity Disorder Treatment Referrals*

The purpose of this study is to 1) determine the effectiveness of warnings about cardiovascular problems, growth suppression and psychotic effects for stimulant medications recommended by the FDA, 2) examine teachers’ attitudes about stimulant medication in light of the warnings, and 3) determine if warnings related to side effects have an impact on teachers’

willingness to recommend stimulant medication as an initial treatment for ADHD. Participants consist of student teachers in both general and special education programs at a midwestern university. The study uses an experimental design to compare the effectiveness of side effect warnings versus popular information on teachers' attitudes towards stimulant medications and its use for treatment of attention deficit hyperactivity disorder. It is important to determine the effectiveness of new side effect warnings in light of reports that stimulants may be linked to a number of serious complications such as cardiac arrhythmia, stroke, suppressed growth, and psychotic effects. Since research has indicated information can affect attitudes towards types of treatment for ADHD and teachers are typically the first to refer a student for ADHD assessment, it is necessary to understand how side effect warnings may be affecting teachers' attitudes towards stimulant medications.

## **Psychology/Kinesiology**

### **Trisha Kemps (151)**

Faculty Advisor/Collaborator: **Allen Keniston & Garry Grant**

*Does the Physical and Emotional Strain of a Competition Produce Similar Cognitive Deficits to Those of a Concussion?*

ImPACT is a computer application that assesses the neurocognitive effects of athletes' concussions suffered during competitions. Much data indicate the validity of several cognitive assessments offered in the program, but an important contrast is missing in reported studies: Comparison to non-concussed individuals who have played hard in games. Thus it is not known to what extent deficits discovered in concussed individuals may result from such sources as fatigue, temporary depressed mood, or other minor injuries they may also have suffered. Our study compared five neurocognitive measures taken from 8 college athletes 48 hours after they were concussed during a sports competition to the same measures taken from 8 non-concussed athletes 48 hours after they played in a sports competition. Participants included men and women playing a variety of contact sports. As part of their athletic programs all participants provided baseline ImPACT scores prior to the beginning of their sports seasons. The expected pre-post interaction with concussion/no concussion conditions did not emerge in analyses; rather, only main pre-post effects appeared in the data. Our findings do not invalidate findings from larger studies, but do suggest that some of the variance attributed to concussion may be confounded with that from other causes.

## **Public Health Professions**

### **Patricia Krug, Taylor Hunding, and Katya Alcaraz (172)**

Faculty Advisor/Collaborator: **Crispin Pierce**

*Survey of Heavy Metal Exposure in Children as Assessed through Hair Analysis*

Heavy metals in human hair have been shown to be a marker of long-term exposure. We are collecting hair samples from children and corresponding questionnaire responses from their parents, to assess whether demographic or lifestyle factors are predictive of levels of mercury, lead, chromium, or arsenic exposure.

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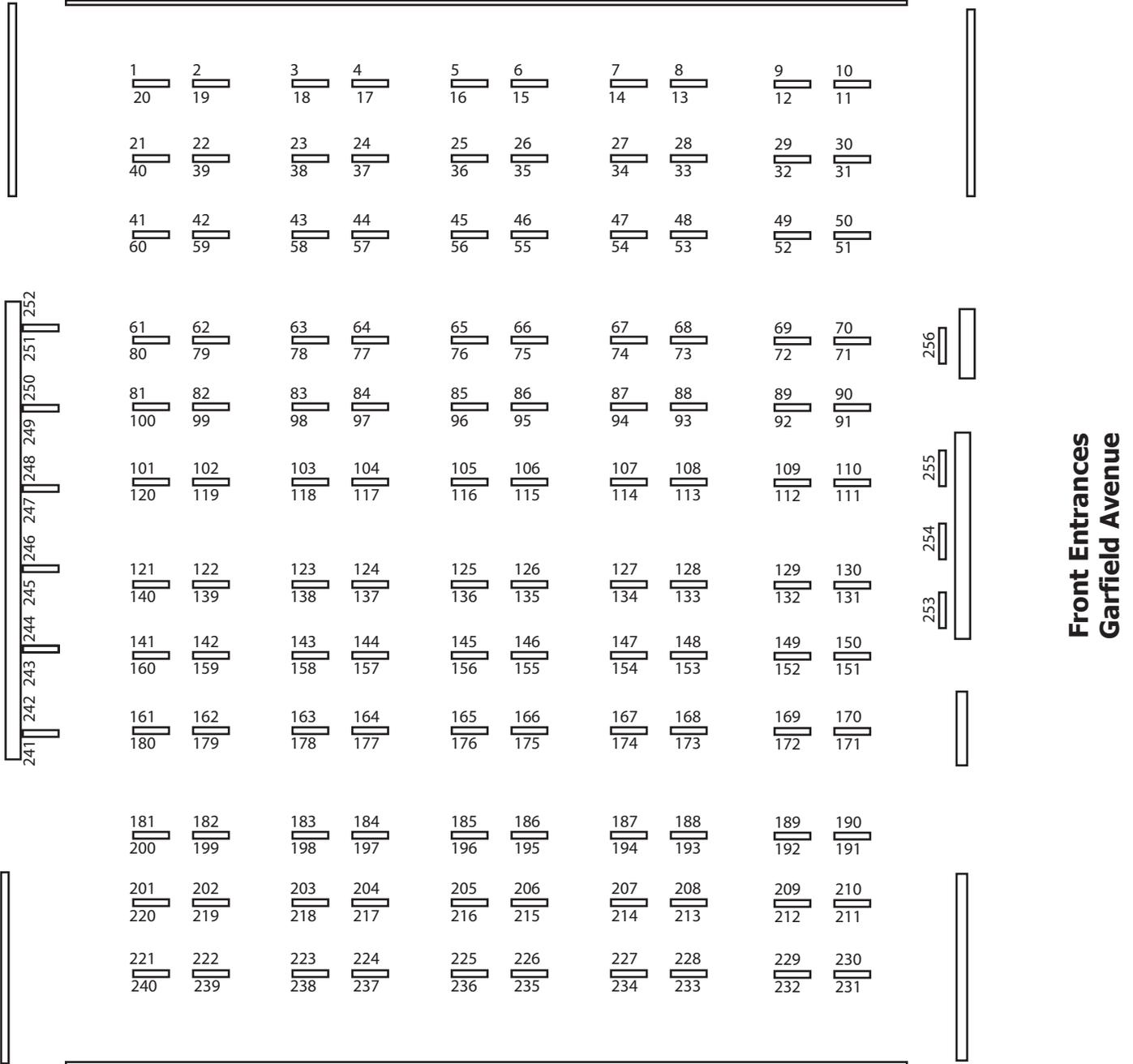
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# Zorn Arena Map



## Zorn Arena