

Center of Excellence

for Faculty and Undergraduate Student Research Collaboration

Proceedings of the 18th Annual University of Wisconsin-Eau Claire Student Research Day

April 26, 27 and 28, 2010

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

Schedule of Events

Monday, April 26, 2010

Time	Event	Location
7:00 – 8:30 a.m.	Students set up posters	Zorn Arena
8:15 – 8:30 a.m.	Judges' orientation	Gold Room, Zorn Arena
8:30 – 3:00 p.m.	Judging (lunch ~11:30 in Dulany)	Zorn Arena
Noon – 6:00 p.m.	Poster session open, with student presenters at posters from Noon to 4:00 p.m.	Zorn Arena
3:45 – 5:00 p.m.	Student Research Day reception	Tamarack Room, Davies Center
~4:15 p.m.	<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 27, 2010

Time	Event	Location
8:00 a.m. – 6:00 p.m.	Poster session open to University community and public	Zorn Arena
12:30 – 1:30 p.m.	Special feature: Science/Math student presenters at posters to welcome high school students	Zorn Arena

Wednesday, April 28, 2010

Time	Event	Location
8:00 a.m. – Noon	Poster session open to University community and public	Zorn Arena
Noon – 1:00 p.m.	Students remove posters	Zorn Arena

Judges

Arts and Humanities

Marynel Ryan Van Zee, Assistant Professor of History, University of Minnesota, Morris
Stephen Heinemann, Associate Professor of Music, Bradley University

Behavioral & Social Sciences

Jorge Conesa-Sevilla, Associate Professor of Psychology, Northland College
Eleni Pinnow, Assistant Professor of Psychology, University of Wisconsin-Superior
Paula O'Loughlin, Professor of Political Science, University of Minnesota, Morris
Wayne Evens, Program Director; Associate Professor, Department of Sociology and Social Work, Bradley University
Kelly Herold, Associate Professor, Communication Studies, Winona State University

Business & Professional Studies

Carol Mooney, Professor, School of Education, University of Wisconsin-Stout
Joan Hamblin, Associate Professor, Department of Family Medicine, University of Wisconsin School of
Medicine and Public Health and Director, UW Health-Eau Claire Family Medicine Clinic

Natural & Physical Sciences

Kelly McConaughay, Professor of Biology; Associate Dean of College of Liberal Arts and Sciences, Bradley University
Bob Shuster, Associate Professor, Department of Geography/Geology, University of Nebraska at Omaha
Peh Ng, Professor of Mathematics, University of Minnesota, Morris
Michelle Edgcomb, Laboratory Coordinator (Biophysical Chemistry), Bradley University

Acknowledgments

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

Karen Stuber, Christine Henricks and Event Services staff—for arrangements in Zorn and Davies Center.

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

Jason Jon Anderson and University Stage crew—for setting up the Arena.

Terri Knudtson, Kristine Hessler, and the Catering staff—for producing delicious victuals for the judges and for the reception.

Betty Feia, Shawn Seuferer, and Kelli Basa, ORSP office staff members—for helping with myriad organizational details.

Stephanie Hager—for the design of the cover of this abstract volume and Research Day publicity materials.

Melissa Davey Castillo, 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; **Mike Skarp, Matt Schultz, and Beth Krantz**—for helping us develop our new electronic application form and being ready and willing to assist whenever we needed them; **Sarah Brower and Help Desk employees**—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 18th Annual UW-Eau Claire Student Research Day.

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Graduate Entries

Counseling Services, Psychology

Walsh, Hannah Elizabeth, Rebecca Lee Kolb, Julia Mary Emch, Caitlin Tracy Campbell, Joshua Martin Kowaleski, and Randall Arthur Kins (79)

Faculty Mentor/Collaborators: **Patrick Kennedy** and **Allen Keniston**

The Outcome Impact of a Structured Suicide Prevention Training Program on a College Campus

This study assessed the outcome impact of providing a structured suicide prevention program to selected student, faculty, and staff audiences at the University of Wisconsin-Eau Claire. We first reviewed the Oshkosh Suicide Prevention Survey and the Youth Risk Behavior Scale Suicide Items, and then integrated demographic questions into both of these pre-existing surveys. These surveys were then used in a pilot study with a sample of convenience to assess the survey's utility. We then incorporated this into a suicide prevention training program which was administered to 140 resident assistants on campus, using the scales first as a pretest and later as a posttest to evaluate the program. The data gathered was then tabulated to assess the degree of impact of the suicide prevention training program, and to help the University of Wisconsin-Eau Claire counseling services refine its suicide prevention training on campus.

Information Systems

Lkhagvadorj, Baterdene (23)

Faculty Mentor/Collaborator: **Bruce Lo**

Marketing to the World in Cyberspace: How Major International Banking Corporations Reach out to the Global Marketplace through Their E-business Websites

To be successful in the global marketplace, international corporations face two challenges. On the one hand they need to convince world customers of the unique brand value of their products/services, and at the same time tailor their offerings to the local needs and circumstances. To maximize their reach, apart from setting up local branches at different geographical sites (which can be very costly) these corporations rely on their e-business websites to market themselves in cyberspace. This research examined the approaches taken by the top 30 international banks by comparing their e-business websites in terms of the degree of localization, site server dispersion, webpage appearance and design, and website interaction features. Preliminary results show that these banks can be categorized into three different groups along the localization-globalization continuum. The differences highlight the distinctive ways taken by these banking corporations to reach and serve their international audience. The underlying principles of this classification scheme provide a useful set of guidelines to e-marketers for planning their global marketing strategies.

Psychology

Gabert, Britny Ann (78)

Faculty Mentor/Collaborator: **Michael Axelrod**

Spectrum Disorders and Specific Learning Disabilities: Parental Perspectives of Special Education Services

Many parents of children with special needs report mixed satisfaction with their child's special education services. This study will compare parent satisfaction ratings of the special education services received by children with an autism spectrum disorder and children with a learning disability. There is some research to suggest that parents of

children with low incidence disorders, like autism, may show more dissatisfaction with special education services than high incidence disorders like specific learning disabilities (Abramson et al., 1983). Comparisons of parental satisfaction with special education services, school-home communication, and involvement in the IEP process will be made between groups of parents.

Lauersdorf, Brandon Lee, Erin Christine Liffbrig, Greta Anne Fenske, and Christine Lynn Peterson (77)

Faculty Mentor/Collaborator: **Michael Axelrod**

Assessing the Social Acceptability of Brief Experimental Analysis in the Context of a Complete Reading Intervention Program

The purpose of the current study was to evaluate the social acceptability of Brief Experimental Analysis (BEA) of oral reading fluency and subsequent interventions resulting from the BEA findings. Understanding consumer satisfaction with BEA is important for several reasons: (1) If the procedure is considered acceptable, then the probability of use is high; (2) the chances the procedures will be implemented correctly by consumers are associated with acceptability; (3) outcomes are often related to acceptability. Nine undergraduate students (the participants) were trained in implementing reading interventions to 2nd grade students. A researcher- developed questionnaire was used and was aimed at evaluating the participants' satisfaction with the implemented reading intervention as chosen by the BEA. The participants reported that the BEA procedures were useful and easy to conduct, the training provided was adequate for the BEA and interventions used, and the interventions used were easy to implement. Results of the current study add to the developing literature suggesting BEA has a high degree of social acceptability.

Peterson, Christine Lynn (100)

Faculty Mentor/Collaborator: **Michael Axelrod**

Playground Settings and the Impact of Recess on Classroom Attention

This study focuses on the comparison of two recess environments and their impact on classroom attention after outdoor play. This research is important in understanding the impact recess has on classroom behavior. Recess environments were either on the playground or a nature walk. Preschool children were exposed to each of the recess environments for approximately 30 minutes per day for four weeks, and observational data were collected directly following each recess to determine the effects of the outdoor activity on attention. Recess conditions were presented one per day in a counterbalanced order over approximately four weeks. After each recess children were observed in their classroom for a twenty-minute period by the primary investigator and student researchers. There was adult/teacher supervision for each recess condition as well as in the classroom. Only the teacher had direct contact with the children. Results indicate no significant change in the children's on-task behavior. Discussion will focus on implications of these findings, limitations and directions for future research.

Zank, Amber Jo and Amber Kay McDougal (99)

Faculty Mentor/Collaborators: **Michael Axelrod and Angela Axelrod**

Training Interventionists to Implement a Brief Experimental Analysis of Reading Protocol to Elementary Students: An Evaluation of Three Training Packages

As the Response to Intervention (RtI) movement has gained momentum, research in school psychology has focused more on data-based decision-making and applying these decisions to academic interventions. One area that has gained increasing focus is brief experimental analysis (BEA) of oral reading fluency. Although literature is replete with BEA research, the literature has failed to focus on training interventionists to implement BEA of reading. The

purpose of the current study was to extend previous research on training interventionists to conduct functional analyses to the context of BEA. In the study, three training conditions were evaluated using interventionists to implement BEA of reading to elementary school students. The three conditions were evaluated to determine which one resulted in the highest procedural integrity. Results suggest interventionists in all three training conditions implemented the BEA of reading with high rates of integrity. Participants in Condition 1 implemented the BEA with 91% accuracy, participants in Condition 2 were 86% accurate, and participants in Condition 3 were 95% accurate. Results indicate that using a brief training of interventionists to conduct a BEA of reading holds promise for school personnel looking for effective and easy-to-implement interventions for increasing elementary students' oral reading fluency.

Arts and Humanities

Art and Design

Berg, Marguerite Louise, Rachel Jeanne Konsella, and Kaleb Noonan Durocher (250)

Faculty Mentor/Collaborators: **Wanrudee Buranakorn** and **Jyl Kelley**

Language In-Form

This project is to curate and produce a retrospective exhibition and a catalog of photographs by Wanrudee Buranakorn. A retrospective exhibition is an exhibition of works produced by an artist over a considerable period, or of an artist's life's work, or of a representative selection of it. It provides the artist and the public an investigation of the artist's background, influence, and development. The collaborators studied curatorial attempts from past retrospective exhibitions and catalogs and studied Wanrudee Buranakorn's artwork created since 1994 in order to create a theme and select 21 pieces of Wanrudee's work that exemplify the exhibition's theme. The collaborators are in a process of producing the exhibiting pieces and designing the exhibition catalog. The production involves studying the best method of converting photographic images from film to digital by way of wet-mount scanning, editing, and printing large-scale photographs on a variety of inkjet printing materials. The outcomes of this project are the exhibition, a curatorial essay, the exhibition catalog, and a manual for converting black-and-white film to digital using wet-mounting method. The exhibition, entitled *Language In-Form*, is scheduled to take place at the Seven Art Gallery, Bangkok, Thailand, in July 2010.

Indrane, Liene, Eva Ikstena, and Dace Jaundaldere (271)

Faculty Mentor/Collaborator: **Jyl Kelley**

Cultural Perceptions 2010

The Latvian Exchange Project, "Cultural perceptions 2010" will have students from Latvia and the University of Wisconsin-Eau Claire collaborating to design an international photography exhibit. Eva Ikstena, Dace Jaundaldere and Liene Indrane, three Latvian exchange students, presented lectures on the history and peoples of Latvia, and have selected music they feel represents Latvian culture. UW-Eau Claire advanced photography students will interpret the music through a series of photographs. Likewise, Latvian Culture College instructor Gunta Anderson will direct her art students in their interpretation of an innovative mix of music provided by UW-Eau Claire students. This project ties the elements of scholarly research and faculty student collaboration in a global setting. Students from both countries are learning about teamwork and the group effort to make the exhibit a reality. In culmination of the project, a series of photographs will be displayed at the Latvian Culture College and the Museum of Foreign Art in Riga, Latvia, and in Haas Fine Arts Center in April 2010. The goal of the project is to share and interpret visual culture between American and Latvia. Our blog: <http://uwec-lkk.blogspot.com/>

Smith, Daniel Lee Ruff, Kaleb Noonan Durocher, and Andrew Charles Kaiser (249)

Faculty Mentor/Collaborators: **Jyl Kelley and Wanrudee Buranakorn**

Residual Reality

The exhibition "Residual Reality" is a successful collaborative project where students and faculty in the department of Art and Design have collaborated to create an innovative public display in the Foster gallery. UWEC art students were involved in every aspect of the development of the exhibition including corresponding with artists & gallery staff to select and edit artworks, traveling to Chicago to meet with art managers, curators and gallery directors who lent us important artworks for our show, completed detailed insurance paperwork necessary to secure valuable art objects, designed a unique gallery space for our show concept, created promotional materials (postcard, book & posters), documented the show with photographs and video and ultimately assisted with the final installation of the entire show. The next step has been producing a creative and informative video document of this experience to share with present and future students plus producing supportive graphics. This video informs current and prospective students with a closer look into the workings and philosophy of our department as well as the possibilities that exist with experiential learning and faculty collaboration. It also gives future students ideas about the possibilities that exist in collaborating with faculty and gaining invaluable experiential knowledge.

English

Fox, Michael Joseph (198)

Faculty Mentor/Collaborator: **Erica Benson**

"The Bag that Scott Bought": The Low Back Vowel Merger, Northern Cities Shift, and Pre-Velar Raising in Eau Claire, Wisconsin

Despite the low vowels being collectively involved in three sound changes – (1) The Northern Cities Shift, a complex vowel shift, common in cities near the Great Lakes, including Madison; (2) the Low Back Merger, in which the vowels in “caught” and “cot” are pronounced the same, widespread in the West; and (3) Pre-Velar Raising, which affects the “a” vowel before velars like “g” such that the vowel in “bag” sounds more like “bait”, found in the upper Midwest – American dialect research has dealt with them minimally in Wisconsin. We examine the outcome of these sound changes converging on west-central Wisconsin. Acoustic analysis of the vowel systems of forty residents of Eau Claire show universal presence of Pre-Velar Raising along with indications of Low Back Vowel Merging with minimal signs of the Northern Cities Shift. Moreover, contrary to previous accounts (e.g. Labov et al. 2006; Purnell 2008), we believe (1) Pre-Velar Raising is separate from the Northern Cities Shift and (2) the Low Back Merger and the Northern Cities Shift can coexist. We demonstrate the significance of using vowel duration and trajectory data and the importance of examining the low vowels as a subsystem in studying regional dialect boundaries.

Huber, Christina Lyn and Heidi Beth Potratz (243)

Faculty Mentor/Collaborator: **Jennifer Shaddock**

Domestic Trauma in Rebecca West's The Return of the Soldier

Christina Huber, Heidi Potratz and faculty mentor Dr. Jenny Shaddock are working to formulate a new interpretation of Rebecca West's World War I novel, *The Return of the Soldier*, which was published in 1918. It is their argument that Kitty, much like her shell-shocked husband, Chris (the novel's central protagonist and the focus of most literary criticism), also experiences severe trauma and in turn suffers from Post-Traumatic Stress Disorder. Yet, because her war is a private, feminine battle, Kitty's trauma is not recognized by either the male-dominated society in which she lives or by recent modern critics. The paper will integrate previous scholarship on *The Return of the Soldier* as well as research on Post-Traumatic Stress Disorder and twentieth-century stereotypes about

women. It is the hope of the authors that such a project will not only lend new insight into West's work, but that innovative interpretations of Post-Traumatic Stress Disorder will resonate for female soldiers and abuse victims today.

Kramer, Joshua (219)

Faculty Mentor/Collaborator: **Erica Benson**

Caution: High Levels of Emotional Investment in the Public View of Language

While there seems to be no limit on the amount of critical linguistic opinion offered by the general public in daily speech and conversation, little of that data is currently in a usable form for meaningful research. Furthermore, it has been asserted that linguists "have not assessed the knowledge base of their clients" (Shuy 1981) and thus are not fully aware of what is important, linguistically, to the average speaker. We looked at a treasure trove of accessible folk data in Schott's Vocab blog posted on the New York Times website on April 24, 2009. Readers of the blog were asked to submit their complaints about the way they and the people around them talk. Through categorization of the responses and examination of the comments that came with them, our study demonstrates that the public is highly personally and emotionally invested in their language. Of the 822 comments catalogued in our study, 36% conveyed some level of emotional reaction to the particular language peeve being described (e.g., Arrrggghh!). These data suggest that variance in language is not merely a matter of correctness to these speakers, but a deeper, more psychological issue of belief of superiority, worthy of further study.

Merry, Anna Victoria (218)

Faculty Mentor/Collaborator: **Erica Benson**

"Oh, the pain of the over-used apostrophe!": A Linguistic Analysis of Language Pet Peeves and Writing

Linguists' choices of what to study – and what to teach – are often guided by their own ideas about the general public's beliefs, though the public's beliefs about language have rarely been the focus of empirical study (e.g., Shuy 1989). We studied people's perceptions of language by analyzing 915 language pet peeves submitted by readers of the New York Times. We categorized readers' posts by linguistic level (e.g., syntax) and type within each level (e.g., verb form) as well as additional comments. Although linguists often consider written language less worthy of attention, since it is less authentic or natural than spoken language, our results suggest that the public does not share this opinion. We found that a surprising number of responses noted features found only in writing and not in speech. Over 13% of all peeves directly addressed spelling or punctuation "errors," with over 36% of these involving homophones (e.g., there vs. their), and 38% mentioning apostrophe use. These results suggest that the general public holds issues of written language in high esteem, and linguists should perhaps shift the focus of their teaching (and research) toward inclusion of written language phenomena to better reach the public.

Rohlinger, Spencer Marie (220)

Faculty Mentor/Collaborator: **Ruth Cronje**

A New Instrument to Assess Scientific Literacy of Citizen Scientists

Scientific literacy is one goal of citizen science programs, but general instruments to assess public scientific literacy have failed to detect scientific literacy gains in citizen scientists. To test a new "context-sensitive" assessment instrument, volunteers in two invasive species monitoring events in Wisconsin and Colorado (n=56) received training in species identification, sampling techniques, and the use of GPS devices. Before and after training, subjects completed a survey that included "general" and "context-specific" items. N= 91 "control" subjects completed the survey but did not attend the event. Survey responses were scored independently by two raters. Results show that the context-sensitive instrument detected significant ($P = .007$) gains in the scientific literacy of

subjects while no significant gains were detected by the “general” item. These results suggest that context-specific instruments are more likely to detect gains in the scientific literacy of participants in citizen science experiences.

Shaffer, Kyle James (221)

Faculty Mentor/Collaborator: **Lynsey Wolter**

Vendler on "Know" and "Believe" and Problems in Contemporary Epistemology

This project explores Zeno Vendler’s linguistic analysis of the meaning of the verbs believe and know, which led him to challenge dominant philosophical theories of the nature of belief and knowledge. The content of the project poses important challenges for the theory of knowledge as “justified, true belief,” a view which has been discussed since the time of Plato, and is widely held among contemporary epistemologists. Research was conducted as an ongoing literature review of both the writing of philosopher Zeno Vendler, whose theories initiated interest in the question, and philosophers writing in response to Vendler. Three types of responses to Vendler’s analyses were found: those which pose relevant, insightful critiques of Vendler’s theory; those which present unconvincing or unwarranted critiques; and those which support Vendler’s overall conclusion while eschewing parts of his methodology. Our expected conclusion is that although Vendler’s analysis depends in part on problematic assumptions about English syntax, there are valid reasons to believe Vendler’s main proposal that the natural language verbs believe and know take very different objects, and that this proposal presents a serious challenge for the view that knowledge is justified true belief.

Sommer, Heather Leanne (199)

Faculty Mentor/Collaborator: **Erica Benson**

The Influence of African-American English (AAE) Discourse Styles on the Slam Poetry of Non-AAE-speaking Performers

In its short 30-year history, slam poetry, a performative art with roots in hip-hop, has been dominated by African-American (and other minority) slammers. Interestingly, despite the primary audience of slams being middle-class Caucasians (e.g., Somers-Willett 2009) features of African-American English and the Black Oral Tradition are commonly used by not only African-American English speaking performers but also performers of other ethnicities/dialects. I demonstrate that discourse characteristics common to African-American English and the Black Oral Tradition — spontaneity (improvisational deviation from a practiced piece), braggadocio (a type of boasting), call and response with rhythmic features typical of African-American church services, and others (e.g., Smitherman 2000; Alim 2008) — are frequently used in the slam poetry of non-African-American English speaking performers. In particular, I examine work by Taylor Mali (Caucasian) and Beau Sia (Chinese-American), in an individual performance and a team performance with New York City’s Team Nuyorican. Moreover, I argue that successful slammers adopt features of African-American English and the Black Oral Tradition to strengthen their perceived minority identity for the sake of authenticity (Somers-Willett 2009) and to build on performances immediately previous to their own for the sake of competition.

Tambornino, Kimberly Marie (244)

Faculty Mentor/Collaborator: **Kelly Wonder**

Residence Life Experiences of International Students at UW-Eau Claire

Living in residence halls is a crucial part of the American college experience. The time spent in the residence halls is equally important to international students studying in the U.S. Understanding how residence life can be enhanced benefits both the English as a Second Language field as well as the Student Affairs field. Two questions guided this study: What experiences do international students have in the residence halls? and How does residence life impact the students’ experiences at a four-year university? To answer these questions, a survey was administered to the

international student population of a four-year university during the spring and fall 2009 semesters. Results indicate resident assistants and roommates to be the most influential factors of positive or negative residence life experience.

Foreign Languages

Alba, Danielle Maria (241)

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

The Reflection of Environmental Damage Done during the Puerto Rican Industrialization Movement of the Mid Twentieth Century in the Literary Works of Rosario Ferré

This study examines the texts of Puerto Rican author Rosario Ferré, focusing on her use of imagery and duality to bring an awareness of the environmental damage done to the island of Puerto Rico during the industrialization movement. The research focuses on three of Ferré's works and their translations; *Papeles de Pandora (The Youngest Doll)*, *Maldito Amor (Sweet Diamond Dust)* and *The House on the Lagoon (La Casa de la Laguna)* with the purpose verifying if the fiction Ferré writes is historically accurate or if the environmental damage she exposes is unfounded. While Ferré is known for her use of metaphor and allegory to express her social and political ideology, as of 2009 we have found very few critical sources that broach the environmental effect industrialization has had on the island as well as on its people. This research identifies parallels between Ferré's imagery and the harmful effects of the industrialization movement in Puerto Rico, focusing on Operation Bootstrap.

Anthony, Ashley Margaret (223)

Faculty Mentor/Collaborator: **Maria Del Puy Ciriza Lope**

Student Attitudes towards Professors with Accents

The present study gathers qualitative data on the attitudes of UWEC students towards professors' accents. The issue of teacher intelligibility is frequently discussed in popular websites, such as ratemyprofessor.com, which influence students' perceptions and predispositions of the classroom experience. Experts on this topic have shown how the political economy of non-accent tolerance is contradictory with the efforts of American universities to diversify the faculty and student body. In this study, we (a) analyze the comments that have been posted on the internet about professors' accents; (b) through data gathered in semi-structured interviews, we examine the ideologies that UWEC students have towards other accents. Finally, the latest stage of the study will consist of the analysis of several interviews with professors dealing with the students' reception of their accents. This study will contribute to previous research collaborations carried out on this topic with students at UW-Eau Claire which are more quantitative-based in which it was found that experiences abroad affected the student's perception of different accents (see Rudnick 2009). The analysis of this topic will be based on research theories on sociolinguistics and discourse analysis (Lakoff 1980; Bauer and Trudgill 1999 and Schiffrin 2001).

Jansen, Michael Tyler (224)

Faculty Mentor/Collaborator: **Meghan Mehlos**

Picture This! Teaching Poetry with Visual and Textual Representation

Oftentimes, there is much abstraction and symbolism in poetry and, by complementing the text with visuals that convey a similar message, we as teachers can provide another avenue for our students to identify and understand the figures, scenes or objects that the poem depicts. Our examination of the poetry of contemporary Mexican poet Verónica Volkow in her work *Arcanos* demonstrates how the visuals and text therein complement each other to convey a similar message. The presentation speaks to the need of language learners to have access to materials in their target language in multiple modes, catering to the needs of the multiple learning styles represented in the

classroom. In the process, we offer applications for second language classroom instruction in a foreign language context by using visuals to aid in reader comprehension of an unfamiliar text in the target language.

Kochom, Garrett Louis (247)

Faculty Mentor/Collaborator: **Matthew Waters**

More Than a Handful is Too Much: An Examination of Republican Roman Battle Tactics

My research examines Republican Roman field armies (circa 218 – 168 BCE) to establish their tactical organization and deployment strategies in order to determine how significant it was in their success. It develops a counterpoint, as well as adds complexity to the commonly held interpretation that the Romans were successful against their various enemies due to having greater resource availability, especially in manpower. The project uses mainly ancient (i.e. Roman) sources, supplemented by modern secondary literature for descriptions of Roman battles and tactics as well as those of their enemies. While not discounting the fact that massive reserves of manpower was undoubtedly a valuable asset, the unique tactical formation used by the Roman legions during this period was greatly influential in Rome's ultimate success, especially when deployed against the Greek phalanx formations. The Greeks used armies of massed infantry standing very close together, all joined as one giant unit. The Romans, however, pioneered small-unit tactics, and organized their armies into smaller formations capable of acting independently of the rest of the army. This made the legions extremely versatile in battle when compared to the phalanx.

Maierhofer, Christopher Nolan (222)

Faculty Mentor/Collaborator: **Tomomi Kakegawa**

Why Aren't Young Japanese Farming?

This project investigated the reasons for the drastic decline in Japan's farming population. The goal of the project was for the student to conduct the research-interviews in Japanese with a largely non-English speaking population, using Japanese communication skills developed at UW-Eau Claire. This was accomplished in Japan, via interviews and correspondence with individuals both actively engaged in farming, those working with farmers, and laypeople. The anecdotal evidence was then corroborated with economic and anthropological research done on the topic to create a thesis. The total number of farms and farmers in Japan has been steadily decreasing since WWII, and today the majority of farmers are over 65-years old. This is due largely to agriculture policies that decreased arable land, and supported dependency on subsidies. The resultant situation is one of elderly, debt-ridden farmers whose children have abandoned the trade for more dependable work. On the other hand, the organic farming movement has been gaining in popularity as an alternative to the traditional system, which is widely viewed as failing.

History

Cormell, Jeffrey Alan (261)

Faculty Mentor/Collaborator: **James Oberly**

Foundation of a Nation: A History of Education on the Lac Courte Oreilles Reservation from 1940-1959

This project looks at the changes in education during the 1940's and the 1950's on the Lac Courte Oreilles Reservation in Northern Wisconsin. The project focuses on four schools, St. Francis Solanus Indian Mission School, Kinnamon School, Hunter (New Post) School, and the White Fish School. The project examines the schools' origins, the reactions to the schools by the tribe and neighboring community, the schools' successes and their failures, and how the progression of the schools fit in with the national education plans of the Department of Education and the Bureau of Indian Affairs. Eight students of the schools studied in the project have been interviewed on reflection of their experiences in the schools. The project is an attempt to prove that the value of

education held by the Lac Courte Oreilles was a predominant factor in the tribe's successes of the 1970's and 1980's. As part of the research for this project, St. Francis and Kinnamon school records were obtained, general correspondences to the State Superintendent of Wisconsin Schools were reviewed, and from the Bureau of Indian Affairs archives in Chicago several correspondences pertaining to education on the Lac Courte Oreilles Reservation were studied. The project includes an area map.

Dupont, Jacqueline Elise (262)

Faculty Mentor/Collaborator: **James Oberly**

The Racine Belles: The Rise and Fall of the Faded Stars of the All-American Girls' Baseball League

This project will survey the rise and fall of the Racine Belles, an All-American Girls' Professional Baseball team that was created to save professional baseball during the 1940s and 1950s. During this time, Major League Baseball's leading players joined the war effort to combat the Axis powers during World War II, creating a fear that the loss of these men could lead to the end of the sport. The Belles were popular and victorious but the team was disbanded sooner than other AAGBL teams. Our article will focus on the possibility that the return of the heroic MLB stars devastated women's professional baseball. This was a triumphant event in women's history and the effects of the Racine Belles and other AAGBL teams on the future of women's sports still lingers. Our research will consist of multiple secondary sources such as historical monographs and scholarly journals. More importantly, our research will include the use of primary sources from the National Baseball Hall of Fame and Museum.

Knowles, Lucas William (245)

Faculty Mentor/Collaborator: **James Oberly**

Beloit, Wisconsin and the Great Migration

The great migration of southern African-Americans to Northern cities in the first half of the 20th century is a well documented historical topic. African-Americans who had grown restive of the Jim Crow south headed North to urban settings seeking employment and a better life. As a result of this process many Midwestern cities such as Chicago and Milwaukee experienced drastic social changes. Another city which became a destination during the great migration is the small city of Beloit, WI. Early 20th century Beloit was a lively manufacturing locale centered on Wisconsin's southern border. When World War I started, Fairbanks-Morse was experiencing a manpower shortage. To fill the void Fairbanks-Morse began recruiting southern African-American men to work in their factory. By offering jobs and housing, Fairbanks-Morse established Beloit as a destination for southern African-Americans seeking to leave the South. The research will focus on the events that led to Beloit becoming a great migration destination. The role of industry, individuals, and family will be examined to provide the reasoning behind Beloit as a destination during the great migration. Overall the focus will be on the factors that led to African-American migration to Beloit in the first half of the 20th Century.

Olson, Elizabeth Ann (265)

Faculty Mentor/Collaborator: **Patricia Turner**

Fatality and Gender in the Great London Plague of 1665-6

The bubonic plague was the most devastating biological incident in late medieval and early modern Europe. The first major attack, known as the "Black Death," struck communities throughout Western Europe in the mid-14th century and resulted in tens of millions of fatalities. The last major outbreak in Europe was the "Great London Plague" of 1665-6 which killed an estimated 75,000-100,000 people. Was the plague's impact on Europe's first metropolis more characteristic of much later pandemics that would afflict urban centers in the 19th and early 20th centuries? The project will attempt to contribute to our understanding of the Great London Plague of 1665-6 by focusing on some of the most interesting – but still unexplained – demographic features of plague outbreaks in

Tudor-Stuart England, specifically the disparities in gender. Thirteen parishes' burial records were examined and entered into a database to analyze for disparities between male and female deaths in the 1665 plague. Although much of the previous research in this topic pointed to an unusual increase in female deaths compared to male deaths, the results from this project indicated that there was not a significant difference between male and female deaths in the parishes that were examined.

Vander Grinten, Garrett Patric (260)

Faculty Mentor/Collaborator: **Teresa Sanislo**

The History and Memory of the Marburg Uprising of 1809 and the Napoleonic Wars in Hessen

Our project asked why a monument to the 1809 Marburg Uprising against Napoleon appeared in the city of Marburg when it did (approximately 100 years after the event took place). We asked which social groups created it, what they hoped to achieve by erecting it, and what role the monument played in the landscape of historical commemoration in the city. Building on a vast literature on the “history of memory” in Germany, we explored the significance of this story for the construction of local and national identity in the region. We did our research in Marburg in the state archives and university library using primary source documents, such as newspaper articles, city records, and the published and unpublished papers of the Historical Society of Hessen. We found that the memory of other historical figures (such as St. Elizabeth or other members of the dynasty or Landgraf to which she belonged) were more central to the emerging historical consciousness of the city elite in the nineteenth century. Yet, the memory of the uprising did play a role in the historical landscape that framed local and national identity in Marburg. The monument became one of many ways that the local elite tried to anchor the identity of Marburg within a narrative of a broader German nationalism and affirm identification with the new German Empire.

Zenda, Benjamin Adam (246)

Faculty Mentor/Collaborator: **James Oberly**

German Wisconsinites during World War One

This article discusses the societal climate of German Wisconsinites during the period of 1914 – 1918. Many German Wisconsinites were quick to assimilate to American standards. However, after the United States joined the war, considerable suspicion brewed over any remaining traces of German heritage found throughout the state. Examples presented in this article include the details of numerous German language book burnings, and intimidation through secret societies such as the Wisconsin Loyalty League. Personal papers of several immigrants attest to the condition of the times in which they lived. The overarching theme of this article is that the incidents aimed at quashing German culture in Wisconsin during World War One were erratic and unfounded because no serious threat existed of any uprising or revolt in support of die Vaterland.

McIntyre Library

Parks, Kathryn (264)

Faculty Mentor/Collaborator: **Colleen McFarland**

Piecing Together a Knitting Community: The Legacy of Elizabeth Zimmermann

Elizabeth Zimmermann (1910-1999) transformed the image of knitting from domestic drudgery to an expression of beauty, intelligence, and women's camaraderie. Her belief that all knitters can design for themselves without the constraints of published and restrictive patterns revolutionized American knitting. Zimmermann began her own mail-order yarn supply business and knitting newsletters in the mid-1950s, hosted her own instructional television show and taught the first knitting camp/retreat in 1974. At a time when many American women and knitters were

isolated, Zimmermann paved the way for the revival of knitting circles and a self-identified community of knitters. This project, the first scholarly research conducted on Zimmermann, documents her life along with her impact on American women and knitters through her knitting camp (1974–present) and her published and self-published writings. This project draws its methodology from archival science, history and women’s studies including oral histories, information gathered from Zimmermann’s scrapbooks and references to her five published books.

McNair Program

Hazard, Michelle Mae (263)

Faculty Mentor/Collaborator: **Patricia Quinn**

How to Become a Dialect Writer in Thirty-Three Years: The Linguistic Environment of Paul Laurence Dunbar

Paul Laurence Dunbar was one of the first African American writers to rise to prominence in American popular culture and literature. While he wrote in many voices, Dunbar’s work is distinctive for its portrayal of African American and Southern dialects. Such pieces have been at the center of much critical work on Dunbar, as well as a source of controversy, raising questions about everything from the authenticity of his transcription to his fidelity to his own “race.” Division over Dunbar’s writing in non-standard dialects arises from a limited view of his exposure to speech varieties and engagement with the study of language. This project investigates the language influences on Dunbar, enlarges the scope of the evidence in frequently-cited sources, and establishes a place for the reintroduction of obscure materials into the conversation. Historical data on the ethnic population of Dunbar’s home town is combined with a review of biographies, unpublished manuscripts, and a catalog of Dunbar’s library to provide evidence of his rich experience with language. The social, literary, and linguistic implications of non-standard dialect literature continue to benefit from increasing scholarly attention, and this project demonstrates the need for thorough documentation of the influences that contribute to its production.

Music and Theatre Arts

Douglass, Katherine Leigh (248)

Faculty Mentor/Collaborator: **Ryan Jones**

Creating a Discography: The Commercial Recordings of Jo Stafford

This project assisted in the ongoing research and preparation of materials related to building a basic discography of recordings made by Jo Stafford (1917-2008) during her prolific professional career as a singer. Through collaboration with and guidance from the faculty advisor, the student, Katie Douglass, researched and compiled a thorough and detailed discographical listing pertaining to Stafford's commercial recording period with Capitol Records and Columbia Records, among other smaller labels. This database of information (including but not limited to record label, recording date, song title and catalogue number, composer, and relevant ensemble personnel) will ultimately serve a central purpose in a larger monograph documenting and contextualizing Stafford’s life and art in American popular music of the last century. Jo Stafford was a major figure in American pop music in the swing era, renowned for her subtle phrasal nuances and impeccable intonation. Much of the research time was spent in correspondence with archivists, record label contacts, and other discographers in an attempt to ascertain where primary source material was located. In the end, the majority of sources that were accessible were secondary sources, and so a discography was built using Tom Lord’s *The Jazz Discography*.

Holm, DeniseFaculty Mentor/Collaborator: **Toni Poll-Sorensen***Research on Research: The Creative Process in Choreography*

The process of choreographic research starts when an idea or some sort of inspiration comes to mind. The choreographer then goes through a period of divergent thinking where various possible directions to explore the idea are considered. During this phase, additional information is gathered and any possible related material and ideas are gathered and sorted through. The “AHA” moment occurs and a direction starts to come into focus. Convergent thinking begins and the creation starts to take shape.

Kidnie, Rebecca Susan, Emily Marie Worzalla, and Angela Therese Nieman (274)Faculty Mentor/Collaborator: **Mitra Sadeghpour***Diversity in the Voice Studio: Exploring “Diverse” American Art Song*

The vocal literature used in undergraduate voice study at American institutions is largely comprised of songs by composers of the Western European canon; inclusion of American music has only recently become more prevalent. We hypothesized that more American music is available than is being utilized; especially art songs by composers of diverse backgrounds, and that studying art songs by these composers could expand a student’s concept of diversity. Our goal was to create a resource to aid in choosing and locating art songs that would increase students’ knowledge of diversity. Initially, we found it necessary to define “art song,” “American,” and “diversity” in order to choose music to include in the resource of 50 songs by diverse American composers. Next, we worked with the voice studio teachers from UW-Eau Claire to assign these songs to students. Last, we will administer a survey in order to assess the influence this has on the students’ knowledge of diversity. We will also conduct interviews, analyze responses, and complete the song guide. We anticipate that study of these songs will positively influence UW-Eau Claire students’ concepts of diversity and that with the distribution of the song guide this influence could be duplicated at other undergraduate institutions.

Turba, Johnathan Fredrick and Stephanie Marie Schmidt (273)Faculty Mentor/Collaborator: **Nicholas Phillips***Exploring the Piano Music of Roy Harris*

American Roy Harris (1898-1979) is remembered primarily for his contributions to the orchestral repertoire, yet the works for solo piano by this pivotal (and often controversial) composer have been neglected and largely forgotten. In an effort to increase awareness of the works, and discuss their importance to his style we prepared a lecture-recital featuring three works: *Piano Suite in Three Movements; American Ballads, Set I; Toccata*. We began by reading all available books and articles on Harris, including his own writings, and exploring his orchestral and vocal works in an attempt to see how his piano works fit in to his oeuvre. Through our research we found that Harris spent much of his life intent on establishing an “American” sound, with especially personal ideas about harmony and inclusion of folk elements. Our lecture-recital features highlights of our findings, including discussion, analysis, and performance of selections from the aforementioned pieces.

Wolter, Michael Joseph (272)Faculty Mentor/Collaborator: **Ethan Wickman***New Music Ensemble*

Dr. Ethan Wickman and I have collaborated on developing an Eau Claire New Music Ensemble. A new music ensemble is a vehicle for the advocacy and performance of contemporary art music. We have done research within the university as well as investigated similar groups in universities around the country. Our research has yielded a

sustainable structure for the ensemble that will provide students and faculty with an opportunity to engage new challenging repertoire. Our ensemble is among the only groups to include both student and faculty performers. The student-faculty dynamic provides students with the opportunity to play with our world-class faculty, a valuable hands-on learning experience. The presence of a new music ensemble is a benefit to our music program as it furthers our reputation of being a progressive department. By offering this opportunity we are equipping students with the tools necessary to perform in any ensemble in any city. As collaborators on the Eau Claire New Music Ensemble it is Dr. Wickman's and my goal to add to the Eau Claire experience and inspire excellence in the music community.

Philosophy and Religious Studies

Cloud, Buckley Lot (240)

Faculty Mentor/Collaborator: **Scott Lowe**

Scientific and Unscientific Aspects of Buddhism

Question: Throughout the 20th and now 21st centuries, Buddhists across the globe claimed that Buddhism was “scientific,” but how is it that Buddhism, out of all the world’s religions, could make such a claim? Significance to Religious Studies: In the West there is a perceived conflict between science and religion, but Buddhism has very unique characteristics which problematize its relationship with science, such that the two most eminent scholars in the debate about whether Buddhism is scientific—B. Alan Wallace and Donald S. Lopez—are both right, but for historical reasons which neither scholar has taken into consideration. Approach: My approach involved focusing on the Buddhist monk Taixu, who attempted an engagement with science, but ultimately, in order to genuinely answer the question, a massive amount of context was needed, e.g. a foundational knowledge of the history of science, Greek philosophy, etc. Conclusions: The Buddha, like Hippocrates, subtly shifted a reliance on the gods, to a reliance on human agency, which resulted in the Buddha’s discovery of a psychological discipline known as “mindfulness,” which modern psychology is now beginning to investigate. However, although the Buddha seems presciently empirical, Buddhism also contains a good amount of metaphysical assumptions as well.

Dierich, Christopher Aaron (239)

Faculty Mentor/Collaborator: **Kristin Schaupp**

Knowledge: Do We Even Know What It Is?

What is knowledge? For centuries philosophers thought of knowledge as justified true belief. This was brought into question when Edmund Gettier outlined several scenarios in which individuals seemed to have justified true beliefs but failed to have knowledge. Recent epistemologists have tried to resolve this tension by appealing to alternate accounts of knowledge such as contextualism, virtue epistemology, and internalist fallibilism. But within each of these theories, there is an element of uncertainty caused by inductive reasoning. We show in our work that the element of uncertainty is quite problematic, not just for the accounts mentioned above, but for any potential account of knowledge. In attempting to respond to Gettier, philosophers have proposed general criteria which must be met in order to consider a specific claim “knowledge.” But because the problem of induction, as outlined by Nelson Goodman, has yet to be resolved, any attempt to design “foolproof” criteria for knowledge ignores the element of uncertainty caused by inductive reasoning, and as such, is unable to provide a definitive and workable analysis of knowledge.

Women's Studies

Emmanuelle, Catherine Nicole (226)

Faculty Mentor/Collaborator: **Barbara Kernan**

Sculpting A Monumental Truth: A Search for Inclusive Equality

This project began during a trip to Washington, D.C. where the student researcher discovered the "Portrait Monument," a (1927) sculpture by Adelaide Johnson, depicting Stanton, Mott and Anthony--pioneers from the American women's movement. An unfinished piece of marble protruding from the sculpture alluded to a fourth figure not yet included. A docent at the Sewell-Belmont Women's History Museum shared lobbying efforts underway to include freed slave and activist Sojourner Truth in the monument. This information created an immediate intersection for the researcher who had studied Truth and racial divisions within the women's movement during a UWEC Women's Studies course. While efforts to include Truth in the unfinished marble were

unsuccessful, Congress passed a resolution to display a new, separate statue of Sojourner Truth near the other monument in the U.S. Capitol Rotunda. This project investigated the lingering divisions within American sisterhood. The researcher reviewed print sources including historical documents, Congressional resolutions, and feminist texts to better understand oppression and inclusion/exclusion within the women's movement. These works aided in an exploration of themes of political contentiousness and relationships among women of different ethnicities. The project raised speculation about the movement's ability to reconcile pervasive divisions among its proponents.

Emmanuelle, Catherine Nicole (225)

Faculty Mentor/Collaborator: **Katherine Rhoades**

The Awakening of Mamie Till-Mobley: Examining Resiliency within Personal Tragedy Transformed to Activism

Mamie Till-Mobley was the mother of Emmett Till, a fourteen-year-old African-American boy who was brutally murdered in the summer of 1955 by white men who, despite confessing to the crime, were never convicted. Our faculty/student collaborative research delved into Till-Mobley's life to learn how she embraced activism as a response to her personal tragedy. We traveled to Chicago in summer 2009 to collect data. During our fieldwork we conducted in-depth interviews with two prominent African-American authors who worked with Till-Mobley, as well as retraced her higher education journey—securing photographs and other related primary print sources from a variety of archived resources. The student researcher will continue with this qualitative research study with a goal of contributing to the body of research regarding Till-Mobley's life and work. Using a grounded-theory approach, the student researcher will continue to immerse herself in the data (published and newly obtained) for continued analysis on Till-Mobley. Our research seeks to lay a foundation of how an activist's response to a tragic event can contribute to broader understandings of patterns of tragedy-linked activism among women and the role, if any, their resilience plays in the process.

Business and Professional Studies

Biology

Wiley, Jasmine Rayne (68)

Faculty Mentor/Collaborator: **David Lonzarich**

Enhancing Undergraduate Research Experiences in Biology and Biochemistry/Molecular Biology at UW-Eau Claire Using Student Perceptions of Course-related and Independent Research Experiences

The goal of this project was to generate knowledge concerning undergraduate research experiences in the biology and biochemistry/molecular biology (B/MB) at the University Wisconsin-Eau Claire (UWEC) to inform an effort aimed at enhancing the undergraduate research experience in these fields. We identified and critiqued various models for undergraduate research implemented at UWEC and other liberal arts institutions, and have implemented a survey to collect data from students who have participated in class-based and/or independent research projects regarding, among other things, their experiences with and expectations of undergraduate research. Over forty articles, essays, and other documents were reviewed and synthesized regarding the importance of undergraduate research experiences to undergraduate education and different models utilized to create these experiences. Based on our survey instrument and the information collected from our literature review, we plan to present student-perceived benefits, challenges, and importance of undergraduate research experiences in biology and/or B/MB to their education and career choice. We also will suggest informed enhancements or adjustments that can be made to our

current undergraduate research program in biology and B/MB so as to better meet the needs of students in the programs.

Center for Excellence in Teaching and Learning

Jansen, Michael Tyler and Eric Eligio Schmutzer (61)

Faculty Mentor/Collaborator: **Robert Eierman**

Teaching Effectiveness Survey

The definition of effective teaching is fluid. Depending on the teaching environment and its community members (faculty, students and administrators) the elements that are a part of the definition are different. The purpose of this student/faculty collaboration was to determine what exactly the faculty members on the UW-Eau Claire campus considered to be effective teaching. A survey was created based on research-based criteria that define effective teaching from various literary sources in the field of teacher education. The compiled list of criteria was ranked in the survey by 200 faculty members from every college of the University as to their perceived level of importance. The perceived level of importance of each criterion was quantitatively analyzed using all the data, and also separated by college and number of years teaching within the university. The results of the survey can be used as one source among others to create evaluation tools for the faculty to ultimately improve teaching techniques and approaches on campus.

Communication Sciences and Disorders

Cooper, Kelsey Louise and Tara Jo Short (19)

Faculty Mentor/Collaborator: **Marie Stadler**

Impact of Aided Augmentative and Alternative Communication (AAC) on Conversations of Adults with Dementia

The purpose of this study was to determine which graphic symbols in the form of photographs and line drawings best support pragmatically and semantically appropriate language use for individuals with early- to mid-stage Dementia of the Alzheimer's Type (DAT). Ten participants, diagnosed with early-to mid-stage DAT, were assessed on pragmatic and semantic performance. Conversational samples elicited under four conditions were analyzed and results compared across conditions and participants.

Humbert, Katie Louise (1)

Faculty Mentor/Collaborator: **Vicki Samelson**

Strategies First Graders with Low Oral Language Skills Use to Solve Math Word Problems

Arithmetic word problems are difficult for all children; even more so for children with low oral language skill. Prior research demonstrates that typically developing children generate and select a wide variety of strategies during math problem-solving tasks. If we can develop a deeper understanding of how children with low oral language skill solve word problems, we can then design interventions to improve their problem solving skills and their comprehension of classroom and curriculum language. Using an existing videotaped data set, our research project aimed to 1) identify, describe, and code the strategies that first graders in the lowest quartile of oral language skill used to solve basic arithmetic word problems and 2) establish the reliability of the coding system. The primary investigator viewed 40 video files, expanded an existing coding system, coded and described the children's solution strategies, and resolved differences with the second investigator. To establish reliability, a second student coded 20 percent of the files. An inter-rater reliability analysis using the Cohen's Kappa statistic was performed (Kappa = 0.825, (p < 0.001)). With

this very good level of reliability, we can now test our hypotheses about differences between typically developing children and children with low oral language skill.

Perkl, Kristin, Rachel Christina Karker, and Erina Ann Kuleta (18)

Faculty Mentor/Collaborator: **Lisa La Salle**

A Comparative Study of Cases Presenting Late Onset Stuttering

Two separate cases involving late onset of stuttering were compared. Both were the only cases of late-onset stuttering evaluated in the past 15 years at the University of Wisconsin Eau Claire Center for Communication Disorders, where only six to eight new cases of stuttering are evaluated each year. The two cases, a male and a female, were selected on the basis of being the only individuals of a similar age (11-12 years old) whose parents reported a late onset of stuttering (9-11 years old). A clinical retrospective design was used to evaluate diagnostic and observation data from case files in order to find commonalities and differences between the cases. Results indicate similar characteristics between Case 1 and Case 2. A table of comparisons between cases on qualitative and quantitative measures of temperament, family history, and medical history will be presented. Results are interpreted in terms of available literature of discussions on psychogenic and late onset cases.

Rindahl, Lorraine Marie (14)

Faculty Mentor/Collaborator: **Marie Stadler**

Comparing the Referential Communication Skills of Bilingual and Monolingual Children

The purpose of this project was to investigate the differences in the direction-giving and -following skills of bilingual and monolingual children. Referential communication is an essential speaker skill, and is an important component for children in the classroom. Ten second graders participated in the study. Five of the children spoke Spanish as their primary language, but were fluent in English as well; the other five spoke only English. Each child completed a language assessment and a barrier task in which each child gave and followed verbal directions without benefit of visual cues. The results of the study showed that there is a significant difference in the referential communication skills of bilingual and monolingual children, with the monolingual children performing significantly better at both direction-giving, and direction-following tasks. We were able to conclude that referential communication is a skill that should be worked on more with students who speak a second language through the use of various tasks that allow for direction-giving and -following practice.

Thompson, Amanda Anne, Jessica Annette Lutz, and Whitney Blair Fitzsimmons (17)

Faculty Mentor/Collaborator: **Kristine Retherford**

Evaluating Change in Adolescents and Young Adults with Asperger's Syndrome

The primary objective of this project was to compare pre- and post-test inventories of functional communication skills in adolescents and young adults with Asperger's syndrome in order to document the efficacy of a pilot program designed to improve social communication. Results demonstrated increase in some positive communication behaviors.

Veress, Nina Lorraine, Allsun Marian Brusehaber, Jenna Lee Napierala, Jessica Marie Sheldon, and Emily Rose Nyeggen (15)

Faculty Mentor/Collaborator: **Lisa La Salle**

Longitudinal Case Study: High Functioning Autism and Fluency

The purpose of the present study was to determine how frequency, type, and duration of disfluencies, specifically

various types of revisions, change over time for a school-aged male with High Functioning Autism (HFA) across the time he was receiving social skills therapy. Longitudinal research regarding the fluency of individuals with HFA is needed in a field that is currently bereft of such data. Methods include transcription, coding, and analysis of spontaneous speech samples collected over a 2-year span of time. Echolalia will be coded and excluded. Time1 includes a baseline sample when the client was 64 months of age, Time2, when 81 months of age, and Time3 was when the client was 85 months of age. Time1 through Time3 will be compared on the measures of frequency, type and duration of disfluency, hypothesizing that revision types will change over time. This longitudinal case study will be compared to data on older individuals reported by Shriberg, et al. (2001) in terms of overall fluency or OR “phrasing” features in spontaneous speech. Results will be discussed in terms of the planning and execution of language as described by Howell (2004).

Viau, Dana Barbara and Becky Jo Wallin (16)

Faculty Mentor/Collaborator: **Jerry Hoepner**

Partner Support Behavior Profile (PSBP) Ratings Among Non-Brain Injured Dyads

The current investigation will validate the use of the Partner Support Behaviors Profile (PSBP; Hoepner, 2010) among non-brain injured individuals. The hypothesis is that untrained, non-brain injured dyads will have higher PSBP ratings, using fewer repair strategies, than untrained dyads consisting of individuals with brain injuries and their non-brain injured communicative partners. The undergraduate research team will attempt to make judgments about this hypothesis and its implications for future therapy techniques on individuals with traumatic brain injuries and their partners. Ten non-brain injured adults and their familiar communicative partners will be asked to have a 20-minute, open-ended conversation with each other while being video recorded. The conversation will be rated using the PSBP, and the amount of support behaviors used by the participants will be analyzed. The conclusions will address whether support behaviors of non-brain injured dyads are similar to dyads including an individual with a brain injury. The implications of these findings will provide comparative data for unpublished research using the PSBP on dyads where one partner is brain-injured. The findings will establish a range of normal behaviors within non-brain injured dyads to serve as comparative data for a dyad including an individual with a brain injury.

Dean of Students Office

Tweedale, Sarah Ashley, Anthony Michael Och, and Ann Stevenson Watson (76)

Faculty Mentor/Collaborator: **Jodi Thesing-Ritter**

Civil Rights Pilgrimage Immersion Experience

Student participants embark on a ten-day immersion experience through six states in the Deep South visiting important historical sites, collecting oral histories, and understanding the individual roles they play in social justice today. The course is composed of eight class sessions which provide a knowledge foundation of key events and people, focusing on women of the Movement; the course also provides a debriefing and call-to-action emphasis after participants’ return. The Civil Rights Pilgrimage Immersion Experience research explores the impact of stand-alone immersion experiences versus course-based immersion experience. Study participants were divided into two cohorts: those taking the class with the trip and those only participating in the trip. Each cohort was given a pre- and post-survey to be completed before and after their respective experiences. The pre- and post-surveys were compared to measure participants’ movement on the Modern Racism Scale. We expect there will be movement from both the trip participants and the class participants; however, a larger movement on the Racism Scale is expected from class participants due to their extended exposure to the issues surrounding racism. In previous studies, notable movement on the scale has been evidenced from the trip alone.

Education Studies

Moua, Pa Sia Lor (46)

Faculty Mentor/Collaborator: **Aram deKoven**

Identifying the Hurdles to Admittance to an Educational Program at the University Wisconsin-Eau Claire for Students of Color

The University of Wisconsin-Eau Claire is actively engaged in the process of making the campus more equitable, diverse, and inclusive. Current quantitative data indicate the number of students of color applying, persisting, and graduating from the teacher education program is low. This research project is designed to uncover what drives this discouraging reality. To answer this question, 16 in-depth interviews were conducted with UW- Eau Claire students of color. Each participant was asked detailed questions about her or his experience with the department of teacher education. Through these testimonials, several clear hurdles to program completion were uncovered. This paper will present the barriers to program matriculation in conjunction with supporting evidence from current research in the field. In the conclusion, we make recommendations that we hope will enable the College of Education and Human Sciences to increase its capacity to serve students of color as they enter the program, persist in their classes, and matriculate with their teaching credentials. Overall, we hope to be able to increase the pool of highly qualified teachers of color who can work effectively with diverse learners in our community.

Thao, Chue, Pa Joua Vue, and Hlee Lee (35)

Faculty Mentor/Collaborator: **Christin DePouw**

Incorporating Hmong Language Education to Support Hmong American Academic Success

During Summer 2009, Dr. Christin DePouw, PaJoua Vue, Chue Thao and Hlee Lee conducted a summer program for Eau Claire Hmong American students in middle and high school grades entitled the UW-Eau Claire Hmong Literacy Program (HLP). The HLP worked to develop culturally responsive Hmong-centered curriculum and instruction in Hmong language and culture, including Hmong language class, physical education in Hmong, and technology activities related to Hmong culture and vocabulary. The HLP targeted area Hmong American middle school students, and its goal was to create greater bilingual skill and Hmong cultural expertise within these students. During this program, the four researchers continually observed student performance and dispositions in relation to Hmong language and academic success, and evaluated the program's instructional methods, curricular choices, and group interactional structure. The four of us then analyzed student and instructor data, along with our educational assessments, in order to determine the efficacy of our instructional methods, the relevance and strength of our curricular choices, and the benefits of our program structure.

English

Jorgenson, Christopher Jean (67)

Faculty Mentor/Collaborator: **Jennifer Shaddock**

Empathy and Effective Critical Writing in the College Literature Classroom

The objective of this project is to ascertain a possible connection between a student writer's ability to empathize and his/her development of creative critical literary interpretations. Student volunteers will be administered the Davis Interpersonal Reactivity Index, a psychological instrument that measures individual levels of empathy. Their scores on this index will then be compared to their scores on a critical literary interpretation to determine if there is a relationship between high scores on empathy and high scores on divergent interpretation. Follow-up interviews with students who have high Index scores and have authored highly creative interpretations will be conducted to

determine their interpretive process. Once the above steps have been completed, the researchers will engage in both analyzing and synthesizing the semester's accumulated data. The project's significance lies in its potential to contribute to existing pedagogical theory and practice regarding the assumed role of empathy in creative literary interpretation.

Maurer, Kathryn Lynn (86)

Faculty Mentor/Collaborator: **Joanne Juett**

Women in the Sciences

Our goal with this project is to create curriculum about current issues surrounding women and the sciences; also we want to utilize a Women in Science class as a critical audience to evaluate the main issues and to conceive solutions to these issues to encourage more representation of women in science. This project revolves around women's studies and science curriculum, which makes our project important because it presents pedagogical research about women in the sciences and actual science concepts involving women. Our project is solely based on research and examples to determine best practices for teaching about education, careers, and lifestyles of women in science. Our two main sources of information are past research and classroom surveys and discussions for present day examples. The main goal of this research project is to create a critical classroom environment through which more women will be encouraged and supported in their participation in this field of study, specifically by finding solutions to problems of bias and exclusion and also by studying science in alternative ways as a field of equal inquiry.

English, Biology

Rohlinger, Spencer Marie (197)

Faculty Mentor/Collaborators: **Ruth Cronje, Kelly Murray, and Todd Wellnitz**

Promoting Students' Scientific Understanding with the Science Writing Heuristic

The Science Writing Heuristic (SWH) is a writing-to-learn initiative that has been demonstrated to improve student understanding of disciplinary science. However, none of these investigations have evaluated its potential to improve student writing in science courses. This project tested the impact of the SWH on the writing performance of students enrolled in six laboratory sections of Biology 110: Ecology and Evolution. All sections were taught by the same instructor (Murray). Three labs were taught with traditional methods; the other three were taught according to the SWH. Students were assigned a formal paper to report the results of their lab activities; these papers were scored independently by three raters for indicators of writing quality. Students in the SWH labs were significantly ($P = 0.043$) more likely to write a "good" paper than students in the traditional labs. Although preliminary, this evidence suggests that gains in student conceptual understanding elicited by the SWH approach transfer to improved student ability to write about these concepts.

Environmental Public Health

Bloecher, Patrick Aaron and Katrina Jeanette Smith (109)

Faculty Mentor/Collaborator: **Crispin Pierce**

Estimates of Mortality and Morbidity from the UW-Eau Claire Coal-Fired Heating Plant

Combustion of coal to produce heat and electricity releases particulate matter, mercury, sulfur and global warming gases into the air. A recent finding by the DNR that coal plants around the UW system are in violation of the Clean Air Act has generated consideration of biofuels and natural gas as substitute fuels at UW-Eau Claire. We used the coal plant's emission rates, the SCREEN3 air dispersion model, and Google Earth to estimate the increased rate of death and disease from inhaling particles from the plant. The estimated breathing zone concentrations were similar

to those established in the DNR permit for emissions. Rates of increased mortality (death) ranged from 0.058% per year at 500 m, to 0.045% per year at 2,000 m from the plant.

Bloecher, Patrick Aaron and Amy Zagar (116)

Faculty Mentor/Collaborator: **Crispin Pierce**

Unregulated Crystalline Silica Exposure in Wisconsin

Occupational silica exposure is related to the development of respiratory disease, tuberculosis, autoimmune disease, kidney disease, silicosis and lung cancer. Recent proposals for sand mines and processing plants around Wisconsin – including Chippewa Falls – have raised substantial community concerns about health risks to the public. This literature search project has gathered research and regulatory information to support an upcoming Department of Natural Resources decision on whether to control currently unregulated crystalline silica as a hazardous air pollutant.

Smith, Katrina Jeanette and Hickory Rye Tate (85)

Faculty Mentor/Collaborator: **Crispin Pierce**

Sustainable Student Commitment through Campus Earth Day Events

This project is focused on how campus Earth Day events can be ideal venues for developing student commitment. Faculty planners and key student leaders from two campuses with active Earth Day celebrations, the University of Wisconsin-Eau Claire and the University of Wisconsin-Whitewater, illustrate student commitment. These two campuses have developed their Earth Days along very different lines, but one thing they have in common is strong student involvement at all levels of planning, promotion, and implementation. Contributions from the UW-Eau Claire student organizations the Conservationists, Student National Environmental Health Association, and the Foodlums are highlighted. The Earth day event draws upon latent student idealism, which, in the case of environmentalism, crosses traditional ideological divides. Earth Day also draws upon students from a variety of disciplines, ranging from the sciences, to the humanities, to business.

Environmental Public Health, Nursing

Steffen, Kelly Ann, Patrick Aaron Bloecher, Matthew Alan Sisbach, and Sara Aragon (92)

Faculty Mentor/Collaborators: **Crispin Pierce, Katherine Ann German-Olson, and Pam Guthman,**
LEAP Education Practice Liaison

Secondhand Smoke Exposure at the University of Wisconsin-Eau Claire

Secondhand cigarette smoke is associated with a spectrum of lung diseases including lung cancer, as well as cardiovascular disease. While designated smoking areas on campus have been established to protect smokers' rights, secondhand exposure to others is common along walkways and in buildings where smoke enters through air intake vents. Recent Student Senate discussions include a campus-wide smoking ban proposal. To evaluate secondhand smoke exposure, we used a GPS unit and DustTrak instrument to measure particulate matter originating from smoking areas across campus. These values were compared to previously published particulate levels in smoking and non-smoking settings.

Foreign Languages

Drewiske, Caryn Leigh (87)

Faculty Mentor/Collaborator: **Jessica Miller**

French Pronunciation in a College-Level Beginner French Course: Explicit Teaching with Phonetics

Despite the importance of correct pronunciation, there is often a lack of explicit pronunciation instruction in beginner-level foreign language courses. Teachers sometimes believe that students acquire pronunciation through mere exposure to the target language. Phonetics, i.e. the description of sound articulation and the use of written symbols to represent pronunciation, is typically reserved for upper level courses. This poster argues that using phonetics in beginner level French courses can help establish a strong foundation for more accurate pronunciation. Two different teaching methods were studied to test that claim. (1) The phonetic method reinforced audio stimuli with visual symbols based on the International Phonetic Alphabet. (2) The reference method helped learners establish spelling-to-sound connections through familiar words. The participants' pronunciation accuracy was evaluated at the end of the semester. Surveys also helped gauge attitudes toward French pronunciation learning and teaching. The quantitative data gathered revealed that both teaching methods had an equal effect on pronunciation. However, the qualitative data showed that participants believed the phonetics method to be the most helpful. These findings suggest that phonetics could be an efficient way to teach pronunciation in beginner French courses.

Shore, Kara Lindsey (5)

Faculty Mentor/Collaborator: **Kate Mastruserio Reynolds**

Clarifying the Field of TESOL

In the field of Teaching English to Speakers of Other Languages (TESOL, encompassing English as a Second or Foreign Language instruction), practitioners are frequently asked questions such as: What does TESOL (or our other acronyms) stand for? How many languages do you speak? So, you teach English? How do you teach students who do not understand anything you are saying? It is clear that the general public needs to know foundational concepts in TESOL in order to envision how to interact and proceed equitably with non-native speakers in the public schools. With a focus on inclusion of non-native English speakers into mainstream American classes, mainstream, or content-area, teachers need more information about basic concepts and practices they can use to assist language learners. This project is the synthesis of information about the field of ESL/EFL instruction, which has been compiled by the student and faculty researcher from a wide variety of field texts and resources, and has been fashioned into an informative, user-friendly video and web page that will be shared with the general public.

Information Systems

Rizanoor, Tidie Tianda (2)

Faculty Mentor/Collaborator: **Bruce Lo**

A Comparison of Web-audience Behavior among Geographically-dispersed Groups with Common Cultural Heritage

Internet audience behaviors and browsing preferences are influenced not only by local culture and regional norms, but also shaped by globalizing trends from large international corporations through their e-business websites. This research examines the interacting effects of globalization and localization by comparing the popular website choices among geographically distinct groups of web-audiences sharing a common cultural heritage. The five regions chosen for this study are: People's Republic of China, Hong Kong, Macao, Singapore, and Taiwan. The top 100 websites in these five regions were analyzed with respect to the sites' popularity rankings, business content, site design, and homepage layout. Evidence suggests that while the dominance of the Internet does produce a global

homogenizing influence, regional variation does exist due to local culture. Therefore the interaction of localization and globalization forces in cyberspace is a complex phenomenon that requires careful interpretation. Findings from this study may provide guidelines for international companies to develop specifically styled websites that can more effectively market their products/services to other parts of the world.

Kinesiology

French, Alyssa Anne, Kristin Lee Hurley, Emily Beth Harrison, Sondra Leigh De Lap, and Briana Marie Berg (42)

Faculty Mentor/Collaborator: **Gary VanGuilder**

Presence of Metabolic Syndrome in Young Asian American Adults

Metabolic Syndrome (MetS) is a cluster of risk factors that contributes to cardiovascular disease and diabetes. Components of MetS include abdominal obesity, lower high-density lipoprotein (HDL) cholesterol, higher blood sugar and triglycerides, and elevated blood pressure. The prevalence of MetS in young adults is increasing worldwide, while rates are accelerating in underrepresented ethnic groups, especially in people of Asian descent. Current guidelines developed by the National Cholesterol Education Program are based on data from Caucasian individuals, and therefore may underestimate MetS in other ethnicities, in particular the Asian American population. Therefore, the aim of our study is to determine the presence of MetS in young Asian Americans by applying criteria that are specific to the Asian ethnic group. To date, blood pressure, waist circumference, fasting blood glucose, triglycerides, and HDL-cholesterol measurements have been obtained in 11 young Asian Americans. Currently, MetS was present in one participant, while five participants (45.5%) had at least one risk factor. Findings from this study will spread awareness of MetS in an understudied Asian population in the Eau Claire community. Identifying risk factors in a young ethnically diverse population is important for the early implementation of treatment and lifestyle modification programs.

Jacobson, Heather Marie, Hillary Elyse Hardy, Amanda Marie Desmond, Ashley Karee Bayliss, and Kristen Nicole Jarvey (40)

Faculty Mentor/Collaborator: **Donald Bredle**

Health Benefits of Underwater Treadmill Exercise for Active Adults

Purpose: To assess health effects of hydrotherapy using an underwater treadmill when added to the exercise of active adults. We hypothesized the underwater treadmill would be beneficial for muscle and joint comfort, energy for activities of daily living (ADLs), sleep quality, and well-being in these individuals. Methods: 14 subjects (56 \pm 11 yr) exercised for 40-min in a therapy pool twice weekly for 5 weeks in addition to current exercise. The treadmill was submerged for 20 min for walking/jogging at an intensity to elicit a 40-60% heart rate reserve. Treadmill speed averaged 50-80 m/min with horizontal flow from jets. 20 minutes were spent in underwater strength movements using a variety of aquatic resistance devices. Anthropometrics, strength, flexibility, and a health survey were assessed at the beginning and end. Questionnaires were completed at each session regarding joint/muscle discomfort, sleep quality, and well-being. Results: All subjects (100%) expressed enjoyment of the underwater treadmill. Hamstring flexibility improved 20% ($p < .05$). Fatigue post-exercise dropped from 1.8/10 pre-program to 0.6/10 ($p < .05$). Muscle or joint pain/soreness 2-4 hrs post-exercise decreased ($p < .05$). Conclusion: In this small group over this short period, overtraining was avoided and health benefits were apparent as hydrotherapy was successfully added to current exercise.

Johnson, Teagen Jade, Kari Ruth Kaeding, Jodi Leah Lindner, Julia Ann Seehafer, and Tonya Ray Prokop (41)

Faculty Mentor/Collaborator: **Gary VanGuilder**

The Difference in Energy Expenditure between Continuous and Intermittent Moderate Intensity Exercise in Young Adults

We are interested in determining whether there is a difference in energy expenditure between continuous and intermittent moderate intensity exercise in young adults. We chose this topic of research because caloric expenditure is an important issue in our obesity-ridden society and can be applied across various populations. We can use our findings to improve exercise programs that will maximize caloric expenditure to produce the greatest health benefits for active individuals and for people beginning an exercise program. Young healthy participants will be recruited to perform two separate exercise testing sessions. The first session will consist of two fifteen minute treadmill tests conducted at moderate exercise intensity. The second session will consist of a continuous thirty minute treadmill test conducted at moderate intensity. We will measure caloric expenditure and oxygen consumption using a metabolic cart before, during, and after both exercise sessions and compare the amount of energy used between exercise bouts.

Schlough, Megan Elizabeth, Jonathan Daniel Miller, Justine Marie Lueck, Abby Lynn Zimmerman, and Matthew Patrick Schuette (270)

Faculty Mentor/Collaborator: **Donald Bredle**

Benefits of an Underwater Treadmill Exercise Program for Non-Exercisers

Lack of physical activity is a growing problem and continues to affect the health and well-being of all Americans. Water exercise with an underwater treadmill is a great alternative to land exercise, by reducing impact while maintaining normal gait. The aim of this study is to investigate the effect training in such a warm therapy pool has on aerobic endurance, flexibility, strength, balance, and well being. We hope to facilitate the transition from a sedentary to an active lifestyle. Eighteen adults who are sedentary, mainly due to orthopedic or obesity issues, were recruited for a 12-week underwater treadmill program. Participants perform 30 minutes of exercise at a self-selected intensity, 2 days/week, including walking or jogging, strength, stretching, and hydromassage. Preliminary results indicate overwhelming appreciation for this mode of exercise, an increase in aerobic capacity as evidenced by increased treadmill speed, and an increase in daily energy and quality of life. Sample client quotes: "my leg felt normal for the first time in six months," "able to do housework without discomfort," "able to start running again on dry land without hamstring pain." We conclude that an underwater treadmill is a successful method to get non-exercisers started towards a regular exercise habit.

Steege, Michelle Renae (38)

Faculty Mentor/Collaborator: **Jeffrey Janot**

Effect of Functional Resistance Training on Muscular Fitness Outcomes in Young Adults

As functional resistance training becomes a more popular method to improve muscular fitness, questions remain regarding the effectiveness of functional training compared to traditional resistance training. Therefore, the purpose of this study was to determine whether functional training has similar effects on muscular strength and endurance, flexibility, agility, balance, and anthropometric measures in young adults as traditional resistance training. In this study, 38 healthy volunteers, aged 18-32 yr, were randomly placed into a control group and an experimental group. The participants were tested prior to and after completing the 7-week training study. The testing battery included: weight, girth measurements, flexibility, agility, lower back flexion and extension endurance, push-up test, sit-up test, 1 leg balance, 1-RM bench press, and 1-RM squat. Results indicated there were significant increases in push-ups,

back extension endurance, 1-RM bench press, 1-RM squat, and 1 leg balance within each group following training. Forearm girth changes following training were the only parameter where there were significant differences between training groups. Collectively, these results suggest that both programs are equally beneficial for increasing endurance, balance, and traditional measures of strength. However, changes in various girth measures and flexibility appear to be program specific.

Stoelzle, Hannah Yates, Kristi Lynn Finco, Sadie Elizabeth Foss, Jenna Marie Snyder, and Katie Jo Edwards (62)

Faculty Mentor/Collaborator: **Marquell Johnson**

Accessibility of Fitness and Wellness Facilities in Western Wisconsin for Individuals with Disabilities

Objectives To examine the accessibility of fitness and wellness facilities in Western Wisconsin. **Method** Direct observation and physical measurements were taken during on-site visits to 16 fitness and wellness facilities in Western Wisconsin. During the on-site visits, 14 structural domains were used to examine facility compliance with Title III of the Americans with Disability Act (ADA). An online survey was also given to owners/managers and employees to examine professional knowledge, education, training, and facility policy related to ADA compliance and accessibility. **Results** No facility was 100% compliant within each of the 14 structural domains. Of the 14 structural domains, customer service desk / materials (84.4%), path of travel (71.9%), and drinking fountains (58.3%) were the most in compliance with ADA. The least compliant structural domains were exercise equipment (60.4%), accessibility around the exercise equipment (56.2%), and exterior doors (55.2%). Survey responses indicated that 93% of the owner/managers and employees do not participate in continuing education opportunities relating to accessibility and services for individuals with disabilities. **Conclusions** There is a strong need to increase the accessibility of fitness and wellness centers in Western Wisconsin. There are structural and psychosocial barriers that continue to inhibit individuals with disability from participating in physical activities.

Woldt, Joel Melvin, Jacob Kenneth St. Mary, David Joseph Clark, and Nicholas Mark Beltz (43)

Faculty Mentor/Collaborator: **Jeffrey Janot**

The Effects of Ordering Resistance and Aerobic Exercise Training on Energy Expenditure

There has been little research to determine the optimal order of aerobic and resistance exercise with respect to the amount of calories expended. Our experiment was designed to examine the effects of exercise sequence on energy expenditure during a single exercise bout. We hypothesize that during a single exercise bout participants will burn more calories when performing resistance before aerobic exercise. If there are significant differences in energy expenditure between exercise sessions it could provide a rationale for considering the sequence of exercise when designing physical activity programs. Twelve physically active college students were recruited to participate in this study. Baseline testing will consist of two sub-maximal exercise tests, blood pressure and heart rate screening, and two maximal whole body strength tests. Participants will be randomized to perform two, 1-hour exercise sessions separated by 3 days consisting of 30 minutes aerobic exercise followed by 30 minutes resistance exercise, or resistance exercise followed by aerobic exercise of the same duration. Oxygen consumption will be measured throughout each exercise bout to determine energy expenditure using a portable metabolic analyzer. This experiment is still in progress, but we expect to determine the total amount of calories expended between the two exercise sequences in 12 participants.

Management and Marketing

Becker, Eric Landis (3)

Faculty Mentor/Collaborator: **Kristina Bourne**

Becoming a Global Leader: Examining the Barriers for Chippewa Valley Businesses

The purpose of this project is to identify the most common barriers to international business and market expansion facing small and medium enterprises (SME) in the Chippewa Valley. The Chippewa Valley is a leading export region in the state of Wisconsin and also competitive on a national scale. SMEs produce twenty five percent of manufactured goods domestically but only account for twelve percent of manufactured exports. Furthermore, firms currently in the international arena report that they are not making substantial steps towards gaining a larger share of the global market. Qualitative research interviews were conducted with ten local businesses to identify barriers they have faced while doing international business. Preliminary findings suggest that such barriers include: lack of international markets knowledge by the company's managers, weak organizational support for export promotion as a strategic goal, and difficulties establishing an effective international sales network.

Callahan, Kelsey Ann (21)

Faculty Mentor/Collaborator: **Douglas Olson**

A Study of Long Term Care Leadership Teams and their Influence on Organizational Quality Outcomes

This study seeks to measure how the administrator (ADM), director of nursing (DON), medical director (MD), and the consultant pharmacist (CP) conceptualize their own specific job roles, and how they collaborate and work as a team. Once we have established how these leaders interpret their own roles and how they work as a team, it will be determined how the quality of long-term care facilities is affected by their cohesiveness. The mail survey will assess how the ADM, DON, MD, and CP of a nursing home conceptualize their roles and describe their perception of how their leadership team works together. This information will construct categories of leadership team profiles and measure the impact these various profiles have on outcomes retrieved from self-reported data and CMS information. Limited research has been conducted on this area of leadership, especially in long term health care. The research team consisting of Dr. Olson, his two co-investigators and Kelsey Callahan, the health care administration undergraduate working on this project, recently completed the development of an external funding proposal to support this effort. This study will be groundbreaking work that will have a national audience from both a practitioner and academic, field-specific perspective.

Higgins, Teresa Denise (20)

Faculty Mentor/Collaborator: **Robert Erffmeyer**

Exploring Online Course Evaluation Response Rates

Student evaluation of course content and instructor effectiveness is an important tool in higher level learning environments. Constructive information and recommendations from students are used to improve the structure, content, and teaching methods used in a course. A shift in higher education from physical classrooms and course evaluations towards web-based learning environments and evaluation methods has posed challenges in course and instructor assessment for many educational institutions. The University of Wisconsin-Consortium MBA Program has experienced lower than desired response rates to its web-based course evaluations. The objectives of this study were to better understand the causes of the low response rates and to explore strategies to increase future response rates from graduate students participating in an on-line learning environment and evaluation process. Phone interviews with current students were conducted to identify reasons they did or did not complete online course evaluations and suggestions for improving the evaluation process. Modifications were made to reduce the length of the evaluation instrument. A total of twenty-one fall and spring courses were selected to test the modified evaluation

format against the existing format. Response rates were collected and analyzed from select fall 2009 and spring 2010 courses. Recommendations for future course evaluations were offered.

Hofer, Ashley Nicole and Clayton Joseph Theiler (4)

Faculty Mentor/Collaborators: **Rama Yelkur** and **Charles Tomkovick**

Predicting Super Bowl Ad Likeability in the New Millennium

Advertisers love the Super Bowl because it reaches a huge audience that is highly receptive. Because it is linked to sales success, Super Bowl advertisers keep a close watch on ad likeability. In 2001, Tomkovick, Yelkur, and Christians researched ad likeability in Super Bowl ads in the 1990's. For this project, we explored ad likeability of ads in the next decade. We examined 488 ads from the nine Super Bowls during the years 2000-2008. Our findings show humor, animals, product category, product information, and presence of children all significantly influenced ad likeability. Implications for advertisers, study limitations, and directions for future research are presented.

Samples, Kerry Ann (22)

Faculty Mentor/Collaborator: **Nancy Jo Hanson-Rasmussen**

Opportunities, Barriers and Best Practice: Employment of Workers with Limited English Proficiency in Western Wisconsin

The intent of this study was to investigate the employment practices and support services available to Western Wisconsin employers who hire workers who are not proficient in English. The collaborative project also questioned employers who have not yet hired limited English speaking workers and identified barriers to their employment. The methods used to collect data include electronic surveys, paper surveys, personal interviews, and secondary research sources. Data was entered into Qualtrics survey tool, and interpreted through statistical programs. Data was then compared to published research from other areas of the country. This research identified which services are best known within the 9 counties of Western Wisconsin and which services are most helpful to responding businesses. Limited English workers are present in the area workforce, yet available services to employers are limited. The results of the survey and secondary research are being used to develop a resource manual for our participating employers. Equipped with good information, employers will be better able to access resources intended to improve workplace communication and experiences and improve management practices.

Management and Marketing, Business Communication

McKee, Jennifer (44)

Faculty Mentor/Collaborators: **Jennifer Johs-Artisensi** and **Paula Lentz**

"Resident for a Day"- How a Simulation Experience Influences Future Leaders in "Culture Change"

Many nursing homes today are still providing resident care based on an outdated medical model, and although there has been a grassroots effort over the past decade to encourage a shift to a more social model, where person-centered care is delivered in a homelike environment, finding ways to influence leaders to take on the challenge of undergoing such a transformation has been difficult. One way to influence industry-wide change is to integrate applied experiences into educational programming for future professionals. In this study we examine how a 24-hour simulation experience, where future administrators live as a resident for 24 hours – pushing a call light when they need to toilet, eating pureed food, being transferred using a Hoyer lift, and a variety of other activities – can influence future leaders of long term care organizations to implement Culture Change. We conducted a content analysis of the discourse in the students' reflective narratives of their experiences. Overall, students experienced this simulation as a major perspective-changing event that will influence them in their future careers. They developed empathy toward residents in terms of understanding the significant life transition that occurs when living in a

nursing home, such a decreased independence and emotional discomfort. They also identified several strategies and practices necessary to develop a culture that supports resident-centered care.

Mathematics

Cypher, Robert Gerald (88)

Faculty Mentor/Collaborator: **Christopher Hlas**

Student Reports of Affective Variables While Completing Electronic Homework (Maple T.A.)

Mathematics educators, both K-12 and post-secondary, are incorporating technology as an assessment tool, and it is important to understand the effects that this technology has on student motivation and learning. This research project seeks to determine how Calculus I students rate their level of flow variables (e.g. challenge and skill) while completing electronic assessments, specifically Maple TA problems. To this end, a sample of 30 Calculus I students at UW-Eau Claire were asked to participate in this research by answering survey questions embedded in their Maple TA homework for six weeks. Survey responses were collected and analyzed to assess student experience of flow along with data on time and location of survey completion. Preliminary findings reveal that a negative correlation exists between student rating of challenge and student rating of skills. In other words, when students rate a problem as difficult they are more likely to rate their skills as being low. This is not ideal, because students are more likely to experience flow when both skills and challenge are rated highly. This research also reveals that Maple TA assignments are most commonly completed in computer labs and dorm rooms on the assignment due date.

Music and Theatre Arts

Rydlund, Katie Marie and Iansa Lucia Zalduendo (64)

Faculty Mentor/Collaborator: **Lee Anna Rasz**

Assessment of Integrative Learning in Music Therapy

This project examined when and how course content was used outside two classes: Clinical Applications of Percussion Techniques and Psychology of Music. Documentation included sustainability of the use of content outside the courses, impact of the application of content when it was used outside the course, and a description of when, where, and how content was used. An examination of any perspective or behavior changes that students experienced as a result of the use of course content outside class was included. Areas of assessment included but were not limited to: diversity awareness (including cultural, political, societal and environmental) and appreciation of people different from self; applications affecting health of self or others, personal growth, and work life; intentional elicitation of relaxation, positive affect, directed mood changes, and pain management; and changes in physiological status, social interaction, and behavior/thinking. Questionnaires completed by students were analyzed using coding scheme and unitizing methodology for identification of themes. Previously documented uses were noted in: musical memorization, practice and performance; therapeutic decision making; ability to pay attention to responses of others while simultaneously performing and leading music; and how to structure session plans to elicit desired therapeutic responses.

Tappe, Amber Serene and Anthony Jacob Schuh (65)

Faculty Mentor/Collaborator: **Lee Anna Rasz**

Assessment of Ability of Nursing Home Residents with Dementia to Imitate and Spontaneously Perform Rhythmic Patterns with Accents and Complex Rhythmic Structure

This poster presents the results of an assessment of the perception patterns of residents on a dementia unit at a nursing home before, during, and after training periods for rhythm pattern performance. Specifically, responses

when residents are allowed to independently play a tambourine or other instrument, clap, or tap along to the music prior to a training period on songs with accompaniments that have rhythmic accents and complex rhythmic structure are compared with their responses when specific rhythm patterns are modeled by music therapy students for residents to follow when playing along to the music. The comparison of pre-training responses is with responses exhibited both during and after the training period. This project more closely examines the musical contour and harmonies that elicit specific rhythmic performances and allows documentation of how the residents perceive and respond to specific rhythmic patterns within the context of specific songs.

Nursing

Grimley, Angela May Bridgeman and Brittney Elise Castleman (63)

Faculty Mentor/Collaborators: **Susan Moch** and Becky Harper, Community Health Partnership
Undergraduate Nursing Student Practice Outcomes through Evidence-based Practice Projects

Currently, obtaining and implementing research into healthcare practice is difficult and time-consuming. This research project is important because it enables practicing healthcare professionals to use current research in their care. Through this project, students obtained research evidence on topics of importance to agency staff and collaborated with staff in getting practice guidelines incorporated into patient care. The plan for this project was to evaluate agency staff use and satisfaction with this student assistance in getting research into practice. Forms for each request describe the projected and actual outcomes. Information for follow-up related to each project is being completed in greater detail. Additionally, agency staff members are being asked to complete written evaluations of student involvement in the agency. Further, because of the use of expert consultants during the first year, consultant connections during the second year have been summarized and evaluated. This ongoing research program that involves undergraduate nursing students getting research into practice has been valued by both students and clinical nursing staff. In the past, students describe extensive learning about research and evidence-based practice and clinical staff report interest in continuing work with students. Through this poster, 2009-2010 evaluation by clinical agency staff will be shared.

Jagusch, Sydney Piper, Lisa Marie Mercer, and Erin Christine Liffbrig (66)

Faculty Mentor/Collaborator: **Sheila Kathleen Smith**
LGBT Healthcare Needs and Concerns

The purpose of this study is to contribute to knowledge regarding Lesbian-Gay-Bisexual-Transgender (LGBT) healthcare needs and concerns. Research indicates that LGBT individuals are at risk for significant health concerns, some of which differ from the non-LGBT population; and that many LGBT individuals experience homophobia in healthcare. Healthcare education programs inadvertently perpetuate these difficulties by not adequately addressing them as part of established curricular content. This study seeks to contribute to improved LGBT healthcare by identifying evidence-based ways to improve nursing education regarding LGBT health needs and concerns. Focus groups with members of the local LGBT community will provide initial data for ongoing research and education applications.

Special Education

Peterson, Jenna Rae, Kaitlyn Jean Carlton, Brent Lee Kaczmariski, and Sarah Emily Classen (37)

Faculty Mentor/Collaborator: **Joseph Morin**
Critical Numeracy Project

Numeracy skills are seen as the gateway to the learning of formal mathematics, especially computational

mathematics. Our goal was to see how our assessment tool, the Critical Numeracy Checklist (CNC), correlated with the KeyMath assessment in the primary grades. We hoped that the CNC would be more detailed than the KeyMath assessment. The CNC relates to special education as it is a specific outcome measure that can be used to inform instruction and create interventions. We administered both the KeyMath Assessment and the CNC to 120 kindergarten through third grade students. We then interpreted the data and found that there is .8 correlation between the two assessment measures. With this information we hope to create a curriculum-based intervention for educators to implement in their classrooms.

Scheithauer, Jenna Novella and Sarah Lucinda Brott (45)

Faculty Mentor/Collaborator: **Rosemary Battalio**

The Systematic Screening for Behavior Disorders and Pre-referral Behavior Intervention Plans

This study focused on determining the effectiveness of using the Systematic Screening for Behavior Disorders (SSBD) as a preventative multi-level assessment in identifying existing or potential serious behavior problems (Walker and Severson, 1990). This research was done in collaboration with a small rural community elementary school in their second year of administering the SSBD. The main research questions were: Would the student researchers' findings be comparable to the teacher's initial ratings of students on the SSBD? Were the student researchers able to create effective and individualized pre-referral behavior intervention plans based on SSBD data? The administration of this assessment required the student researchers to (a) administer the SSBD in grades 1st through 5th, (b) analyze the data in order to identify students at risk, (c) use the data to develop pre-referral behavior intervention plans, and (d) evaluate intervention plan effectiveness. Working with the elementary school provided a "real life" opportunity for the student researchers to apply data-based decision making skills and utilize data to determine the effectiveness of individualized intervention plans.

Shirer, Daniel Richard and Britta Johnn Cook (36)

Faculty Mentor/Collaborators: **Rosemary Battalio and Angela Dalhoe**

How High School Special Education Teachers Implement Interventions to Address Student Behavioral Challenges

High school students with EBD pose a difficult situation for most high school special education teachers. They have some of the highest academic skills but present such problematic behaviors that their academic performance is below expectations. On top of this challenging situation, students with EBD do not have positive outcomes once out of high school. With approximately 50% drop-out rate, having more involvement with the criminal justice system, and holding minimal wage jobs once out of high school, it is imperative that teachers use the most effective interventions to mitigate these negative outcomes. Using a survey of 200 HS special education teachers, this study will investigate: (a) what high school special education teachers use to intervene with challenging behaviors, (b) how teachers rank potential disruptive behaviors, (c) what interventions they implement, and (d) how the Individual Educational Plans (IEP) goals reflect the behavioral concerns. We collaborated with the faculty members to develop survey questions, create announcement postcards, and develop a system that randomly selected participants. We will be actively involved with the analysis of the data.

Behavioral and Social Sciences

Communication and Journalism

Acheson, Kim, Laura Marie Sukowatey, Unbi You, and Kailey Lynne Mezera (50)

Faculty Mentor/Collaborator: **Ellen Mahaffy**

New Media Research Project

The goal of the new media project is to investigate media use by collage students at The University of Wisconsin – Eau Claire in relation to entertainment events in and around the University. This was done by administering two surveys to University students. Both surveys find out how University students hear about entertainment events in and around the University by dividing the media into the categories of newspaper, TV, radio, or the current University online news site, and by age group. Findings from this project show new media as impacting television news the greatest amount and strongly suggest further study on a larger scale.

Arends, Andrew Joseph, Tracey Ann Kostuch, Joseph Jay Soldner, and Justin Lee Johnson (27)

Faculty Mentor/Collaborators: **Martha Fay** and **Mary Hoffman**

Leaders Among Peers: An Exploratory Study of Factors Associated with Peers Perceived as Influential

Research on superior to subordinate influence has shown that nonverbal immediacy is related to motivation and influence on employees (Teven, 2007), transformational leadership is directly related to both nonverbal immediacy and communication competence (Kirkpatrick & Locke, 1996), and that generational cohorts communicate differently (Faber, 2001; Whelan, 2002). While this illustrates that influence flows from superior to subordinate, it fails to consider peer-to-peer influence, even though such influence is likely to be associated with other variables such as communication competence, nonverbal immediacy, transformational leadership, and age. The current study is an exploratory study of how communication competence, nonverbal immediacy, transformational leadership, and age may be associated with perceptions of peer influence. The age of the peer evaluating influential others may mediate their relationships. Employees from a variety of organizations were asked to report their perceptions of influential peers as they relate to these variables. Results will provide a framework in which subordinates can communicate more effectively in order to be influential among peers.

Bailey, Elizabeth Ann, Jacob Paul Kinsman, Anna Elizabeth Qualley, and Kayla Janae Thigpen (24)

Faculty Mentor/Collaborator: **Nicole Schultz**

Organizational Messages and How They Relate to Student Leadership Involvement

The purpose of this study was to explore the importance of messages produced by the University of Wisconsin-Eau Claire's Division of Student Affairs to see if there is a relationship between perceptions of the messages and student tendencies to pursue a leadership position. Smart, Ethington, Riggs, and Thompson (2002) support our research as they discuss how student desire for leadership affects the extent to which students are involved in university leadership positions. Theories that drove our research include Transformational Leadership Theory (Webb 2007) and Holland's Theory of Careers (Smart, Ethington, Riggs, & Thompson 2002). Our group created an electronic Qualtrics survey and used convenience sampling to distribute the survey using e-mail and social networks. We used SPSS to run Pearson Chi-Square and Cronbach Alpha tests on the feedback received from the survey. One Chi-Square test revealed a significant positive correlation that e-mail is the most preferred channel for receiving messages ($n = 226, p = .016$). Our group used thematic analysis to analyze qualitative data. This study may be useful to UWEC faculty, administration, organizations, students and practitioners who want to send effective messages to students or to recruit members for potential leadership positions.

Bowers, Zachary Thomas, Emily Jo Amundson, Danielle Elise Geheran, Kelsey Robyn Juvette, Britni Tamra Welsh, Caitlin Garnett Shuda, and Ashley Nicole Hofer (10)

Faculty Mentor/Collaborator: **Nicole Schultz**

You've Got Mail: Professor Use of E-mail and Student Willingness to Communicate

Research by Waldeck, Kearney, and Plax (2001) found frequent e-mail use by professors can repel students from

communication. However, our study supports that frequent e-mails from professors positively impacted student willingness to communicate, suggesting an appropriate frequency of e-mails may exist. The research question we sought to examine was, "How does a professor's use of e-mail influence students' willingness to communicate with that professor?". The Uses and Gratification Theory (Ko, Cho, & Roberts, 2005) provided a foundation of background theory for our study, such as information regarding psychological needs and how tone affects student willingness to communicate with professors. We used convenient, non-random sampling through online survey research to gather data. Cronbach alpha, Pearson r Coefficient significance tests, thematic analysis, and SPSS were used for analysis. Findings showed neither perceived age nor sex of professors affected students' willingness to communicate; e-mail variables such as frequency and tone had a positive correlation. Student perception of the professor's tone was also measured through the Pearson r Coefficient, resulting in a significance value of .003, thus supporting our hypothesis. This study gives insight into professor e-mail communication with students and how educational communication can be improved.

Busacker, Kristin Marie (30)

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

U.S. Press Coverage of the Six-party Talks, 2003-2007

This study uses a controversial foreign policy issue named the Six-party talks on nuclear issues. There is little known of how western media have covered the North Korean issues and how they may interpret this controversial topic. The purpose of this study is to explore how media framing has been used in news stories as a means to channel each dominant ideology and national interests into the public and the society. It is an important process because this study will contribute to the public's interpretation and opinion of foreign issues covered and then has important consequences for government administration's foreign policy decision making. This study combined a quantitative content analysis with a qualitative assessment of the overall framing in the news and editorial content of the Six-party talks from the Associated Press (AP). The results concluded that while among the major frames U.S. media might accept and use the anti-communism frame and national interest, AP news coverage was reinforced by the journalistic propensity to cover conflict.

Denney, Garrett Jon, Paydon John Miller, Daniel Cornelius Coughlin, Jordan Dwayne Sherman, and James Dwain Hunter (8)

Faculty Mentor/Collaborator: **Nicole Schultz**

Electric President: The Media's Effect on College Students' Perception of the Obama Administration

The hypothesis analyzed was: "There is a significant correlation between the amount of media consumed and a college student's positive perception of the Obama administration." Initially, we researched past studies on political perception and the media (Anastasio, Rose & Chapman, 1999) (Donsbach & Haumer, 2009). To further investigate our hypothesis, we examined the cognitive linguistics theory in our preliminary research. To research this hypothesis, we used nonrandom convenience sampling via social networking which produced a snowball effect with our Qualtrics survey. Data collected was analyzed using Cronbach Alpha, Tau-C Coefficient, an independent sample t-test, and a statistical package for the social sciences. No significant correlation was found between media consumed and a positive perception of the Obama administration ($n = 298$, $p = .001$, $sig = .988$). In a cross-tabulation of our secondary hypothesis there was no significant correlation between the amount of TV watched and an individual's conservative ideology ($n = 272$, $p = 0.091$, $sig = 0.271$). Our research found that college students are able to differentiate between diverse viewpoints on television and their own political ideology. When targeting college students, television news sources should not count on their programming to be effective in persuasion.

Falch, Stephanie Frances, Hannah Renae Baldwin, Brittany Nicole Sutton, and Catherine Avonne Slauson (49)

Faculty Mentor/Collaborator: **Mary Hoffman**

"Go Ye Therefore and Make Disciples:" Persuasive Communication Methods and Participation in Christian Organizations on Campus

With an increasing number of Christian organizations emerging on campuses around the United States, the challenge of attracting and maintaining new members will increase. It is important that researchers and church leaders understand the role of communication in recruiting both domestic and international students. At present though, little is known about what communication channels and types of messages are most persuasive in motivating people to attend, or about the communication practices participants consider important for continued involvement. To answer these questions, 100 domestic and international students at a mid-size Mid-western university were surveyed about their experiences in campus Christian organizations. Our research will describe student evaluation of the channels and messages currently used to attract and retain members of Christian organizations on a university campus.

Francour, Beth Marie, Angie Eileen Jones, Danielle Susan Widmer, Allyson Marie Hedding, and Grace Margaret Maring (7)

Faculty Mentor/Collaborator: **Mary Hoffman**

Perceptions of Racial Diversity: Affects of Campus Tours on Prospective Students

This study investigates whether a campus tour given by the Admissions office of the University of Wisconsin-Eau Claire that communicates explicit visual and verbal messages pertaining to diversity will create positive perceptions of racial diversity on campus for prospective students. This study is important to both the university and prospective students, as research has shown that participating in cultural experiences can strengthen University students' impressions of their institutions and improve their self-esteem and familial relationships (Jenkins 2009). Research also suggests that a diverse population is more educationally effective than one that lacks diversity (Terenzini, et al. 1998). Approximately 125 prospective students will participate in this study by taking a campus tour and completing a questionnaire. Participants will be split into an experimental group, receiving our enhanced tour, and a control group who will receive a regular UWEC tour. Both groups will be asked to complete a pre-test and a post-

test regarding the tour. We expect to find that students who experienced the enhanced tour will form more positive perceptions of and also an increased awareness of diversity at UWEC.

Fredman, Amy Jo and Amy Lynn Bainbridge (25)

Faculty Mentor/Collaborators: **Nicole Schultz** and **Mary Hoffman**

Communicative Experiences of Female Church Leaders

Ordained female ministers are a growing part of the church workforce, but remain a minority. Because of social expectations of women and of clergy, female ministers face unique challenges in leading their organizations. Although other studies explore female leadership in churches (Jablonski, 1988; Chaves 1996; Hoffman, 2004; Adams, 2007), this study seeks to understand how communication contributes to women's identities as female ministers. To that end, we focus on female ministers' communicative experiences in organized church settings. We employed a grounded theory approach to analyze interview data obtained from 15 ordained ministers. Findings reveal female ordained ministers' unique experiences communicating with colleagues and congregants that impact their approaches to leadership within the church and implications for both male and female ministers and their congregants.

Gannon, Danielle Kathleen (48)

Faculty Mentor/Collaborator: **Mary Hoffman**

"The Whole Peace Corps Thing": A Rhetorical Analysis of Peace Corps Volunteer Blogs

This rhetorical analysis will explore the values of Peace Corps Volunteers as expressed through blog entries posted on the Peace Corps website. This specific research will add to the understanding of how individual and organizational values interact and are manifested in language. I use Walter Fisher's 1984 Narrative Paradigm to analyze 100 randomly selected Peace Corps Volunteer blogs. This analysis should reveal the relationship between individual member values and professed organizational values.

Huibregtse, Justin Michael, Patrick Michael Rohr, Joshua Toufar, Jonathon Robert Weise, and Joshua Lee Parsons (13)

Faculty Mentor/Collaborator: **Martha Fay**

Faith Communication Needs and Desires: Understanding Computer-Based Communication Applications and Media Preferences of Churchgoers

Research has shown that more than 100 million Americans rely on the internet to deliver some aspect of their religious experience (Campbell, 2006; Last, 2005). Despite this widespread use, little is known about which spiritual needs Christians prefer to meet online versus face-to-face. Specifically, studies on which computer-based communication applications (CBCA) churchgoers prefer to use for specific needs and the influence they have on desired behaviors have not been conducted. People who identified with the non-denominational Christian church were surveyed to examine potential relationships between church-related behavioral changes and CBCA preferences of churchgoers. Because preference for mediated versus face-to-face (ftf) communication may be related to communicative apprehension (CA), this study also tested the relationships between CA and media versus ftf preferences for various spiritual needs. McCroskey's (1970) Personal Report of Communication Apprehension was used, along with questions related to CBCA preferences and behavioral influence. Based on existing, but separate findings in all three areas, we expect to find a positive correlation between communication apprehension, churchgoer preferences for various media and CBCAs, and the desire for behavioral change.

Breen, Daniel Carl, Stephanie Renee Jarvais, Jessica Deanna Gossett, Anna Joy Larson, Frederick Alan Hubert, and Jared Carl Hause (9)

Faculty Mentor/Collaborator: **Nicole Schultz**

Techno Affect: The Affect of Technology on Student-Professor Communication

The purpose of this study was to determine whether or not a significant positive correlation exists between professors' increased use of technology and improved student-professor communication. The theory represented in the work is the social presence theory, which states that communication is increased through both verbal and nonverbal cues (Schrodt, 2006). Convenience sampling and online survey research were used to gather data. The statistical significance of the research was determined by Cronbach Alpha, Cross Tabulations and Chi Square tests using SPSS. Results revealed that technology such as Email and PowerPoint created positive correlation between professor and student communication, (p-values .004 and .012 respectively). However, technology in the form of Desire2Learn did not create a positive correlation (p-values: D2L discussion boards .697, D2L profiles .144, D2L feedback .698). One open-ended question was, "Has technology improved communication between you and your professors?". From the responses students alluded to the fact that having technology is more efficient in communication, creating an almost ever-present method to talk with the professors when they are not face to face. The findings in this study are valuable to professors to determine the amount of technology to use for courses in the future.

Khang, Pang Kou (31)

Faculty Mentor/Collaborator: **Martha Fay**

Going Paperless: Gauging User Behavior and Opinion in the Transition to Online University Catalogs

In an effort to transition from paper to web-based catalogs, a Midwest university examined user behavior and preferences with regard to the university's current and potential future catalog formats. Using focus groups and an online survey, this study explored how people use catalogs, what challenges they encounter, and what ways the change can be structured to be most beneficial, based on Giddens' (1984) structuration theory. Previous research on the introduction of new systems suggests that experience and familiarity with technology affect the success of the initiative (Poole & DeSanctis, 1992), as do general attitudes about change (Senge, 1999). In addition, the climate of the organization and leadership style impact acceptance of change (Riley, 1983). Participants responded to an online survey asking about catalog use and preferences, attitudes toward change (using Oreg's Resistance to Change scale, 2003), and organizational environment (using Amabile's Work Environment scale, 1995). Results will be used to make recommendations for the catalog and for communicating with various constituents about the change, and will further elucidate the relationship between attitudes toward change, leadership style, work environment, and change implementation.

Koch, Pierce Alan, Justin Jerome Rudnick, Kelsey Marie Meixner, and Loni Marie Olstad (33)

Faculty Mentor/Collaborator: **Mary Hoffman**

Broadcasting the Closet: Influence of Television Consumption on Attitudes Toward Homosexuality

This study aims to explain the relationships between exposure to prime-time television programming and attitudes toward homosexuality. While numerous studies have explored homosexuality in the media, few have taken an in-depth look at how exposure to specific television programming influences attitudes toward homosexuality. To measure the potential correlation between prime-time television exposure and attitudes toward homosexuality, an online survey was administered to college students at a Midwestern University. The survey used an adapted version of Massey's (2009) measure of sexual prejudice to measure attitudes toward homosexuality, and modeled questions about media exposure after Calzo and Ward's (2009) methodology. Previous research has found that there is a direct correlation between television exposure and attitudes toward homosexuality. This study expects to replicate

these findings within specific genres of television during the prime-time viewing period.

Nelson, Ashley Lynn, Jane Louise Wilson, Sasha Rae Sarkkinen, John Paul Arnold, and Matthew David Biren (47)

Faculty Mentor/Collaborator: **Mary Hoffman**

Perceptions of Communication Behaviors of Generation Y

Research shows that intergenerational communication is becoming increasingly more difficult in the workplace. There is evidence that other generations hold negative perceptions of Generation Y (1982-2000), but no specific information on how these perceptions are formed (Reynolds, Bush, & Geist, 2008). Some scholars have suggested that these perceptions may be due in part to technology use (Reynolds et al., 2008; Van Dyke, Haynes, & Ferguson-Mitchell, 2007). Generation Y is the first generation that had access to all forms of electronic communication including instant messaging, texting, and email (Poindexter, 2005). Our study examined whether the communication channels and message characteristics used by Generation Y have an effect on the perceptions Baby Boomers (1946-1964) form of them and their own perceptions of themselves. Data was gathered through surveys of Baby Boomers and Generation Y's in the workforce. The survey included sample mediated messages sent by coworkers,, and were evaluated using semantic differential scales. At the conclusion of this research we expect to describe how Baby Boomers and members of Generation Y perceive a range of communication behaviors commonly associated with Generation Y.

Northey, Katherine Ann, Meghan Claire Rohe, Samantha Lynn Howard, Lindsey Marie Smith, and Anna Christine Riedel (12)

Faculty Mentor/Collaborator: **Martha Fay**

The Silencing Effect of Uncertainty: Communication Apprehension and Organizational Change

The current economic downturn is challenging organizations (Mitchell, 2009), resulting in unprecedented change. Change is associated with high levels of uncertainty and stress, which may affect employee willingness to communicate and lead to communication apprehension (Golden-Biddle & Rao, 1997; Russ, 2010). Research has shown that communication apprehension (CA) deprives employees of important information and causes communication avoidance, withdrawal and disruption (Bartoo & Sias, 2004; Daly & McCroskey, 1984). However, research has yet to tie CA to levels of uncertainty. While high levels of uncertainty may be related to organizational change, the impact of perceived valence of the change has also not been studied. Individuals who have been part of an organization for at least twelve months participated in an online survey asking them to rank order their general level of workplace uncertainty, and answer questions related to CA using McCroskey's (1982) scale. Based on previous research, we expect that high levels of uncertainty may be related to high levels of CA. Additionally, the perception of the change as either positive or negative may mediate the relationship between uncertainty and CA. Results can be used to help organizations assist their employees in navigating change through more involved communication.

Porter, Benjamin Donald, Zachary Martin Hayes, Jerad Lee Hill, Heather Braye Jacobson, and Megan Patricia Kirt (26)

Faculty Mentor/Collaborator: **Martha Fay**

Relationship Satisfaction, Friendship, and Facebook Use

Facebook has grown to the sixth most used website on a daily basis (Tom Tong, Van Der Heide, Langwell, and Walther, 2008). Facebook is a social networking site where users create profiles and engage in an online global community through the process of reciprocal "friending." Previous research has shown that Facebook promotes low commitment and weak relational ties among college students (Lewis and West 2009). However, research has not

shown how the frequency of Facebook use is related to relationship satisfaction. Further, given the increasing use of Facebook, people's perception of friendship may have changed due to the transition from face-to-face communication to online communication through Facebook. Participants who were 18 to 25 year olds were given an online survey assessing relationship satisfaction using Norton's (1983) relationship scale, frequency of Facebook use, and the participants' perception of friendship. Further, this study fills a gap in the literature by examining the definition of friendship. Findings will help determine whether frequency of Facebook use impacts young adults' satisfaction with relationships, and will illuminate young adults' perceptions of what friendships mean.

Rudnick, Justin Jerome (32)

Faculty Mentor/Collaborator: **Mary Hoffman**

Unmasking the Moral of the Story: A Narrative Analysis of the "Stand for Marriage Maine" Campaign

The marriage equality debate has recently become the subject of political and social commentary across the country. Many states have seen some sort of marriage amendment come to a vote. As with any controversial issue, groups aligned with both sides of the debate have been arguing their perspectives. It is important these messages are analyzed. Stand for Marriage Maine released three television commercials in their 2009 "Yes on One" campaign. In the election, Mainers voted to repeal their marriage equality act. The influence of the messages used by this campaign to reverse marriage equality in Maine can be better understood through rhetorical analysis. This project uses a narrative analysis of the Stand for Marriage Maine commercials to explain how the campaign used narrative elements to attempt to persuade viewers to accept a view of the world that was consistent with the group's agenda.

Smith, Alexis Kristen, Jacqueline Juliet Kress, Bridget Beverly Simmons, Alexis Kristen Smith, Kristi Rae Halvorson, and Andrea Nicole Keister (28)

Faculty Mentor/Collaborator: **Martha Fay**

The Effect of Family Communication Patterns in the Family of Origin on the Amount of Self-Disclosure in Employee to Employee Communication

Interpersonal research has shown that self-disclosure is important for relationship development (Langan-Fox, 2009); organizational researchers have shown that positive relationships with co-workers are associated with more participative decision-making, more economic stability, and more organization commitment to product quality and employee rights (Kassing, 2006). However, self-disclosure in the workplace has only been examined as it relates to educational systems (Cayanus, 2009). Communication patterns in adults' families of origin have also been linked with varying amounts of self-disclosure, which in turn fosters friendships (Black, 2007). However, how much one self-discloses at work has not been systematically examined as it relates to communication in family of origin. Using McLeod, Atkin, and Chaffee's (1972) Family Communication Patterns (FCP) Scale and Wheelless and Grotz's (1976) Revised Self-Disclosure Scale, we surveyed full-time employees from a variety of companies. The concept-orientation family communication pattern was associated with higher levels of self-disclosure, and the socio-orientation was associated with lower levels of self-disclosure. Findings have important implications for individuals as well as companies.

Wee, Caroline Viola, Laura Marie Bruggeman, Amy Jo Knight, Chuluunbaatar Enkhtungalag, and Katelyn Leigh Matthews (11)

Faculty Mentor/Collaborator: **Martha Fay**

Refugee Communication and Acculturation

According to the Migration Policy Institute, roughly 1.8 million people migrate to the United States each year as refugees, immigrants, and students. These individuals try to adapt to their new surroundings by becoming acculturated to their host country. Research has shown that communication skills play a vital role in the

acculturation process (Shuang & Louw, 2007; Jiang, Green, Henley, & Masten, 2009). More specifically, the majority of research has shown that language proficiency is a major aspect of one's acculturation process (Stoldoska, 2008; Trebbe, 2007; Miglietta, 2009; Saumure & Yang, 2006). However, specific communication skills, such as self-disclosure (Wheless & Grotz, 1978) and communicative adaptability (Duran & Kelly, 1988), have not been sufficiently studied as they relate to acculturation. Using interview and survey methods, this study asks how communicative adaptability of refugees and self-disclosure to the host population are related to acculturation. Results are expected to improve understanding of one specific communication practice and communicative adaptability, both of which may positively impact acculturation.

Williams, Brittany Marie, Cierra Jane Forsberg, Mallory Jane Markham, and Angela Lynn Lochner (34)

Faculty Mentor/Collaborator: **Mary Hoffman**

Communication Networks in Event Planning

The purpose of this study is to investigate the role of informal communication in forming organizational networks, in the context of event planning. Event planning has become a multi-billion dollar industry in the past decade making it a critical aspect of many organizations. Because this industry involves coordinating vendors and clients throughout the planning process it is a productive platform in which to study inter-organizational networks. Networks play a vital role in providing access to additional resources, stability in a given market and the ability to work more efficiently. In accordance with network research we aim to understand the role that communication within these networks plays in the process of planning an event. An online survey was sent to a convenience sample of approximately 350 event planners in the continental United States. In addition, five interviews were conducted with event planning professionals from large Midwestern cities. By triangulating the information collected from surveys and interviews, we anticipate being able to describe the role of informal communication in forming event planning networks.

Dean of Students Office, Housing and Residence Life

Gonzalez, Sarah Katherine, Rogelio Encizo Jr., and Cara Mee Shimon (53)

Faculty Mentor/Collaborators: **Jodi Thesing-Ritter, Kirby Harless, Lissa Jo Martinez, and Meleina Sega**

The Personal and Academic Impact of Pre-College Mentoring on Middle- and High-School Students

Blugold Beginnings is a pre-college access program designed to help inspire and educate underrepresented youth (specifically students of color, low-income students and first-generation college students) in realizing that post-secondary education is a viable option for them in their future. This program provides mentoring opportunities with college role models that then offer participating students the tools and resources needed for admission to a post-secondary institution. Our research has been developed to determine the personal and academic impact of pre-college mentoring on middle and high school students within Eau Claire and its surrounding areas, including Altoona and Arcadia, Wisconsin. A pre- and post-session survey will be distributed to each participating student during a "college knowledge" visit to the UW-Eau Claire campus; results of these surveys will then determine the extent to which access to one-on-one-mentoring has on each middle- and high-school student's familiarity and comprehension of the college admissions process.

Economics

Fennig, Robyn Maureen and Drew Arthur Bowlsby (201)

Faculty Mentor/Collaborator: **Sanjukta Chaudhuri**

The Economics of Drinking: Evidence from the UW-Eau Claire Campus

This project aims to identify student and parental background characteristics that lead to increased alcohol consumption, as well as identify price sensitivity for various types of alcoholic beverage purchases (beer, liquor, wine, and other). The primary data was collected in the beginning of spring semester 2009 through a combination of paper-based and online survey techniques. Data was analyzed and a model was created using econometric techniques. Demand curves were also calculated based on survey data. Summary statistics, analysis, conclusions, and policy implications will be discussed.

Fennig, Robyn Maureen (216)

Faculty Mentor/Collaborator: **Maria Dacosta**

The Importance of Industry Clusters in Local Economic Development

This project seeks to help better understand industrial clusters in the Eau Claire Metropolitan Statistical Area (MSA). Existing and potential clusters must be identified in order to understand their impact on local economic development. The study focuses on low-cost and time-effective methods of identifying clusters: expert opinion interviews, calculation of location quotients (calculated from US Census data), input-output-based methods, and network analysis. From these, meaningful policy recommendations can be made, helping to stimulate the local economic development of the Eau Claire MSA.

Goodrich, Ryan Jeffrey (202)

Faculty Mentor/Collaborator: **Yan Li**

Contributions to Healthcare Cost and Utilization of Wisconsin Medicare Part A Enrollees through 2018

Understanding the major factors that contribute to the rising healthcare cost is quite important for policymakers. Since procedural utilization and demographics differ by region, state policy decisions may play a significant role in curbing the increased costs of Medicare enrollees. This project tries to investigate the sources of healthcare cost increases for Medicare Part A enrollees in the state of Wisconsin by examining the costs and utilization of inpatient procedures by gender and age. In the mean time, we also consider the impact of “controllable” variables on health costs that have been linked to lifestyle choices such as smoking, drinking and dietary factors. The results show that the aging of the population and cost inflation together create a very serious problem for the Medicare budget. In addition, poor lifestyle choices have significantly pushed up the Wisconsin Medicare costs.

Hehl, Paige Louise (217)

Faculty Mentor/Collaborator: **David Schaffer**

Wage Penalties in Majority-Female Occupations

Most economic researchers have concluded that gender wage discrimination in the United States has significantly decreased. However, our research using a different set of statistical techniques shows that a more indirect form of wage discrimination is still common. Using standard econometric methods, we regressed wages onto several variables including two new ones which we created- fraction female and average occupation education. The variable fraction female represents the portion of employees in a given occupation that are women. Analyzing data from

1971 through 2006, we found that being in a majority female occupation results in a significant wage penalty, for both men and women. Clearly, gender wage discrimination continues to be a serious problem in the U.S.

Huebner, Nicole Ann (200)

Faculty Mentor/Collaborator: **Sanjukta Chaudhuri**

The Impact of Economic Recession on Labor Force Outcome: Do Gender and Ethnicity Matter?

The objective of this project is to analyze the differential impact of the current economic crisis in the United States on its adult labor force, with special focus on the role played by gender and ethnicity. Using the Current Population Survey data, we will look at monthly data between 2001 and 2010 on a set of variables: (1) occupation, earnings and employment status, (2) human capital, (3) marital status/family, (4) gender and ethnicity, (5) geographic location and demography. We want to explore the possibility that these variables are significant factors in explaining the impact of the recession on the labor force. In particular we are interested in examining the role of gender and ethnicity as explanatory variables to explore reasons why the recession has impacted people differently. This is beneficial to the field of study to understand the state of the economy and understand economic patterns. Our research questions are: Has the racial/gender impact of the economic crisis followed historical trends? What (and why?) if any, are the exceptions? What is the specific role of gender/ethnic discrimination in explaining the differential impact of the crisis?

Nosker Tanner, Leroy Martin (191)

Faculty Mentor/Collaborator: **Yan Li**

A Comparative Study of the Islamic Prohibition of Usury

Usury (i.e. lending at interest rates) has been practiced in parts of the world for thousands of years. However, there is substantial evidence of criticism by various traditions, institutions and social reformers on religious, moral, ethical and legal grounds. Among its most visible and vocal critics has been the religious institution of Islam. The practice of Islamic banking has received more attention in recent years. However, most of the previous literature attempted to describe the extensive critique of usury, and to crystallize and synthesize the main tenets of the arguments used in support of the prohibition of usury. Our paper will revisit this issue mainly from an economic point of view and contribute to the literature by introducing a two-edged comparative study. Several Islamic countries are chosen for our study and we will particularly investigate how Muslims generally deal with money and banking in different Islamic economies without usury, how Muslims living in non-Islamic countries influence and become influenced by mainstream economic practices, and finally how banking principles laid out by Islamic societies might be able to help their banks survive the current financial crisis better than the Western system.

Sackmann, Matthew Louis, Nicholas John Kuqali, Paul Charles Stroik, and Benjamin Thomas Ponkratz (194)

Faculty Mentor/Collaborator: **Eric Jamelske**

The Chippewa Valley Center for Economic Research and Development Global Warming Project: What do Students and Households Think About Global Warming?

Global warming has become a hotly debated topic with much discussion occurring in the U.S. and around the world. The U.S. appears headed toward passing new legislation mandating reductions in carbon emissions possibly coupled with tax policies and perhaps even a cap and trade permit system. But how much do people really know about global warming? To find out we began with a survey to assess the perceptions and general understanding of global warming/climate change issues among UWEC students and Chippewa Valley households. We first ask whether global warming is happening and how much cause for concern should we have regarding this issue? The survey then probes what policies/strategies may be effective in addressing global warming. Our results are presented using

graphs and tables to highlight the similarities and differences in the responses given by university students compared to households in the region.

Stroik, Paul Charles (196)

Faculty Mentor/Collaborator: **Laura Berlinghieri**

Residential Investment and the Business Cycle: International Evidence

Generally speaking, economists believe that recessions start with a slump in investment spending (e.g. buildings, machinery, equipment), which is why the short-run fluctuations in the economy are referred to as the "business cycle." Previous research finds that residential investment spending (housing), a subcategory of investment spending, is below normal leading into a recession and contributes weakness to the growth rate of real GDP in the U.S. The objective of our research is to determine whether residential investment spending contributed significant weakness to real GDP growth before the most recent global recession for a group of developed countries. We apply the method of the existing studies in order to analyze this relationship at the international level. Our analysis also enables us to observe the effects of business cycle fluctuations across trading partners. Our preliminary results find that a small group of countries does experience a downturn in residential investment spending leading into a recession; however, the remaining countries do not exhibit strong evidence that residential investment spending contributes significant weakness leading into a recession.

Stroik, Paul Charles, Nicholas John Kugali, Matthew Louis Sackmann, and Benjamin Thomas Ponkratz (195)

Faculty Mentor/Collaborator: **Eric Jamelske**

The Chippewa Valley Center for Economic Research and Development Global Warming Project: A Citizen's Guide to Useful Resources on the Science and Public Policy of Climate Change

Global warming has become a hotly debated topic with much discussion occurring in the U.S. and around the world. The U.S. appears headed toward passing new legislation mandating reductions in carbon emissions possibly coupled with tax policies and perhaps even a cap and trade permit system. Based on survey results from both students and households in Western Wisconsin there is a general consensus that global warming is real, but it is not clear how worried or concerned we should be regarding this issue. Moreover, many people are not sure which policies would be most effective in lessening global warming and most are only a little familiar with the current political debate in the United States. This project creates a report defining what is meant by global warming and also outlines the basics of carbon offsets as well as a carbon tax or a cap and trade permit system. There are also links to scientific and political sources that have extensively studied these topics including a characterization of existing policies in Canada and several European nations. Our goal is to provide a one-stop information clearinghouse to the general public for those that want to know more about global warming science and global warming policy.

Wieseman, Laurelyn Elise, April Christine Ross, Samuel Block, and Drew Christensen (192)

Faculty Mentor/Collaborator: **Eric Jamelske**

The Chippewa Valley Center for Economic Research and Development Cash for Clunkers Project: An Overview of the Guidelines and Goals of the Program and an Assessment of the Program's Success

The United States automobile industry was one of the first sectors to be hit by the economic downturn of 2008-09 and it was also one of the hardest hit industries. At the same time there has been an intensive debate on what the United States automobile fleet should look like given concerns regarding dependence on foreign oil and also the possible impacts of climate change. The Cash for Clunkers Program was launched by the federal government in July 2009 and lasted for two months through the end of August. This project uses data from a variety of sources and reviews the existing research to assess the impact of The Cash for Clunkers Program. We clearly state the program's

rules and guidelines as well as the program's goals. We then examine how the program affected automobile sales in the US, Wisconsin, and the Chippewa Valley. Lastly, we review the environmental and economics literature and comment on the cost-effectiveness of the program in reducing carbon emissions. All data will be presented in tables and graphs as well as described and analyzed in text.

Wieseman, Laurelyn Elise, April Christine Ross, and Drew Christensen (193)

Faculty Mentor/Collaborator: **Eric Jamelske**

The Chippewa Valley Center for Economic Research and Development Economic Indicators Project: An Overview of the 2008-09 Great Recession in the Chippewa Valley and Wisconsin

Nearly all Americans have been impacted by the recent economic crisis which has been severe enough to now be called The Great Recession. The impacts of the recession include substantial job losses resulting in rising unemployment as well as increased bankruptcies and home mortgage foreclosures. This project describes the overall impact of The Great Recession in the Chippewa Valley and Wisconsin as a whole. In particular we examine what sectors were hit the hardest in terms of lost jobs. Similarly, we also examine if the employment effects of this recession impacted various age groups, genders and races differently. Lastly, we explore the degree to which this recession increased the filing rates for both bankruptcies and home mortgage foreclosures. All data will be presented in tables and graphs as well as described and analyzed in text.

Ziemann, Benjamin James, Zachary Michael Hines, Eric Peter Nohelty, Matthew Michael Porwoll, and Brian Joseph Wood (176)

Faculty Mentor/Collaborator: **Eric Jamelske**

The Chippewa Valley Center for Economic Research and Development Investment Track Project: A Market Overview and an Analysis of Alternate Investment Strategies 2007-Present

Despite all of the attention given to the financial crisis and market collapse as well as the ensuing great recession of 2008-09, 2007 was not a banner year in terms of market performance either. All seems well now as the market rebounded dramatically with a record breaking performance in 2009, but the sluggish performance and eventual near collapse of the recent past has left the market wondering what the future holds. The Chippewa Valley Center for Economic Research and Development (CVCERD) collects market data on four different investment strategies and also provides an overview of overall market conditions through its Stock Market Project. Of particular interest to the CVCERD is tracking the performance of the Eau Claire Basket (ECB). The ECB is an investment in the stocks of 51 companies with an employment presence in West-Central Wisconsin. This research poster examines the overall market trends from 2007-present with a particular emphasis on the market slide that began in 2008 and the subsequent recovery in the second half of 2009. All data will be presented graphically as well as described and analyzed in text.

Economics, Psychology

Reinhold, Bryan Thomas, Amber May Jamelske, Elizabeth Anne Reinke, and Kevin Michael Reinhold (177)

Faculty Mentor/Collaborators: **Eric Jamelske and Lori Bica**

Evaluating the USDA Fresh Fruit and Vegetable Program in Wisconsin Elementary Schools: Comparing Program Effects after Two Months and Six Months of Program Implementation

The USDA established the Fresh Fruit and Vegetable Program (FFVP) in 2002 to increase fruit and vegetable consumption as part of a broad effort to combat childhood obesity. This project analyzed whether the FFVP

positively impacted student attitudes and behavior. The FFVP has increased the fruit and vegetable intake of participating students by providing free access to fruits and vegetables as a morning snack. If students are given fruits and vegetables in a setting with few or no alternative options they will eat them. Not surprisingly, fruits were more popular than vegetables. The impact of the FFVP was limited in several ways. Post-test data showed no evidence that participating in the FFVP increased fruit and vegetable consumption at lunch. Similarly, there was no evidence that the FFVP encouraged children to eat more fruits and vegetables outside of school for breakfast, after-school snack, dinner, or night-time snack. Most surprising is that the FFVP did not influence student behavior on days when their school did not provide a free fruit or vegetable through the program. Moreover, these program effects were present after only two months of program implementation and did not grow in magnitude as the program was in place longer.

Reinhold, Bryan Thomas, Amber May Jamelske, Elizabeth Anne Reinke, and Kevin Michael Reinhold (178)

Faculty Mentor/Collaborators: **Eric Jamelske** and **Lori Bica**

Using Incentives and Reminders to Increase Fruit and Vegetable Intake among Wisconsin Elementary School Students

The USDA established the Fresh Fruit and Vegetable Program (FFVP) in 2002 to increase fruit and vegetable consumption as part of a broad effort to combat childhood obesity. Earlier research shows that the FFVP has been very effective in increasing the fruit and vegetable intake of participating students by providing free access to fruits and vegetables as a morning snack. Unfortunately, there is no evidence that participating in the FFVP increased fruit and vegetable consumption at lunch or outside of school for breakfast, after-school snack, dinner, or night-time snack. Perhaps most surprising is that the FFVP did not influence student behavior on days when their school did not provide a free fruit or vegetable through the program. This study used incentives and reminders for students in a selected intervention school to see if these methods influenced students to bring fruit or vegetable items for snack on days when the FFVP did not provide a free fruit or vegetable snack. The results showed that toy prizes had some limited positive influence, but that a simple reminder for homework worked even better. Moreover, a dedicated and enthusiastic teacher also made a big difference in whether children brought fruit and vegetable snacks from home.

Geography and Anthropology

Baum, Rebekah Christine (71)

Faculty Mentor/Collaborators: **Christina Hupy** and **Ryan Weichelt**

Examining the Relationship between Alcohol Outlets and Crime in Eau Claire County, WI

The goal of this study is to explore the geographic relationships between crime occurrences and alcohol outlets within Eau Claire County, Wisconsin through both ordinary least squares and geographically weighted regression. Independent variables include alcohol license density, and a suite of data from the U.S. Census Bureau 2000 census data (population density, median income, unemployment, poverty, education level, and race). The dependant variable, crime density, was categorized by incident type, for example driving under the influence, burglaries, robbery, etc., and analyzed separately against the suite of independent variables. Both independent and dependant variables were spatially aggregated to the block group level, the unit of analysis, when necessary. The spatial clustering of crime occurrences within the county was also explored with hot spot analysis. Results indicate a positive relationship between crime density and alcohol outlet density. The results of this research will inform the county board in their evaluation process for alcohol license requests. The results will also assist law enforcement in crime prevention and resource allocation.

Brickheimer, Amy Sue (80)

Faculty Mentor/Collaborator: **Ezra Zeitler**

Clinging to Ethnic Identity: The “Polka-Identity” of Polish-Americans in Central Wisconsin

Music plays a critical role in the cultural shaping of all ethnic groups. Polish-American individuals in particular have clung to their traditional music, Polka, in hopes of holding on to one of the last remaining pieces of ‘old-world’ Polish ethnic identity here in the US. This study explores the role that music plays in the maintenance of Polish ethnic identity among Polish-Americans in Central Wisconsin and also examines the role that rural Polish communities and landscapes play in fostering Polish traditions and ethnic pride. Through historical analysis, a series of personal interviews, and first-hand studies of select Polish-American rural landscapes in Marathon and Portage counties in Wisconsin, this research provides evidence of the disappearance of many traditional Polish ethnic customs and to why one of the last remaining pieces, Polka, still remains.

Christian, Jenna Marie (97)

Faculty Mentor/Collaborator: **Paul Kaldjian**

Representations and Realities: Investigating Roadside Bias in Coded Civil War Data

By nature, studying spatial patterns of conflict is challenging due to the difficulty of collecting data from warzones. One result of this has been that quantitative analysis has often only been possible at very large scales, such as the national or regional levels. As a growing solution to this problem in some academic circles, coded conflict data aims to address the need for increasingly disaggregated analysis of war. One such dataset is the Armed Conflict Location Event Data, which is composed of battle events that are georeferenced to specific locations with corresponding event information. This offers many options for small scale analysis; however there is a tendency for the coded events to occur near roads. Given that records of many battle events are taken from local and international news media, some concern should be raised over whether reporters were reporting from vehicles. If this were the case, areas less accessible by roads would be under-reported, and as a result also under-represented in the dataset. Using Liberia as a case study, this project investigates spatial bias in civil war data through GIS analysis, comparison with refugee data, and broader discussion about spatial patterns of news reportage and its utility in coded data.

Fahrenkrog, Brooke Ann (95)

Faculty Mentor/Collaborator: **Joseph Hupy**

Karst Geology and Clean Drinking Water: Wisconsin League of Conservation Voters Internship

The Wisconsin League of Conservation Voters (WLCV) is a non-profit, non-partisan organization that is dedicated to electing conservation leaders, holding decision makers accountable and encouraging lawmakers to support conservation policies that effectively protect Wisconsin’s public health and natural resources (adapted from WLCV mission statement). By cartographically displaying the concentration of members around the state who were in attendance at Conservation Lobby Day, WLCV was able to focus on the location of strong and weak conservation-minded voting districts in Wisconsin. One of the main conservation issues of focus for WLCV is the groundwater contamination of local wells in 13 counties in northeastern Wisconsin and how Karst bedrock geology encourages this. With local industry being primarily agriculture, the manure and treated sewage spread on fields is seeping into the groundwater due to the local bedrock geology. This is a priority issue of the WLCV and their endorsement of Wisconsin legislators. Linking the geospatial distribution of WLCV supporting members to ground water contamination issues is integral to water cleanup legislative efforts in Wisconsin.

Free, Jonathan William (55)

Faculty Mentor/Collaborator: **Ari Anand**

The Effects of Online Communities in Our Society

When people go online they bring with them their culture, which is transformed into a digital framework where it meshes with other digitized people and their cultures. This Independent Study looked at how technology affects people in our culture by observing how people interact with one another on various online forums. As technology advances, people in our society become more engulfed in the digital world and in order to understand how our society is changing, research needs to be done on online communities and how individuals interact. The forums used for my research pertain to patterns and behaviors of online individuals on facebook.com and foxnews.com. In addition, I studied how individuals communicated on the forums. Particular words, phrases, and abbreviations can have multiple implications depending on the context. What was found from the research is that people can digitize themselves to different extents. The extent to which an individual is digitized correlates to how they are treated in the communities. The interactions cause the individual to either become more digitized to become more assimilated or to become less digitized and be taken less seriously in the community.

Melsness, David John (58)

Faculty Mentor/Collaborator: **Ryan Weichelt**

Geographical Crime Displacement: The Robert Taylor Homes and Englewood

This project is a case study of the effectiveness of the Chicago Housing Authority's revitalization efforts in creating new lower-crime/livable communities after the demolition of the Robert Taylor Homes in Southern Chicago. Specifically, this project examined the impacts of displacement of population on crime in the 2nd Police District (where the Robert Taylor Homes were) and the 7th Police District comprising the Englewood community to the south. The goal of the project is to see if there is a correlation with the demolition of the complex and crime trends in the 2nd and 7th districts. This study is premised on the concept of geographic displacement theory, which suggests that when governmental agencies attempt to eliminate crime by changing the local situation in which it occurs rather than eliminating crime, they move it to a different location. My hypothesis is that there will be a direct correlation with increased crime in the 7th district while there will be decreased crime in the 2nd district during the demolition that took place between 2002 and 2007.

Mertig, Darin Avery (82)

Faculty Mentor/Collaborators: **Ezra Zeitler** and **Ryan Weichelt**

Geographic Bias in the National Football League (NFL) Draft, 1970-2009

The popularity of the National Football League (NFL) and its product has increased steadily since the American Football League merged with the NFL in 1970. Today, the NFL is one of the wealthiest professional sports leagues on the planet (Plunkett Research, 2009), and its annual draft is the most watched professional sports league draft in the world (Nielsen Company, 2009). For teams of the NFL, the draft is a critical ingredient for success on the field. With millions of dollars at stake, teams painstakingly evaluate potential draft picks on a number of physical and mental factors, and while a team's draft success is often measured by the level of influence their selections have on the game, there remains an unexplored avenue of investigating a franchise's draft behavior - geographic bias. This research examines the role that proximity has played in the selection of college football players by twenty National Football League (NFL) franchises since 1970. A number of statistical methods, including T-mode factor analysis and correlation and regression analysis, are employed to answer a number of questions.

Olson, Lindsay Marie (57)

Faculty Mentor/Collaborator: **Brady Foust**

Drive Until you Qualify: A Comparison of San Diego and the Twin Cities Urban Areas

"Drive until you qualify" is a phrase often cited as a major cause of urban sprawl and increasing dependence upon foreign oil. The primary idea is that house prices decay with distance from the center of a city because of falling land prices. This study analyzes empirical data from a variety of sources to model the price/distance dynamic and compare it in two metropolitan areas: coastal San Diego, CA and the land-locked "twin cities" of Minneapolis and St. Paul, MN. While generally true, the phenomenon has strong directional biases and responds well to transportation corridors and physical barriers.

Peterson, Trevor Todd (81)

Faculty Mentor/Collaborator: **Ezra Zeitler**

The Right Foodstuff: Using Geographic Information Systems (GIS) to Determine Food Accessibility in Hennepin and Ramsey Counties, MN

Farmers' markets and food co-ops provide fresh, local food to urban neighborhoods. However, low income and predominantly minority areas tend to have poorer access to these food sources. Geographic Information Systems (GIS) provides the analysis tools necessary to identify the spatial patterns of food outlets in relation to population centers. This paper uses geocoding and network analysis to examine neighborhood food access in Hennepin and Ramsey Counties in Minnesota. Additional regression analysis of the socioeconomic characteristics of these neighborhoods determines the factors explaining poor food access in the Twin Cities area.

Schulz, Roger Thomas (73)

Faculty Mentor/Collaborator: **Joseph Hupy**

Regional Geospatial Analysis: The Northwoods Vernacular Region as Defined by Hydrology and Sportsmen

For many Americans the northern part of Wisconsin, Michigan, and Minnesota holds something extraordinarily special. Among the trees, lakes, rivers, and streams there is a common belief declaring this a unique region in our majestic country. Therefore, the question "What constitutes the Northwoods as a unique region?" is what guided this research endeavor. As fishing and hunting are seen as a unique component of the Northwoods, we applied fishing and hunting license sales per county, and lakes with lodges and resorts on them to define the Northwoods as a region. This study used data obtained from Wisconsin, Michigan, and Minnesota Departments of Natural Resources, including hunting and fishing license sales. Normalization of the data came from ESRI™ Census population data. To be more specific, the type of region that is being defined is a vernacular region. In this study, the unity was found in the sales of fishing and hunting license sales per county, and the density of resorts on big lakes of 35 square kilometers. Numerous convincing trends can be ascertained when the data are used to create an ArcGIS™ geodatabase and thoroughly analyzed. The frequency of these geospatial trends allows for a vernacular region to emerge.

Wiedenfeld, Noah Jonah (96)

Faculty Mentor/Collaborator: **Paul Kaldjian**

Food Insecurity and Northwest Wisconsin

This project explores the food system of northwest Wisconsin. Specifically, the food systems in eight counties in the Eau Claire region will be analyzed to understand food security, its spatial patterns, and how it works in this region,

which may be uniquely vulnerable due to its largely rural demography and distance from Madison. For example, data shows that food insecurity in NW Wisconsin is growing faster than the state average. Field interviews, phone conversations, email, and work group meetings with local government and nonprofit experts will be combined with government data and reports to understand the nature and extent of hunger in northwest Wisconsin, contributing factors, the services provided by area social programs, and possibilities for improving regional food security. In the attempt to understand the food systems of the food-insecure, the project will attempt to identify where food-insecure citizens purchase food and what they consume, for example, through FoodShare (food stamp) and free and reduced school lunch program data. The end goal is to explore how the food system can better serve the food-insecure.

Human Development Center

Liffrig, Erin Christine (123)

Faculty Mentor/Collaborator: **Michael Axelrod**

Evaluating the Impact of a Multicultural Service Learning Program at a Comprehensive University

This study focused on the impact of a multicultural service learning experience on undergraduate students at UW-Eau Claire. Participants consisted of students who chose to attend the Lac du Flambeau Indian Reservation program to complete service learning hours. Subjects completed pre- and post-experience surveys to assess changes that may have occurred in their awareness, skills, and knowledge. The service learning hours involved a 2-day orientation to the Ojibwe culture and a 2-day return trip during which students worked in the Head Start program and public school. The data were analyzed using t-tests and ANOVAS which revealed some statistically significant differences with small to moderate effect sizes. The majority of the differences fell into the knowledge category, suggesting participants benefitted the most in this domain. Further recommendations for research in this area of study center on evaluating the long-term effects of service learning on multicultural awareness and civic engagement.

Political Science

Novak, Lauren Marie (51)

Faculty Mentor/Collaborator: **Obika Gray**

Child Sex Trafficking in Peru: Policy, Practice, and Protection

The crime of child sex trafficking in Peru is largely underestimated by the Peruvian government and the public. Sex trafficking is when a commercial sex act is induced by force, fraud, or coercion or in which the person induced to perform such an act has not attained 18 years of age. This research was conducted through interviews with victims and organizations in Peru, a review of the literature, and an analysis of the sources. The current state of child sex trafficking in Peru is caused by an interaction of several variables, the most prominent being poverty and lack of education. The conditions that the victims experience are inhumane, illegal, and largely unrecognized. The Peruvian government is making progress towards the eradication of the crime, yet the efforts rarely reach the target population due to inadequate law enforcement, the lack of after-care facilities, and lack of resources to impoverished populations.

Sitzman, Elise Marie (52)

Faculty Mentor/Collaborator: **Geoffrey Peterson**

Policy Galore: How The Films Of James Bond Tell The World What Issues Really Matter

The James Bond films have served as icons of style and adventure. The films' perfectly-tailored suits, gourmet food, and sleek automobiles provide evolving benchmarks of Western style. In the same way, the Bond films can act as a

measure of the evolving set of dominant western political issues, from the Cold War to space weaponry, from the drug trade to blood diamonds. We do not view the Bond films as setting the patterns for global issues. Rather, we assert they engage issues that have reached a critical mass in Western political consciousness. Always cutting edge, the Bond films have never shied away from the salient, even trendy, issues of their time. Thus, the Bond films function as a lagging indicator; once an issue reaches the status of a James Bond film plot, it has received enough public attention to warrant serious discussion. We examined the James Bond series and connected the plot lines to the issues that dominated the contemporaneous political debate. We also examined the long-term impact of the use of these issues in the Bond films to determine if publicizing the issues makes a significant impact on public opinion and/or public policy. Overall, we found significant connections between important global events and the content of the Bond films from the concomitant eras.

Tran, Brittney (29)

Faculty Mentor/Collaborator: **Geoffrey Peterson**

Do Younger Candidates Draw Younger Voters? A Test of Two Competing Hypotheses

The recent punditry surrounding the 2008 presidential elections has resulted in a variety of untested assertions being treated as fact by many political amateurs. The goal of this project was to test the viability of two competing hypotheses regarding the interaction of younger voters and the age of candidates for office. The first hypothesis was that younger voters tend to gravitate towards the younger candidates, while the second hypothesis was that the deciding factor was the age “gap” between the two candidates. We found that there was no evidence to support the argument that younger candidates attract younger voters, and the evidence on the age gap tends to show that younger voters actually move to older candidates as the age gap becomes larger.

Psychology

Barth, Jaime Rose and Cody Scott McCormick (169)

Faculty Mentor/Collaborator: **Blaine Peden**

Computers: Misused on Campus?

Computer labs on campus provide opportunities for use and misuse by students. Students can use the computers to assist in academic activities using computer software programs such as SPSS, webmail and Microsoft Office while completely homework tasks along with text books and assignments. Or computers can be misused for non-academic pursuits such as social networking on Facebook. Although social networking is popular, research shows that networking sites interfere with school work (Craig, 2008). In addition, use of computer labs for social networking can affect others' ability to do their school work. We explored the use and misuse of University of Wisconsin-Eau Claire computer labs by performing a naturalistic observation of students at different locations around the university campus. Results indicated the majority of students, about 80%, were engaged in school related activities; however the location of the computer labs influenced the variety of websites that were visited. We found that in Hibbard Hall students were more likely to be on entertainment sites than social networking, while students in the lab on the first floor of the library, the 24-hour lab, and Davies Student Center were more likely to be on social networking sites when not engaging in school related activities. We suggest that there is no need for change in campus policy regarding use of computer labs on campus; however, periodic studies like ours may be informative.

Barth, Jaime Rose, Holly Suzanne Perszyk, Jeffrey Robert Miller, Katie Marie Wiskow, Tory Lea Miller, Samantha Ashley Liggett, and Brianne Helen Foiles (170)

Faculty Mentor/Collaborator: **Daniel Holt**

Evaluation of Three Leash-Training Approaches with Canines

For a dog handler's safety and leisure enjoyment, it is important to have a leash-trained dog. Different leash training techniques are promoted in canine training literature, but no published research has systematically made comparisons of them. The current study examined how long it would take for a dog to reach mastery of leash walking using one of three distinct training approaches. Each dog was randomly assigned to one of the three conditions and the number of training session required to achieve leash walking mastery was measured. The results of this study are of primary importance to those dog trainers with relatively limited training time.

Barth, Jaime Rose, Valerie Lynn Vantussi, and Emily Carol Prosser (152)

Faculty Mentor/Collaborator: **Blaine Peden**

Woman's Preventive Health: Where Are You Getting Your Information?

We studied women's awareness of preventive health measures. We conducted an online study, including an experimental manipulation, asking women all over the country about their views on women's preventive health. We wanted to determine how the type of information (testimonies or a scientific article) influenced women's ideas of preventive health measures. Women throughout the United States took a pre-test and were randomly instructed to read either the testimonies or the scientific article before taking a post-test. We believed that the testimonials would be more effective in influencing women's perspective regarding this topic, because testimonials are vivid and often relate to one's personal life. Our results did not confirm our belief; however, women who had previous life experience relating to the health issues of others tended to be more proactive when it came to women's health care for themselves. A new study, inspired by the first, focused more explicitly on reactive versus proactive approaches to women's preventive health exams. We believe this follow-up study will benefit women who are unsure about preventive health guidelines and unclear about what it means to be proactive in order to stay healthy.

Dakins, Breinn Louise (124)

Faculty Mentor/Collaborator: **Ann Collier**

Alcohol Risk and Quality of Life in Textile Handcrafters

There has been an increase in textile handcraft making (e.g., knitting, crocheting, etc.) over the last 20 years. Qualitative studies suggest that women use textile handcrafts as a coping mechanism; no research to date has explored the relationship using quantitative methodologies or examined the relationship between textile making and destructive coping (i.e., alcohol abuse). We investigated the relationships between textile use, quality of life (QOL), and alcohol risk in a random sample of women age 18 and over. This study was part of a larger study which looked at women who identified themselves as textile handcrafters (n=812). Participants completed a Qualtrics survey with a variety of questions about textile making, mood, and well-being. We hypothesized that women who were at-risk alcohol users would have poorer QOL and use textiles less frequently. We also hypothesized that if women use textiles to cope, they will be more likely to be low-risk alcohol users. The results of this study did not support either hypothesis. Surprisingly, an increase in alcohol use was significantly correlated with an increase in QOL. Other unexpected finding will be reviewed and discussed.

Daugherty, Sara Lynn (149)

Faculty Mentor/Collaborator: **Daniel Holt**

Relationship between Extraversion and Delay Discounting of Social Interactions

Delay discounting refers to the subjective value of a commodity decreasing as delay to its receipt increases. Delay discounting has been tested with different commodities such as money, food, alcohol and entertainment media. Research shows that people discount these commodities at different rates and that these differences can be attributed to the commodity characteristics such as whether the outcome can produce satiation, can be immediately consumed, and serves a metabolically relevant function (e.g., Charlton, 2007). The present study explores the discounting of social interactions – which is a unique commodity. Of specific interest was whether delayed social interactions would be discounted and, if so, would the degree of discounting correlate with extraversion scores from a commonly used personality measure. The present results indicate that delayed social interactions are discounted and that highly extraverted individuals are more likely to choose a smaller social interaction now than a larger social interaction after a given delay.

Domask, Benjamin Zachary and Elizabeth Jade Pawlicki (167)

Faculty Mentor/Collaborator: **Blaine Peden**

Do Age, Gender, and Location Affect the Way We Chew Food? and Mate Manners Matter Most

Our research is composed of two studies that we performed in our Psych 271 Research Methods class. Our naturalistic observation study examined the chewing of participants as a function of their gender, age, and location. The participants were 127 residents between the ages of 3 – 80 in Eau Claire, who were unobtrusively observed chewing while eating in one of three different locations on three different days around lunch time. The participants showed that 2/3 people chew with their mouths open and that age and location are unrelated with people's chewing habits. The general conclusion was that etiquette has declined over time. We further examined the impact manners have on society in our second study. Our experimental research study measured the significance that “good” and “bad” manners have on participant's ratings of attractiveness and desirability for members of the opposite gender. A total of 229 participants between the ages of 18 – 24 took a survey in which they viewed a one minute dating video and answered questions relating to the attractiveness and desirability of our confederate. Our results showed that both males and females agree that good manners make mates more desirable and attractive.

Dunbar, Andrew Robert, Barbara Emily Bolek, Christopher Min-Cheo Blume, Annie Elaine Borton, Ryan Douglas Green, Joseph Paul Vargo, Dana Christine Bauer, Jacob John Cafilisch, Eden Marie Anderson, Katherine Saara Hughes, and Chelsea Lee Christ Harstad (150)

Faculty Mentor/Collaborator: **David Jewett**

Effects of Exendin in Rats Trained to Discriminate between 22 and 2 hr Food Deprivation

Previous research had demonstrated that GLP-1 agonists decrease food intake and energy expenditure. Previously we have found that drugs that alter energy expenditure also alter the effects of 22 hr food deprivation in rats. We tested the effects of exendin-4, a GLP-1 agonist, in rats trained to discriminate 22 hr food deprivation from 2 hr food deprivation in a two-lever, operant choice task. After rats acquired the discrimination, subjects were food restricted for 22 hr and administered saline or exendin-4 (0.1-0.56 mcg/kg, i.p.). Thirty minutes later, the effects on the discrimination task were assessed. Exendin-4 did not alter the discriminative stimulus effects of 22 hr food deprivation. A larger dose (1.0 mcg/kg) eliminated responding and significantly decreased food intake. While exendin-4 decreases intake and rate of responding, exendin-4 did not alter the "hunger" discrimination.

Durand, Vanessa Aileen and Katherine Emily Quigley (98)

Faculty Mentor/Collaborator: **Michael Axelrod**

A Comparison of Polysubstance Abuse Diagnoses Based off Juvenile Self-report with Independent Psychologists' Diagnoses using Criteria from the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)

The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) is commonly used in the field of psychology to diagnose mental disorders. Self-report surveys are often included in the assessment of mental disorders. Given this, it stands to reason that research would find a strong relationship between self-report and diagnosis particularly in the area of substance abuse where substance abuse diagnoses are generally considered objective. Three hundred self-reported bio-psychosocial assessments were retrieved from archival data of a Midwest juvenile residential treatment center. The bio-psychosocial assessment was conducted by trained therapists. The assessments included juvenile self-reported use and frequency of a variety of illegal drugs. Self-reports were analyzed and fit to criteria of Polysubstance Abuse. Criteria for diagnoses were based off the DSM-IV-TR criteria for Polysubstance Abuse. A comparison was made between the diagnoses based off the self-report with independent psychologists' diagnosis prior to admission to the residential facility. It is expected that there will be a strong relationship between clinically diagnosed Polysubstance Abuse and a diagnosis of Polysubstance Abuse based on the self-reports.

Erickson, Leah Rebecca and Laura Elizabeth Ritchie(147)

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

Benefit or Burden? Attraction in Emerging and Middle-Aged Adults' Cross-Sex Friendships

“Cross-sex friendship” refers to a mutually cooperative non-reproductive alliance between a male and female. In one of the first papers on cross-sex friendship, O’Meara (1989) proposed that cross-sex friends confront the challenges of determining the type of emotional bond shared, confronting sexuality in the relationship, and presenting the relationship as an authentic friendship. We propose that, because cross-sex friendships are a recent phenomenon, men’s and women’s evolved mating strategies are activated in the context of cross-sex friendships and influence men’s and women’s cross-sex friendship experiences. In this paper we describe four studies involving a total of 89 male-female friendship pairs, 310 young adults, and 142 middle-aged adults. Select findings include: (1) In both young adulthood and middle-age, men and women nominate attraction to their cross-sex friend as a cost more often than as a benefit; (2) For women more than for men, attraction to a cross-sex friend is tied to their own current romantic relationship status; and (3) Particularly among middle-aged adults, satisfaction with one’s current romantic relationship is negatively associated with reported attraction to a current cross-sex friend. Our findings support O’Meara’s original proposal that men and women confront challenges of sexuality in their cross-sex friendships.

Fenske, Greta Anne, Andrew Daniel King, and Autumn Nicole Meyer (122)

Faculty Mentor/Collaborator: **Michael Axelrod**

Brief Experimental Analysis in Selecting Reading Interventions to Improve Reading Fluency

The goal of this study was to increase the oral reading fluency, correct words (read) per minute (CWPM) of 2nd grade students who were referred to an after school reading program. Three second grade students from two elementary schools participated in this study. Sessions took place two days a week. Assessment involved a Brief Experimental Analysis (BEA) phase containing baseline trials and trials in five different reading interventions. Reading clinic supervisors selected the interventions for each participant that had the highest number of CWPM during the BEA. Participants 1 and 2 continued with the Repeated Reading (RR) strategy and the Listening Passage Preview (LPP) strategy, and in session 6 for Participant 1 and in session 11 for Participant 2, the two intervention strategies were combined. Participant 3 had trials of the RR strategy for all sessions. Results demonstrated that

CWPM for all participants were higher in the final baseline trials compared to baseline trials. Thus, BEA was an effective way to select reading intervention strategies for the participants. Furthermore, oral reading fluency as measured by CWPM increased for all participants. The key implication is that educators should consider using BEA to select appropriate, individualized intervention strategies.

Fletch, Jordan Elizabeth, Tory Lea Miller, Adam Scott Zastrow, Ashley Susan Zellhoefer, Alicia Rae Nemec, Andrea Sarah Nelson, and Alyssa Jeane Collura (106)

Faculty Mentor/Collaborator: **Jennifer Muehlenkamp**

Stress, Coping, and Suicidal Ideation in College Students

Suicide continues to be the 2nd leading cause of death among college students (CDC, 2009), yet little research has examined the relationship between stress, coping styles and suicidal ideation within this population. The current study tried to address this gap in the literature in order to better inform assessment of risks for suicide and university prevention efforts. It was hypothesized that negative coping styles and stress would be positively associated with suicide ideation. A total of 123 students (79.7% female, 90.2% Caucasian) completed self-report scales that measured suicide ideation, hopelessness, depression, anxiety, coping styles, and stress. To assess group differences participants were divided into high and low suicide ideation groups based on their scores, with results showing significant differences (Wilk's $\lambda = .580$, $F(21, 90) = 3.10$, $p < .001$, $\eta^2 = .420$). High suicide ideation groups scored significantly higher on the majority of the scales than low suicide ideation groups ($ps < .05$). Results suggest that while many things are related to suicide, coping may be a particular variable to focus on.

Forai, Marta (174)

Faculty Mentor/Collaborators: **Blaine Peden, Allen Keniston, and Catya von Karolyi**

Difference in Reaction Times between True Memories and False Memories in a Recognition Task.

Roediger and McDermott (1995) showed that false memory for words can be generated by showing a list of words to research participants, then asking them to recognize some of those words on a new list that also contains words semantically related to the original words but not present on the first list. Participants often think the semantically related words appeared on the first list. I will use a similar recognition task with twenty participants and measure their reaction times to words from the original list and to words frequently believed to have been on that list. I will induce false memories using lists of words that Roediger and McDermott have shown robustly produce the effect. I will use lists of words known to produce false memories with varying degrees of probability. I expect to find slower "false memory" reaction times compared to "real memory" reaction times, and that the degree of difference varies as a function of a list's ability to induce false word memories. Such a result would support the idea that different mechanisms are at work when people have false versus real memories.

Fuerstenberg, Eric Adam and Maria Ann Vander Wyst (125)

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

Scientific Literacy and its Correlates: Knowledge of Evolution, Genetics, and the Physical Sciences in UW-Eau Claire Freshmen

Rates of basic scientific literacy in adult America are low – in fact, they are lower than rates of scientific literacy in 32 European countries and Japan (Miller, Scott, & Okamoto, 2006). Researchers have identified education as a key positive correlate, and religiosity as a key negative correlate, of scientific literacy (Miller, 1989). However, no study has tracked the same individuals over time to determine whether undergoing a college education is followed by growth in scientific literacy and, if so, the degree to which incoming level of religiosity and exposure to science coursework moderate that growth. In this poster, we describe the results of Phase I of a planned longitudinal study of UWEC students' scientific literacy. During the 2009-2010 academic year, we collected responses from 264

freshmen enrolled in a 100-level general education course. Students completed measures of scientific reasoning and basic scientific knowledge (physics, chemistry, evolution, and genetics), as well as measures of religiosity and young earth creationist beliefs. In addition to describing the distribution of scientific literacy in our sample, we describe how religiosity and gender relate to students' scientific knowledge and understanding of the scientific process. We discuss educational implications of our findings.

Geissler, Andrew Wayne, Katelyn Ashley Westaby, Shawna Kristine Lawcewicz, and Aubrey Ann Chwala (121)

Faculty Mentor/Collaborators: **Allen Keniston, Jennifer Muehlenkamp, and David Jewett**
Connections with Disturbed Eating: Correlates of Disordered Eating Behaviors

The purpose of this research is to determine the relative strength and direction of correlations between several known predictors of disordered eating behaviors among college students. We will assess body mass index (BMI), body satisfaction, depression, grade point average (GPA), life satisfaction, social influence, self-esteem, and willingness to seek help. We expect to find that disordered eating behaviors are as prevalent on this campus as other college campuses. We hypothesize that social influence (teasing) and depression correlate positively and more strongly with disordered eating behavior than BMI and willingness to seek help. Conversely, body satisfaction, life satisfaction, and self-esteem have strong negative correlations with disordered eating behaviors. We don't expect to find a significant correlation between GPA and willingness to seek help with disordered eating behavior. We will use descriptive statistics to assess the prevalence and severity of disordered eating behaviors on campus and correlations and multiple regression analysis to assess the relative strength and direction of associations between our variables and disordered eating behavior. Our findings may aid Counseling Services in identifying and treating students with disordered eating behavior. Additionally, this research may assist clinicians and communities in the prevention and treatment of eating disorders and disordered eating behavior.

Gerszewski, David Andrew (173)

Faculty Mentor/Collaborator: **Blaine Peden**
Issues of Competence at the Undergraduate Level

Competence is an important ethical concept for psychologists, and failure to fully understand the limits of one's competence can have severe effects on clients. These dangers exist with anyone who has obtained knowledge of psychological concepts, even though almost all of the research on competence has focused on the graduate and applied areas of psychology. The aim of the current study is to analyze undergraduate students' understanding of, and willingness to apply, the concept of competence. The method that I will be applying is an online survey, which gives participants situations that include competence issues. Students will be asked two questions after each survey, what should be done and what they actually do. With this method I would expect to see that students have a fairly sound understanding of what they should do, but they will be less likely to act in accordance with what they said they should do.

Greelis-Vanlaningham, Dustin, Leah Rebecca Erickson, and Jennifer Marie Becker (102)

Faculty Mentor/Collaborator: **Jeffrey Goodman**
Stigma Acknowledgment: Why and When is it an Effective Social Strategy

Acknowledgment of a visible stigma (e.g., physical disability) during social interaction leads to more positive evaluations of stigmatized individuals (e.g., Hastorf, Wildfogel, & Cassman, 1979; Hebl & Kleck, 2002), yet the reason for this improvement is unclear. We propose that acknowledgment is effective because it conveys that the stigmatized person is psychologically healthy. In a study on "forming first impressions," participants were led to believe they interacted with another student, who was in reality a confederate in a wheelchair. The participant and

confederate exchanged personal information and a photograph. Half of the participants received acknowledgment information from the confederate including mention of his wheelchair, the cause (a birth defect), and an indication that he was comfortable talking about it. In addition, some participants reviewed information stating that he was psychologically healthy, while others learned that he was psychologically less healthy. We expect to observe an interaction between acknowledgment and psychological health such that acknowledgment will result in more positive evaluations of the confederate, but only when he is believed to be psychologically healthy. If hypotheses are confirmed, our findings will make a substantial contribution to theories of stigma acknowledgment. Furthermore, our findings may assist stigmatized individuals' success in social interactions.

Harris, Heather Dawn, Kelly Catherine Denking, and Leah Rebecca Erickson (126)

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

Women's Appearance and Body Shape across the Menstrual Cycle: Heightened Attractiveness at Ovulation?

Research on human female sexuality suggests that women experience cyclic changes in mate preferences and behaviors that reflect a fertile phase preference for good genes. Although they are sexually receptive across the menstrual cycle, women choose more revealing clothing and are more receptive to romantic overtures from attractive men when they are fertile. They also manifest subtle physiological changes over the course of their menstrual cycle: Men rate the scent of fertile women's armpit odor more favorably than they rate the scent of non-fertile women's armpit odor. The current study was designed to test the hypothesis that women's body and face are more attractive during the fertile phase of their cycle. After an intake questionnaire and information session, we visited 80 college student women at the low and high fertile phases of their menstrual cycle. At each visit, which happened upon wake-up for each woman, we photographed their face and measured their bust, waist, and hips. Naïve judges viewed each woman's set of photos and chose the one they perceived as more attractive. We present our preliminary findings on cyclic changes in body shape and attractiveness.

Haugle, Kathryn Rose and Rochelle Ruby Smits, University of Kansas (129)

Faculty Mentor/Collaborator: **Daniel Holt**

Examining Temporal Discounting of Other Outcomes to Determine the Characteristics that Affect the Rate of Discounting

Many researchers have examined individuals' selection between a small immediate outcome and a delayed large outcome. Results show that as the delay to an outcome increases, the subjective value of the outcome decreases. This phenomenon has been termed temporal discounting (Raineri & Rachlin, 1993). Researchers have also examined how individuals temporally discount various outcomes, including consumable and non-consumable outcomes (Estle, Green, Myerson, & Holt, 2007; Odum & Rainaud, 2003) and have found that individuals discount non-consumable outcomes (money) less steeply than immediately consumable outcomes (candy, soda, drugs, etc.). These researchers suggest the difference may be due to characteristics of the conditioned reinforcer. The present study compared temporal discounting of conditioned reinforcers (food gift card and money gift card) to previously used hypothetical outcomes (food and money) in order to further expose the role of the conditioned reinforcer on how individuals make decisions.

Haugle, Kathryn Rose, Jeffrey Robert Miller, Stephanie Kristina Keetz, and Chelsea Bianca Hedquist (130)

Faculty Mentor/Collaborator: **Kevin Klatt**

Investigating Procedural Considerations for Implementing Progressive-Ratio Schedules with Children with Autism

Therapists who provide behavior therapy to children with autism need items preferred by the children. Researchers have used various assessments to determine children's preferences (Pace, et al., 1985; Fisher et al., 1992; Windsor, et al., 1994; DeLeon & Iwata, 1996) but studies show these assessments may not be accurate in determining which items will function as reinforcers when work requirements increase (Tustin, 1994; DeLeon et al., 1997). Roane et al. (2001) compared various stimuli under a preference assessment and also under a progressive-ratio schedule of reinforcement and found the progressive-ratio (PR) schedule to be more accurate in determining which items would better function as reinforcers under increasing response requirements. Currently, research has not examined PR schedules in depth in the applied setting. One aspect of a PR schedule that needs a more in-depth analysis is the step size used in a PR schedule. The current study examined PR schedules with different step sizes in order to determine how to effectively implement a PR schedule in clinical settings.

Haugle, Kathryn Rose and Chelsea Bianca Hedquist (143)

Faculty Mentor/Collaborator: **Kevin Klatt**

Using a Multiple Baseline Design to Demonstrate Experimental Control while Teaching a Child with Autism to Answer Questions

The number of autism diagnoses has increased dramatically in the past decade (Association for Science in Autism Treatment). There are a variety of therapies that claim to be effective for treating autism. Lovaas (1987) demonstrated that behavioral therapy is an effective treatment for autism. Clinicians providing behavioral therapy can utilize experimental designs to display the effectiveness of clinical treatments. One experimental design is a multiple baseline design, where treatment is staggered temporally across participants, targets, or settings (Baer, Wolf, Risley, 1968). At the Campus Autism Program in the Psychology Department students are able to practice implementing behavior therapy to young children with autism, as well as practice utilizing experimental designs to demonstrate treatment effectiveness. The current project demonstrates the implementation of a multiple baseline design to demonstrate experimental control while teaching children with autism to answer questions.

Hedquist, Chelsea Bianca, Nicole Christine Scharrer, Sara Lynn Daugherty, Nicholas Kyle Reetz, and Allie Marie Hensel (144)

Faculty Mentor/Collaborator: **Kevin Klatt**

A Comparison of Mastery Criteria in Young Children Diagnosed with Autism Spectrum Disorders

Behavioral therapy for children diagnosed with autism includes a focus on teaching new skills. In past studies, skills have been taught using varying numbers of trials per therapy session (e.g., Cummings & Carr, 2009; Volkert, Lerman, Trosclair, Addison, & Kodak, 2008). No studies to date, however, have investigated how many trials are necessary each day for skills to be acquired and maintained. The current study investigated the number of trials necessary each day for skills to be acquired and maintained. Two conditions were compared, including one with a minimal number of trials per day (e.g., 5 trials) and one with considerably more trials per day (e.g., 20 trials). The current study investigated the total amount of trials and training time to reach mastery criteria. Skills were then probed once a week to determine if the skill maintained.

Heutmaker, Jessica Danielle (103)

Faculty Mentor/Collaborators: **Catya von Karolyi** and **Ann Collier**

Are There Individual Differences in Social Interest During Visualization?

Individual differences in how people react to stressful situations, including the extent to which they want social interaction, are commonly found in the literature. We wondered whether, when they cope with having a terrible mood, (A) do extroverts differ from introverts and (B) do males differ from females in the extent to which they exhibit social interest. To explore these personality and gender differences, we administered an online survey to undergraduate students at a Midwestern university. A measure of the big five personality factors allowed us to categorize participants as extroverted or introverted and participants indicated their sex (at birth). Of the participants that used visualization to change a terrible mood, some displayed social interest--or imagined that there were other people around. We hypothesized that when using visualization to improve a terrible mood, extroverts and females would display more social interest than did introverts and males. There may be real world implications if our hypotheses are supported by our results and our study replicates. For example, clinicians may be able to customize the social component of visualizations to better meet their clients' needs.

Jorandby, Jennifer Lynn, Stephany Kristina Reetz, Chelsea Bianca Hedquist, and Kathryn Rose Haugle (146)

Faculty Mentor/Collaborator: **Kevin Klatt**

Comparison of Prompting Procedures on Intraverbal Behavior and Conditional Discriminations in Children with Autism

Intraverbal behavior, which can be classified as social interchanges, question answering, and conversational speech, is important in the development of communication skills and social interactions among children with autism. Previous research has compared the effects echoic and textual prompts have on the acquisition and generalization of intraverbal skills, finding that textual prompts are more effective in teaching children with autism. Only a small number of studies have examined the effects of echoic, picture, and textual prompts on intraverbal behavior, and even fewer studies have examined the effects of prompting procedures on specific components of intraverbal behavior, such as conditional discriminations. Conditional discrimination in intraverbal behavior occurs when a verbal stimulus alters the evocative effect of another verbal stimulus, and together the stimuli evoke a new intraverbal response. Study 1 compared the three prompting procedures in teaching intraverbal behavior to four children diagnosed with autism. Study 2 also compared the three prompting procedures in teaching the conditional discrimination of intraverbal behavior to children diagnosed with autism. Comparisons between prompting procedures were evaluated on the acquisition, generalization, and maintenance of intraverbal behavior. Some differences were found in the acquisition, generalization, and maintenance of the three prompting procedures for both studies.

Michels, Kelsey Rae (151)

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

RateMyProfessors.com: Testing Assumptions about Student Use and Misuse

Since its inception in 1999, the RateMyProfessors.com (RMP.com) website has grown in popularity and, with that, notoriety. In this research we tested three assumptions about the website: (1) Students use RMP.com to either rant or rave; (2) Students who post on RMP.com are different from other students; and (3) Students reward easiness by giving favorable quality ratings to easy instructors. We analyzed anonymous self-report data on use of RMP.com from 208 students at a regional public university and RMP.com ratings of 322 instructors at that university. Our findings suggest that (1) student motivations for posting on the website are wide ranging and moderate in tone; (2) few student characteristics differentiate those who post from those who do not post on the website; and (3) although

easiness and quality are highly correlated, discipline differences in easiness but not in quality suggest that students can, and do, discriminate between easiness and quality. We concur with previous researchers (e.g., Otto, Sanford, & Ross, 2008) that, although the site is limited, RMP.com has more validity than generally assumed.

Miller, Jeffrey Robert, Nicole Christine Scharrer, Holly Suzanne Perszyk, Nicole Jean Jerdee, Jaime Rose Barth, Tory Lea Miller, and Samantha Ashley Liggett (128)

Faculty Mentor/Collaborator: **Daniel Holt**

Evaluating the Effectiveness of Prompting Ratio Procedures for Canine Skill Acquisition

Prompts are commonly utilized to teach canines novel skills during canine obedience training. Over-prompting or fading prompts too quickly may be detrimental to skill acquisition. To remedy the issue past research has used a prompt to probe method (Mattingly & Bott, 1990) to determine when stimulus control has been transferred. No previous research has examined the effectiveness of different prompting ratio procedures. The purpose of the present study was to evaluate the effectiveness of 3 different prompt to probe ratios, 1:1, 3:1, and 5:1, when teaching various skills to canines. The results indicate that the 3:1 and 5:1 prompt to probe ratios were most effective.

Miller, Jeffrey Robert, Katie Marie Wiskow, and Kathryn Rose Haugle (145)

Faculty Mentor/Collaborator: **Kevin Klatt**

Using a Multiple Baseline Design to Demonstrate Experimental Control When Teaching Vocal Imitation to Young Children Diagnosed With Autism

The number of autism diagnoses has increased dramatically in the past decade (Association for Science in Autism Treatment). There are a variety of therapies that claim to be effective for treating autism. Lovaas (1987) demonstrated that behavioral therapy is an effective treatment for autism. Clinicians providing behavioral therapy can utilize experimental designs to display the effectiveness of clinical treatments. One experimental design is a multiple baseline design, where treatment is staggered temporally across participants, targets, or settings (Baer, Wolf, Risley, 1968). At the Campus Autism Program in the Psychology Department students are able to practice implementing behavior therapy to young children with autism, as well as practice utilizing experimental designs to demonstrate treatment effectiveness. The current project demonstrates the implementation of a multiple baseline design to demonstrate experimental control while teaching children with autism to imitate vocals.

Nelson, Andrea Sarah and Alicia Rae Nemece (119)

Faculty Mentor/Collaborator: **Jennifer Muehlenkamp**

A Gendered Analysis of Nonsuicidal Self-Injury and Body Image Avoidant Behaviors

Objectification Theory states the objectification of the female body in the current culture causes women to internalize the objectified image, which in turn may lead to many psychological concerns such as disordered eating, depression, and body dissatisfaction (Fredrickson & Roberts, 1997). Research has found both men and women with body dissatisfaction have a higher capacity for self-harm (Orbach, 1996). Often, those with body dissatisfaction engage in body image avoidant behaviors, attempting to avoid situations that provoke concern about physical appearance (Rosen, Srebnik, Saltzberg, & Wendt, 1991). Nonsuicidal self-injury (NSSI), the deliberate self-harm of one's own body without suicidal intent, is often associated with body dissatisfaction, but current research does not link NSSI to body image avoidant behaviors. The current study attempts to find a relationship between NSSI and body image avoidant behavior. By finding a relationship between NSSI and body image avoidant behaviors psychologists are able to learn about features linked to NSSI. We hypothesize that body objectification, NSSI, and body image avoidant behaviors will be significantly and positively correlated. We also hypothesize more females than males who engage in NSSI will engage in body image avoidant behavior.

Prosser, Emily Carol and Valerie Lynn Vantussi (168)

Faculty Mentor/Collaborator: **Blaine Peden**

OMG! R U TXTING IN CLASS?!?

Technology is a large part of the lives of college students and a dominant technology in college life is text messaging. Some instructors have incorporated text messaging into the classroom and some students seem to text everywhere. Our research question concerns who is doing the texting and in what settings. Some factors thought to have the most impact on texting in classrooms are sex of texter, time of the week, and size of class. We designed a naturalistic observation study to investigate these three independent variables. We observed 123 students in three different classes. To ensure interobserver agreement, two observers sat in the back of each classroom and recorded every instance of texting. Sex, class size, and time of the week were also recorded. Although about 10% of students texted during class in all conditions, no statistically significant associations were found among the observed variables. In other words variations in the percent of students who were text messaging was not associated with either sex of texter, time of the week, or size of the class. Whether text messaging by students in college classrooms proves to be a benefit or detriment remains an open question.

Reetz, Nicholas Kyle, Shantel Renee Mullins, Sara Lynn Daugherty, Jeffrey Robert Miller, and Allie Marie Hensel (127)

Faculty Mentor/Collaborator: **Kevin Klatt**

Use of Modified Change Over Delay Procedure to Decrease Scrolled Responses by a Child With Autism

In reference to behavior, scrolling is the act of quickly rotating through several different learned behaviors. Scrolling must be minimized while teaching imitation skills to ensure that the participant is reinforced solely for correctly imitating the behavior of the instructor. Changeover delay procedures have been used in the experimental analysis of behavior to temporally separate behaviors that are contingent on separate schedules of reinforcement (Herrnstein, 1961). In the current study, researchers used an adaptation of the changeover delay procedure to reduce the rate of scrolling through three learned motor imitation responses by a child with autism in an attempt to increase correct imitations. The modified changeover delay procedure consisted of delaying the child's access to reinforcing items by four seconds whenever scrolling occurred during a motor imitation trial. Immediate access to reinforcing items occurred whenever the child imitated correctly without engaging in scrolling. The results of the study demonstrated that the rate of scrolling behavior decreased after implementing the changeover delay, suggesting that the procedure can be effectively used in clinical settings to address problems with teaching imitation; however, no clear implications can be made because of inconsistent experimental control and procedural fidelity over the course of the study.

Rice, Andrea Lynn and Brianne Helen Foiles (101)

Faculty Mentor/Collaborator: **Jeffrey Goodman**

(Mis)perception of Morality between Believers and Nonbelievers in God

Public opinion indicates strong distrust of those who are skeptical of God. A recent survey indicated that American voters were less likely to vote for an atheist presidential candidate than a Black, Jew, Muslim, or homosexual (Edgell, Gerteis, & Hartmann, 2006). Believers' distrust of nonbelievers may stem from actual differences in moral standards. Alternatively, distrust could simply be the product of misperceptions. Participants who were believers or nonbelievers in God ascribed moral traits to themselves, believers, and nonbelievers. Consistent with previous data from our lab indicating similarity between believers and nonbelievers, we hypothesized that believers and nonbelievers would describe themselves in the same moral terms. We also predicted an asymmetry in ingroup favoritism such that believers in God would rate their own group as more moral than nonbelievers but that nonbelievers in God would not rate their own group as more moral than believers. Inconsistent with hypotheses,

nonbelievers rated themselves as less moral than believers rated themselves. Consistent with hypotheses, believers rated their own group as more moral than nonbelievers and they judged nonbelievers as less moral than nonbelievers rated themselves. Our findings contribute to theories of morality and suggest that believers misperceive nonbelievers' morality.

Scharrer, Nicole Christine and Jeffrey Robert Miller (172)

Faculty Mentor/Collaborator: **Daniel Holt**

Generalization of the Behavior Sit in Canines to Novel Trainers

Stokes and Baer (1977) claim that generalization does not automatically occur; therefore active procedures should be in place to ensure that commands given to dogs will transfer to another trainer or environment. Dogs involved in the Behavioral Applications Regarding Canines program are typically trained by one trainer, and then receive commands from a novel trainer (i.e., the new owner). No active procedure is in place to ensure that generalization occurs. The current study assessed how many trainers are necessary for the command "sit" to generalize to a novel trainer. Dogs that did not already perform the behavior sit on command were trained to sit by 1, 2, or 5 trainers to mastery criteria, and then were given the verbal command "sit" for 20 trials by a novel trainer in a generalization test. Results from the current study will inform us as to whether specific training is needed for dogs to perform skills for novel trainers.

Thoftne, Amy Kay and Jill Marie Jansen (154)

Faculty Mentor/Collaborator: **Blaine Peden**

A Comparison of Two APA Ethics Codes

Our goal of this poster is to compare and contrast the 1953 American Psychological Association Code of Ethics to the current (2002) American Psychological Association Code of Ethics. This comparison is relevant to psychology because it brings to light new ethical issues and shows how ethical guidelines for conduct have changed over the years. We consulted both the original and current APA codes with other sources concerning ethical conduct. Using these sources we identified the most pertinent changes. Current ethical dilemmas in psychology served as a template of issues to focus on. The main conclusions are that there are several radical changes from the first to the most current edition, which may imply changes to social and professional conduct, and there are major differences in language style. Finally, we expect the new code to be very specific in nature, highly organized, and to provide more instructions, whereas the 1953 code is vague and lacking instruction.

Vander Wyst, Maria Ann and Eric Adam Fuerstenberg (148)

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

Expectations of the Future: Undergraduates' Plans for Work, Love, and Family.

Past research has documented a belief among college students that mating desires change over the college years; specifically, students believe that their peers become more long-term oriented and less short-term oriented, and more focused on personality and less focused on outward appearances, as they go through college. Initial studies of these beliefs, however, showed that older college students and younger college students did not differ in their relationship desires and mate preferences (Bleske-Rechek, VandenHeuvel, & Vander Wyst, 2009). We designed a longitudinal study to provide a straightforward test of the hypothesis that individuals' relationship desires change during college; in this poster we describe the results of Phase I of this longitudinal study. During the 2009-2010 academic year, we collected responses from 345 underclassmen enrolled in a 100-level general education course. In addition to measures of their mating orientations and mate preferences, students reported on a variety of plans for the future (as applicable): age of anticipated marriage and child rearing, number of children desired, desired salary and education,

and work plans before and after children. We describe men's and women's responses to these measures and speculate how response patterns might differ when we assess them three years from now.

Westaby, Katelyn Ashley (153)

Faculty Mentor/Collaborator: **Blaine Peden**

Analyzing Language According to Well-Being

This study investigates whether a person's word choice correlates with their well-being level. Positive and negative well-being has significant effects on welfare and thinking patterns. Previous research has shown that a positive affect correlates with better physical health while negative moods can decrease the meaningfulness of life. In addition, words are powerful indicators of a person's emotional, physical, and mental state. This study will contribute to our knowledge of emotional well-being as a correlational variable to our actions and thinking. Participants completed the Psychological Well-Being Scale and wrote about their daily lives on four consecutive days. The study used online survey software and divided individuals into a high, medium or low well-being group. The journal entries were entered into the Linguistic Inquiry and Word Count program which counts word frequency and categorizes them (e.g., into affective, cognitive, and social classifications). This study focused on first person singular pronouns, first person plural pronouns, and positive and negative emotion words. We expected that participants with a low well-being score used significantly more self-referential words ("I" and "me") and negative emotion words than participants with a high well-being score who used more social words ("we," "us," and "our") and positive emotion words.

Wiskow, Katie Marie, Jeffrey Robert Miller, Jaime Rose Barth, and Nicole Jean Jerdee (171)

Faculty Mentor/Collaborator: **Daniel Holt**

Comparing the Effects of Separate and Mixed Trials When Teaching Multiple Skills to Canines

Previous research (unpublished manuscript) found that teaching one skill to mastery before introducing another skill resulted in faster skill acquisition compared to teaching multiple skills in a mixed fashion simultaneously. No known research has addressed whether simultaneously teaching multiple skills in mixed or separate trials within a session will produce faster skill acquisition. Therefore, the present study, using a between-subjects design, compared the effects of simultaneously teaching three skills in separate and mixed trials within a session. The results will help to determine the method that facilitates skill acquisition in canines.

Zellhoefer, Ashley Susan, Tory Lea Miller, Adam Scott Zastrow, Jordan Elizabeth Fletch, Alyssa Jeane Collura, Alicia Rae Nemeck, and Andrea Sarah Nelson (120)

Faculty Mentor/Collaborator: **Jennifer Muehlenkamp**

Nonsuicidal Self-injury (NSSI) and Social Support: College Students' Cry for Help

A number of risk factors have been associated with Nonsuicidal Self-injury (NSSI), such as mood disorders and childhood trauma. A lack of supportive family or peer relationships may increase the likelihood of NSSI. Research has overlooked social support and its relationship to NSSI. The purpose of the current study was to examine how perceived social support from peers and family differs among college students who do and do not report a history of NSSI. A total of 1464 college students completed self-report questionnaires that assessed mental health, NSSI and social support. Of the total sample, 13.3% reported engaging in self-injury at least once in their lifetime. ANCOVAs were conducted to assess differing levels of perceived social support between those with and without a history of NSSI. Significant differences were found, such that self-injurers reported less social support than controls, $F(1, 1364) = 16.14, p < .01$. Additional results pertaining to other social support variables will be reported. These results show that individuals who engage in NSSI tend to have a lower sense of perceived social support. The results of the

current study suggest that enhancing interpersonal skills and helping to build strong social networks may be an effective intervention for NSSI.

Zellhoefer, Ashley Susan, Tory Lea Miller, Adam Scott Zastrow, Jordan Elizabeth Fletch, Alyssa Jeane Collura, Alicia Rae Nemec, and Andrea Sarah Nelson (105)

Faculty Mentor/Collaborator: **Jennifer Muehlenkamp**

Nonsuicidal Self-Injury Features and Correlates in Adolescents

Nonsuicidal Self-Injury (NSSI) continues to be a growing problem among adolescents. Professionals today have even begun to label NSSI as the new epidemic. Research indicates that inpatient adolescents exhibit higher levels of disorders, such as depression and borderline personality disorder, in conjunction with higher levels of NSSI. Research also suggests that community adolescents exhibit relatively high levels of NSSI. However, the research largely overlooks the comparison between these two groups of adolescents. Previous research also tends to neglect other relevant issues relating to NSSI. Problems of impulsivity, dependence and developing an identity as a self-injurer have been proposed, as relevant to understanding the behavior, but have been researched very little. This poster will present an overview of the NSSI literature across inpatient and community adolescents, with regards to what is currently known and what needs to be further studied. Also included will be a description of a study currently being designed to assess how the adolescent groups (inpatient and community) can be differentiated based on the features and correlates of the NSSI.

Zellhoefer, Ashley Susan, Nathaniel Berninghau Murken, Benjamin Douglas Hustedt, with Daniel Walenski and Andrew Clemens, UW-Stout (104)

Faculty Mentor/Collaborator: **Allen Keniston** and Kathryn Hamilton, UW-Stout

The Interactive Effects of PowerPoint and Note-taking as a Function of Lecture Pace Among UW-Eau Claire Students

PowerPoint is a little studied lecture aid. Our research focuses on characteristics such as lecture pace, use of PowerPoint, and note-taking. No one has addressed pace, but theory suggests that pace mediates multimedia effects. Our research and other previous studies have yielded no clear picture of PowerPoint's effectiveness. However, many studies find note-taking has positive effects on student retention and comprehension of lectures. The current study evaluates whether note-taking interacts with PowerPoint use and lecture pace. We recruit students from lower-division psychology classes with in-class invitations and sign-up sheets on a bulletin board. Students come to computer laboratories in small groups, where experimenters guide them to complete the study using an online survey tool. Participants provide demographic data, complete a survey of their knowledge of the lecture topic, watch the lecture in one of eight conditions, and respond to multiple choice questions about lecture content and true-false comprehension questions. We expect main effects of lecture pace, PowerPoint use, and note-taking. We also expect interactions between PowerPoint use and note-taking depending on lecture pace. PowerPoint use will augment the benefits of note-taking at a normal pace, but interfere with note-taking's benefit at a fast pace.

Sociology

Ling, Caryn Michele (74)

Faculty Mentor/Collaborators: **Jeff Erger** and **Pamela Forman**

Sexi Pirate!: Gender and the Social Construction of "Tough but Good" Sociology Professors on RateMyProfessors.com

Quantitative and qualitative analysis was performed on RateMyProfessors.com ratings and comments for 263 sociology professors at 40 schools. Statistical analysis shows no gender difference overall on Quality or Ease

ratings for all professors in the study, including the 27 in the “tough, but good” subsample. However, when the text of the comments was analyzed a different picture emerged. Tough but good female professors are seen as “smart,” which describes a characteristic of the person, whereas males are seen creating real change in their students. Students’ comments on role behavior for both genders labeled men as “unclear” but deemed women as “unfair” for similar actions. Women in the classroom face the risk of role failures being labeled character flaws, whereas men’s role failures do not carry over to claims about character. Men are given credit for relating to students and creating change in them whereas female professors are not acknowledged for it, and are even attacked for not doing it, showing that gender does in fact play a powerful part in the classroom experience.

Turner, Trisha (54)

Faculty Mentor/Collaborator: **Jianjun Ji**

Rural Chinese Elderly: Demographic Characteristics and Activities of Daily Living

Based on national elderly survey data of 1992, this paper presents the demographic characteristics of the Chinese rural elderly in terms of age, gender, and marital status and examines the restrictions on activities of daily living (ADL) in terms of eating, sleeping, dressing, toileting, and bathing. By applying the Chi-square significance test, the results show that activities of daily living of the Chinese rural elderly are associated with their demographic characteristics.

Yang, Monica Mai Vue (75)

Faculty Mentor/Collaborator: **Kathleen Nybroten**

Exploring the Dynamics of Hmong Parental Involvement in Education

Empirical evidence suggests that early parental involvement in a child's education results in greater academic success. Many studies have been done on White, African American, and Hispanic families; however, few have examined Hmong families. This study explores the extent to which language and other cultural factors create barriers that impede Hmong parents' involvement in their children's education. A qualitative study was conducted with Hmong families from two mid-sized cities in Wisconsin. Early results indicate that Hmong parents' lack of English proficiency, resources, and cultural beliefs about education limits their engagement in their children's education.

Natural and Physical Sciences

Biology

Blaisdell, Brandon Douglas (91)

Faculty Mentor/Collaborator: **Derek Gingerich**

*Phenotypic Characterization of *lrb* Mutants in *Arabidopsis thaliana**

LRB1 and *LRB2* are two members of a three-member gene family in *Arabidopsis* and are part of a larger superfamily of *BTB* genes, which are believed to act in targeted protein degradation. These two *BTB* genes play a role in the regulation of the phytochrome-mediated red light signaling pathway, however whether there is a role for the third family member (*LRB3*) in this pathway was unclear. *lrb1/lrb2* double mutants display hypersensitivity to red light. We created a number of different *Arabidopsis* mutants containing various combinations of *lrb* and *phy* mutations in order to determine the relative contributions of the *LRB* genes to red light signaling and to determine which phytochromes they act downstream of. We present detailed phenotypic analysis of the mutant’s responses to different fluence levels of red light, focusing particularly on hypocotyl elongation and cotyledon expansion. Thus far our data suggests that the *LRB3* gene does not act in red light signaling.

Braunreiter, Kara Marie and Candice Alesia Bartels (181)

Faculty Mentor/Collaborator: **Jamie Lyman Gingerich**

Altered Behaviors: Mutation of cil-5 affects C. elegans Chemical Preferences and Fat Storage

Primary (non-motile) cilia are found on most human cells. Non-functional cilia cause a number of human diseases, including polycystic kidney disease. We are trying to understand the roles of cilia in mediating cellular responses to the environment. Cilia are well-conserved throughout evolution, thus cilia of the nematode *C. elegans* provide a good model for our research. We are investigating the role of one cilia-related gene, *cil-5*, by examining the changes in cilia function in *C. elegans* mutant for *cil-5*. Both sensitivity to chemicals and regulation of fat storage have previously been shown to be dependent on functional cilia. In chemotaxis sensory assays, *cil-5* mutants show hypersensitivity to certain volatile chemicals. In addition, preliminary results from assaying the fluorescent intensity of labeled fat droplets suggest that *cil-5* mutants do not properly regulate fat storage. Future research will focus on further characterizing the range of chemical hypersensitivity and examining the signaling pathways involved in fat storage. These studies will help us to better understand the genes involved in regulating cilia function.

Fischer, Gregory John (206)

Faculty Mentor/Collaborator: **Julie Anderson**

Heterologous Expression of MBP1 from Candida albicans in Saccharomyces cerevisiae: A nontraditional approach

The yeast species *Candida albicans* is the most commonly-isolated yeast in human disease. To infect host tissue, the usual unicellular form of *C. albicans* switches into an invasive, multicellular filamentous form. This conversion to the filamentous state has been shown to contribute significantly to the pathogenesis of *C. albicans*, leading to infection especially in immunocompromised patients. We have been investigating the role of the *MBP1* gene in this process. The *MBP1* homolog in the nonpathogenic budding yeast, *S. cerevisiae*, has been well-studied and is involved in cell cycle regulation. To further our understanding, we are expressing *C. albicans MBP1* in the more genetically amenable *S. cerevisiae* and observing its phenotype. This requires constructing the *MBP1* gene under the control of a *S. cerevisiae* promoter sequence. After many attempts to obtain this construct using conventional methods, we determined the gene produced toxic effects when introduced into bacteria. We are currently pursuing a laborious alternative approach that bypasses bacteria and uses *S. cerevisiae* directly to obtain the construct. Once achieved, this allows us to express *C. albicans MBP1* in *S. cerevisiae* and observe any changes in phenotype, contributing to our understanding of the role of *MBP1* in the pathogenesis of *C. albicans*.

Fitzmaurice, Danae Lyn (184)

Faculty Mentor/Collaborator: **Winnifred Bryant**

Environmental Estrogens and Regulation of the Prolactin Promoter in Pituitary Cells

The ability of environmental estrogens to regulate gene transcription on model and physiologically complex promoter was examined in GH₃ cells, a pituitary cell line. In transient transfection studies, the pGL3 model promoter and the physiologically complex prolactin promoter were both responsive to the xenoestrogen bisphenol A and the phytoestrogen daidzein in a dose-related manner. These transcriptional responses were mediated by estrogen receptors, as responses were ameliorated in the presence of ICI 180, 782, a pure antiestrogen. Cotransfection of Pit-1 significantly enhanced the transcriptional response of the prolactin promoter to stimulation by environmental estrogens. The nature and magnitude of transcriptional responses to estradiol sensitive genes following challenge by environmental estrogens is likely dependent on regulatory elements found in the promoter and their ability to recruit transcription factors.

Hartshorn, Kaitlin Heather (163)Faculty Mentor/Collaborator: **Daniel Janik***Does Duration Spent in Dim Night Light Conditions Affect Clock Shifts in Mice?*

Recent research has shown that mice that are maintained in dim light conditions during the night exhibit larger clock shifts in response to a non-photic stimulus than mice maintained in complete darkness during the night. We maintained groups of mice in dim night light conditions for varying amounts of time to determine if the length of time maintained in dim night light conditions affected the subsequent clock shift. After exposure to complete darkness at night for a period of time, mice were then exposed to dim light at night for either 10, 20, 30, or 40 days (n = 4 or 5 per treatment). All mice were simultaneously given a non-photic stimulus that consisted of complete darkness beginning at ZT6 (in the middle of the normal bright light period) to stimulate a clock shift. We found that the duration spent in dim night light conditions had no significant effect on the size of the subsequent clock shift. However, the data did indicate some interesting trends in regard to the correlations between activity and the size of the clock shift.

Hartshorn, Kaitlin Heather (162)Faculty Mentor/Collaborator: **Daniel Janik***Sex Differences and the Estrous Cycle in Relation to Clock Resetting in Mice*

While mice are a common laboratory model for circadian rhythms, most experiments use males and little research has been done on the differences between the sexes. Also, recent research has shown that the clock shift exhibited by female hamsters will vary depending on the stage of their estrous cycle. We investigated the effects of sex and the estrous cycle on clock shifts in mice. Ten female mice and ten male mice were maintained under dim night light conditions and then given a non-photic-like clock shift. The stage of the estrous cycle of the female mice was determined by vaginal smears. We found no significant differences between male and female clock shifts, although there was a trend towards smaller shifts in females. There were indications that females may be more sensitive to dim night light conditions, exhibiting less activity and sometimes not entraining. While there were no significant differences between females in different estrous stages, there was a trend towards larger clock shifts in females who were in estrous. Because our groups in the estrous stages were small (n = 2 through 4, and there were no females in diestrous), this trend may warrant further investigation.

Hellmich, Caitlin Elise, Ashley Ann Sheridan, Brendon Scott Trebelhorn, and Alexander Chao Vang (188)Faculty Mentor/Collaborator: **Todd Wellnitz***Human Impact on Surrounding Communities in Campsites of the Boundary Waters Canoe Area Wilderness*

We are interested in human impact in the form of soil compaction and its effect on species richness in and around campsites in the Boundary Water Canoe Area Wilderness of Northern Minnesota. Our research hopes to provide insight on the effects humans have on areas designated for wilderness conservation. A soil penetrometer was used to gauge soil compaction in and around campsites. Two transects inside and outside of the campsite were chosen at random, and three soil observation areas were placed along each transect. Three soil compaction and species richness measurements were taken in each observation area. Our results indicate that human activity increases soil compaction which is negatively correlated with species richness.

Humbach, Hannah Ruth (183)Faculty Mentor/Collaborator: **Daniel Herman***Expression Analysis of the MBP1 Gene in Candida albicans*

Candida albicans is the most frequently isolated fungal pathogen in humans. Morphogenesis, the ability to transition from the yeast to filamentous morphology, is an important factor in causing systemic infections. Previously, we have characterized the Mbp1 protein and demonstrated that mutants lacking the protein are defective in morphogenesis when grown under nitrogen-limited conditions. Our research set out to determine whether the Mbp1 protein is constitutively expressed or differentially expressed according to environmental signals, which would further elucidate the role Mbp1p plays in signal transduction pathways that regulate morphogenesis. Comparisons of *MBP1* expression were made by isolating total RNA content from *C. albicans* grown on different media types that induce morphogenesis (both solid and liquid forms of M199, Spider, FBS, and SLAD) and non-inducing media (YNB). Reverse transcriptase-PCR was used to detect and amplify any *MBP1* transcripts present in the RNA samples. Results indicated that Mbp1p is constitutively expressed. This suggests that Mbp1p may interact with another protein or proteins whose expression is regulated according to environmental clues.

Immerfall, Mallory Kae (137)Faculty Mentor/Collaborators: **Todd Wellnitz and Eric Merten***Velocity Effects on the Spatial Patterning and Density of a Caddisfly in the Chippewa River*

The effects of near-bed current velocity on the density and spatial patterning of the caddisfly *Leucotrichia* were studied in the Chippewa River. *Leucotrichia* larvae are sessile and construct oval-shaped silk cases that they fix to hard substrates. The larvae feed on periphytic algae that surround their cases, and spacing between cases is determined largely by competition for this limiting resource. Increased current speed is correlated with greater rates of algal productivity, and I hypothesized that faster near-bed current would allow for closer *Leucotrichia* spacing. I also predicted that case orientation would become aligned with flow as current velocity increased. To test these hypotheses, I measured near-bed current velocity and, by using underwater photography, sampled *Leucotrichia* populations along a transect running perpendicular to the Chippewa River shoreline. Photographs were analyzed to determine case density, distance to nearest neighbor, and orientation relative to flow direction. I found that as near-bed current speed increased, density became greater and nearest-neighbor distance grew smaller, but even spacing was maintained. Current velocity did not influence *Leucotrichia* case orientation. These results support the notion that stream current may modify species distributions via indirect effects; specifically, by influencing algal growth and herbivore competition.

Jacobson, Matthew James, Andrew Hollis Barta, and Tessa Lyn Wirz (136)Faculty Mentor/Collaborators: **Todd Wellnitz and Evan Weiher***Effects of Stress on Community Assemblages in Boreal Forests*

Chase (2007) suggested that ecological communities exhibit two modes of assembly, *stochastic* (random) and *niche-based*. Communities experiencing high stress tend to show niche-based assembly and contain similar species due to high selective pressure for stress-tolerant traits. Stochastic-based assembly would be expected in low stress environments where community membership would not be “filtered” by the requirement for stress tolerance. Our goal was to determine if these assembly patterns held true for plant communities within the Boundary Waters Canoe Area Wilderness (BWCAW) of northern Minnesota. We used hill slope as a stressor because steep inclines limit soil depth, increase erosion, and reduced light (due to aspect). Data were collected from 16 paired plots (high-stress, high slope and low-stress, low slope) in September 2009. Plant species presence and abundance were determined within a 1-m radius for herbs, and a 5-meter radius for shrub and trees. Slope, aspect, and soil depth were recorded. Non-metric Multidimensional Scaling showed that high-stress plots had similar communities, whereas low-stress plots

were more variable (F-test, $p=0.009$), supporting Chase (2007). Canonical Correspondents Analysis also showed how the environmental factors (slope, aspect, soil depth; $p<0.05$) mediated variability in community composition.

Joosten, Caitlin Claire, Chelsea Rae Sager, and Molly Dieterich (110)

Faculty Mentor/Collaborator: **David Lonzarich**

Growth and Survivorship on Coho Salmon (Oncorhynchus kisutch) from a Study of Otolith Microstructure

Birth date can be an important correlate to evolutionary fitness because birth timing can profoundly affect growth and survival. Here we report on birth date, growth and survival patterns for two populations of coho salmon (*Oncorhynchus kisutch*) in Washington (WA, where salmon are native) and Wisconsin (WI). Otoliths from 600+ fish were used to determine birth date, age and age-specific survivorship patterns for the two populations. Both populations show extended hatching seasons (>6 wk), but WI fish hatched 3 weeks later, emerging from nests one month following the spring snowmelt. WI fish also grew at a slower rate (~40%) and had a longer nest residency than WA fish, findings that probably reflect the existence of warmer, more productive stream conditions in WA. Survivorship patterns also differed in the two streams. Using Maximum Likelihood Estimation and spline regression, we modeled selective mortality based on a cross-sectional analysis of age-frequency data. From this analysis, we found that mortality in WI fish fell heaviest on younger fish. The pattern was reversed in WA fish. Our examinations also 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).

Karosas, Alexandra Dawn, Isaac Allen Kruse, Matthew James Jacobson, and Jacob David Ring (111)

Faculty Mentor/Collaborator: **David Lonzarich**

Linking Channel Stability, Fish Habitat, and Fish Assemblage in the Lower Chippewa River

We conducted a study of shallow water fish assemblages in three reaches of the Lower Chippewa River in western Wisconsin. The reaches were distinguished by the stability and diversity of their channel form; features quantified from analyses of historic aerial photographs. For each reach, we mapped the distribution of backwater, island, sandbar and riffle habitats. Fish surveys then were conducted from each habitat type to characterize the link between fish diversity patterns and local habitat- and reach-scale conditions. With respect to habitat availability, we found the greatest diversity and abundance of habitats in the unstable, braided reach. By contrast, shallow water habitat was most scarce in the stable, simple reach. Fish assemblage structure varied among habitat types, but also among reaches and over the summer survey period (from early to late summer). We encountered nearly 50 fish species in surveys completed at 70 sites distributed across approximately 30 km of the river. The importance of this work lies in its effort to link large-scale geomorphic characteristics (channel dynamics) to small-scale fish distribution patterns. An interesting pattern to note: yellow perch, a rare species in 1999, have now become the most dominant species in nearly all habitat types of the river.

Karras, Jenna Rose (182)

Faculty Mentor/Collaborator: **Daniel Herman**

Phenotypic Analysis of MBP1/SKN7 Double Null Mutant Strains of Candida albicans

Candida albicans is an opportunistic fungal pathogen that causes systemic diseases in immuno-suppressed individuals. Morphogenesis, the change from yeast to filamentous forms, has been shown to be important in establishing systemic infections. Environmental stimuli such as neutral pH, serum, lack of a fermentable carbon source, and limited nitrogen availability can induce morphogenesis. Under nitrogen limiting conditions, Mbp1p appears to promote morphogenesis. The Skn7 protein regulates the oxidative stress response and has been shown to

play a minor role in morphogenesis. We constructed MBP1/SKN7 double null mutants which were then inoculated onto morphogenesis inducing media. No changes in filamentation were observed from wild type to MBP1 and SKN7 single null mutants on FBS and M199 media. However, a definite reduction was shown by the MBP1/SKN7 double null mutant on FBS and M199 media. Spider media displayed a slight reduction from wild type to MBP1 and SKN7 single null mutants, while the double null mutant exhibited no filamentation. No reduction in filamentation from wild type to Skn7 null mutants were shown on SLAD media. Filamentation was greatly reduced with Mbp1 null mutants and even further reduction was seen from the double null mutants on SLAD.

Lauer, Timothy Donald (89)

Faculty Mentor/Collaborator: **Derek Gingerich**

Suppressor Screen of LRB (Light Response BTB)1/LRB2 Mutants in Arabidopsis thaliana

A plant's ability to assess light quantity and quality is fundamental to maintaining healthy growth. One way that plants sense changing light conditions is via the perception of red (~670 nm) and far red (~730 nm) wavelengths by a group of light receptors called the phytochromes. Currently, the pathways for red/far-red light reception are not fully understood. We have identified two genes which act in the red light-response pathway in *Arabidopsis*: *Light Response BTB1 (LRB1)* and *Light Response BTB2 (LRB2)*. Plants with disruptions of these two genes are red light hypersensitive. We hypothesize that LRB1 and LRB2 target for degradation some component in the phytochrome B pathway. In order to identify that target, or other components in red light signaling, we have conducted a genetic suppressor screen, identifying mutations which relieve red light inhibition of hypocotyl elongation in the *lrb1/lrb2* double mutant. This screen is ongoing, but thus far we have identified and confirmed four individuals with moderate to strong suppressor phenotypes. We are currently conducting detailed phenotypic characterization of these suppressor lines to determine the effect of these mutations on other red light-regulated processes. We are also beginning the process of mapping these mutations to identify the genes affected.

Lowney, Jessica Marie (161)

Faculty Mentor/Collaborators: **Chris Floyd** and **Evan Weiher**

Ecological Determinants of Nest-site Selection by a Keystone Engineer: The Red-naped Sapsucker

Woodpeckers are considered keystone engineers because they excavate nest cavities that ultimately provide shelter for other animals. In aspen woodlands of the Rocky Mountains, red-naped sapsuckers are the predominant woodpecker, providing nest holes for multiple bird species. Sapsuckers also create sap wells in willows, thus supplying a food resource for many species. To conserve sapsuckers and associated species we need to better understand sapsucker habitat requirements. In our previous research, conducted in the East River Valley (ERV), CO during 2007-2008, we compared sites with sapsucker nests to those without. We found that nest sites had more surrounding willow and more *Phellinus tremulae*, a heartrot fungus that softens aspen heartwood, thus promoting nest excavation. In 2009, we sampled 30 randomly selected sites in the ERV; our goal was to better understand the relationship among *Phellinus*, willow, and other factors. Preliminary results indicated lower fungal prevalence at higher elevations and virtually no sap well scars on aspens located > 200 meters from willows. The latter pattern is intriguing because we previously found that nest sites on average had more scars but were not significantly closer to willows. Apparently, the relationship between willow, fungus, and sapsucker feeding/nesting is more complex than previously thought.

Mergenthaler, Mathew Bryan (158)

Faculty Mentor/Collaborator: **Daniel Janik**

Circadian Clock and Estrous Cycle Resetting in Female Syrian Hamsters

The circadian clock is an endogenous phenomenon that controls the sleep/wake cycle and is associated with several

biological events including homeostatic regulation. Female hamsters have a four-day estrous cycle that, under normal conditions, is highly regular. Previous work has shown that, when the circadian clock of female hamsters is reset by increasing their activity level through exercise, their estrous cycle is also reset. The purpose of the present study was to manipulate activity levels and clock resetting in female hamsters to determine which of these factors – activity or clock resetting – is causal with regard to the resetting of the estrous cycle. To test this, three treatments were employed – free access to exercise wheels (control), exercise wheels locked, and confinement to a nest box. The clock of control animals reset by about 3.4 hr, animals with locked wheels reset 2.7 hr and animals confined to nest boxes reset 1.7 hr. In parallel with clock resetting, 80% of control animals, 55% of animals with locked exercise wheels, and 20% of animals confined to nest boxes delayed their estrous cycle. These data suggest that activity is linked to both clock resetting and the delay of the estrous cycle.

Nikolai, Stephen James (160)

Faculty Mentor/Collaborator: **Todd Wellnitz**

Fire Effects on Lake Ecosystems: Water Chemistry and Zooplankton Community Structure

To determine the effects of forest fire on zooplankton communities in the Boundary Waters Canoe Area Wilderness, we sampled a lake for nutrients and zooplankton two years before and three years after the Ham Lake Fire of 2007 burned its catchment. Non-Metric Multidimensional Scaling Analysis of zooplankton and environmental data showed that the lake's zooplankton community before and after the forest fire were different, suggesting a fire-driven shift in community composition. We also found that the concentration of Total Organic Carbon (TOC) immediately after the fire was higher ($p < 0.01$), but decreased to pre-fire levels by two years later. Increased TOC was also correlated to increases in total phosphorus, Kjeldahl nitrogen, suspended solids, and chlorophyll-a (which provides an estimate of algal biomass). To our knowledge, shifts in zooplankton composition following fire disturbance have not previously been documented in the literature. This research contributes to our understanding of fire disturbance effects on lake ecosystems and provides insights into the catchment-level influences of wildfires.

Pauley, Brian David (187)

Faculty Mentor/Collaborators: **Evan Weiher** and **Joseph Rohrer**

*Disarming the Novel Weapons of *Alliaria petiolata**

Alliaria petiolata, Garlic Mustard, is an invasive plant that can displace native plant species when introduced into a forest under-story. The competitive ability of *A. petiolata* is due in part to the production of benzyl isothiocyanate (BITC), which is exuded from its roots. BITC disrupts the protein structures of mutualistic fungi, which make associations with plants where they aid in water and nutrient uptake. Research has shown that BITC is highly reactive with primary amines. In a preliminary experiment, we assayed lysine (a primary amine) toxicity on *Avena sativa* in a green house. Average biomass from a low dosage treatment was nearly 3 times higher than the controls. Biomass from two intermediate treatments did not differ from the controls. At high doses germination did not occur. We applied these dosages of lysine to 40 soil samples collected from Putnam Park with different densities of *A. petiolata* and assessed establishment from the seed bank. Lysine suppressed germination at all concentrations suggesting that Lysine will not be an effective management tool concerning *A. petiolata*.

Pierce, Emily Ann and Chelsea Rae Sager (185)

Faculty Mentor/Collaborator: **Darwin Wittrock**

*Survey of Rural Farm Cats Infected with the Parasite *Tritrichomonas foetus**

The goal of this study is to determine the prevalence of infected farm cats in the Chippewa Valley in Wisconsin and surrounding areas. *Tritrichomonas foetus* is a sexually transmitted protozoan parasite that has long been known to cause endometritis, abortion, and pyometra in cattle, but has also been associated with large bowel diarrhea in cats.

While feline trichomoniasis is considered an emerging problem, the prevalence of this disease has only recently been studied; to our knowledge the prevalence in farm cats has not been reported. To determine the prevalence of this parasite in the Chippewa Valley we are conducting field research, taking samples from cats found inhabiting area farms. Those samples are then returned to the lab and tested for the presence of the *T. foetus* parasite. This project is still in progress but it appears we will be able to report a percent prevalence of *T. foetus* in a sample group of about 50 cats found in the Chippewa Valley.

Pischke, Kate Elizabeth, Jessica Ann Soine, Sarah Faye Ames, Nicholas Michael Schoenfuss, Zachary Robert Snobl, and Joshua William Pletzer (114)

Faculty Mentor/Collaborators: **Todd Wellnitz and Eric Merten**

How Many Lichen? How Many Trees? Island Biogeography in the Boundary Waters Canoe Area Wilderness

Concepts garnered by studying islands and their biogeography can be applied to conservation and land management, since many natural areas are isolated due to fragmentation of the landscape by human activity. Two factors that influence species numbers on islands are insularity and habitat diversity. A study analyzing species richness on islands in the Boundary Waters Canoe Area Wilderness (BWCAW) was used to assess the relative importance of these two factors. Lichen and tree species richness was assessed on 30 islands in six lakes of the BWCAW. On each island, lichen and tree richness, island area, and distance to shore were measured; in addition, the number of habitats per island was quantified. Taxa richness increased with island size ($p < 0.0001$) and the number of habitats ($p < 0.0001$); however, distance from shore influenced neither tree ($p=0.48$) nor lichen ($p=0.96$) species richness. Nonetheless, our data suggest a potential distance effect threshold at approximately 95 m, and we hypothesize that island insularity may influence species richness beyond this distance. Our study suggests that the number of habitat types on an island is more influential in the BWCAW than insularity. Conservationists could use this knowledge to preserve the integrity of wilderness areas.

Pischke, Kate Elizabeth and Megan Elizabeth Meller (113)

Faculty Mentor/Collaborators: **David Lonzarich and Darwin Wittrock**

Methodology for Determining Alarm Substance Cell Density in Epidermal Tissues of Creek Chub in Relation to Black Spot Parasite Load

It is generally thought that alarm substance cells (ASC) in the fish epidermis evolved as a means to warn other fish of nearby predation via release of the chemical substance these cells hold. It has been recently hypothesized, however, that the evolution and presence of ASC in fish may have more of a relationship with parasitism than predation. The goal of our study is to determine if an increased infestation of the black-spot parasite (*Neascus pyriformis*) in creek chub (*Semotilus atromaculatus*) also correlates with an increase in the density of ASC. To our knowledge, this would be the first study to field test this recently developed hypothesis concerning the evolutionary origins in ASC in freshwater fish. We will focus at this time on the methodology involved in collecting our data (collection of field specimen, quantifying external signs of parasitism, preparing the tissues for cross-sectioning using microtoming techniques, microtoming, mounting the cross-sections onto microscope slides, staining techniques, microscopic imagery, and finally quantifying the density of ASC in the fish epidermis) as well statistical analysis of our data.

Ring, Jacob David (112)

Faculty Mentor/Collaborator: **David Lonzarich**

Daily Mortality Patterns in Juvenile Creek Chub (Semotilus atromaculatus)

For probably all fish species, mortality risk falls heaviest upon the smallest and youngest individuals. Using the

method of otolith microstructure analysis, we estimated daily mortality rates in juvenile creek chub (*Semotilus atromaculatus*). Creek chub is one of the most common fish species in streams and rivers of the Wisconsin, and belongs to the diverse Minnow family. As such, mortality rates derived from the creek chub can serve as a model for the study of mortality patterns in minnows. Juvenile creek chub were collected from Little Niagara Creek. Fish were collected over a period of two months (from June to August 2009). We extracted otoliths and estimated the age of each individual (in days) and total length (in millimeters). Daily mortality rates were estimated from changes in the relative abundance of age-specific cohorts. Sizes at each age were compared to determine if there is directional selection favoring fish of a certain size at a given age. Results suggest fish that hatch earlier in the season have a lower mortality rate than their later hatching counterparts.

Ruff-Berganza, Sophia Ana (159)

Faculty Mentor/Collaborator: **Daniel Janik**

Methamphetamine Induced Circadian Clock Resetting in Mice

Mice are nocturnal animals that exhibit predictable activity patterns controlled by their internal (circadian) clock. Previous studies have shown that a mouse's circadian clock can be reset to an earlier time through the administration of methamphetamine, a drug that stimulates the release of the neurotransmitters norepinephrine and dopamine. We wanted to determine whether methamphetamine-induced clock resetting was due to the drug's affect on norepinephrine or dopamine levels. Therefore we administered methamphetamine in conjunction with propranolol, a drug that blocks norepinephrine receptors, or clozapine, a drug that blocks dopamine receptors. Our data suggest that methamphetamine affects clock resetting through both the dopamine and norepinephrine pathways, but further work needs to be done to confirm these findings.

Schoenfuss, Nicholas Michael (139)

Faculty Mentor/Collaborators: **Todd Wellnitz** and **Eric Merten**

Influence of Bedload on Macroinvertebrate Community Composition

This study was undertaken to determine the effects of discharge and bedload on macroinvertebrate community composition. Fieldwork was conducted in summer 2009 at the Outdoor Stream Lab (OSL) located at the St. Anthony Falls Laboratory (SAFL) in Minneapolis, Minnesota. Discharge and bedload were manually controlled and detailed hydrologic data were recorded. Surber samplers were used to collect macroinvertebrates from riffles at ~2-week intervals throughout the summer. Macroinvertebrates were sorted and categorized based on taxonomic and functional feeding group affiliation. Over the course of the summer, species richness increased from 12 to 18, and Shannon diversity increased from 3.37 to 6.15. Collector-gatherers and collector-filters were two functional feeding groups that dominated the assemblage, comprising 30% and 62% of macroinvertebrates, respectively. The relative abundance of these two feeding groups mirrored one another; when collector filterers increased in number, collector gatherers decreased by roughly the same amount. Ongoing analyses will compare discharge and bedload with species' abundances for each sample period.

Shaw, Jodi Rachelle and Otto Maxwell Renner (164)

Faculty Mentor/Collaborator: **Tali Lee**

Interactive Effects of Elevated CO₂ and Reduced Soil Water Availability on Leaf Physiology and Water Relations

Our study examined plant water relations and photosynthesis under elevated CO₂ and how these responses are modulated by water availability to better understand vegetation responses to global change. If stomatal conductance is lower in plants grown under elevated CO₂, then photosynthetic rates and water potential will be less negatively affected by reduced soil water availability compared to plants in ambient CO₂ and this effect will be increasingly

significant as the day progresses. To test this hypotheses, we measured photosynthesis, stomatal conductance, and water potentials of leaves throughout the day of *Solidago rigida* grown under ambient and elevated (580 ppm) CO₂ and ambient and reduced (-32%) soil water content. Stomatal conductance was significantly higher mid-day for plants under ambient than elevated CO₂ contributing to a significant decrease in photosynthesis later in the day. This led to more negative leaf water potentials in plants with reduced compared to ambient water availability. These results suggest that leaf physiological responses to elevated CO₂ depend on the time of day and are modulated by important indirect effects of elevated CO₂ on leaf water relations. Therefore, the effects of reduced water availability may be somewhat ameliorated by elevated CO₂ and should be considered when predicting future vegetation responses to global change.

Stanton, Brianna Michele (211)

Faculty Mentor/Collaborator: **Paula Kleintjes Neff**

Assessing Butterfly and Vegetation Response to the State Acres for Wildlife Enhancement (SAFE) Program in Eau Claire County, WI

In 2009, we began a 10-year study of the effectiveness of the State Acres for Wildlife Enhancement (SAFE), a new program managed by the United States Department of Agriculture's Natural Resource Conservation Service (USDA-NRCS). In Eau Claire County, SAFE was created to provide suitable habitat for the federally endangered Karner Blue butterfly (*Lycaeides melissa samuelis*). In July-August we conducted baseline surveys of the butterflies and vegetation along a 200-m transect on each CRP site (n=8) and native prairie site (n=2). We observed a total of 74 butterflies belong to 10 species, the majority of which were cabbage whites (*Pieris rapae*). Monarchs (*Danaus plexippus*) were the second most abundant species and the Gorgone Checkerspot (*Chlosyne gorgone*) was unique to native sites. We counted a total of 78 species of forbs, 20 of which were restricted to native sites. On CRP sites we observed 8 of 11 species planted as part of the CRP program, (e.g., *Lupinus perennis*). Principal Component Analysis of forb species community composition separated CRP from native sites with the CRP sites dominated by "weedy" species. We hypothesize that the percentage of native forbs, grasses and prairie-associated butterfly and native bee species will increase on CRP sites over time.

Tisdell, Nathaniel Lucas (90)

Faculty Mentor/Collaborator: **Derek Gingerich**

Analysis of TCP genes in Arabidopsis thaliana

The Gingerich lab has previously identified the *LRB1* and *LRB2* genes as important regulators of red light signaling in the model plant *Arabidopsis thaliana*. In order to better understand how *LRB1* and *LRB2* act in this pathway, Dr. Gingerich conducted a yeast two-hybrid screen to identify LRB-interacting proteins. Interactors belonging to one group are members of the TCP-family of transcription factors (TFs). Therefore, TCP TFs may have a role in red light signaling, which we wanted to test. The first step was to identify *Arabidopsis* lines containing mutations in *TCP* genes. We identified individual lines homozygous for those mutations (both copies of that particular *TCP* gene disrupted). Thus far, we have identified 4 lines, each with a disruption in a different *TCP* family gene. Next the mutants were tested under red light conditions to look for growth variations as compared to the wild type (non-mutant) strain. As of this moment, there have been no visible phenotypes with the tested mutant lines. We are expecting to create *TCP* double and triple mutants and to look for phenotype changes in lines with multiple *TCP* genes knocked out.

Trimbell, Brandon (138)Faculty Mentor/Collaborators: **Todd Wellnitz** and **Eric Merten***The Effect of Light Intensity and Near-bed Current Velocity on Benthic Periphyton Accumulation and the Macroinvertebrate Community in a High Altitude Stream*

The purpose of this study was to analyze the influence of light intensity and near-bed current velocity on benthic periphyton accumulation and macroinvertebrate abundance in Snodgrass Creek, a small, high-altitude stream (9700 m elevation) located near the Rocky Mountain Biological Laboratory. I hypothesized that decreased light intensity would yield less periphyton in terms of ash-free dry mass (AFDM), but that AFDM would be positively related to near-bed current. I further hypothesized that macroinvertebrate abundance would be reduced in treatments having lower light intensity due to decreased accumulation of periphyton, which provides food to many macroinvertebrates. Light levels were manipulated by layering shade cloth over 75 x 75 cm PVC frames. Frames were constructed to have 0 to 4 layers of shade cloth to create a 5-step light gradient that was replicated twice (n =10). Trays containing stream cobbles were placed on the streambed under each frame and near-bed current was recorded. After 25 d, trays were sampled. My data show that decreasing light intensity and near-bed velocity both reduced periphytic AFDM and macroinvertebrate abundance. Further analysis will examine the relative strengths of these factors for shaping the benthic community in Snodgrass Creek.

Weiland, Ruth Ellen (135)Faculty Mentor/Collaborators: **David Lonzarich** and **Mary Ruth Elger-Lonzarich***Aquatic Plant Diversity in an Undisturbed, Clear Water Lake in Northern Wisconsin*

Pine Lake, a deep, clear water lake in northwestern Wisconsin had remained relatively undisturbed for over one hundred years. Because of current land use activity pressures on lakes, we began a long-term study to examine the macrophytes (including mosses and algae) of Pine Lake. Macrophytes are commonly used as indicators of water quality in lakes. A modified point-intercept survey was conducted at 140 sites during the summer of 2007 using a 1 m² plot and examined by SCUBA, snorkeling, and rake toss methods. Six depth zones were studied in which four distinct floras were identified. Two major functional plant groups based on height and growth rate, the isoetids and elodeids, were also identified. Isoetid diversity, in particular, was unusually high, and because they are sensitive to degraded water quality, their presence is a strong indicator of the lake's health. Also remarkable were the mosses, which were represented by a large number of species and occurred at depths to at least 15 m (51 ft). Future surveys will be conducted every 5-7 years to monitor and aid in preserving these unique qualities of Pine Lake.

Williams, Kayla Marie (186)Faculty Mentor/Collaborator: **Darwin Wittrock***Survey of Alpacas Within the Chippewa Valley for the Parasites *Cryptosporidium* spp. and *Eimeria macusaniensis**

The objective of this project is to detect the gastrointestinal protozoan parasites *Cryptosporidium* and *Eimeria macusaniensis* in alpacas (*Lama pacos*) from the Chippewa Valley. As alpacas are becoming increasingly popular as companion animals, owners, veterinarians, and researchers alike are becoming more and more interested in the growing number of reports of parasitic protozoa, including *Cryptosporidium parvum* and *Eimeria macusaniensis*. *Eimeria macusaniensis* has recently become of interest due to its recognized prevalence while the prevalence of *Cryptosporidium* in alpacas is not well known. This study will contribute either additional or new information on the occurrence of both parasites within alpacas. Fresh fecal samples were collected directly from 49 individual animals. Samples were then split and processed by a method appropriate for the identification of each parasite. The prevalence of these parasites will be largely based on mode of transmission and on environmental and housing

conditions. If the parasites *Cryptosporidium* and *Eimeria macusaniensis* are present in the herd we expect them to be found in juvenile animals and those exhibiting clinical signs of gastrointestinal illness.

Biology, Mathematics

Dieterich, Molly (115)

Faculty Mentor/Collaborators: **David Lonzarich** and **Jessica Kraker**

Assessing Different Models for Determining the Effect of Birth Date on Fish Survival

Natural selection acts on phenotypes and many models have been used to characterize selection on such traits. In this study, we evaluated different mathematical approaches for measuring selection (i.e., mortality) on birth date in juvenile coho salmon (*Oncorhynchus kisutch*) from otolith data. We explored and critiqued several selective mortality models, with the purpose of finding a model or group of models that had desirable characteristics (e.g., mathematically tractable, robust, quantitative, biologically meaningful). From a literature review of dozens of relevant fish research articles, we identified four distinctive modeling approaches for estimating selective mortality. We have since examined each of these models to determine their compatibility with cross-sectional age-frequency data, which forms the basis of our data set. Only two models generated quantitative estimates of selective mortality, and both used maximum likelihood estimation for fitting functions to the data. To evaluate these two models, we compared outputs using simulated frequency data. The two models yielded similar outputs for most data sets, but this simulation exercise revealed important differences between them. In the end, we chose the model that was the most biologically intuitive and mathematically tractable.

Chemistry

Cao, Bach Viet, Karl Jet Meitzner, and Matthew John Tschudy (256)

Faculty Mentor/Collaborators: **Sanchita Hati**, **Sudeep Bhattacharyay**, and Karin Musier-Forsyth, The Ohio State University

Role of Protein Electrostatics on the Post-transfer Editing Function of Escherichia coli Prolyl-tRNA Synthetase

Prolyl-tRNA synthetases (ProRSs) are class II synthetases that catalyze covalent attachment of proline to the 3'-end of the tRNA^{Pro}. ProRSs from all three kingdoms of life have shown to misactivate noncognate alanine and cysteine, and form mischarged aminoacyl-tRNA^{Pro}. The insertion domain (≈ 180 amino acids) of *Escherichia coli* ProRS is the post-transfer editing active site that hydrolyzes specifically mischarged alanyl-tRNA^{Pro}. The highly conserved lysine 279 (K279) in the insertion domain is critical for the post-transfer editing reaction and previous studies have shown that mutation of this lysine to alanine is detrimental to the post-transfer editing function of the enzyme. The exact mechanism through which K279 catalyzes the post-transfer editing reaction has remained poorly understood. In an attempt to gain insight into the mechanism of post-transfer editing reaction of *Escherichia coli* ProRS, the pK_a calculations of the K279 have been performed using combined quantum mechanical and molecular mechanical (QM/MM) simulations. Herein, we report the effect of charged residues on the pK_a of K279 and thereby, on the post-transfer editing function of *Escherichia coli* prolyl-tRNA synthetase. These computational results are also validated through site-directed mutagenesis.

Doyle, Philip Michael, Bradley Phillip Klemm, Jeremiah Jacob Stromich, and Enkhtuul Tsogtbaatar (208)

Faculty Mentor/Collaborator: **David Lewis**, and Michael D. Caldwell, M.D., Marshfield Clinic
Synthesis, Properties, and Reactions of Vitamin K Analogs

The synthesis of new vitamin K analogs has been undertaken. We have recently reported that two of these compounds act as *in vivo* adjuvants that enhance anticoagulant activity of Warfarin in rats. The preparation and characterization of these compounds is being continued with the aim to synthesize new oral anticoagulant compounds. We are also investigating the mechanism of the vitamin K mediated γ -glutamyl carboxylase enzyme (GGCX) involved in the vitamin K cycle.

Flesch, Kurt Bradley (254)

Faculty Mentor/Collaborator: **Christine Morales**
Computational Study of Structure and Stability in Supramolecular Liquid Crystals

A liquid crystal system was modeled computationally using a para-methoxy benzoic acid as a hydrogen bond donor and various para-substituted stilbazoles as hydrogen bond acceptors. The substituents on the stilbazole included NO₂, CHO, Cl, Br, F, CF, NH₂, and OCH₃. Because these substituents have varying electron donating and accepting abilities based on their Hammett constants, the strength of the hydrogen bond also varied. While stability of the system should decrease with some of the substituents, experimental results show that stability increased regardless of Hammett constants. The computational study was done using Spartan and Gaussian to determine the effects that dipole interactions and pi stacking had on the stability and structure of these liquid crystals, in addition to the hydrogen bond strength.

Greene, Alexander Jerome and Karl Jet Meitzner (257)

Faculty Mentor/Collaborators: **Sanchita Hati** and **Sudeep Bhattacharyay**
Dynamically and Evolutionarily Coupled Residue Clusters Mediate Allosteric Communication in Methionyl-tRNA Synthetase

Methionyl-tRNA synthetase (MetRS) activates methionine in the presence of ATP and acylate tRNA substrates. Long-range communication contributes significantly in maintaining high precision in substrate recognition and catalysis. Efforts had been made earlier to identify networking residues that facilitate domain-domain communication in *E. coli* MetRS using molecular dynamics simulations (Ghosh and Vishveshwara, 2007)). However, these studies are computationally very expensive requiring simulations over prolonged periods of time. In contrast, we have previously shown that a combined use of a computationally low-cost normal mode analysis and statistical coupling analysis could provide fairly detailed information of the interaction networks that play crucial role in mediating functional dynamics (Weimer et al., 2009). Herein, we will report an extension of this fast method, developed using bioinformatics and coarse-grain modeling techniques, to extract paths of communication between distant functional sites of *E. coli* MetRS. The results of present study are compared and contrasted with the existing knowledge about interaction networks that propagate long-range communication in this enzyme.

Harder, James William and Heidi Joy Mulheron (233)

Faculty Mentor/Collaborator: **Warren Gallagher**

On the Road to Unraveling the Mysteries of How Methanobactin Reduces and Stabilizes Copper Ions

Methanobactins are peptide-derived, copper-binding molecules produced by methanotrophic bacteria, which use methane as their primary source of carbon and energy. They synthesize methanobactin to scavenge copper ions from the environment and use this copper as a cofactor for the enzyme that catalyzes the conversion of methane to methanol. Methanobactin displays the remarkable property of binding and reducing copper(II) ions to copper(I) ions and stabilizing them in an aqueous environment. Methanobactins can also bind and reduce Mercury(II), Silver(I), and Gold(III) ions. Currently we do not know how methanobactins are able to carry out these reactions. We do know from the structure of copper-bound methanobactin 03b3 that there are 2 oxazolone rings that are intimately involved in the binding of Copper(I) ions. We will report on a method we have developed for selectively opening these rings. We are currently using these chemically modified methanobactin molecules to further investigate the metal binding properties of methanobactin by assessing the role that the oxazolone rings play in reducing and stabilizing metal ions.

Helminiak, Heather Marie and Robin Reagan Knauf (207)

Faculty Mentor/Collaborator: **James Phillips**

Condensed-phase Effects on the Structural Properties of $RF'-BF_3$ Complexes

We have been examining the structural properties of $RF'-BF_3$ complexes, with an eye toward solvent effects and their role in Friedel-Crafts reactions. Using several DFT methods and MP2, we have obtained gas-phase structures, frequencies, and B-F' bond potentials for CH_3F-BF_3 , $(CH_3)_2CHF-BF_3$, and $(CH_3)_3CF-BF_3$. All the complexes are weakly bonded in the gas phase, with B-F' distances of about 2.4 Å and binding energies between 3.5 and 4.1 kcal/mol. However, the inner wall of the gas-phase B-F' potential is fairly soft for all complexes, and moreover, for $(CH_3)_2CHF-BF_3$ and $(CH_3)_3CF-BF_3$ in dielectric media, we observe a shelf-like feature at about 1.7 Å. We have also obtained low-temperature IR spectra of these complexes, both in argon matrices and bulk RF/BF_3 thin films. Comparisons between these data and computed gas frequencies will shed further light on the degree to which solvents drive structural changes in these complexes.

Jones, Thomas and Shilo Alena Bender (258)

Faculty Mentor/Collaborator: **Michael Carney**

Transition Metal Complexes Incorporating Multi-dentate Amidine-based Ligands for Ethylene Polymerization

Chromium catalysts are used commercially to produce billions of pounds per year of polyethylene and shorter chain alpha olefins. Attempts to improve commercial catalysts have led many research groups to synthesize discrete chromium compounds supported by various multi-dentate ligands. For example, chromium complexes supported by ligands containing nitrogen, phosphorus and sulfur donor atoms have been found to be effective catalysts for the polymerization of ethylene (forming high polymers and alpha olefins) and for the selective formation of 1-hexene and 1-octene. We have developed a new family of catalysts by supporting transition metals with an amidine-based ligand that incorporates an additional donor atom (donor atom = N, O, P, S). Synthetic schemes have been developed for the ligands and for the resulting metal complexes. X-ray crystallographic, spectroscopic and magnetic susceptibility data, as well as selected ethylene polymerization results will be presented.

Kopidlansky, Kyle Michael (209)Faculty Mentor/Collaborator: **David Lewis***Reactivity of N-aryl-4-substituted-1,8-naphthalimides towards Amine Nucleophiles*

It has long been believed that the heterocyclic ring of a naphthalimide dye was resistant to nucleophilic attack. However, our research has shown that reacting *N*-aryl-4-substituted-1,8-naphthalimides with nucleophilic primary amines has resulted in addition to the heterocyclic ring with loss of the aromatic amine to give an apparent net substitution at the nitrogen atom. We have found that the presence of an electron releasing group at the 4-position prevents this reaction, whereas an electron withdrawing halogen at the position results in the substitution at the heterocyclic nitrogen. In contrast to this, changing the substituent on the *N*-aryl group did not affect reactivity.

Krentz, Benjamin David (232)Faculty Mentor/Collaborator: **Warren Gallagher***The Structure of a New Methanobactin Hints at the Existence of a Whole New Class of Peptide-derived Metal-binding Molecules*

Methanobactins are peptide-derived, copper-binding molecules produced by methanotrophic bacteria that use methane as their primary source of carbon and energy. They synthesize methanobactin to scavenge copper ions from the environment and use this copper as a cofactor for the enzyme that catalyzes the conversion of methane to methanol. Here we report our results for determining the chemical structure of a new form of methanobactin, methanobactin SB2, and compare this structure to a previously determined structure for another methanobactin, methanobactin O3b3. These two methanobactins are produced by different methanotrophic bacteria and the comparison is proving valuable for revealing the features that are important to a functioning methanobactin molecule. Our comparisons so far with methanobactin SB2 and O3b3 suggest that methanobactins may represent a new class of molecules that have evolved from simple peptides to become powerful agents for binding, reducing and stabilizing metal ions in aqueous environments. We plan to expand the comparison by carrying out similar investigations on methanobactin-like molecules produced by other methanotrophic bacteria.

McAnally, Michael O'Neal (234)Faculty Mentor/Collaborator: **Thao Yang***Characterization of an Eleven Residue MUC-1 Peptide Structure in Solution by 2D NMR Spectroscopy*

MUC-1 peptides are peptides based on the amino acid sequence of the tandem repeat domain of mucin expressed by cancer cells, which immunity in a host could be induced against. MUC-1 peptides have been used as antigenic agents in the development of cancer vaccine. The purpose of this research is to better understand the specific conformation of a specific MUC-1 peptide. To address the question, we have synthesized an 11-mer peptide with the sequence GVTSAPDTRPA that spans the main portion of the tandem repeat domain of mucin that is known to bind to MUC-1 monoclonal antibody. The presentation will include data on the characterization of the MUC-1 peptide by preparative HPLC, LC-MS, 2D NMR, and computational modeling of the peptide. Results showed that there exists a β Type turn localized along the Ala5-Thr8 residues on the peptide backbone in solution.

Moris, Matthew Jerome (230)Faculty Mentor/Collaborators: **Thao Yang** and **Sudeep Bhattacharyay***Dynamic Studies of Mondonal Antibody SM3 with a Peptide Antigen*

MUC1 mucin protein is naturally expressed on the surface of epithelial cells in humans; it is found on the apical surface of ductal epithelia tissues of the breast, pancreas, airways, and the gastrointestinal tract. MUC1 mucin is also

expressed in cancer cells in the breast, pancreas, and ovaries. Tumor mucin is immogenic and different in the glycogen structure. The antibody against the MUC1 tumor mucin, known as monodonal antibody SM3 is made up of two large subunits (211 and 212 residues); its crystal structure complexed with the antigenic peptide ligand TSAPDTRPAPGST is known. Dynamic studies of the SM3 complexed with the antigenic peptide antigen, using VMD and NAMD, have shown hydrophobic interactions between the ligand and the aromatic rings of the protein. These attractions are observed between Pro4 of the ligand and the aromatic rings of Trp33, Tyr35, Trp94 of the SM3. There are also strong hydrophobic attractions between Pro4 and Pro8 of the ligand and Tyr32 of the protein. There is intra hydrogen-bond stabilization within the peptide antigen between Pro4 and Thr6 as well as between Asp5 side chain and Arg7. The mapping of this binding site could allow for the docking of alternate antigen in the future.

North, Michael Alexander (268)

Faculty Mentor/Collaborator: **Sudeep Bhattacharyay**

Effect of Aromatic Interactions on Flavin's Redox Potential: A Theoretical Study

Flavins, substituted isoalloxazines, are redox active cofactors ubiquitous among oxidoreductases that catalyze diverse chemical reactions. They also exhibit photoinduced electron transfers and have great potentials as sensors and as light-harvesting chromophores. Versatility in chemical functions in flavin- containing enzymes arise mainly due their unique ability to undergo both one- and two-electron reductions. Modulation of the redox potential is accomplished by various hydrogen bonding interactions with flavin ring atoms, as well as π -stacking interactions with aromatic sidechains. Although, recent studies revealed the role of hydrogen bonding and electrostatics on the charge separation upon reduction, the significance of aromatic functionalities and their impact on flavin's redox potential have remained poorly understood. In the present study, these noncovalent interactions, in various flavin-aromatics, have been studied and their impact on the electrochemical properties investigated. Using density functional theory (DFT), the free energy changes of these flavin-aromatic non-covalent hybrids have been calculated in their gas-phase and condensed-phase. The geometry and energetics of these molecular hybrids derived from this study will be presented.

Stuckert, Erin Patricia and Daniel Scott Swedien (267)

Faculty Mentor/Collaborator: **Alan Gengenbach**

Metalloporphyrin Catalyzed Oxidation of Thiophene Derivatives

The oxidation of dibenzothiophene and related compounds is an important reaction in oxidative desulfurization treatment of diesel and other fuels. Iron tetrakis-(pentafluorophenyl)porphyrin chloride catalyzes the oxidation of benzothiophene (BT), dibenzothiophene(DBT), 4-methyldibenzothiophene (4-MDBT), and 4,6-dimethyl-dibenzothiophene (4,6-DMDBT) by hydrogen peroxide. A high conversion of DBT to products requires only a slight stoichiometric excess. The products of the reaction are the sulfoxide and the sulfone and the product distribution depends on the amount of hydrogen peroxide employed. The oxidation can be performed in a variety of solvents including hydrocarbons. The metalloporphyrin catalyzed oxidation reaction was incorporated into an ODS scheme that removed the majority of the total sulfur from the model fuel.

Swanson, Teresa Mae and Lisa Nicole Chesner (255)

Faculty Mentor/Collaborator: **Scott Hartsel**

Metal Reduction by Methanobactins

Methanobactins (mb) are copper-binding peptides or chalkophores secreted by methanotrophs to scavenge copper ions from the environment. A unique feature of these molecules is their ability to reduce and stabilize copper as Cu(I). In the absence of Cu, the molecule will also bind and reduce many other metals including silver, gold and

mercury. We have investigated the methanobactin (MB) from *Methylosinus trichosporium* OB3b, as well as a newly isolated methanobactin from *Methylocystis* sp. SB2 in order to determine how these novel polypeptides reduce and stabilize Cu(I) and other metals. We have used UV-Visible, NMR, and LC-TOF to characterize both methanobactins in an attempt to find the internal reductant, determine the process of reduction, and look for structural similarities. Our results eliminate methionine, cysteine and tyrosine as reducing agents for Cu(II) and TOF mass spectra show no difference between MB exposed to Cu(I) vs. Cu(II). The most likely remaining sources of electrons are the thioamides or water which would have to be oxidized by a Cu(II) with an unusually high reduction potential.

Vang, Nou (235)

Faculty Mentor/Collaborator: **Thao Yang**

Mucin Peptides-Antibody Binding Study by NMR Spectroscopy

Mucin, a component of mucus, is a class of large, heavily glycosylated proteins that are found on epithelial surfaces such as respiratory, gastrointestinal, and reproductive tracts. Mucin serves as a lubricant, acts as a protective barrier to soft tissues, and binds to pathogens to protect the body from infection. MUC-1 mucin is a type of mucin encoded by the gene MUC-1; it consists of three domains: the extracellular, transmembrane and intracellular domain. On normal cells, mucins are highly glycosylated and are found on the apical surfaces of cells. In tumor cells, MUC-1 mucin can be found all over the cell surfaces. Tumor mucin has carbohydrate chains that are shortened compare to the normal one. The shortening of carbohydrate side chains exposes MUC-1 epitopes to the immune system, which allows for antibody production against it. MUC-1 mucin is a growing topic of research in vaccination against breast cancer using synthetic carbohydrates and peptides. In this study we will present the results for the synthesis of mucin peptides by solid-phase peptide synthesis method, characterization of the peptide structures, and mucin peptide binding to antibody by NMR spectroscopy.

Schieffer, Phillip John and Matt David Hammers (231)

Faculty Mentor/Collaborator: **Kurt Wiegel**

Halogen Bonded Liquid Crystalline Networks: Crosslinking as a Probe of Mesophase Strength and Stability

A series of halogen-bonded supramolecular networks based on rigid bispyridyls, non-mesogenic tetrapyrindyls and bis(4-iodo-2,3,5,6-tetrafluorophenoxy)-1,10-decane will be synthesized. All complexes will be analyzed for liquid crystalline characteristics. Initial calculations have indicated that using the nitrile as the halogen bond donor presents a challenge due to the weaker association energy, especially as compared to the pyridyl species. We will determine if this is carried through empirically and the effect of altering the electron density in the donor species on binding energies. Previous work has shown a direct correlation between the extent of crosslinking and the liquid crystallinity of hydrogen-bonded networks. Additionally, supramolecular networks utilizing n-PFAI, 2RP and p-TPPE will be created in order to determine the extent to which the non-mesogen forming networking agent will disrupt the liquid crystallinity of the system.

Wrass, John Peter (210)

Faculty Mentor/Collaborator: **James Phillips**

Structural Properties of the Acetonitrile – Boron Trichloride Complex via Low Temperature IR Spectroscopy and Computations

We have examined the structure, frequencies, and B-N bond potential of CH₃CN-BCl₃ using a variety of computational methods. Interestingly, we obtained two distinctly different structures; with a B-N distance near 1.6 Å or between 2.7 and 3.2 Å. We obtain both of these minimum energy structures with every method employed; the end result depends only on the starting B-N distance for the optimization. We also mapped the B-N bond potential using

both hybrid DFT/HF and post-HF methods. With DFT, the global minimum is located near 1.6 Å, and a secondary minimum (3-5 kcal/mol higher in energy) occurs between 3.1 and 3.2 Å. With post-HF methods, the global minimum is still observed near 1.6 Å, but the secondary minimum shortens to 2.7-2.9 Å, and lies between 4.0 and 7.0 kcal/mol above the global minimum. The experimental crystal structure has a B-N distance of 1.65 Å, which corresponds to the global minimum. Frequency measurements are currently in progress, but computed frequencies for each equilibrium structure, indicate that IR spectra will clearly indicate which structure of the complex is present in neon matrices.

Computer Science

Bartig, William James (259)

Faculty Mentor/Collaborator: **Paul Wagner**

Updating the Open Source Database Benchmark Project

The Open Source Database Benchmark (OSDB) project offers value to anyone who wants the ability to compare the performance of database systems in their own environment, without the associated costs involved with licensing commercial benchmarking tools. The open source model allows the OSDB project to provide a free tool for anyone to use while allowing other willing programmers to contribute code for the benefit of everyone. This project's goals are, first, to extend the OSDB project by increasing the functionality of the Oracle benchmark test, and, second, to convert the project to a more object-oriented design and to migrate the code base from C to C++. The existing Oracle benchmark test is limited to a single-user simulation, which means that OSDB is unable to simulate multiple simultaneous connections to the database. Expanding the Oracle benchmark test to include a multi-user test will increase its value, since many real-world environments have multiple users consuming database resources at the same time. Switching to an object-oriented framework will simplify the process of building benchmark tests, in turn allowing more programmers to generate tests for other database management systems (DBMSs). By utilizing an object-oriented model, tests can be modular within a common programming framework.

Bernhart, Bryan Gerald (269)

Faculty Mentor/Collaborator: **Daniel Stevenson**

Real-time Indoor Location System Using WiFi Scanning

Location tracking is an important part of many ubiquitous computing applications. Unfortunately, global positioning systems (GPS) only provide sufficient tracking coverage in an outdoor setting, unavailable to many users in an indoor setting. With the popularity of WiFi, the use of this wireless infrastructure can become a viable option for indoor tracking. We investigate and propose deploying a real-time indoor location system that accounts for obstacles and wireless instability without fingerprinting locations. We discuss the actual performance and accuracy of tracking both stationary and moving targets by incorporating common mobile device tracking features, and applying predictive heuristics to account for inaccuracies such as structural boundaries. Provided with only a passive-based collection of WiFi-based signal strength indications (RSSI), this system relies on achieving accuracy by using the built-in orientation features present in many existing mobile devices, and does not rely on any costly additional sensor feedback. With the collected signal graph, a positioning map is formulated and used with both predictive and deterministic algorithms to derive the estimated location of a node. We compare the performance of the algorithm with several other approaches, including fingerprinting. A scalable context-aware mobility framework was then developed to demonstrate a context-dependent multimedia interactive application.

Computer Science, English

Hoover, Carl James and Heather Leanne Sommer (266)

Faculty Mentor/Collaborator: **Michael Wick**

The Automated Chinese-to-English Translation of Creative Writings

Preliminary research reveals that current work in the machine translation of Chinese-to-English focuses entirely on a statistical approach. This approach measures the probability of a word appearing next to the previously translated word based on studies of corpora (collections of texts) on the same subject matter stored in databases. This approach does not allow for a culturally-sensitive translation with regards to the source language, as meaning is often lost through metaphor or folk-lore references. Translation is a difficult process and one which is often shied away from in favor of studying language in spoken or theoretical applications. By compiling a database to allow for the corpora analysis of creative works previously translated and employing an example-based approach to translation (in addition to the currently popular statistical approach), this daunting task can be made significantly easier. Various dialects and disparaging sociolinguistic statistics have been observed. Many prescriptive rules for the translation of Chinese-to-English have been compiled and discrepancies between textbook corpora and contemporary spoken Chinese have been examined. Work is still in progress and these efforts are showing promise with the examination and development of corpora.

Geography and Anthropology

Hansen, Ian Andrew (157)

Faculty Mentor/Collaborator: **Garry Running**

Geographic Information Systems (GIS) Mapping of 2009 Lake Wissota Aquatic Plant Survey

Over the summer of 2009 The Beaver Creek Reserve Citizen Science Center conducted a survey of aquatic vegetation along the littoral zone (shore line) of Lake Wissota. Lake Wissota is an impoundment created by a dam built on the Chippewa River in 1917. This dam is used by Xcel energy for hydroelectric power. The 2009 survey is a follow-up to 1989 and 2005 surveys, all funded by Xcel Energy and the Wisconsin Department of Natural Resources. The goal of the survey is to assess the impact of annual drawdowns (lowering of the lake level) of Lake Wissota on the ecosystem. The purpose of drawdowns is to minimize spring flooding and maintain power levels supplied by the dam. Aquatic vegetation was sampled at 609 points along 160 transect lines radiating from the shoreline out to 10-20 foot depths. For easy interpretation by the public, Geographic Information Systems (GIS) software was used to create maps of the aquatic vegetation data collected. Comparing the 2009 survey to previous surveys shows a change toward a healthier aquatic ecosystem. However continued monitoring is necessary as an increase of invasive plant species over time is shown.

Koehler, Thomas John (83)

Faculty Mentor/Collaborator: **Joseph Hupy**

Assessing Landscape Disturbance and Ecological Recovery of the Khe Sanh Battlefield following Anthropogenic Disturbance by Explosive Munitions in the Second Indochina War

This research aims to address to what degree explosive munitions and land use patterns play a role in the biotic properties in the Khe Sanh battlefield in South Vietnam. In an age when warfare is being waged in a variety of climates and ecosystems across the globe, sometimes in biologically diverse areas, it is important to understand how war impacts both the biologic and geomorphic properties of these landscapes. Data was collected for this research during a three-week field study of the Khe Sanh battlefield during the summer of 2009. The data was then compiled and used for both a microtopographic and remote sensing analysis of the area, producing a comprehensive look at

how the study area was affected by landscape disturbances during, and possibly following, the Vietnam War. Preliminary findings for the research have indicated that disturbances rendered by explosive munitions have had minimal long-term impact on the physical landscape. While there have been significant changes to the region's physical features, our research shows that these changes have in many cases enhanced the region's ability to develop vegetation despite the presence of intense agricultural practices in the central highlands of Vietnam.

Otte, Rachel Marie (70)

Faculty Mentor/Collaborator: **Joseph Hupy**

Microclimate Analysis of UW- Eau Claire Footbridge

Analyzing geospatial patterns of climatic and meteorological phenomena has become increasingly prevalent in the field of geographic information science. Aside from the climatology field, using this technology to study global climate change, recognizing spatial temperature patterns can be useful in other fields such as agriculture. By understanding climatic variability in a given area, farmers can significantly increase crop yields, and mitigate future frost damage. This study seeks to display the climatic spatial patterns of the UW-Eau Claire footbridge in comparison to the surrounding campus to see just how cold the footbridge is. The footbridge is widely renowned by students, faculty, and visitors for its bitter cold temperatures and blistering winds making it an interesting study piece. In order to produce models displaying spatial patterns, climatic data was collected at specific locations distributed on campus and recorded for three months. Point data was then converted to a continuous surface map depicting temperature trends. After the surfaces were created, error analysis was performed to address irrelevant results, maintain data integrity, and generate the best surface based on the error analysis. Findings show that there were no significant differences in temperature until the winter months, when much colder temperatures on the footbridge were noted.

Pettingill, Kaitlyn Grace (59)

Faculty Mentor/Collaborator: **Christina Hupy**

Dendrochronological History of the Lower Chippewa River Valley

The Lower Chippewa River Valley in west-central Wisconsin is the largest contiguous floodplain forest within the Midwest; it remains forested along most of its channel stretching from Eau Claire to where the Chippewa meets the Mississippi River and consists of a variety of plant and animal species. Vegetation along the Chippewa River has been mapped over a 70 year period (1938-2008) and preliminary analysis has shown prominent vegetation coverage consisting of prairie, savanna, woodland, forest, or marsh throughout the study period. The main objective was to establish a dendrochronological record for the study area. Suitable locations for analysis were chosen by finding sites in a Geographic Information Systems that remained vegetated since 1938. Three sites were chosen and visited and multiple samples (cores) were collected from individual trees of several *Pinus* and *Quercus* species; cores were aged through counting and measuring tree rings. Aging samples has given insight into the chronology of species from the study area. A full chronology was established through cross-dating; site-level analysis performed on each species provided climatic responses. Counts have revealed the oldest samples from each species collected: *Quercus alba* (1793), *Quercus macrocarpa* (1877), *Quercus rubra* (1903), *Quercus ellipsoidalis* (1973), and *Pinus strobus* (1886).

Reid, Nathan James (60)

Faculty Mentor/Collaborator: **Christina Hupy**

A Descriptive Habitat Model for the Cayos Cochinos Boa Constrictor on Cayos Cochinos Menor, Honduras

The Cayos Cochinos boa constrictor (CCB) is an endangered and endemic species of *Boa constrictor* which inhabits a chain of islands located off the north coast of Honduras. The goal of this research is to develop a habitat model within a geographic information systems (GIS) framework for the CCB on the second largest island in the Cayos Cochinos chain, Cayos Cochinos Menor. A suite of existing geospatial data, including environmental variables such as temperature, humidity, precipitation recorded by a 100 operative temperature models (OTM) across the island, and CCB capture data were prepared for use in a GIS. Kriging, a method of spatial interpolation, was used to generate surfaces for each of the environmental variables. CCB captures were then overlaid with the suite of environmental variables to identify the characteristics of CCB habitat on the island. Results indicate that the CCBS are impacted by the climate of the island; habitat use varies during wet and dry seasons. The results from this research will be used to develop a predictive 3-D habitat model for CCBs on Cayos Cochinos Menor. The model will be tested and refined in the field in fall of 2010.

Smith, Katrina Jeanette (69)

Faculty Mentor/Collaborator: **Christina Hupy**

*Examining Gene Flow and Habitat Characteristics of Multiple Genetic Pattern Classes in the Whiptail Lizard Genus *Aspidoscelis**

The purpose of this project was to use Geographic Information Systems (GIS) to map and analyze gene flow in the whiptail lizard genus *Aspidoscelis* of southeastern Colorado, and to create a descriptive habitat model for these lizards. This spatial analysis facilitated the examination of genetic variation between genetic pattern classes of *Aspidoscelis*, leading to clarification of the speciation of this genus. The habitat model helped to establish habitat characteristics of *Aspidoscelis* and to enable predictions of the locations of future populations. Point pattern analysis was performed with GIS to determine gene flow between genetic pattern classes. The habitat model was generated by intersecting spatial occurrences of *Aspidoscelis* with a suite of environmental variables including elevation, slope, aspect, soil type and soil drainage class. The results provide insight into the gene flow and habitat conditions of each genetic pattern class. A map of all pattern class polygons labeled with the average spatial distance between each was produced, as well as a map showing the descriptive habitat model of *Aspidoscelis*.

Geology

Butkus, Nicole Jeannette (179)

Faculty Mentor/Collaborator: **Beth Johnson**

The Effects of Krakatau's Eruption of 1883 on Art Around the World

The eruption of Krakatau in 1883 is the first well-documented volcanic event whose effects could be felt around the world. One of the most important documents written immediately after its eruption is *The Eruption of Krakatoa and Subsequent Phenomena* by the Krakatoa Committee of the Royal Society of London (1888) which has been chosen for this research because it has vast tables of individual reports on Krakatau's effects around the world which helped create a better understanding of the change in subsequent artwork of the time. The research focus is comparing artwork before and after Krakatau's eruption. The comparison is done objectively by analyzing the mean pixel intensity of cyan, magenta, yellow, and black (CMYB) in each painting. For this comparison, several considerations and limitations have been imposed. Pieces of art studied in this research were created between 1879 and 1889.

Dependent on this comparison is a certain knowledge of art history. Ultimately, the research reveals a close relationship between paintings' color intensity and air pollution from Krakatau and pre-industrialization.

Conde, Giselle (156)

Faculty Mentor/Collaborator: **Phillip Ihinger** and Ellery Frahm, University of Minnesota-Twin Cities
Geochemistry of Anatolian Obsidian: Implications for Sourcing and Dating of Artifacts

Abundant volcanism in southwest Asia provided early civilizations with obsidian, which was used to manufacture tools and other carved items. Because each obsidian flow has a unique chemical composition, ancient trade routes can be traced, and artifacts can be sourced to the volcanoes from which they originated. The presence of water in obsidian is also invaluable to both geologists and archaeologists. The relative abundance of the two hydrous species in obsidian (OH hydroxyl groups and molecular H₂O) allows geologists to distinguish glasses that retain their initial magmatic water content from those that have experienced post-eruption hydration. In addition, the diffusion of water into exposed surfaces of glass artifacts has allowed archaeologists to develop a relative dating technique for the manufacture of obsidian artifacts. We present the major and trace element compositions of obsidian samples from 30 different flows in southwest Asia using the XRF facility at UWEC, and compare them to electron microprobe measurements taken at the University of Minnesota. These measurements are compared with micro-FTIR measurements of hydrous species concentrations in these glasses. We find that samples having experienced low-temperature, post-eruption hydration also experienced depletions in SiO₂, Na₂O, and Fe₂O₃.

Conde, Giselle, Daniel Steltz, and David Kawatski (165)

Faculty Mentor/Collaborator: **Phillip Ihinger**

How Fast Did That Crystal Grow? Quantifying the Growth Rate of Natural Quartz Crystals

Circulation of hydrothermal fluids controls the timescales of cooling in the Earth's crust and allows for large-scale exchange of matter between different levels of the crust. The time required to grow quartz crystals within these systems governs how long individual fluid-filled fractures remain open. Every hydrothermal quartz crystal contains small amounts of impurities that were trapped on the growing crystal face at the time of mineral growth. The trace constituents record the physical and chemical conditions that were present as the mineral was growing. Here, we present micro-FTIR measurements that characterize the morphologic evolution of a series of quartz crystals grown from a single hydrothermal vein from China. Our analyses show that each crystal grew as successive layers were added to the terminal rhombohedral faces. Measurements from different heights within each crystal define diffusion profiles toward the crystal boundaries that document the time-dependent impurity concentrations that were trapped during growth; diffusion profiles at the bottom of the crystals are more pronounced than profiles observed at the tips. The time elapsed between growth at the bottom and growth at the terminus represents a novel approach to investigating crystal growth kinetics.

Crist, Taylor Lea and Crystal Louise Nickel (118)

Faculty Mentor/Collaborator: **Katherine Grote**

Experimental Determination of Ground Penetrating Radar (GPR) Groundwave Sampling Depth as a Function of Data Acquisition Parameters

Ground Penetrating Radar (GPR) groundwaves can be used to measure the near-surface soil water content. Previous laboratory research has shown that the sampling depth of GPR groundwaves is frequency dependent when adjacent soil layers have highly contrasting soil water contents. This experiment investigates how the GPR groundwave sampling depth varies as a function of frequency and antenna offset in a natural soil during gradual infiltration and drying. GPR data were simultaneously acquired using four frequencies over a laterally homogenous 2.5 x 3 m plot area, and data for each frequency was acquired at five antenna offsets. Data acquisition was interspersed with

sprinkling over the plot area in one hour increments until the soil water content sensors installed in boreholes around the perimeter of the plot area showed saturated conditions; data acquisition was then performed every few days as the soil dried. Comparison of GPR data with soil water content measurements obtained using probes and gravimetric samples confirm that the groundwave sampling depth is frequency dependent under natural soil conditions, indicating that multi-frequency GPR data could be used to create a vertical soil water content profile. Results also showed that groundwave sampling depth was slightly dependent on antenna offset.

Erickson, Jae Oliver (166)

Faculty Mentor/Collaborator: **Phillip Ihinger** and Paul Spry, Iowa State University

The Mineral Chemistry of Purple and Yellow Fluorite: Insights from High Resolution FTIR Spectroscopy

Banded fluorite crystals sampled from the Cave-In-Rock Fluorspar District, Illinois offer insights into the evolving hydrothermal fluids that hosted sulfide ore deposition. Earlier studies have shown that fluids responsible for the Cave-In-Rock deposits followed similar trends in crystallization temperature, salinity, and isotope systematics. However, these studies failed to identify chemical and/or environmental factors that correlate with the observed prominent color banding. We present detailed micro-FTIR analyses of hydrous species within a gemmy fluorite specimen from the Hill mine. Our analyses represent the first high-resolution (100 Åμ) IR analyses on fluorite. The specimen consists of a yellow core with a thick coating of alternating purple and colorless bands. We have identified a prominent broad peak at 3400 cm⁻¹ and four sharp peaks at 1400, 1550, 1650, & 1740 cm⁻¹. We show that yellow fluorite has order of magnitude higher absorbance at 3400 and 1650 (common features associated with hydroxyl stretching and bending of molecular water, respectively) but no absorbance at 1740. Colorless and purple bands show appearance of the 1740 band, and no absorbance at 1400. The peak heights at 3400 & 1650 generally correlate with one another within bands, but do not show distinct differences across purple and colorless bands.

Floyd, Corrie (180)

Faculty Mentor/Collaborator: **Beth Johnson**

Geophysical Analysis of Wisconsin Episode Deposits in the Savanna Terrace Near Savanna, Illinois

The Savanna Terrace can be traced for approximately 1,000 km along the Mississippi River from Pepin County, Wisconsin to Jackson County, Illinois. The terrace is composed of Wisconsin Episode Glacial sediment deposited during deglaciation of the Laurentide Ice Sheet (LIS). Core analysis describes the study area as approximately 2.97 m of slackwater materials of the Equality Formation above fluvial sands of the Henry Formation. Geophysical analysis at this site was performed to confirm the boundary between the fluvial sands and slackwater sediments, as well as evaluate which geophysical method would yield the most accurate results in high clay regions. Supplementing previously conducted core and electrical conductivity (EC) analysis, this project utilized resistivity and ground-penetrating radar (GPR). The GPR surveys were conducted along a 20 m transect oriented north and south with 50 MHz and 100 MHz antennae. For resistivity, a Schlumberger Array was used along the same transect extended 40 meters at each end. The geophysical data illustrated that the contact between the slackwater sediments and the fluvial sands is relatively flat and is at ~3 m depth, which is within ~0.03 m of the depth indicated by the core data.

Johns, Raymond August and Adam Adrian Krieger (108)

Faculty Mentor/Collaborator: **Katherine Grote**

Factors Influencing High Nitrate Levels in Groundwater in Eau Claire County, Wisconsin

In Eau Claire County, about 6.4% of private wells have nitrate concentrations exceeding the Enforcement Standard (ES) of 10 mg/L. This project investigates whether high nitrate concentrations can be linked to hydrological parameters and to land use. Data sets of nitrate concentrations in private wells were acquired for a period from 1999

to 2004 and again from 2005 to 2009. Using GIS, these data sets were correlated to maps of depth to bedrock, depth to water table, soil type, and land use. Preliminary results of these correlations indicate that land use is the most important factor contributing to high levels of nitrates, where industrial sites had the greatest percentage of high nitrate wells; agricultural and residential sites had significantly lower concentrations. The correlations with geologic parameters show that high levels of nitrates are more prevalent in shallow bedrock (<5 feet), shallow water table (<20 feet), or loamy soil. The ultimate goal of this project will be to develop an evolving risk assessment map for Eau Claire County that could be used to predict areas that are at an elevated risk for nitrate contamination.

Kadulski, Brennan Michael and Julia Jaglowski Potter(142)

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

Constraining Mineral Potential of the Alexander Terrane Near Porcher Island, Northwestern British Columbia

The Paleozoic Alexander terrane in northern British Columbia and Alaska contains two island arc sequences, including, the late Proterozoic to Cambrian Wales Group and the early Ordovician to late Silurian Descon Formation. Both of these sequences are thought to represent volcanic arc assemblages composed of sedimentary, volcanic, and plutonic rocks and their metamorphic equivalents. Both the Wales and Descon have significant volcanic massive sulfide potential based on alteration patterns, prospects, showings, and favorable rock types. Mapping and sampling of the Wales Group and Descon Formation on Porcher Island, along with geochemical and geochronological data, is critical for understanding and constraining the VMS economic mineral potential of the Alexander terrane. Preliminary geochemical data suggests that the Wales Group consists of two geochemically distinct rock packages, primarily based on Ba and Pb enrichment and depletion. Primary volcanic rocks are limited in the Descon formation, but limited data suggests the Descon represents a subduction-related typical calc alkaline volcanic arc assemblage.

King, Nicholas Edward, Julia Jaglowski Potter, Jessica Lee Meyers, Brennan Michael Kadulski, Elizabeth Balgord, and Bryan Glen Hardel (131)

Faculty Mentor/Collaborators: **J. Brian Mahoney, Geoffrey Pignotta, and Phillip Ihinger**

Geologic Analysis of the Northern Margin of the Boulder Batholith II: Geologic Map of the Esmerelda Hills Quadrangle

Southwest Montana experienced large-scale magmatism and regional contraction during the Late Cretaceous. The northern margin of the Boulder batholith contains the juncture between deformed Paleozoic strata, the voluminous intrusive rocks of the batholith, and the overlying Elkhorn Mountain volcanic rocks. Detailed mapping of the Esmerelda Hill 7.5 minute quadrangle has identified field relationships that are critical for understanding the tectonic evolution of the region, including 1) a rarely exposed angular unconformity between the Mesoproterozoic Belt Supergroup and the Cambrian Flathead sandstone; 2) folds and thrust faults involving the Cretaceous Colorado Group, and 3) an intrusive contact between an undeformed Cretaceous stock and strongly folded Paleozoic strata. Field relationships involving Cretaceous rocks provide critical constraints on the sequence of events that characterizes the tectonomagmatic evolution of the Helena salient.

Meyers, Jessica Lee and Bryan Glen Hardel (133)

Faculty Mentor/Collaborator: **Geoffrey Pignotta**

Geochemical characterization of the Paleozoic Mt. Attree Volcanic Complex, Terrace, British Columbia

The Paleozoic Mt. Attree volcanic complex, exposed in the Terrace, British Columbia region, contains potentially economic volcanogenic hosted massive sulfide (VHMS) mineralization. The primary objective of this research is to establish a geochemical framework for the region and assess economic mineralization in the Mt. Attree volcanic

complex. Geochemical and assay samples were collected during the summer of 2009 from six target areas within the volcanic complex and from cross-cutting dikes interpreted to be potential feeders for the volcanics. Field observations and preliminary geochemical analysis show that Mt. Attree volcanic complex compositions range from basaltic through rhyolitic, with andesitic compositions dominating. Initial interpretation of this geochemical pattern is that the volcanic complex was formed in continental margin or island arc setting. Further analysis of these samples will provide a better understanding of the tectonic setting during deposition/intrusion. Assay results from volcanic units exhibit variable metal concentrations, some of which are consistent with other Paleozoic and Mesozoic VHMS deposits found in British Columbia. Assay samples will reveal the style and extent of mineralization associated with the Mt. Attree volcanic complex.

Mohr, Audrey Rose (84)

Faculty Mentor/Collaborators: **Kent Syverson, J. Brian Mahoney**, and James Cotter, University of Minnesota-Morris

Geochemical Analysis of a Glacial Lake Benson Varve Sequence, West-Central Minnesota

Glacial Lake Benson formed in western Minnesota as meltwater from the retreating Des Moines Lobe filled low areas of the Minnesota River valley during the Late Wisconsin Glaciation (Rittenour et al., 1998). This study, analyzed the internal geochemistry of a 15-year Glacial Lake Benson varve sequence to investigate how geochemistry may change in a single location. In addition, we compared lake sediment geochemistry to the geochemistry of western Minnesota surficial till (Thorleifson et al., 2007). Fifteen samples of consecutive varves were collected and dry sieved to obtain the silt and clay fraction for major and trace element analysis by XRF. Bulk geochemistry within the varved succession exhibits a distinct geochemical partitioning between the bottom and the top of the succession. In particular, large ion lithophile (LIL) elements such as Ba, La and Rb are depleted at the base of the section. Depletion of these mobile LIL elements may be associated with groundwater movement. Lake Benson sediments are significantly enriched in Cu, Zn, Nb, Zr and Y relative to the till. This geochemical enrichment, particularly in nonmobile elements such as Zr, suggests that Lake Benson sediments might have been derived from a different source than the surficial Des Moines Lobe till.

Nickel, Crystal Louise, Shane Michael Peterson, and Taylor Lea Crist (107)

Faculty Mentor/Collaborator: **Katherine Grote**

Three Dimensional Vadose Zone Characterization of a Wisconsin Orchard Using Electromagnetic Techniques

Estimating soil water content is important for environmental and agricultural applications. Ground penetrating radar (GPR) groundwaves are a geophysical technique that can be used to estimate water content, and recent laboratory studies indicate that multi-frequency groundwave data can be used to obtain water content information at different depths. This research explores the potential of multi-frequency GPR groundwave data for characterizing the three-dimensional water content distribution at the field scale. GPR groundwave data were acquired over a 7-acre field site using frequencies of 100-, 250-, 500-, and 1000-MHz. The antennas were pulled in traverses using a sled system and a multi-channel adapter to acquire data simultaneously with all antennas. For each GPR measurement, the groundwave velocity was calculated and converted to water content using a petrophysical relationship. Gravimetric water content measurements were also acquired from boreholes along the GPR traverses, and water content estimates from GPR were compared to these vertical gravimetric water content profiles. Comparison of GPR data from different frequency antennas and the gravimetric water content profiles shows that the water content did vary with depth across the field, and that multi-frequency groundwave data can be used to characterize both the lateral and vertical variations in soil water content.

Olson, Christopher John and John Robert Guy (155)

Faculty Mentor/Collaborator: **Phillip Ihinger**

Magma Evolution of the Mineral Lake Intrusive Complex, Mellen WI

The Mineral Lake Intrusive Complex (MLIC) of northern Wisconsin is a well-preserved magmatic system of the Mid-Continent Rift at 1.1 Ga. The MLIC is composed of a bimodal suite of compositions that include gabbro and granite. Surprisingly, the intrusive complex has largely escaped careful geochemical analysis. We present new field, geochemical, and petrographic analyses of the MLIC that further constrain its magmatic evolution. In particular, we provide a test of our hypothesis that the felsic magmas were produced by liquid immiscibility from highly evolved residual liquids. Our model holds that the residual liquids were trapped within a mafic crystalline framework located just behind the advancing crystallization front within the evolving chamber. Our alternative theory for the origin of granite offers an exciting new explanation for a series of paradoxes observed in the evolution of igneous rocks, including the cause of the extreme Fe-enrichment observed in samples from the classic Skaergaard and Bushveld Layered Mafic Intrusions that define the 'Tholeiitic Trend' on AFM diagrams.

Olson, Jeffrey Dean (93)

Faculty Mentor/Collaborator: **Kent Syverson**

Mapping the Limit of the Penobscot River Valley Calving Embayment, Hampden 7.5' Quadrangle, Maine

The Penobscot River valley of south-central Maine is an area of moderate relief that underwent deglaciation ~14.5 ka. Previous work in the Bangor area to the north revealed ice-flow convergence toward the Penobscot valley -- strong evidence for a calving embayment. In 2009, we mapped ice-flow indicators (striation sets and crag-and-tail features) on bedrock surfaces in the Hampden 7.5' quadrangle. The ice flow maximum trended S/SE throughout the entire Hampden quadrangle. In the north, ice-flow indicators demonstrate a change from a southerly flow maximum (175o azi. mode, n=10) to WNW/ESE (315o/135o azi. mode, n=28). The N/S striae set (165o azi. mode, n=29) is still present in highlands in the southern part of the map (>100 m a.s.l. - above the marine limit), but deviations from the flow maximum seem consistent with local topographic control. To the north, Syverson and Thompson (2008)

attributed evidence of ice flow toward the Penobscot River to a calving embayment. The WNW/ESE flow indicators in the northern Hampden quadrangle likely represent ice flow toward a calving embayment in the Penobscot River valley. The southern highlands of the Hampden quadrangle lack secondary flow indicators and likely mark the southern limit of the Penobscot valley calving embayment.

Potter, Julia Jaglowski (141)

Faculty Mentor/Collaborators: **J. Brian Mahoney** and **Lori Snyder**

Determining the Origin and Evolution of the Avon Volcanic Complex, Southwest Montana

The Avon volcanic complex (AVC) is a suite of felsic rocks occupying a fault-bounded basin encompassing approximately 90 km² in southwestern Montana. The AVC consists primarily of crystal-rich lava flows and volcanic domes. Trombetta (1987) divided the complex into seven map units and supplied basic structural interpretation. Geochemical and geochronologic analyses of these rocks are necessary to constrain the age, origin and evolution of the AVC, and to place them in context within the extensive Eocene-Oligocene volcanic province of the northern Rocky Mountains. A geochronologic sample collected in 2009 from the AVC's most voluminous unit (Trp) yielded a 40.3 Ma (U-Pb) age. Geochemical samples have been collected throughout the lateral and vertical extent of the Complex. Rocks from the AVC fall into three distinct geochemical groups. The first occurs as dacitic flows and domes. The other two groups are rhyolitic in composition but are divided based upon significant differences in elemental abundance. One group is enriched in NaO₂, Nb, Pb and Rb and depleted in Hf, La, Nd and Zr relative to the other. Geochemical signatures indicate a crustal source during magma genesis, suggesting magmatism in the area may in part be a result of Early Eocene crustal extension.

Spencer, Christopher Brian (140)

Faculty Mentor/Collaborator: **Phillip Ihinger**

Computer Simulations of Magma Chamber Evolution: Testing an Alternative Model for the Development of Layered Mafic Intrusions and the Origin of Granite

The association of granite and basalt is observed in every large basaltic magma chamber. Large basaltic rock bodies (termed LMIs, for Layered Mafic Intrusions) provide unique insights into the evolution of the material that makes up over 75% of the Earth's crust. Yet, the details of LMI evolution remain obscure and controversial. For example, many studies of the well-exposed Skaergaard Intrusion in Greenland document a relatively simple, closed-system evolution in which a single vat of magma progressively crystallized from the outside in. However, the compositions of individual rock layers do not represent realistic magma compositions, and the average composition of the entire intrusion is significantly more mafic (i.e., poor in SiO₂) than the initial basaltic melt preserved on the chilled margins of the intrusion. Here, we test the viability of an alternative model that can explain this paradox. The new model invokes the sequential extraction of evolved felsic liquids from within a crystal mush zone located *behind* the advancing crystallization in the magma chamber. Our code is written using test-driven development with C++ to track three diagnostic chemical parameters (SiO₂, Mg/Fe, and Ca/Na) that change systematically with progressive crystallization of magma.

Materials Science Center, Geology

Fahrenkrog, Brooke Ann (94)

Faculty Mentor/Collaborators: **Jill Ferguson** and **Robert Hooper**

Sacramento Valley Ultra Mafics as a Potential Hazard

The Sacramento Valley in California is bordered by two mountain ranges; the Coast Ranges and the Sierra Nevadas. The Coast Range Mountains contain an exposed section of the Coast Range Ophiolite, a remnant of a mid-Jurassic

volcanic arc. This area is very important to the agriculture in California hosting 6500 acres of winegrapes for example. The surrounding mountain ranges contain ultramafic volcanic packages that contain hazardous metals such as chromium and nickel. Due to the size and transport potential of these minerals air, soil, and water samples are being analyzed Using Transmission Electron Microscopy (TEM) techniques. The typical size of these particles is so minute that the TEM is one of the only instruments able to analyze the lattice structure of minerals; this is essential in determining the nature of the nanoparticulate metals. By determining the mineral phase, structure and general size of these metals their relevance to human health can be analyzed and solidified.

Mathematics

Bauer, Mark Patrick and Hong Yang (228)

Faculty Mentor/Collaborator: **Simei Tong**

Optimizing the Evacuation of Hospitals Phase II

In Phase I of our project, we developed a successful evacuation model for Luther Midelfort Hospital of Eau Claire, WI. It saved 23% of total evacuation time in comparison to a logical method of evacuation. In Phase II, we have expanded our model to another major U.S. hospital. We dealt with 13 departments on four floors with 12 elevators, as well as 7 stairwells. Our model can now handle different scenarios of evacuation such as: the use of only elevators, no elevators at all, and horizontal evacuation between buildings. We performed sensitivity analysis on our solution to see how it varies with changing constraints.

Boettcher, Travis Alan and Matthew Richard Nelson (238)

Faculty Mentor/Collaborators: **Shyam Chadha and Veena Chadha**

Duality in Linear Fractional Programming

In this project a dual of a linear fractional functionals programming problem is formulated as another linear fractional functionals programming problem. Duality in linear programming is used to establish the duality results for a linear fractional functionals programming problem.

Christy, Jacqueline Marie, Noah Williams, and Joshua David McHugh (236)

Faculty Mentor/Collaborator: **Manda Riehl**

Distinct Minimal Sequences in Genome Arrangements using the Double-Cut-and-Join Model

How closely related are the genomes of different species or individuals within a species, and how can one genome be mutated into another? The double-cut-and-join (DCJ) method models the way mutations can occur. For this project, we explored this model to find patterns between unsigned genomes and to calculate the number of DCJ operations required to turn one genome into another. Using Python, we developed a computer program which takes an unsigned genome as input and outputs the new genomes acquired after a desired number of DCJ operations are performed. Using this program, we found sequences of numbers relating the length of the genome, the number of DCJ operations performed, and the number of genomes created. We found an exponential generating function for the number of genomes which are distance n away from a genome of length n . We generalized this function to apply to any number of pairs of external vertices and proved its validity by comparing it to a formula we found directly using counting methods. Furthermore, we are exploring the relationship between genomes which are maximally distant, and we will use clique software to generate conjectures about the graphs for genomes of length n .

Edge, Robert Adam (253)

Faculty Mentor/Collaborator: **James Walker**

Objective Quality Measurement in Image Compression

We worked on applying an objective comparison of image quality in image compression. This objective measure is the recently published "Image Quality Index" (IQI). We applied the IQI to obtaining objective comparisons of three different state-of-the-art image compression algorithms: the faculty mentor's ASWDR algorithm, the JPEG algorithm, and the JPEG2000 algorithm. Some previous work of the faculty mentor has shown that ASWDR may be superior, in visual terms, to both of these JPEG-type algorithms. Obtaining objective confirmation of that, using the IQI, would be of interest to the image processing community. We also did research on developing an algorithm that incorporates the IQI into an image compression algorithm, thereby allowing a user to specify a desired quality based on the objective IQI measure. This preassigned quality value would be superior to the JPEG or JPEG2000 "quality" specifications, which are not well-justified empirically in relation to human visual appraisal of quality. An image compressor incorporating the IQI measure is a significant new development.

Frinak, Joshua Joseph and Austen Isaac Ott (214)

Faculty Mentor/Collaborator: **Michael Penkava**

Constructions of Low Dimensional A-infinity Algebras

Associative algebras are familiar objects to all students. For example, polynomial algebras, the integers, the rational, real, and complex numbers as well as matrix algebras are examples known to most students. A1 algebras are generalizations of associative algebras which were first studied by topologists in the 1960's but later became important in mathematical physics. Until recently, there have been few concrete examples of such structures. We study some low dimensional examples with the aim of developing a classification of A1 algebra structures on some low dimensional spaces.

Hellenbrand, Kaitlyn Rose (252)

Faculty Mentor/Collaborator: **Colleen Duffy**

Solutions of Polynomial Equations over Matrices

If we are given an n^{th} degree polynomial over the complex numbers, we know that it has exactly n solutions. However, this is not true for an n^{th} degree polynomial over matrices. The reasoning lies in the many differences between matrices, which are a ring, and complex numbers, which are a field. The question then becomes: How many solutions can exist? Researchers have developed a geometric approach to solving this problem, which shows the maximum number of diagonalizable solutions for an n^{th} degree polynomial over $k \times k$ matrices. This approach also leads to results that demonstrate which numbers of diagonalizable solutions are possible.

Wackwitz, Daniel Joseph and Joshua Joseph Frinak (203)

Faculty Mentor/Collaborator: **Michael Penkava**

Classification of Real Z_2 -Graded Associative Algebras

The classification of complex associative algebras of low dimension goes back to Peirce in the 1800s. Recently, Z_2 -graded algebras have begun to play a role in physics and mathematics. To classify them we first extended some classical theorems of Wedderburn to the Z_2 -graded case. As a consequence we classified all simple Z_2 -graded real algebras. Using these results we give a complete description of some real algebras of low dimension, including an analysis of their deformations.

Williams, Tristan Jay Newman (229)

Faculty Mentor/Collaborator: **Manda Riehl**

Avoiding Paired Colored Patterns of Length Three

We study pattern avoidance in colored permutations ($S_n \wr C_r$) using the pattern matching condition developed by Toufik Mansour. He proved results in the enumeration of avoidance classes of patterns of length two. We have taken the next step and proved results in the enumeration of avoidance classes of paired patterns of greater length. Specifically we have enumerated the avoidance of uni-colored patterns of length k in $S_n \wr C_r$. Our poster will present a proof of our enumeration method and a bijection from the avoidance class in $S_n \wr C_r$ of paired uni-colored patterns of length three to symmetric permutations of length $2n$ avoiding a decreasing string of length 5, studied by Eric Egge. This work builds on that of previous authors including Mansour, West, Vatter, and Egge.

Mathematics, Computer Science

Bauer, Mark Patrick and Ryan Brent Yohnk (237)

Faculty Mentor/Collaborators: **Simei Tong, Shyam Chadha, and Daniel Ernst**

Optimizing the Evacuation for the City of Eau Claire, WI

Natural disasters and other related emergencies are of major concern for communities. It is crucial for the city to evacuate its citizens from danger, in the event of an emergency. Therefore, we have created a mathematical model based on Operations Research Theory and Graph Theory that can construct an evacuation plan to perform the optimal evacuation of a variety of emergency situations. We designed a program using the Java programming language that dynamically implements Dijkstra's algorithm and the Simplex Method to efficiently calculate the optimal solution of evacuation with minimal user interface. Specifically, the Emergency Management Officer of the City of Eau Claire will be able to implement this software during times of emergency in the most efficient way.

Mathematics, Spanish

Radloff, Kelli Lynn (251)

Faculty Mentor/Collaborators: **Colleen Duffy and Manuel Fernandez**

Mathematical Influences from the Inca Empire

The influences in the mathematical world from various pre-Hispanic civilizations such as the Inca, Maya, and Aztec are vast. Investigating what mathematics were used by the Inca Empire is very interesting and we see these same uses every day. We have investigated the mathematics used by the Incas in creating the quipu, which are knotted cords used as an accounting system. This system was very convenient for the Incas to take important information across a great area. An ancient calculating device believed to be related to the quipu is the yupana. It can be likened to an abacus. Another area we have studied is the Nazca Lines. These lines consist of various large animal shapes, straight lines, and geometrical shapes which are throughout a desert area in Peru. There are many mathematical applications found in these lines dealing with geometry and geometric figures, and proportions and relations. There are so many applications from the works of the Inca Empire that have influenced the mathematical world that many people do not know about. This research project introduces the ideas and shows how we use these same ideas in mathematics every day.

Physics and Astronomy

Bilty, Katherine Ann (212)

Faculty Mentor/Collaborator: **Nathan Miller**

Examining X-ray Sources in Trumpler 14 and 16

We have obtained X-ray data from the orbiting Chandra X-ray observatory in order to investigate the hot stars in the

star clusters Trumpler 14 and 16. Our data set contains a number of CCD images centered on two stars in the clusters (HD93129 and HD93250). After combining our images into a master image we determined the X-ray sources and identified them with previously cataloged optical sources. Spectra, which relate to the X-ray temperature of a star's wind, were created for the brightest stars.

Bomber, James Benjamin and Nicholas Riley Brewer (189)

Faculty Mentor/Collaborator: **Thomas Lockhart**

Bouncing Liquid Jets: The Role of the Air Film

When a jet of canola oil strikes a bath of the same oil within the correct range of speeds and angles, the jet will rebound off the bath back into the air. This project studied the air film which separates the jet from the bath making this phenomenon possible. Using high-speed video, lasers, and flow-tracing with dyes and smoke, visual evidence of the existence of the air film is presented. The processes by which the air film and bounce are maintained are also discussed.

Kuehn, Katherine Ann (190)

Faculty Mentor/Collaborators: **Matthew Evans** and Dr. Max Yen, Southern Illinois University-Carbondale

Sol-Gel Corrosion Sensors

The steel beams embedded into major structures are subject to corrosion. Strain sensors give information about the outside material and predictions can be made about the health of the inside, but we are blind to internal problems. Sol-gel corrosion sensors adhered to the beams can absorb ions given off by corroding steel and detect when the corrosion has reached an unsafe level. The goals of this project were to design electrodes for the sensors of different geometries to determine the optimal shape, to observe and improve the stability of the sol-gel coating, and to use different methods of coating to obtain a more uniform coating. The sensors were tested to determine the conductivity of the sol-gel as a function of the amount of chloride ions they were exposed to. This experiment was unable to support previous research with sol-gel and there were obstacles that prevented accurate data collection such as material deterioration and faulty equipment. The experiment needs an optimal substrate for the sensor and sol-gel needs to be synthesized to be more stable to prevent shrinkage and cracking. Once these few issues can be resolved, a marketable corrosion sensor to monitor the safety of structures is very possible.

Vasel, Justin Allen (205)

Faculty Mentor/Collaborator: **Nathan Miller**

Determining the Radial Location of the X-ray Emitting Zones of Spica

Although it is well known that O and B type stars are X-ray emitters, the mechanism driving this process is not entirely understood. Knowing the radial location of the X-ray emission is key to understanding which models of X-ray emission are correct. Emission line ratios of highly ionized, Helium-like ions can be used as a diagnostic tool for determining these radial positions, but a correct analysis relies on a complete understanding of the far-ultraviolet photospheric flux from these stars. In this project, we analyzed several photospheric models to determine which should be used and determined the ionizing flux for several ultraviolet wavelengths over a range of temperatures. We then compared this flux to a unique H-alpha data set for the B star Spica to scale the model.

Workenaour, Shaun Michael and Adam Weeks (204)

Faculty Mentor/Collaborator: **Kim Pierson**

Spectroscopy of Silicon Thin Films

The objective of this project is to use a recently purchased spectroscopy system to characterize the electronic properties of thin silicon films that are being used in an attempt to develop a low-cost method of fabricating solar cells. This fabrication method takes advantage of a unique thin film deposition system that has been recently developed at UW-Eau Claire. The conversion efficiency of solar cells depends intimately on the electronic properties of the films. These electronic properties can be altered by changing various parameters during the formation of the thin films. The thin film system we are using has the capability to create a unique environment during the formation of the films in which multiple parameters can be varied independently. The independent control of the process parameters is not available in most commercial deposition systems. The overall research goal is to assess whether or not a set of process parameters can be found that produces solar cells of the same or better efficiency than those currently available at a lower cost. The new spectroscopy system will allow us to quickly assess the effect that process parameter changes have on the electronic properties of the films. This will allow us to efficiently investigate the parameter space available with the unique deposition system.

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