Celebration of Excellence in Research and Creative Activity
Poster Sessions and Exhibits:
Ojibwe Ballroom and Hallways, 3rd Floor
Poster Student Presentation Times:
Wednesday, Apr. 30  4:00 - 6:00
Thursday, May 1  2:00 - 4:00

Map of Davies Center with CERCA Rooms labeled:
Oral Sessions and Films
Wednesday, Apr. 30  10:00 - 4:00
Thursday, May 1  9:30 - 2:00
Reception
Dakota Ballroom
Thursday, May 1  4:00

Poster Student Presentation Times:
Ojibwe Ballroom and Hallways, 3rd Floor
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<tr>
<td>4:30-6:00 p.m.</td>
<td>Students set up posters</td>
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<td>7:00-8:00 a.m.</td>
<td>Students set up posters</td>
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<td>8:00-6:00 p.m.</td>
<td>Poster session open, with student presenters at posters from 4:00-6:00 p.m.</td>
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<td>10:00-3:50 a.m.</td>
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<td>Women’s Studies Awardees Presentations</td>
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<td>8:00-4:00 p.m.</td>
<td>Poster session open, with student presenters at posters from 2:00-4:00 p.m.</td>
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<td>4:00 p.m.</td>
<td>CERCA Reception. A buffet of hors d’oeuvres with speakers Chancellor Schmidt and former UW-Eau Claire student researcher, Dr. Tim Nelson, currently a researcher at the Mayo Clinic in Rochester, MN</td>
<td>Dakota Ballroom</td>
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Acknowledgements

Many people helped to make this *Celebration of Excellence in Research and Creative Activity* (and 22nd Student Research Days) possible, and we thank them for contributing their part cheerfully and efficiently:

Christine Henricks, Jason Jon Anderson, Karen Stuber, and Event Services crew - for attending to a million details of preparing to hold this event in Davies Center for the second time.

Brian Heller and the Custodial Services student crew - for carefully transporting poster panels from their storage location to the new Davies Center.

Terri Knudtson and the catering staff - for producing delicious victuals for the reception.

Phil Ostrander, Jordan Jenkins, and Kristofer Bergh for performing at the CERCA Event reception.

Molly Collman, student from Art and Design - for the design of the cover of this abstract volume and all publicity materials for this event.

From Learning and Technology Services, Beth Krantz, Gene Leisz, and BITS trainers - for providing training in poster design and creation; Mike Skarp – for application software assistance; Danielle Ryan, Sarah Brower, Brian Franson, and the Help Desk and Training employees - for managing the increased load of poster printing with apparent ease; Sally Fehling and the Printing Office staff - for providing us with our printing needs; and Rick Mickelson and Bill Hoepner - for recording the event on camera.

Ann Statz, Erik Williams, Chris Zimmerman, Heather Johnson Schmitz, and Carissa Beckwith, ORSP office staff members - for helping with myriad organizational details including compilation of this abstracts book.

The University Bookstore and the Alumni Relations for donating items for door prizes.

Lastly, we thank student participants and their faculty mentors for all the hard work that led up to the polished presentations we see and hear in the W.R. Davies Student center.
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Robert Bell

*Many Cultures One Family: Celebrating Cultural Diversity across Tribal Lines at the Santa Fe Indian School*

The Santa Fe Indian School is best known for the artwork produced there. Two aspects I focused on in my research were the interactions between the students that attended the school, that lead to the creation of a family and Native American community within the school across tribal lines, and the role Progressive educators played in that interaction. The teachers in the day schools of the northern Pueblos became involved with the Pueblo students at a very young age. They used many Progressive educational theories that complemented Pueblo cultural values. These teachers paralleled the educative process, an educational theory of John Dewey. Dewey experimented with the educative process in his Laboratory School in Chicago. Two elements were present at the Santa Fe Indian School that helped a family and community of Native Americans form; the Progressive educational ideas of Dewey and Pueblo cultural values. These two elements worked in conjunction with each other and created a family of Native Americans that viewed themselves collectively as Native American, which fostered the roots of pan-Indianism. Both Native American students and Progressive educators at the Santa Fe Indian School worked together to make an educated Native American that had an identity rooted in Native American culture, not a cheap copy of a white man.

Lisa Chase

*Prostitution in Eau Claire between the Years of 1890-1910*

Prostitution between the years of 1890-1910 was at its peak in Wisconsin. To find out why and what could be done, Wisconsin Governor Francis McGovern appointed Howard Teasdale to conduct research on this problem. After sixteen months of research, Teasdale published his findings in 1913, with a report entitled *Report and Recommendations of the Wisconsin Legislative Committee to Investigate the White Slave Traffic and Kindred Subjects*. With this report Wisconsin legislator was motivated to pass laws and established police forces to help deal with what they said was the vice of prostitution. During this time period, prostitution in Eau Claire was decreasing but not at the rate Governor McGovern wanted. My paper will add to the existing literature on prostitution by examining the vice committee report and its findings. It will also look at the women after leaving prostitution and how their lives were affected. There have been two papers on prostitution in Eau Claire but these papers don’t examine the vice report and its findings extensively. Meanwhile, a study of the vice committee didn’t take an in-depth look at prostitution itself. My paper will include the hearings from the vice committee which will help get a look at these women. Finally, I will enhance my argument by including newspaper articles and census data to help get a well-rounded look at the causes of the decline in prostitution.

Dara Fillmore

*Century America: Digital History Website*

*Century America* is a distance mentoring digital humanities project that is being created and funded through the Council of Public Liberal Arts Colleges (COPLAC) and the Teagle Foundation. This college course will result in multiple digital history websites on a common theme. Through this course, students from numerous colleges across the U.S. are creating websites that focus on their own university and surrounding community during the Great War and the influenza epidemic (1914-1919). The website being presented for this symposium, *Near the Great Lakes during the Great War*, details northern Wisconsin’s involvement in the war. This presentation will be unique because it is a research project that will soon become a public website. This will be a multi-media presentation showing the process of researching for and creating the website, and many of the artifacts found as well. A short discussion of the college course, the logistics and the ethics of digital history and distance men-
toring, will be followed by a screen and projector presentation of various artifacts found, and the layout and
set-up of the Century America website with an emphasis on the University of Wisconsin-Superior, nearby Western Great Lakes communities, and the roles local residents played in the Great War. The goal for this website is to invite both the general public and the dedicated historian to learn more about how the community and the campus dealt with the challenges of the war. This website will house photographs and stories about the Superior State Normal School, local newspaper stories about the price of meat, the plight of women in Europe, the cost of America’s part in the war, and the work of patriotic residents. A video blog (vlog) about the process of researching for and creating the site is in the works, and audio files of some war poems have been recorded.

Other items of historical research that will likely be included in the website are:
- News about the normal school fire in 1914
- Photos of the college campus during the years being researched
- Stories from Duluth’s Labor World
- Military artifacts owned by a local resident
- Photos of soldiers from the area
- Listings of those who served and those who died from battle or influenza

Andy Hanson
*The Difference Between “Wet” and “Dry”: Defining the Saloon and Temperance in Eau Claire, Wisconsin, 1880-1933.*

As one of the most important social concepts within American history, progressivism has informed many interpretations of what it means to be an American. Progressivism is also one of the most influential reform movements of the twentieth century. As a quintessential reform movement between 1870 and 1933, the progressives attempted to remove alcohol from society. Many scholars argued that alcohol destroyed families and social cohesion. Despite these charges, many others contended that the saloon instead represented a vibrant community of people who thrived in the United States by embracing cultural identity, ethnic traditions, and common drinking practices. One of the most important arguments for this divide fell upon the variances in ethnicity and class as core differences between these two groups. In Eau Claire, Wisconsin, these divided beliefs as to alcohol’s place in society created a lively debate. To that end, the first goal of this study is to prove that ethnicity and class defined the separation between temperance and the saloon. These causes of division only appeared on the surface of the debate, however. The other goal of this study is to prove that the alcohol debate incorporated many people who defined themselves as neither “wet” nor “dry.” Waldemar Ager is one example of an Eau Claire resident that experienced and supported the ideas of temperance, but also promoted cultural pluralism and diversity. While these concepts are not new for other communities around the nation, this study will present a new Eau Claire history. A history that is defined by the social reform ideas of the Progressive Era and the struggle that the saloon culture and temperance organizations in Eau Claire, Wisconsin, endured.

Matt Honer
*Multi-Racial Resistance to Traditional Urban Renewal Programs*

American inner cities had been deteriorating for decades before federal policymakers conceived programs to revive them in the 1950s and 1960s. These programs, known as urban renewal, were undertaken by cities across America to replace deteriorating neighborhoods with businesses and infrastructure. In Milwaukee’s inner city, referred to as the Inner Core, a collection of highly segregated and deteriorating neighborhoods became candidates for renewal. Two neighborhoods in the Inner Core, Kilbourntown-3 (K-3) and Midtown, presented contrasting stories of urban renewal projects. In K-3, nearly 700 structures were acquired by right of way and over a 1,000 families, the majority of whom were African American, were forced to relocate. Across N. 20th St., Midtown was an extensively larger area composed of older working class white residents. Instead of clearance, a conservation effort to stop deterioration, improve infrastructure, and preserve the existing social and racial construct of the neighborhood was the major goal of neighborhood associations and the city of Milwaukee. The city and the neighborhood agreed on the idea of conservation, yet rarely did the two parties agree on implementation. Acquisition of property in K-3 initiated the relocation of families across N. 20th St., to
the Midtown neighborhood. The older white families of Midtown now for the first time had younger African American families as neighbors. In Post-WWII United States, the introduction of African American residents into traditional white neighborhoods predictably established a series of events: white flight, racial turnover, and slum establishment and maintenance. The longtime residents of Midtown had a decision to make: rebuild Midtown with the help of their new neighbors, opposing city plans and creating a multi-cultural neighborhood built on common values or flee to the suburbs. The Midtown story presented a multi-racial resistance to traditional urban renewal programs. It suggested that neighborhood allegiance did at times overcome racism as a driving force of midcentury urban landscape change.

Jacob Riehl
“Let Them Eat Their Gold:” Olin and Emma Swenson and the National Farmer’s Holiday Association, 1931-1934

The contributions of Olin and Emma Swenson with the National Farmer’s Holiday Association (NFHA) through the incorporation of the farmers of the state of Wisconsin were great. The National Farmer’s Holiday Association was one of the most prominent and largest agricultural organizations of its time. The impact of Olin and Emma Swenson in bringing Milo Reno, President of the NFHA, to Wisconsin and the inception of the Wisconsin Division of the NFHA were critical in the overall success of uniting Wisconsin farmers under the NFHA. Furthermore, Olin and Emma Swenson began their activism in the local Rusk County Farmer’s Union even before the NFHA exploded onto the scene, planting the seeds that would blossom into connecting with Milo Reno and the NFHA. Once the association’s successes were known throughout the agricultural world; Olin asked Milo Reno to speak to the farmers in Wisconsin in order to gain support. Olin, along with his wife Emma, who was the secretary for the Rusk County Farmers Union, used local newspapers to spread the message of the NFHA to Wisconsin farmers. The incorporation of the Wisconsin Division of the NFHA was a shining victory for the state farmers, allowing both small time union farmers and larger unions such as the Wisconsin Cooperative Milk Pool to unite under one banner to give the farmers what they deserved: financial relief and a fair price for goods. The Wisconsin Division was different from most other farm organizations in that its relationship with the Wisconsin Cooperative Milk Pool was a tense alliance. The Milk Pool operated independently from the NFHA, but at times, the groups cooperated with one another. The Milk Pool was a more militant group that favored actions over slow political change. This tension was seen during pickets, and when strikes were called off prematurely, the Milk Pool refused to cooperate, feeling they were abandoned by their comrades. This is what made the Wisconsin Division of the NFHA so unique. Olin and Emma Swenson stood with the NFHA in its relationship, and were quick to “forgive” the Milk Pool’s independent and sometimes violent strikes in order to recover quickly for the common cause of the farmer. The Swenson’s were also quick to patch things up when Milo Reno seemed to act on his own when cancelling a nationwide farmer’s strike after a governor’s meeting. Without a united front, the cause of the farmers would not be attainable. Without the contributions of Olin and Emma Swenson, the NFHA may never have recruited Wisconsin into their organization.

Melissa Schultz
If it’s a Choice, When Did You Choose? The History of the University of Wisconsin-Eau Claire’s Student LGBTQ Community and their contributions to the Sexuality Movement.

The LGBTQ student community at the UW-EC is one that hasn’t been researched prior to my work. Collecting the oral testimonies of alumni is imperative to understanding how this student group formed on this campus. Comparing collections available at other UW campuses to the collection available at UW-EC depicts the difficulty in understanding these student groups because of the lack of documented histories. It is important to gather oral histories and to collection available evidence depicting the importance of the LGBTQ student community because the students who formed these groups are getting older and the memories available may diminish over time. The paper covers the years from 1979 to roughly 2000. The paper ends before the emergence of the transgender identity because it is a movement completely on its own, and is difficult to understand the significance of it at this time. My paper documents the history of the Eau Claire LGBTQ student group and compares the significance of what the students achieved at the time. The purpose of my paper is to create a document that tells the story of the LGBTQ student community and includes all the documentation from a variety of sources located in the UW-EC archives. The point made at the end of the paper is that the ac-
acceptance of the LGBTQ student groups on campus allows and provides the means necessary to cultivate more educated people that are able to fight for what they believe to be right. These students fought for equality on the University of Wisconsin- Eau Claire’s campus and then encouraged others to find the strength to promote equality by participating in the milestones of the Gay Rights Movement. The unique aspect of this paper is the inclusion of oral testimonies not heard prior to the interviews conducted for the paper.

WOMEN’S STUDIES AWARDEES PRESENTATIONS

Wednesday, April 30
10:00-11:50 in Menominee

Helen X Sampson Graduate Award
Chelsey McKimmy
Nominated by Jennifer Shaddock
I Must Be Taken As I Have Been Made: A Feminist Re-Vision of Estella in Great Expectations

I argue that Dickens was influenced by Nathaniel Hawthorne as well as the tale of Beatrice Cenci to create Estella, and, furthermore, that Dickens, like Pip, had long chased after some “visionary love,” a concept made possible through his idealizations of women. I demonstrate how he may have found, through his relationship with Ellen Ternan and his identification with Beatrice Cenci, that women’s actual nature diverged from his fictional ideal, an ideal that I trace to the early nineteenth century. Indeed, I argue Dickens’ creation of Estella demonstrates that he came to realize that women are often shaped in negative ways by patriarchal systems that oppress them. I posit that this understanding conjoined with a new framework for discussing Estella’s emotions, feminist affect theory, necessitates that critics neither demonize Estella nor attempt to “angelize” her because doing either reinforces patriarchal discourses that seek to silence women by removing their emotional experiences and their selves from nature, preventing women’s identification with one another and subsequent unification against the oppressive practices of a patriarchal society.

Helen X Sampson Undergraduate Research Award
Wendy Guerra
Nominated by Oscar Chamberlain
The Design of Domesticity in the American Dream House: Post World War Two House Plans as an Expression of Advertised Gender Roles

Magazines strongly influenced middle-class Caucasian American families before, during, and after World War Two. Advertisements and informative articles urged women to succeed in an idealized housewife role by utilizing the newest domestic technologies within an efficiently designed house. The housing shortage anticipated at the end of the war prompted the prolific publishing of house plans. Publishers utilized society’s desire for strong nuclear families to promote houses built according to affordable plans that did not necessarily meet consumer desires. The trends of the interior layout of house plans from 1945-1960 were expressions of popularly prescribed gender roles of the time. Through the use and analysis of house plan books, women’s and architectural magazine articles, and data from McCall’s “House of Tomorrow Contest,” my research shows how many women’s desires for their home layouts were neglected in the postwar housing boom. Predominant post-World War Two house plans expressed and pressed the advertised idealistic domestic gender roles onto women and their families.
Human trafficking is an important contemporary issue that is gaining international attention, with 20.9 million people currently enslaved. Although many anti-trafficking organizations such as Not For Sale and End It to provide information and policy statements, there is little empirical research on the issue and many individuals, especially college students, know little about human trafficking. This experiment presented information about either human trafficking in the United States or abroad to the participants. The study assessed whether and how the type of information and participants’ political orientation influenced their acceptance and willingness to help victims. Participants completed a Qualtrics survey in which they provided basic demographic data in addition to their political views. After reading a randomly assigned article, participants answered twenty-six questions assessing their acceptance and willingness to help victims of human trafficking. Participants with liberal political views were significantly more accepting of victims than participants with conservative views. Incidental findings show participants had little previous knowledge of human trafficking, which emphasizes the need to spread awareness on the issue. Nonetheless, participants expressed an overall willingness to help victims, and a general interest in the topic.

Tillie Olsen Award
Jason Anger
Nominated by Theresa Kemp
*Undoing the Binary in Eli Claire’s Exile and Pride*

This essay explores Eli Clare’s collection of essays and memoir as a means of undoing the binaries that prove a barrier to inclusivity. In particular, the essay looks at how Clare’s essays engage the ways the language of binaries has a material impact on the quality of life for many people. Clare’s collection of essays seeks a complex interpretation of language use and identity that will improve the quality of life for all people.

**WOMEN’S STUDIES AWARDEES FILM PRESENTATION**

*Wednesday, April 30*
*12:00-12:25 in Woodland Theatre*

Mickey Crothers Award
Jessa Brynn Quick, Anna Schwanebeck, Ryan Spaight
Nominated by Pam Forman and Ellen Mahaffy
*Planned Parenthood: Unplanned Politics*

In light of the recent announcement that the Chippewa Falls Planned Parenthood will close, *Planned Parenthood: Unplanned Politics* examines the impact that this will have on the community. Recognizing that this issue is framed as both socially and fiscally motivated, this film illuminates the misconceptions on the closing health center and about Planned Parenthood in general. It approaches the closure as an unfortunate loss of reproductive health resources for both women and men and seeks the best way to proceed from here. Zeroing in on Planned Parenthood begins to unearth deeper-rooted social problems, such as the war on women and disdain for the lower class.
WOMEN’S STUDIES CAPSTONE PRESENTATIONS

Thursday, May 1
1:30-3:00 in Centennial

Tabatha Moran, Tiffany Miller, Ariel Wisniewski, Jamie Solberg, Erin Ottowitz, Jessie Tremmel
Faculty Mentor/Collaborator: Theresa D. Kemp

Connecting Individuals through the AIDS Resource Center of Wisconsin (ARCW) to Available Resources by Updating a Directory of Community Partners

Our group aims to connect individuals through the AIDS Resource Center of Wisconsin (ARCW) to available resources by updating a directory of community partners. During office hours at the ARCW, we are contacting service providers to obtain updated information. Through group collaboration, we will be producing a comprehensive guide for ARCW staff and specialized brochures for their clients. By working in partnership with the ARCW we will fulfill the Women’s Studies Learning Goals of “individual and social responsibility to effect change that promotes social justice” and “respect for and understanding of diverse communities and global perspectives.” We will achieve these goals by connecting an underserved population with necessary resources to satisfy basic human needs and increasing awareness about the ARCW clientele, primarily injection drug users. Utilizing a harm reduction framework to create better circumstances for high-risk individuals, we are introducing and enhancing awareness of and access to services available in Chippewa, Dunn, and Eau Claire county communities.

Taylor Nicole Schleif, Kandi Renee Zach, Dani Jo Fiebelkorn, Bridgid Colleen Manion, Hannah Lee Engstrom, Casey Thomas Coughlin
Faculty Mentor/Collaborator: Theresa D. Kemp

Advocating for Planned Parenthood of Wisconsin: Engaging Campus and Community in Conversations about Women’s Health

The purpose of our Women’s Studies Capstone is to communicate with the campus, community, and political representatives about Planned Parenthood’s critical role in providing safe and affordable healthcare to Wisconsin women. Our project fulfills Women’s Studies goal #4, “individual and social responsibility to affect change that promotes social justice,” in that our actions will educate the campus and community on the importance of women’s health, while advocating on these issues to political representatives. To accomplish this goal, our group partnered with Advocates for Choice by participating in their campaigns; we organized grassroots style conversation campaigns with campus and community members; we promoted women’s health by writing letters to local news sources and calling our representatives. Our project intends to proliferate discussion about women’s health issues and inform the community about Planned Parenthood’s services.

Christine Hruza
Faculty Mentor/Collaborator: Theresa D. Kemp

An Education Manual for Talking to Teens about Healthy Relationships

The Center for Disease Control labels unhealthy and abusive relationships as a public health concern. National prevention programs are currently implemented to address these issues, but not at a personal level. I will be constructing an education manual to teach teens about healthy relationships. My manual will focus on three relational aspects: partners, friends, and self. As a secondary education major, the purpose of my project is to better the lives of my students, in relationship to the Women’s Studies academic goal to fulfill my individual and social responsibility to effect change that promotes social justice. My manual will follow a constructivist pedagogy that emphasizes respect and understanding for different human experiences and cultures. My aspiration for the education manual is to foster communication and self-actualization skills in my students. My call to action is for community leaders, educators, and researchers to collaborate to create culturally sensitive and relevant programs to accommodate the needs of various demographics.
Steven Trampe  
*Moral Realism: The Explanatory Power of Moral Facts*

Do concrete moral facts exist? Moreover, if there are moral facts, how do those moral facts cause us to have the moral beliefs that each one of us holds? This essay attempts to investigate this issue specifically by picking apart a debate between Gilbert Harman and Nicholas Sturgeon. Harman argues that there is a “problem with ethics” because moral facts cannot be tested against the world unlike scientific facts. Sturgeon responds that if Harman is skeptical of ethics he must be skeptical of everything. I claim that there is work to be done on both sides of this debate. Sturgeon must show how moral facts are causally linked to moral beliefs, and Harman needs to show how Ethical Realism is different than Scientific Realism.

Norah Harper-Godderz  
*Inference in Language Comprehension: Why Inference to the Best Explanation is the Best Model*

Communication is a fundamental aspect of our daily lives. Every verbal interaction relays some information. According to Speech Act Theory (the theory of language comprehension I consider in this paper), a speaker has a purpose behind every utterance. For communication to be effective, the listener must successfully determine the intended meaning of a speaker’s utterance—this is the process of *interpretation*. Since we do not always speak literally, a listener must consider additional information to fully understand the meaning. Such information can include, but is not limited to, the literal meaning of the words used, the relationship between the speaker and the listener, the personality of the speaker, the situation surrounding the utterance, the way a word was emphasized, etc. The meaning of an utterance, even the exact same sentence, can be interpreted very differently in different contexts. I argue Peter Lipton’s Inference to the Best Explanation (IBE) is the most representative model of how the process of interpretation occurs.

Brian Macke  

When individuals interact with each other, it’s expected that someone will assert something to someone else. In philosophy this assertion represents the beginning of transferring knowledge and is generally called testimony. How the recipient evaluates this information (and their choice to accept it as true) is a thriving area of study, one that has yielded some very promising theories. Such an area of study is how the two dominant models of non-deductive inference (Bayesian Inference and Inference to the Best Explanation (IBE)) view our analysis of testimony. When these two models of testimony are compared to H. P. Grice’s linguistic concept of the Cooperative Principle, it appears that IBE has a better explanation for our management of testimony. This presentation will explore the two models of inference, evaluate the weaknesses of both as they apply to testimony, and show how IBE is the best explanation for how we manage testimony.

Nathan Walhovd  
*Inference to the Best Explanation: How Do We Tell One Theory Is Better Than Another?*

How do we tell that one theory or explanation is better than another one? This seemingly simple question is actually quite deceptive. Since we can’t directly tell whether a theory is true or has a high probability of being true in comparison to alternative theories, there must be some other way that we compare theories to one another – and as it turns out, there is. By comparing the virtues and vices of theories, we are able to compare theories. However, this only brings up more questions. Just what are these theoretical virtues and vices? Which
ones are most important? How do they interact with one another? In an attempt to answer such questions, my paper considers theoretical virtues such as explanatory power, simplicity, and coherence alongside theoretical vices such as ad hoc explanations and ridiculousness.

Thursday, May 1
9:00-9:50 in Menominee

Johnathan Jones
Underconsideration and Where it Leaves Us

The argument from underconsideration presents a skeptical challenge to realist interpretations of science and consists of two main points. The first is the ranking premise which claims that the scientific evaluation of hypotheses is comparative and consists of ranking competing hypotheses; the second is the no privilege premise which claims that scientists have no reason to suppose that the truth resides among the hypotheses they are comparing. I argue that underconsideration presents a problem that has not yet been overcome by realist proponents of Inference to the Best Explanation (IBE). In particular, the defenders of IBE have fallen short of establishing why we are justified in expecting that IBE should lead us to even an approximate truth. What remains in the wake of underconsideration, however, need not be so grim as it might at first seem. I examine and defend alternative measures by which we might attempt to evaluate our inferences and ultimately argue for an agnostic stance which encourages the growth of science while acknowledging our epistemic limitations.

Bret Wilde
Hypotheses of Dinosaur Extinction: A Consideration of Issues in Choosing the Best

What caused the extinction of the dinosaurs? The main theories are a meteor strike, volcanic activity, marine regression, and a combination of the previous three. Which theory can best explain the evidence? Using Peter Lipton’s guidelines for the application of Inference to the Best Explanation, I argue that in this debate it is best to stay agnostic given the state of the evidence so far.

CERCA FILM

Wednesday, April 30
12:30-12:55 in Woodland Theatre

Corrin Francis Turkowitch
Faculty Mentor/Collaborator: Jeff R. DeGrave
Geography and Anthropology
‘Empowerment and Electricity, Community and Coffee’ : Microturbines in Central Honduras’

In the cloud forests of central Honduras, the ingenuity of two men, Hector Oviedo and Adalid Zavala, led to the design, construction and implementation of small hydroelectric turbines, or ‘microturbines,’ throughout the rural countryside. The installation of the microturbines has led to new social and economic challenges as they relate to the human-environment relationship. Through the assistance of Farmer to Farmer—a western Wisconsin-based fair trade cooperative—I was able to conduct the majority of this research during a ten-day trip through Honduras this past winter. Farmer to Farmer’s mission is to not only provide direct profit to coffee farmers, but also increase cross-cultural dialogue to assist with sustainable coffee production. While researching and traveling in Honduras one must grapple with the reality of media perceptions, the consequences of climate change, the challenges of gender inequality, and ultimately the people’s reactions to such challenges. Although negative reactions may be sensationalized, many responses are rooted in creative necessity, as is the case with the microturbine project. This research offers alternative voices in sustainability and challenges systemic exploitation for the creation of energy in order to bring forth a more just planet.
Dropblog: An Automated Blog Generator

The goal of this project was to create a system to automate blog creation, particularly blog posts. The system would be geared toward blog creation in areas where Internet was limited or slow. Initially, the plan was to use Dropbox to store files, and a distributed system to process them. However, bandwidth overhead due to Dropbox was too great, so the system was created to run locally, processing the files on a local machine, and sending them directly to a Wordpres blog. This cut down bandwidth consumption and simplified the process by removing the need for a web browser. This system was developed and tested in both New Zealand and the United States. The importance of a system like this is to not only simplify the process of creating blogs and managing blogs for non-tech savvy individuals, but to decrease the costs of maintaining a blog in areas where internet is pay-as-you-go. Currently, the system has been tested on OSX computers, and can generate and upload blog posts from simple text files copied into a specified folder.

Investigation of Student Attitudes and Understanding in General Chemistry

Our research studies the effect of adding one inquiry-based laboratory experiment, in place of a traditional verification “cookbook” laboratory experiment, on student attitudes and understanding on the subject of stoichiometry in a first semester General Chemistry at a large Midwestern public undergraduate-only institution. We understand that incorporating inquiry-based laboratory experiments in large intro-level general chemistry courses is often challenging in terms of cost, institutional capacity and grading time for the instructor, but our work reveals substituting one inquiry-based lab for a traditional lab has a significant effect on student understanding of the topic and overall attitude toward chemistry. The goal of this study was two-fold; the first was to gather information about the impact of a guided inquiry laboratory experiment on students learning and the second was to gather information regarding student attitudes towards the subject of chemistry. These will be assessed by a number of quantitative measures including an attitude toward chemistry survey that was administered before and after the treatment laboratory experiment, post-lab conceptual quiz questions, and calculation-based midterm exam and cumulative final exam stoichiometry questions. All which were evaluated and statistically analyzed. While changing the entire laboratory curriculum over to inquiry-based experiments is not practical for many reasons, substituting a few key inquiry-based experiments for traditional experiments at specific times in the course may have a significant advantage to student learning.

The Making-Meaning Dance: Variety and Frequency of Instructional Strategies

An instructional paradigm entitled content-based instruction (CBI) has changed the manner in which English as a Second Language (ESL) and general educators engage learners in their classrooms. In this instructional model, teachers are to differentiate instruction for a variety of diverse learners in their classrooms. Many
general educators receive little training in ESL instruction (DeJong & Harper, 2009) and report that the strategies they learn are the same as “good teaching” strategies (DeJong & Harper, 2009). In this quantitative study, we observed three ESL and three general educators who were considered “excellent” teachers by their peers in order to determine what instructional strategies were employed by each group, the frequency of these strategies, and whether the two groups differentiated instruction similarly or differently. Our findings showed that among these two groups of excellent educators, there were several aspects of effective instruction they shared; however, they were notably different in some areas. ESL training for general educators should include strategies supported by second language acquisition (SLA) research. These strategies and their connection to SLA research must be made explicit in order to create classroom environments that are likely to help English language learners learn effectively.

Geography and Climate

**Wednesday, April 30**
**11:00-11:50 in Ho-Chunk**
Moderators: Carissa Beckwith

Nicholas Hans Jaeger, Nicholas Dean Topper, Brittany Grace Charlton  
Faculty Mentor/Collaborator: Harry M. Jol  
External Collaborators: David Nobes, University of Canterbury, Luke Mahon, University of Canterbury  
Geography and Anthropology

*A GPR Study of Edoras: A Look at the Braided River Deposits in the Upper Reaches of the Rangitata Valley, New Zealand*

Mount Sunday, a roche moutonnee made famous by its appearance in the Lord of the Rings movies as the city of Edoras, stands above the large braided Rangitata River plains, northwest of Lake Clearwater along the Southern Alps of New Zealand. Working in the shadow of this feature, our research aimed to image and assess characteristics of the braided river deposits using ground penetrating radar (GPR) along the Mt. Sunday hiking trail that travels northwest, on the eastern side of the mount. A pulseEKKO 100 GPR system with 50, 100, and 200 MHz antennae frequencies and a 400v transmitter was used along the transect. A common midpoint survey determined a velocity of 0.077 m/ns, from which a depth of penetration was determined. The collected information was topographically corrected using location data from a laser leveler. We also gathered a 381-m long electrical imaging (EI) profile to complement the GPR. The EI used a Wenner array with 128 electrodes at 3m spacing. The GPR data is still being processed to identify reflection patterns, thickness of deposits, and other key attributes.

Joseph Anthony Quintana  
Faculty Mentor/Collaborator: Ryan D. Weichelt  
Geography and Anthropology

*Climatic Effects in Minor League Baseball*

The study of climatic influences on sport performance is typically related to temperature and precipitation. While some argue playing in extreme heat or cold may give a home team an advantage compared to their competitors, others suggest athletes at the highest levels will excel no matter the circumstance. In baseball, studies of the impact weather has on the game has solely concentrated on Major League Baseball and a majority of these studies have examined either wind or humidity. This study will explore the influences of humidity and examine how increases or decreases in atmospheric moisture impacts batting averages of teams in the Pacific Coast League of Minor League Baseball. Specifically, four teams will be analyzed, all with differing climatic patterns, controlling for atmospheric moisture by using dew point depression over a seven year period for only home games.
Culture, Race, and Gender

Wednesday, April 30
1:00-1:50 in Ho-Chunk
Moderators: Jake Wrasse, Carissa Beckwith

Bethany Joy Sekora, Nancy Yang, Melady Vue, Justina Nkauj npaim Kinard
Faculty Mentor/Collaborators: Leah Olson-McBride, Elena G. Izaksonas
Social Work
Campus Racial Climate

The purpose of this research project is to assess student perceptions on campus racial climate at the University of Wisconsin-Eau Claire. Campus racial climate refers to the extent to which students feel safe and valued on campus while around people of different races and cultures. It includes attitudes, experiences, and behaviors that affect the personal development of the campus and its community. Our research team felt it important to assess and analyze campus racial climate at the University of Wisconsin-Eau Claire, as recent events on campus and in the general Eau Claire community have demonstrated a need to delve deeper into race-related issues and phenomena. Our research team has gathered qualitative data through a semi-structured, 21-question interview instrument. About 50 University of Wisconsin-Eau Claire undergraduate students from a variety of racial and ethnic groups voluntarily participated in these individual interviews. The data is currently being analyzed to compare and contrast the experiences between students who have different racial and ethnic identities. Although the analysis is still in progress, we hypothesize different themes between students of color and white students.

Jesse Andrew Martinez, Casey Thomas Coughlin, Phaedra Jeanne McDougall, Alayna Marie Spengler, Morgan Kay Gerke, Vajfue Lee
Faculty Mentor/Collaborator: Jodi Marie Thesing-Ritter
Student Affairs/Dean Students
Qualitative Assessment of Multicultural Competence Development of Participants in Civil Rights Pilgrimage

The development of multicultural competence is a priority at American colleges and universities as they strive to prepare students for an increasingly diverse world. Experiences beyond academic courses are a viable alternative. Students at UW-Eau Claire have participated in a 10-day Civil Rights Pilgrimage (CRP) that provides a case study for immersion experiences as an alternative means of education. Previous research using multiple metrics show a significant decrease in racism as measured by the Modern Racism Scale and a significant increase in awareness and understanding of White privilege, measured by the White Privilege Attitudes Scale. Researchers scored pre- and post-trip writing samples to assess students’ awareness of their own assumptions, biases, and values; understanding of others’ worldviews; understanding of African-American culture; and awareness of current social justice issues on rubrics assessing knowledge, attitudes, and skills. Pre- and post-trip samples were compared to measure growth from pre-trip survey to post-trip survey as a result of the ten day intercultural immersion experience. This study supports the use of quality immersion experiences in American colleges and universities as an educational method for improving multicultural competence development for college students.

Choua Xiong
Faculty Mentor/Collaborator: Ari S. Anand
Geography and Anthropology
Race and Gender among Hmong-American College Students

A faculty-student collaborative research project that explores and critically analyzes Hmong-American undergraduate students’ experiences. Hmong-American college students live in a multi-cultural environment that shapes their perception of their gender identities and roles. The objective of this project is to emphasize criti-
cal analysis (such as Delgado and Stefancic 2012) when assessing minority experiences in the United States, in this case Hmong-American experiences. In particular, the project draws upon critical perspectives to analyze the contributions of race and gender to social constructions of gender discourse. Findings suggest that experiences of race and gender are experienced differently within mainstream public spaces (MPS) and Hmong public spaces (HPS). These experiences shape the ways in which Hmong men and women perform gender.

Science and Math

**Wednesday, April 30**
**2:00-2:50 in Ho-Chunk**
Moderators: Heidi Feyereisen and Louisa Strange

**Yeng Matthew Chang, Lindsey Marie Gohr**
Faculty Mentor/Collaborators: James S. Walker, Gary W. Don
Mathematics/Music and Theatre Arts
*Geometry of Harmony and Modes in Vaughan Williams’ Romanza*

Ralph Vaughan Williams (1872 – 1958) was an English composer who made extensive use of modal melodies and drew inspiration from English folk songs. Vaughan Williams’ music cannot be classified as being completely tonal or atonal to music theorists, making his music extremely difficult to analyze. We extend the results and the method of analysis from the previous project *Late 19th Century Harmonic Practice as a Bridge to the 20th Century*, which introduced Dr. Bates’ operations on the Table of Diatonic Relations as a way of visualizing and studying musical modes and their large-scale relationships in musical form and structure. Furthermore, we use a model by Euler – the Tonnetz model – to analyze and visualize the chords, harmonies, and their harmonic relationships in the opening of third movement of Vaughan Williams’ *Symphony No. 5*. Results of the project display the usefulness of Bates’ Table and the accessibility of the analysis Vaughan Williams’ music through Bates’ operations that are inaccessible through conventional musical analysis.

**Thomas David Nevins**
Faculty Mentor/Collaborator: Paul Jonathan Thomas
Physics and Astronomy
*Simulating Space Debris from a Satellite Explosion*

With the increased use of satellites in low Earth orbit (LEO) there has also been an increase in the amount of man-made orbital debris in LEO. Events like the explosion of the Breeze M rocket stage and the collision between Iridium-33 and Cosmos-2251 satellites create a great deal of debris which disperses after impact. These objects in high-speed orbit around the earth have great potential to damage functional satellites also in orbit. This is a significant threat to the existing satellite infrastructure and also to future missions beyond Earth. In this research project, a computer simulation of the breakup of a satellite was created. Many models exist to look at the total amount of debris in orbit, but a model of a single breakup allows us to predict the time the debris stays in orbit and how to remove the debris more effectively. This talk will explain the non-inertial reference frame, and the finite differencing algorithm within the simulation. Results of the simulation will be presented for a satellite breaking apart uniformly. These results tell us a great deal about the dangers of orbital debris, the unusual trajectory of objects in orbit, and possible solutions to the “space junk” problem.
Public Health professionals are required to continuously improve the quality of service given to the communities they serve. In order to achieve health and economic benefits, professionals need access to evidence-based research findings. The purpose of this project is to improve public health practice by having University of Wisconsin – Eau Claire students obtain and share evidence-based research on topics identified by public health staff. Undergraduate students will also learn the need for integrating research evidence into practice. The collaborative process involves an initial meeting with the public health staff, email contact to submit requests for evidence searches, and a student obtaining the information and sending the information found to the staff member. Early evaluation of this project through site visits and participant feedback shows that the collaboration has been beneficial to both public health agencies and students. The evaluation plan also includes obtaining feedback from staff and administrators through an email survey and descriptions of student involvement and participation in a Northwest Area Health Education Center board meeting. The project process and summary will be shared at environmental and public health state conferences. Project funded by Northwest Area Health Education Center.

Lydia J. Alf
Faculty Mentor/Collaborators: Vicki M. Samelson, Gayle Holte
Communication Sciences and Disorders
Intervention for Vowel and Vocalic /r/ Speech Sound Disorder: Efficacy of Biofeedback

/r/ is one of the most frequently misarticulated sounds in elementary-age children because it requires a more-complex tongue shape. In this study we extended prior research by combining two approaches to remediate persistent vowel and vocalic /ar/ errors (e.g., cart) in the speech of an 8-year-old male who had not responded well to traditional interventions. First we targeted one of his vowel misarticulations using the Sona-Match software, which provided visual biofeedback for correct tongue position. When our participant realized that changing his tongue position resulted in a more-mature vowel production, his vowel accuracy increased rapidly. This approach was then applied to his immature vocalic /ar/ sounds. A change in the quality of his /ar/ words was confirmed with formant analyses (F1, F2, and F3) on audio files for his immature /ar/ (Level 1), somewhat-mature /ar/ (Level 2), and fully mature /ar/ productions (Level 3). Statistically significant changes were noted in all three formants, with the highest effect sizes between maturity levels 1 and 3. Changes in tongue position resulted in significant changes in formant frequencies, which were perceived as mature /ar/ productions. This combination of therapy techniques will be tested on more children with persistent vocalic /r/ speech sound errors.

Rachel Ann Haugen
Faculty Mentor/Collaborator: Abby Leigh Hemmerich
Communication Sciences and Disorders
Respiratory Contributions to Vocal Tremor: A Comparison of Typical and Tremulous Breathing

Rhythmic muscle contractions caused by vocal tremor lead to changes in pitch and/or intensity, and this occurrence can hinder communication abilities. There have been numerous studies focusing on assessment of tremor in the larynx; however, other structures outside the larynx can lead to vocal tremor. This study specifically investigated the impact of respiratory tremor on voice symptoms. Participants included older adults with
voice tremor and older adults with typical respiratory and voice function (i.e., no tremor). The participants completed various speech tasks while data about respiratory movements were recorded using an aerodynamic assessment, Respitrace, as well as palpation of respiratory structures. Results of palpation and Respitrace were compared to determine the effectiveness of palpation in assessing tremor. In addition, volume measurements from the tremor participants’ Respitrace recordings were obtained to determine whether severity correlated to palpation findings. Initial results suggest palpation is an effective tool for assessing respiratory tremor, but further analysis is underway.

Studies Abroad

Wednesday, April 30
3:00-3:50 in Menominee
Moderators: Taylor Turben and Stephen Fong

Chi Ab Vang
Faculty Mentor/Collaborator: Jan M. Larson
Communication and Journalism
Perception of Media in Moldova: Citizen responsibility

As an independent state, Moldova has a short history. In 1991, Moldova became an independent state after the Soviet Union fell. In this fairly new country, media and journalism are still perceived by the public as influenced by the government (Stefanescu, Dumitriu et al. 2011). A research group from the University of Wisconsin-Eau Claire consisting of Communication and Journalism students and mentors examined perceptions of media through a small village in rural Moldova. This study explores how exposure to democratic journalism influences public expectations and the role of the audience in moving toward a more democratic nation. Researchers use grounded theory to determine how residents of a felt their role was in ensuring a free and independent press. With the gathered data, researchers were able to identify citizen responsibility through the frame of media dependency theory.

Quinn Forss, Anthony Hoffmeier Letourneau
Faculty Mentor/Collaborators: Asha Sen, Theresa D. Kemp
English
Strategies in Independent Feminist Publishing in India

We explored what strategies independent feminist publishing presses of India use to build audiences, stimulate activism, and promote feminist authors. An understanding of feminist publishing in India provides insight into independent publishing on a global scale and the future of feminist presses. To adequately explore this topic, preliminary research was conducted on Kali for Women, a press that later folded into the current houses of Zubaan and Women Unlimited, as well as Katha. In addition, a three-week immersion experience provided the opportunity to interact with these presses firsthand. Finally, we attended the Jaipur International Literary Festival to witness how feminist presses interplay with larger publishing houses and the multinational publishing market. In summation, we postulate that a multiplicity of infrastructural approaches to publishing is what sustains feminist independent presses in an increasingly multinational market.

Heather Nicole Spray, Gregory Thomas Nelson
Faculty Mentor/Collaborator: David Soll
Arts and Sciences
Water Supply and Waste Management in the Developing World

Rapid urbanization and population growth create a multitude of problems for cities, especially those in the developing world. Bangalore, a massive metropolis in southern India, is one such city. While experiencing an inordinate rate of population growth in the last several decades, Bangalore has had to address problems that accompany this rapid growth, such as water supply and solid waste management. The research involved reading articles related to urban development and traveling to Bangalore and New Delhi to learn more about the
history of the issue and answer questions about what happens when a city in the developing world experiences an inordinate amount of growth, and how the municipal government deals with that. In the case of Bangalore, we learned about how they have struggled to cope with their growth. We primarily looked at two aspects of urbanization: water supply and solid waste management. After conducting interviews and doing field research, we drew some conclusions about the nature of urbanization in the developing world, especially in Bangalore. Primarily, we realized that typically, sacrifices are made to ensure that the growth continues, even at the expense of protecting nature. For example, in Bangalore, a once-extensive system of lakes has largely disappeared due to urban encroachment; instead of lakes and surrounding parks, the city now has housing developments and bus stations. With regards to solid waste management, we attended a 10-hour Trash Trail, where we learned about the official and unofficial economies that make up the intricate system that is trash collection in Bangalore. As a result of our library research, fieldwork, and interviews, we gained valuable insights to the issue of rapid urbanization and the way in which governments address said issues.

**Literary Criticism**

**Thursday, May 1**  
**9:30-10:45 in Ho-Chunk**  
Moderators: Caitlyn Duley and Elijah Freeman

**Michael Thomas Strasburg**  
Faculty Mentor/Collaborator: Carey F. Applegate  
English  
*Exploiting Castration Anxiety as a Dramatic Device in Goldfinger*

This critical essay applies Feminist Film Theory to the 1964 film *Goldfinger*, and in doing so, explores the Freudian concept of castration anxiety and its role in the film’s narrative structure. This essay was written in order to further examine the ideas expressed in Feminist Film Theory, as well as illustrate how the historically sexist nature of the mainstream film industry not only subjugates women, but also exploits male instincts. Laura Mulvey’s seminal essay “Visual Pleasure and Narrative Cinema” was closely examined and applied to numerous in-depth, close readings of *Goldfinger* in addition to a concentrated study of key scenes. The conclusions brought forth by this analysis is that *Goldfinger* vividly presents sexist concepts that Feminist Film Theory is critical of (male gaze, fetishistic scopophilia, etc.). The essay also asserts that one concept in particular, castration anxiety, is unconventionally used as a dramatic device in order to produce dramatic tension for male spectators and to make them further empathize with the film’s protagonist.

**Joseph P. Davies**  
Faculty Mentor/Collaborator: Joel F. Pace  
English  
*The Three Kongs: Examination of Shot Length, Facial Identification, and Historical Implications*

This project involves a critical examination of the three versions of *King Kong* (Merian Cooper’s 1933 version, John Guillermin’s 1976 version, and Peter Jackson’s 2005 version). The analysis compares the three in terms of average shot length (ASL), technological innovations that enhance story presentation, the shifting role of Kong, audience reception, and critical reviews. I argue that the three films show persistence in the efficacy of the Kong topos, yet a reinterpretation of that topos according to various societal events and technological audience tastes. Film reflects a society’s place in history and its technological sophistication; the making then the remaking of *King Kong* reflects American values and fears during the great depression, the first wave of environmentalism in the 70’s, and the great recession of the 21st century.
Virginia Woolf’s groundbreaking experimentation with the interplay between form and content in the British novel is unmistakably streamed throughout *Mrs. Dalloway* (1925). Woolf departs from her literary predecessors by incorporating stream-of-consciousness and lyrical prose into the internal perceptions of her cast of characters, and Mrs. Dalloway particularly exemplifies this psychological focus. Woolf’s use of these forms taps into the inner mind, emotions, and sensory perceptions, yet with the incessant employment of commas, semicolons, and other punctuation marks, Woolf moves beyond mere psychological exploration to capture the everyday beauty of this life. Punctuation naturally slows down, even pauses action in a text, and the application of this form works to decelerate Mrs. Dalloway’s thoughts to acknowledge each fragmentary moment of life as significant and special, while each fleeting instant inevitably leads closer to death. Consequently, Woolf connects the form of halting punctuation and lyrical pauses to the content of Mrs. Dalloway’s psychological perceptions to express how each moment in life should be slowed down and enjoyed for its own pleasure in the face of inescapable death, ultimately exposing the strand of secular humanism prevalent in Woolf’s writing.

**Samuel Christian Weaver**  
Faculty Mentor/Collaborator: Jennifer Shaddock  
English  
*Radical Protest through Disengagement: Rhoda and Anti-Imperialism in Woolf’s “The Waves”*  
This paper will examine connections between Virginia Woolf’s 1931 novel *The Waves* and her 1938 anti-war polemic *Three Guineas*. Specifically, I will focus on the character Rhoda as a sort of artistic prefigurement of the Outsiders Society described by Woolf in *Three Guineas*. Rhoda’s story contains great ambivalence to the project of empire and I want to compare Rhoda’s thoughts in *The Waves* with the complicated meditation on power and fascism in *Three Guineas*. Linking these two works together will present a more complicated view of the interactions of Woolf’s art with her politics as well as offering opportunities for insight into both texts.

**Feminism and Philosophy**  
*Thursday, May 1*  
11:00-12:15 in Ho-Chunk  
Moderators: Jake Wrasse and Heidi Feyereisen  

**Braden Joseph Krien**  
Faculty Mentor/Collaborator: Audrey A. Fessler  
English  
*“He Feeds Upon Her Face”: Christina Rossetti’s Goblin Artist*  
To control perception is to define the object being perceived; it is to arrogate psychological and social power over the object of the gaze. In 1975, Laura Mulvey published a ground-breaking article that identified what she called “the male gaze” and critically examined the social implications of films that deploy that perspective. Twenty years later, Robert Schultz reworked Mulvey’s theory to focus on sexual and consumerist aspects of the male gaze. My paper applies Schultz’s work to a new feminist reading of Christina Rossetti’s “In an Artist’s Studio”. Many scholars have focused on the sexual and consumerist aspects in another of Rossetti’s poems, “Goblin Market”, but relatively little attention has been paid to how these elements of sexual objectification and consumerism operate within “In an Artist’s Studio”. I use the theory of the male gaze to analyze the ways in which the male artist within the poem objectifies, commoditizes, and consumes his female subject; I seek to develop a new understanding of “In an Artist’s Studio” and its place within Rossetti’s oeuvre.
Ryan Scott Vingum  
Faculty Mentor/Collaborator: Cathy J. Rex  
English  
*Literacy and Identity in Women’s Commonplace Books in 18th-19th Century America*

The purpose of this project was to study the realm of women’s writing and, specifically, how women undertook writing in commonplace books, or scrapbook type books, as their medium. Through examining this field, I hope to illuminate how women, who are generally silenced by patriarchal society, were able to assert their own literacy and identity through these mediums. This looks beyond more broadly examined female writers, such as literary figures, and helps to give voices to women who might otherwise have gone unnoticed. Through an examination of two “commonplace” type books and their contents, I seek to show how women were able to express an attainment of literacy as well as escape patriarchal censure and express their own identities as well, both as women and as individuals. Through examining these two books, I also highlight that what is considered a “commonplace book” is a fluid term, and that it can be used to understand broader means of how individuals and cultures collect their own ideas about their identity into collective spaces, similar to commonplace books.

Natalie Rose Fiedler  
Faculty Mentor/Collaborator: Kristin P. Schaupp  
Philosophy and Religion Studies  
*The Dismissal of Diotima*

Philosophers commenting on Plato’s *Symposium* frequently dismiss Diotima of Mantinea, a figure referenced by Socrates, as fictional. Yet scholars regularly assume that other characters or figures referenced in Plato’s dialogues existed. In this project, we surveyed the philosophical literature and categorized articles according to whether they contain explicit statements regarding Diotima’s historical or fictional status, indirect indications of Diotima’s status, or no indication of Diotima’s status. We discovered that many statements and assumptions regarding Diotima’s status are supported by little or no evidence, despite an article by Mary Ellen Waith (1987) detailing the issue. Not only do these practices fail to meet disciplinary standards, but they may also provide a partial answer to rising questions about why female philosophers are struggling to have their voices heard and what can be done about it. To address these concerns, we recommend that scholars working on Plato’s *Symposium* acknowledge both the absence of conclusive evidence and the fact that experts disagree.

**Studying UW-Eau Claire**

**Thursday, May 1**  
**11:00-12:15 in Menominee**  
Moderators: Jake Stendahl and Stephen Fong

Dustin Edward Schipper  
Faculty Mentor/Collaborator: Ned B. Gannon  
Art and Design  
*An Exploration of Social Spaces*

Over the course of last summer I created a sculptural structure which I then installed in three consecutive highly active social spaces on campus. The spaces I chose for installation were designed (by their architects) to function as social epicenters around campus, encouraging characteristically frequent instances of chance encounters and unusual social circumstances to navigate. My design intention was to create a structure which encouraged contemplation of the social characteristics of these familiar environments. The sculptural work accomplishes this by implementing similar social design principles to those of the three larger spaces: controlled visibility, directed motion, seating availability, and spatial enclosure. By adjusting the parameters of these characteristics to be in almost direct opposition to those of the original space, similar principles serve to create a sharp juxtaposition of qualities between the interior of the structure and the exterior pre-existing space. By highlighting the otherwise unnoticed characteristics of the exterior space through juxtaposition, the piece was
intended to inspire reflection upon the consciously designed environment surrounding us and intentionally influencing our behaviors.

**Alyssa Jean Colwitz**  
Faculty Mentor/Collaborators: **Leah Olson-McBride, Holly T. Hassemer**  
Social Work, Academic Skills Center  
*Experiences of First-Year Students at UW-Eau Claire*  

The transition from being a high school senior to a college freshman is a very significant event in a young person’s life. For this reason, our team of student researchers from the UW-Eau Claire Collegiate Bridge Program decided that it would be beneficial to conduct research to learn more about the expectations first-year students had about college and the experiences they have had so far in their first year. Our team has constructed a questionnaire and is currently in the process of gathering second semester freshman volunteers to participate in our research and conducting our interviews. Once our interviews have been completed, our team will search through our participants’ responses and pick out the different themes that are present in our data. We then want to see if we can find any correlations in our data, specifically between students’ expectations and their experiences. From our results, our team hopes to acquire more information about students’ expectations of college as well as information about college freshmen’s first year experiences that we can use to help prepare high school students for the transitional process from being a high school student to being a college student.

**Alexandrea Leigh Krause**  
Faculty Mentor/Collaborator: **Carey F. Applegate**  
English  
*Meeting Campus and Community Needs through Service- Involvement of Sigma Tau Delta*  

The purpose of my project was to present ways that the Theta Zeta chapter of Sigma Tau Delta on the University of Wisconsin-Eau Claire campus engages both campus and neighboring communities. As the current president of the campus’s Sigma Tau Delta chapter, it’s my duty to present service opportunities for chapter members within the campus and surrounding community. The method I used to complete my project included searching through various documents created by the Theta Zeta chapter in recent years. I compared activities and programs that our organization has done in the past to programs we’ve put on in recent years. My conclusion for this project highlights the individual programs that the Theta Zeta chapter participates in and offers to the campus and neighboring communities.

**Pada Xiong**  
Faculty Mentor/Collaborators: **Leah Olson-McBride, Holly T. Hassemer**  
Social Work/Academic Skills Center  
*An Exploration into the Experiences of Student-Athletes at UW-Eau Claire*  

A research team consisting of first-year Collegiate Bridge students conducted research in order to learn more about the experiences of student-athletes at the University of Wisconsin-Eau Claire. Information was collected from approximately fifty student-athletes, all of whom participate in a NCAA-sanctioned Division III sport. The semi-structured interview protocol focused on the respondents’ opinions regarding the impact that participation in Division III athletics has on their academic performance, social lives, and financial situation. Specific questions within the interview included items such as “what are your favorite parts of being on a sports team?” to “do faculty members treat you differently because you are on a sports team?” Data is still being collected and will be analyzed to determine recurring themes related to how participating in sports impacts student-athletes’ college experiences. We hope the findings will expand our knowledge and understanding of student-athletes’ college experiences, and provide information that universities can use to promote and support student-athletes in terms of academic performance, social well-being, and financial stability.
History

Thursday, May 1
12:30-1:45 in Ho-Chunk
Moderators: Taylor Turben and Suri Pourmodheji

Christopher Joseph Dictus
Faculty Mentor/Collaborator: Matthew W. Waters
Languages
*Tiridates I of Armenia: Caught Between Rome and Parthia.*

The Roman Empire in its imperialistic conquests is well documented in modern scholarship, but it is often overlooked that there was an empire that rivaled the Romans in size and power projection, that of the Parthians. The Parthians rose in power after the decline of the Seleucids in the Ancient Near East. With two great powers such as these, in relative proximity, military conflict was inevitable, especially over territory. One of the prime examples of conflict over territory concerned the buffer, and client kingdom, of Armenia. Diplomatic relations between the states were consistent from the time of Augustus, starting around 20 BC, though tensions came to a boil when Tigranes (a Roman supported prince) invaded Parthian dominated territories. The subsequent military campaigns, and the spectacle of a Parthian noble, Tiridates I, traveling to Rome in 66 AD to receive his crown from Nero, provide fascinating insight into Roman-Parthian relations of the time. Based largely on Roman sources such as Tacitus and Cassius Dio, the dynamic of the powers is explored, largely focusing on the military campaigns during the rule of Nero. The overall purpose of the project is to analyze the relationship between the two great powers focusing how that was manifest in Armenia, and what actions broke the Cold War-like standoff that brought on war.

Sean Steven Szydel
Faculty Mentor/Collaborator: Patricia R. Turner
History
*All The World’s A Fair: The Lasting Legacies of Exhibitions*

In 1851, London hosted the first Crystal Palace Exhibition Fair. Exhibition fairs were crucial in the development of both identity formation and popular culture and were an expression in North America of a time dominated by political and social struggle. This project interprets primary sources to argue that exhibition fairs were carefully designed so the exhibits praised the Anglo-Saxon Race as superior to all other minorities and the ability to convert them to Christianity justified American Manifest Destiny. While middle class spectators gazed at displays of “savage” indigenous people’s culture and arts, the location of the exhibit was selected in order to highlight the superiority of middle-class white society.

Ryan David Furlong
Faculty Mentor/Collaborators: James W. Oberly, Joel F. Pace
History and English
*‘The Spirit Which Dictates Them’: Ralph Waldo Emerson’s Transcendental Decision to Decline the Social Reform of Brook Farm, 1840*

Ralph Waldo Emerson’s decision to deny George Ripley’s invitation to join the proto-socialist, communal experiment of Brook Farm in December of 1840 has been a definitive event for understanding both Emerson’s complex relationship to Fourierism and his reasons for abstaining from the utopian ideology. Historians and literary critics have correctly pointed out the practical considerations Emerson faced with moving his family to the farm in West Roxbury, Massachusetts and stifling his literary work, while concurrently addressing his long-trumpeted theory of “self-reliance,” in which individual reformation preceded societal transformation. What has been absent, however, is why Emerson preferred this individual reformation. Moreover, a deficient elucidation of why Emerson’s philosophy remained at odds with the farm has persisted in to modern scholarship. Through the study of Emerson’s literary, philosophical, and personal writings and the secondary literature, I
wish to resituate the decision within its proper philosophical context. I will argue that the primary reason for turning down Brook Farm was predicated on Emerson’s transcendental philosophy of the “Over-Soul,” which confronted and contradicted the Fourier model for societal transformation and thus proved to be an irreconcilable barrier for Emerson to commit his residence, money, and intellectual support to Brook Farm in 1840.

**Ryan David Furlong**  
Faculty Mentor/Collaborator: Patricia R. Turner  
**History**  
*Finding a “New Consensus”: Early Christian Responses to Roman Military Service in the First and Second Centuries*

The problem of military enlistment and participation for early Christians in the Roman military was an especially disruptive subject and consensus was discordant through the first and second centuries (the focus of this paper), and remained well into the third and fourth centuries. Early Christians maintained a variety of responses to enlistment and the subsequent violence tied to the responsibilities of Roman military service. Scholars have traditionally argued that most, if not all, early Christians prior to 173 CE held to a complete pacifist view of military participation. However, through the investigation of several early Christian sources prior to 173 CE, I have found several examples of Christians serving in the Roman legions. Thus, I will argue the years preceding 173 CE in early Christianity did not homogeneously accept pacifism as the exclusive view toward military service (as historians have traditionally posited), rather through the investigation of first and second century sources, it is possible to contend that not only did early Christians support alternatives to pacifism, but some indeed did serve in the Roman military.

**Creative Writing**

**Thursday, May 1**  
**12:30-1:45 in Menominee**  
Moderators: Alex Brown and Elijah Freeman

**Allison Kay Puestow**  
Faculty Mentor/Collaborator: Carey F. Applegate  
**English**  
“Eye of the Mountain”  

“Eye of the Mountain” is a short story written for and accepted by Sigma Tau Delta’s National Convention. This imaginative story follows a college-age couple as they explore a mountain located in the girl’s hometown. The story then centers on the local legend surrounding the mountain. The boyfriend is skeptical about the legend. The girl, who grew up on this legend and annually visits the mountain, views it like an old friend. While this story does contain elements of the fantastical, it still remains in the realm of believable reality. I hope my readers will be left with the same awe and wonderment that the girl feels towards the mountain.

**Rebekah Marie Pueplichhuisen Morrisson**  
Faculty Mentor/Collaborator: Carey F. Applegate  
**English**  
*Deconstructing Love - Original Fiction*  

“Deconstructing Love” is a story about a female construction worker, Sandy, who finds herself detached from most of what surrounds her. Her story unfolds and by a stroke of bad timing, her father passes away the day after she connects with someone, a bartender who has some imperfections of his own. Deconstructing Love explores personal struggle with love, loss, and the flawed ways we sometimes deal with tough situations. As a character-driven creative fiction piece, this short story can be considered ‘realistic fiction’ wherein the situations that occur, although completely fabricated, can happen in everyday life to most everyone.
Juli Anne Jasicki  
Faculty Mentor/Collaborator: Carey F. Applegate  
English  
*Compass*

This collection of poetry shows the distinct senses of place within the United States. It looks at the lore, landmarks, landscape, history, and culture of four states at opposite ends of the country from North to South and East to West. As I participated in the National Student Exchange program, I was inspired to bring to light those experiences that stemmed from my travels. Presenting those experiences as a collection of poetry makes it accessible to many and also is a form that promotes creativity. The main outcome of this collection is to promote extension outside of the places a person may commonly occupy.

Crystal Louise Kloth  
Faculty Mentor/Collaborator: Carey F. Applegate  
English  
*The Sound of Loss*

A collection of poetry on the theme of loss, the poems focus on the dynamic of sound that surrounds different kinds of loss. The collection includes “The Labyrinth”, “Fireworks”, “A Waiting Donor”, “paper clip”, and “the room of the man who lost his sock”, each poem mirroring the dynamic of sound that accompanies the different kinds of loss through metaphor as well as demonstrating an overarching resonance of the powerful silence that lingers after. It simplifies the complex concept of loss in physical and tangible ways. “The Labyrinth” explores that there isn’t any one right path to complete the grieving process. “Fireworks” compares the yearly fireworks show that celebrates the Fourth of July to war and violence with representations of post-traumatic stress disorder. “A Waiting Donor” looks at the theme of loss on how one person’s decisions and actions can permanently affect the lives of others. “paper clip” compares a simple paper clip, something everyone typically keeps in a desk drawer, to a broken relationship focusing on temporary feelings and actions. “the room of the man who lost his sock” focuses on the image of an empty, yet cluttered room that displays signs of the aftermath of loss.

Erin Elizabeth Stevens  
Faculty Mentor/Collaborator: Benjamin J. Hollars  
English  
*The Things They Never Tell You and Other Stories About Love*

This presenter will read three original flash-fiction stories (stories told in 1,000 words or less). By using flash-fiction instead of poetry, the presenter was given room to thoroughly develop the characters and conflict within these stories. Likewise, flash-fiction was better for telling these stories than a short story because shorter stories create more tension in a much smaller space, as well as more abrupt endings, letting readers imagine how the story really ends. Each piece explores a different dynamic of love, relationships, and the complications which arise from them. “Beauty in the Shadow of the Jack-o-Lantern’s Smile,” tells the story of a couple sitting beneath an abandoned barn near a highway. When the girl reveals a troubling secret, the boy finds himself disturbingly more in love with her than he was before. “A Burning Lust,” recounts a toaster obsessing over her latest carbohydrate infatuation. Her hopes of attaining true love may or may not burn to a crisp. “Things They Never Tell You,” discusses the invisible warning labels attached to love, and how a person might be affected by these warnings.
Communication Sciences and Disorders

Melissa Marie McDonald (165)
Faculty Mentor/Collaborator: Jerry K. Hoepner, Vicki M. Samelson

Clinical Flexibility: A Graduate-Clinician Focus Group

Clinical flexibility is an essential skill in a field that requires speech-language pathologists (SLPs) to provide individualized services, rather than applying cookbook approaches. A focus group, comprised of eight second-year graduate students in Communication Sciences and Disorders, examined student learning preferences as they relate to prior knowledge, flexibility, and theoretical perspectives. More specifically, our aim was to discover which prior learning experiences seemed to most influence the development of clinical skills and flexibility. Transcripts of the focus group discussion were analyzed to identify major themes and subthemes. Our results will help us develop teaching methods that scaffold flexible thinking, and will help us explore how students transition throughout their academic careers to become skilled and flexible speech-language pathologists. Knowing what makes early-developing learners different from more-experienced learners can help academic and clinical faculty facilitate a trajectory towards expertise through better teaching and supervisory approaches that can aid in this transition. Our results show that a combination of content knowledge and principle-driven instruction helps students think more critically. Also, students follow very specific transitions in their academic careers that contain challenges they must overcome in order to become more-skilled clinicians.

Psychology

Jessica Catherine Spurr (243)
Faculty Mentor/Collaborators: Mary Beth Tusing, Leah Olson-McBride

Destination Collaboration: How Does Working with Different Education Professions Change Perceptions?

In the field of school psychology, the National Association of School Psychologists Practice Model identifies consultation and collaboration as practices that should “permeate all aspects of service delivery” (NASP, 2010). The current study explored the effects of participation in an education training facilitate at a small university. This clinic setting provides an interprofessional pre-service training setting for students in the fields of communication sciences and disorders, special education, reading education, social work, nursing, and school psychology. The current investigation focused on how student clinician’s knowledge and attitude toward other professions and attitude toward collaboration changed throughout the clinic experience. For the current study, two existing surveys were adapted to assess the student clinicians’ beliefs and attitudes towards other disciplines in roles/responsibilities and ethics/attitudes. This adapted survey was administered prior to and after each student clinicians’ experience. Preliminary paired-samples t-test results from survey responses from pre and post clinic experiences indicate positive results. Student clinicians are more knowledgeable about other professions, consider themselves more flexible in collaboration situations, and have a more positive attitude towards collaboration.

Matthew Emmett Mitchell (242)
Faculty Mentor/Collaborator: Mary Beth Tusing

Universal Academic Screening: Comparing Computer-Adaptive and Curriculum-Based Measurement

Response to intervention (RTI) is a multitiered system which uses data-based decision making to provide supports, accommodations, or differentiated instruction to students. Successful application of RTI in schools frequently revolves around the ability to accurately identify students who are at-risk for developing behavioral or academic difficulties (Glover & Albers, 2007). Current research supports the use of universal academic screening as a method to identify students who are at risk for meeting current or future academic difficulties (Fuchs & Deno, 1991; Hintze, 2004; Twyman & Tindall, 2007). The current study seeks to understand how well
AIMSweb curriculum based measures (CBM) of Oral Reading Fluency (ORF) and the Computer Adaptive Test (CAT), Measures of Academic Progress (MAP), predict future performance on a state comprehensive exam. Archival data representing sixth and eighth grade students will be included in the current study. Correlational and regression analyses will be conducted to answer the following three questions. First, what level of concurrent Validity exists between Spring CBM-AIMSweb ORF scores and CAT-MAP scores in middle school? Second, how well do MAP and ORF individually predict future performance on the MCA-III? Finally, how well do Map+ORF predict passing and failing performance of students on the MCA-III.

**UNDERGRADUATE POSTER PRESENTATIONS**

**Education and Scholarship of Teaching and Learning**

**Chemistry**

**Amanda Krueger, Tiffany Tran Huynh (229)**
Faculty Mentor/Collaborator: **Robert J. Eierman**

*Mindful Mentoring: Faculty Perceptions of Undergraduate Mentoring Practices*

A mentor is a distinctively, personally and positively influential model and guide in a student’s intellectual and professional development. This study evaluates the current state of mentoring practices and faculty perceptions of undergraduate research at the University of Wisconsin-Eau Claire. Faculty and staff who received ORSP funding for undergraduate scholarly projects within the last five years were surveyed. Participants were asked about their priorities and challenges as mentors in the following: design, recruitment, initial, continuing, and final project stages. They answered a second set of questions about what they perceived to be most challenging at various stages. We received over one hundred responses from a wide range of disciplines and career stages. An in-depth analysis of the current project is underway; however, there are some preliminary results that are of note. Several reoccurring themes in the responses include: managing the workload and schedules, matching student attributes to the project, balancing student development and the progression of the project, and maintaining the project focus and commitment. Further analyses will be conducted to draw conclusions about mentoring. The results of these analyses will be used to create materials for the improvement of the process of mentoring within the University of Wisconsin System.

**Communication Sciences and Disorders**

**Brooke JoAnna Bonney, Britton Lauren Clarke (138)**
Faculty Mentor/Collaborator: **Vicki M. Samelson**

*Expository Writing in the Communication Sciences and Disorders Curriculum*

A significant learning outcome for Communication Sciences and Disorders (CSD) majors is to achieve a level of clinical report writing proficiency that will allow them to convey complex information clearly to parents, teachers, and other professionals. We hypothesized that when direct instruction in expository text structure and a peer editing process are embedded in the CSD writing curriculum, we would see an improvement in global text structure (macro-structure) and structure within paragraphs (micro-structure). Four expository text writing assignments from two cohorts of CSD senior-level students were retrospectively de-identified, randomized, and re-scored. Both cohorts received direct instruction in expository text structure and received instructor feedback after all submissions. One cohort wrote and edited independently, whereas the other cohort also received a peer editor’s feedback prior to submitting their written products. All papers were scored using a rubric that focused on four subdomains: introduction/conclusion, content, organization, and form. While both cohorts’ scores increased from assignment one to four, peer editing produced an additional positive effect on the second cohort’s scores. Interscorer reliability was good (ICC = .798, p < .001). We will discuss the effectiveness of peer editing and how this process can positively impact expository writing products.
The purpose of this study was to learn about teachers’ perspectives on mathematics, language, and manipulatives. Teachers and students use language to clarify mathematical concepts, exchange ideas, and participate in classroom discussions. However, in the mathematics classroom environment students are often confused by challenging language comprehension tasks and novel problem solving tasks which require considerable language skill. Therefore, teachers utilize manipulatives, or concrete objects, to facilitate student learning and understanding of the language involved in mathematics. Manipulatives allow students to conceptualize and connect the language to the concepts they are learning. With the support of manipulatives, students are better able to interact with the language used by teachers, students, and the curriculum. A qualitative research design consisting of semi-structured interviews and classroom observations was used to describe two elementary school teachers’ perspectives regarding the relationships between mathematics, language, and manipulatives. Transcripts of the interviews were analyzed using an axial coding approach in which major themes and subthemes were identified. Themes focused on classroom discourse, teacher language, student language, and curriculum language. Implications include increased collaboration between speech-language pathologists and teachers on how to support language and deeper understandings in mathematics through the use of manipulatives.

Communication and Journalism

Madelyn Jean Miller, Erin Elizabeth Stevens (84)
Faculty Mentor/Collaborator: Mary F. Hoffman
Writing Centers’ Physical Environments and Their Impact on Students’ Learning

This study explores the effect physical environments/spaces have on instructional communication and college students’ learning. Educational professionals and researchers are interested in how physical environments/spaces influence students’ perceived learning success for the purposes of campus planning and instructional communication research. For example, Temple (2008) argued that institutional spaces are “communities,” brought to life by the social interaction of their inhabitants. In order to advance this important area of inquiry, this study examines how two different writing center spaces at a midsized Midwestern liberal arts university affect students’ perceived learning success. Methods include a systematic observation of the two spaces, taking into account factors/elements such as lighting, furniture and furniture arrangement, and other aesthetics. Writing center tutees will also participate in an exit survey designed to examine perceived effects of the spaces on their learning. We expect to be able to explain how physical environments/spaces impact student learning and communication within these two writing center locations.

Alexis Brie Benjamin, Erin Elizabeth Hanson (85)
Faculty Mentor/Collaborator: Nicole Schultz
First-Year Seminar Curriculum, Liberal Education Reform, and Integrative Learning

Research shows that creating and evaluating strategies that encourage students to engage in integrative learning promotes advancement of personal, educational, and professional development (Newell, 2010; Flower & Rhodes, 2005). Studies illustrate that the commitment to providing students with higher education integrative learning opportunities should be practiced intentionally to maximize student connections to course material and across disciplines (Werdner, 2013; Miller, 2005). The purpose of the current study was to examine the extent to which students engaged in integrative learning and the extent to which students were aware of such. Data was collected via focus group interviews and student work from students enrolled in first-year seminar CJ/WMNS 111 – Gender, Race, Class & Communication: The Social Construction of Identity Fall 2013 and analyzed using thematic analysis and the UWEC Integrative Learning Liberal Education Assessment Rubric (Draft: 8/16/13). Results of analysis of student work revealed the vast majority of students met or exceeded UWEC’s integrative learning benchmarks of connecting academic knowledge to personal experiences, making
connections across disciplines, and applying academic knowledge to out-of-classroom contexts. Analysis of focus group interview data reveal that intentional engagement in integrative learning contributes to broadened student perspectives of the potential interconnectedness across disciplines in higher education.

**Education Studies and Mathematics**

**Maya Malayne Witte (217)**  
Faculty Mentor/Collaborators: Aram deKoven, Dandrielle C. Lewis  
*Domestic Intercultural Immersion: Experiencing Somali Immigrant Culture in the Minneapolis School System*

Many studies regarding international language- and culture-based immersions are available, research on domestic intercultural immersion experiences are rare. This study evaluates a domestic intercultural immersion experience for undergraduate pre-service teachers. *The Somali Intercultural Immersion* is a comprehensive educational program that combines more than twenty four hours of classroom-based instruction, a week-long, full-day, field placement in specially selected schools that serve primary Somali youth, and daily excursions in and around the Somali community in a large Midwestern city. The goals of the program are to increase participant awareness and comprehension of issues relating to a) discrimination based on race, culture, socio-economics and religion, b) effective strategies for working with second language learners, and c) Somali history, culture, and customs. Pre-and post-test survey data was collected along with post immersion focus group interviews from fourteen participants. The results of both the qualitative and quantitative data indicate significant improvements in each of the central areas of awareness and comprehension. Implications and limitations are discussed.

**English**

**Casey Thomas Coughlin, Bridgid Colleen Manion (199)**  
Faculty Mentor/Collaborator: Theresa D. Kemp  
*Correlating Interpretive Complexity and Cultural Pluralism in the Introduction to Literature Course (ENGL 150)*

We started with the question: Is there a correlation between students who are able to close-read and students who are able to produce a multi-cultural reading of a text? Our work continues and elaborates upon Nancy Chick et al.’s 2007 study on teaching students how to read for complexity in an introductory literature course. Drawing upon part of the rubric for UWEC’s new Liberal Education Learning Outcome for Responsibility 1 (“Use critical and analytical skills to evaluate assumptions and challenge existing structures in ways that respect diversity and foster equity and inclusivity”), we included attention to multi-cultural reading by scaffolding, prompting, and assessing the students’ work for it. Our preliminary findings are that multi-cultural reading is enabled by close-reading, but that our students rarely produced it without prompting. Based on these preliminary findings from our data, we also encourage further research to consider the effect of the content of the assigned multi-cultural readings.

**Josiah David Moore (198)**  
Faculty Mentor/Collaborator: Jan C. Stirm  
*Chaucer In Area High Schools*

The purpose of this project is to attain and analyze information about how Chaucer and *The Canterbury Tales* are being taught in High Schools near Eau Claire. Our information revealed that teachers were concerned with how to make Chaucer relevant to their students, how to teach a subject like Chaucer with limited materials, and why Chaucer should be included in a crowded curriculum. Our research also revealed what many teachers find useful about Chaucer. They choose *The Canterbury Tales* for the character description in The Prologue, the way it embodies all levels of Chaucerian society, and its rich satire. Our goal is to respond to the teachers’ concerns about teaching Chaucer. We will be developing specific unit ideas and lesson plans which show how this text can be used in ways that invigorate students. The rationale for these units will also help to show how
Chaucer can fit into a crowded curriculum. As we create these materials for teachers, our goal is to synthesize what we have learned from teachers with our own emphases. By synthesizing our unique approach to Chaucer with that of teachers, critical theorists and educational theorists, we will help teachers bring Chaucer into the classroom in a powerful way.

Languages

Sarah Janice Vowels, Emily Marija Kurmis (133)
Faculty Mentor/Collaborators: Linda Carlson, Ami Christensen
How Does Realigning the Curriculum Prepare Intensive English Program (IEP) Students at UWEC to Succeed in Content-Based Writing?

While the number of IEP students on campus is increasing, a fairly low percentage of these students are matriculating to degree programs. The goal of this project was to realign the IEP reading/writing curriculum with university-wide learning goals, and then examine how the new curriculum develops proficiency and confidence in IEP students. Instructors used a backwards design to re-write the curriculum for IEP writing courses. Student collaborators designed a series of interviews and surveys to be given to IEP students at the end of each of the major segments of the reading/writing courses. Results show this content-based approach develops a deeper level of understanding of basic elements of writing, and students are now able to break down the separate stages of a writing assignment and create more realistic writing timelines. While students initially struggled with the concept of compiling, considering, and citing their sources, their confidence in these tasks rose over time. In addition, students’ vocabulary in their assignments expanded and the stress on correcting grammar and spelling mistakes was replaced with a focus on analysis of sources and organization of argument. For these reasons, students are feeling more confident in their abilities and will be better prepared to be degree-seeking students at UW-Eau Claire.

Susan Kathleen Fandre (108)
Faculty Mentor/Collaborator: Jessica S. Miller
Assessment of Introductory French Textbooks’ Integration of Pronunciation

The current research examines recurring issues related to the teaching and learning of French pronunciation, which is often overlooked in beginning courses. To evaluate the systematic integration of pronunciation material in such courses, we examined introductory French textbooks for references regarding French pronunciation. We documented different ways pronunciation can be presented. For example, pronunciation explanations can be implicit or explicit; pronunciation material can be accompanied by practice activities or not; pronunciation explanations can be linked to chapter functions and recycled, or they can be included without any specific ties. Our data indicates that introductory French textbooks vary widely in their approach to discussing pronunciation. However, they generally do not address pronunciation as systematically as they do other features of the language (e.g., grammar, vocabulary). This research will provide French teachers access to an inventory of books paired with a description of the tools each book uses to instruct pronunciation. This will allow teachers to better select French textbooks in accordance with their needs and preferences on the inclusion of pronunciation instruction, thus enhancing student learning. We will also provide suggestions that textbooks may take in order to improve learners’ intelligibility and functionality.

Languages and Physics and Astronomy

Elizabeth Ann Davis (132)
Faculty Mentor/Collaborators: Linda Carlson, Matthew M. Evans
Improving the Exit Survey

The purpose of this project is to improve the exit survey that is given to International Students in the ESL program each semester. The ESL program at UW-Eau Claire is growing so we want to improve it and an improved
exit survey will help gather information on how to do that. I will meet with focus groups of different demographics and ask them about areas of their life here at UW-Eau Claire, such as orientation, living situation, classes, support services, and advising. I will ask them what was helpful, what was important, and what kinds of questions should be on the exit survey. We expect that the information gained from the focus groups will help inform creation of an improved exit survey.

Management and Marketing

Madeline Ann Higley, Ariel Wegner (95)
Faculty Mentor/Collaborator: Scott R. Swanson

Critical Classroom Encounters: Student Perspectives

This research investigated student/professor interactions and corresponding improvement strategies from the student point-of-view. No studies to date have recognized that when classroom encounters go poorly (well), students are not always simply dissatisfied (satisfied), but may feel outraged (delighted). These strong emotional reactions may prove critical to future student behavior toward the instructor and the service organization (i.e., university). This research addressed two main questions: (1) From the students’ viewpoint, what are the key interpersonal and non-interpersonal factors that lead to memorable classroom experiences? and (2) what is the relationship between the classified experiences and student behaviors/intentions? A structured, self-completion questionnaire was utilized to collect primary data (n = 1,208). The study included the critical incident technique with each respondent also rating: (a) the seriousness of the encounter at the time it occurred; (b) his or her level of satisfaction with the end result of the encounter; (c) what could have been done to most improve the encounter described; and (d) any word-of-mouth behaviors related to the critical incidents. Findings provide rich contextualization of important quality factors, and illustrate the key role played by instructors in managing the co-consumption process.

Madeline Ann Higley, Michael Gregory Boucher (86)
Faculty Mentor/Collaborator: Scott R. Swanson

Undergraduate Internships: How Values and Search Strategies Differ across Business Majors and Internship Providers

Students contemplating an internship should have a clear understanding of employer expectations. Comparison of student and industry evaluations of internship importance variables can identify important gaps useful to academic departments in evaluating and updating their curriculum and internship programs. Opinions on the importance of critical worksite elements, student benefits, internship provider benefits, and communication vehicles were all measured utilizing previously developed scales. The sampling frame for internship providers consisted of businesses that have direct involvement in a student internship program (n = 196). Students enrolled in a variety of undergraduate business courses were invited to participate in the research (n = 1,175). The study findings assessed and compared undergraduate business student and internship provider perspectives in regards to: 1) how business students (overall and by major) and internship providers rate the importance of various internship attributes and related underlying factors, 2) how internship providers and business interns (overall and by major) compare in their perceptions of these attributes and factors, and 3) identified what search strategies are used by business students (overall and by major) and internship providers to locate and promote internship opportunities, and how these significantly differ from each other.

Mathematics

Jasmine Rose Olson (185)
Faculty Mentor/Collaborator: Charles W. Bingen

Studying the Relationship Between Developmental Math Student Attitudes and Academic Achievement

The purpose of this study was to examine the relationship between students’ levels of confidence and anxiety
and academic achievement in the course. The significance of this study is to better understand this relationship in order to create a more effective learning environment. We looked at archival and current survey data. We will do statistical analysis on the data to see if there is a statistically significant relationship between survey responses and academic achievement. We expect that we will be able to report significance for confident and anxiety levels and academic achievement. Based on the significance of the results, we will choose self-efficacy questions to add to the survey instrument to make it more robust. Doing this will allow us to understand the relationship between components of the course and students’ confidence and anxiety levels.

Psychology

Reese Butterfuss, Hannah Mae Kalmon, Arianna Marie Brown, Jordan Nicole Simpson, Nicole Keup Fogarty (18)
Faculty Mentor/Collaborator: Melissa C Chaffin

Using Brief Experimental Analysis to Increase GRE Vocabulary Knowledge

College students planning to apply to graduate school often prepare to take the Graduate Record Examination (GRE). The advanced vocabulary questions on the GRE Verbal are commonly a high priority for students studying for the GRE. We plan to explore whether Brief Experimental Analysis (BEA) procedures can be applied to select an effective vocabulary word knowledge intervention for university students preparing for the GRE. In BEA, different interventions are introduced in succession to individual participants for a brief period of time and their effects are measured. The effects of each intervention are compared to baseline conditions as well as to the other interventions for that participant in order to determine what is most effective for that individual. Once a promising intervention is identified for each participant through the BEA, this intervention will be applied over time to measure its effectiveness in increasing vocabulary word knowledge.

Reese Butterfuss, Allison Kaye Gehring (43)
Faculty Mentor/Collaborator: Mary Beth Tusing

Early Literacy Screening: Comparing PALS-K and AIMSweb

Effective screening for children at risk of failing to meet academic standards is increasingly important; there is a nationwide push for early intervention for children performing below benchmark standards (Howell, Patton, & Deiotte, 2008). In Wisconsin, the mandated screener used in kindergarten classrooms is the Phonological Awareness Literacy Screening-Kindergarten (PALS-K). However, there are few findings that report the predictive accuracy of PALS-K on first-grade reading performance. We used archival data collected from kindergarten and first-grade classes from a school district in Wisconsin. Sensitivity, specificity, and positive and negative predictive power analyses were conducted for PALS-K and AIMSweb Tests of Early Literacy to explore predictions for first-grade reading performance. We hypothesize that PALS-K and AIMSweb differ in the number of students identified as performing below benchmark and accuracy of predictions for first-grade testing.

Reese Butterfuss, Hannah Mae Kalmon, Nicole Keup Fogarty, Arianna Marie Brown, Jordan Nicole Simpson (19)
Faculty Mentor/Collaborator: Melissa C Chaffin

Brief Experimental Analysis of Modeling Interventions for Oral Reading Fluency: Results from a Summer Program

Effective screening for children at risk of failing to meet academic standards is increasingly important; there is a nationwide push for early intervention for children performing below benchmark standards (Howell, Patton, & Deiotte, 2008). In Wisconsin, the mandated screener used in kindergarten classrooms is the Phonological Awareness Literacy Screening-Kindergarten (PALS-K). However, there are few findings that report the predictive accuracy of PALS-K on first-grade reading performance. We used archival data collected from kindergarten and first-grade classes from a school district in Wisconsin. Sensitivity, specificity, and positive and negative predictive power analyses were conducted for PALS-K and AIMSweb Tests of Early Literacy to explore predictions for first-grade reading performance. We hypothesize that PALS-K and AIMSweb differ in the number of students
identified as performing below benchmark and accuracy of predictions for first-grade testing.

Forrest James Toegel, Elizabeth Mary Kerber, Bryan Tomes Yanagita (20)
Faculty Mentor/Collaborator: Carla Hames Lagorio

*Classroom Projects to Motivate Student Involvement in Behaviorally-Based Community Initiatives*

Undergraduates are required to learn about research methodologies in one or more targeted courses; with requirements focused on students conceiving of and subsequently implementing research protocols. While several projects involve sophisticated and potentially fruitful research ideas, many do not meet this objective. What’s more, conception of project ideas often are of primary focus, when undergraduates often could benefit from increased exposure to research strategies and controlling for confounding variables in well-conceived projects. Furthermore, a good majority of projects do little to improve human affairs. In an attempt to address these issues and meet learning needs, our Experimental Analysis of Behavior course has been allotting credit for implementing small-scale community initiatives. Three projects have been implemented over the past year: two are behavioral-economics-based interventions assessing how decreasing effort to emit a specific response can improve behaviors society generally applauds (increasing paper recycling in professor’s offices, reducing food waste in college cafeterias); a third has been increasing reinforcement – on a molecular level – by introducing “fun” manipulations across-campus and measuring those best picked up via cultural selection. These projects have sustained extra-curricular involvement and can provide students with an increased understanding of research intricacies while also providing benefits to society.

Sara Ann Herzog (42)
Faculty Mentor/Collaborator: Mary Beth Tusing

*Evaluation of Sound Partners Reading Intervention for First Grade*

In response to school reform initiatives, educators are increasingly focused on providing early intervention to children at risk for reading failure. This study investigated whether Sound Partners, an early literacy intervention for kindergarteners, could be delivered in a group setting with the same level of effectiveness as when delivered in a one-on-one setting. Progress monitoring data for sixteen students was analyzed to evaluate the level of effectiveness between the two different intervention delivery models. In addition, data from a matched control group not receiving the intervention was analyzed. For the control group of students who have not participated in early intervention, Sound Partners participants demonstrated higher levels of performance on early literacy assessments following intervention. Further analysis will compare progress monitoring scores on early literacy assessments for participants in a group tutoring model to those in a 1:1 tutoring model. In addition, pre and post-intervention assessments will be compared for control group versus Sound Partners participants. The data is expected to show little difference in the level of effectiveness between the two delivery settings. Sound Partner participants are expected to demonstrate higher levels of performance on early literacy assessments relative to the control group after the intervention.

**Special Education**

Marissa Jane Kinjerski (193)
Faculty Mentor/Collaborator: Cathy A. Thorsen

*Documenting Evidence of Developmental Changes in Preschool-Age Children with Special Needs Engaged in Project-Based Learning*

The primary activity of the study was to document individual changes in children’s development through creating developmental portfolios based on classroom observations and results from classroom assessment. Developmental portfolios allow parents and teachers to see the progress an individual child has made throughout the year and evaluate the effectiveness of instruction. The investigators participated in the classroom each week to document children’s activities and interactions, and collected artifacts of child work. The investigators are in the process of observing children’s learning through the use of the Creative Curriculum, which uses specific units of study to deepen children’s knowledge on a particular topic. The observations are being used
to create developmental portfolios that contain each child’s progress in a confidential and cumulative binder. The investigators will write a summary of growth for families following an analysis of change according to the portfolio. The summary and portfolios will be given to the parents upon completion so that an overall picture of the child’s developmental progress is provided for them. The project is still in process, but the investigators expect to report that all of the children in the Creative Curriculum classroom have made significant developmental gains through the year.

Fine and Performing Arts

Art & Design

Christine Ann Dvorak, Serena Skie Wagner (251)
Faculty Mentor/Collaborator: Sooyun Im

Art + Tech Exhibition Promotional Print Materials

The purpose of this project was to create promotional print materials to bring attention to the Art + Tech exhibition that was held at the Foster Art Gallery this past January. The exhibition focused on artist’s integration of technology into their works. The challenge as designers was to figure out the essence of the exhibition and create visuals that portrayed a combining of various mediums, technologies, and art forms. In approaching the challenge, we conducted extensive research on the artists, the works that were being exhibited, printing processes, color, style, and form. In our research, we were able to discover a common idea between the various artists and works being shown. We used that shared idea to create a design that represented the multitude of artists as having equal significance in the exhibition, while giving the show its own identity. The style and idea was then applied to posters and booklet brochures that were used in promotion before and during the event.

Jessica Rachel Pautsch (252)
Faculty Mentor/Collaborator: Sandra Lee Starck

Ink, Paper & Pressure: Restoration of a 1925 Vandercook Press and Renewed Printmaking Research

Senior art student Jessica Pautsch and Professor Sandra Starck spent the year researching the ancient art of Letterpress (as in Johannes Gutenberg); the project was multi-faceted with sequential outcomes. Starck & Pautsch began their quest by attending the international letterpress conference/workshop at Hamilton Wood Type Printing Museum in November 2013. Afterwards, they restored a 1925 Vandercook Press (rescued from a local dumpster); this antique press was the project’s initial raison-d'être. Acquisition and use of the many accoutrements essential to letterpress printing ensued (i.e., type drawers, lead type, ens & ems, leadings & slugs, quoins & key, wood & iron furniture, etc.). Subsequently they learned how to print. Construction of a moveable cart followed, to house the Vandercook with its multitudes of accessories. Starck & Pautsch curated an exhibition for Foster Gallery, Artifacts from Hamilton Wood Type and Printing Museum, February/March 2014, and hosted Hamilton Director Jim Moran for a two-day lecture/critique/printing demonstration. Ms. Pautsch also held printing demonstrations on the Vandercook in Foster Gallery, March 11-13, 2014. Ms. Pautsch is currently perfecting the art of typesetting and is creating broadside editions on the restored press. Ms. Starck is planning for a broadside project option to be incorporated into future Intro to Prints classes.

Corrin Francis Turkowitch (258)
Faculty Mentor/Collaborator: Eugene M. Hood

Contextualizing and Locating Friedrich’s Seminal Journey

Caspar David Friedrich, a German Romantic painter, departed on a journey in 1810 to sketch the landscapes of the Riesengebirge Mountains. Located on the border of the present-day Germany, Czech Republic, and Poland, this journey was influential on Friedrich’s artistic output, as it provided him with readily accessible source material in the form of sketched images. Through these preliminary sketches, he was able to construct larger and more elaborate composite paintings. The goal of this project was to not only find the geographical locations of his sketches but to contextualize his sketches in the modern landscape. Emphasis was placed on
bridging the disciplines of art history and geography, and due to this interdisciplinary nature of the project, a mixed methods approach was undertaken. A translated version of an itinerary of Friedrich’s 1810 walking trip formulated by German art historian Günther Grundman provided the base of the project. Building upon the itinerary, geospatial analysis was used to pinpoint the locations of the sketches. Further analysis focused on human-environmental factors shaping the region now, such as pollution, industry, and perceptions. Friedrich’s sketching journey provides a useful tool for an interdisciplinary understanding of location, sense of place, and human environmental change.

Music and Theatre Arts

Claire Sophie Henningsgaard (190)
Faculty Mentor/Collaborator: Phillip A. Ostrander
Survey of Beginning Instrumental Band Methods Used in Conjunction with “Smartmusic.”

The aim of this project is to survey at least twenty of the most popular beginning band methods and their success (or lack thereof) when combined with the Smartmusic computer application. After the survey is complete, the most successful band methods will be integrated into MUSI 202 – Brass Techniques. Using Smartmusic, grade school or university students can perform their assignments with an accompaniment recording. A specially designed microphone picks up the student performance and instantly evaluates the performance, identifies mistakes, and offers performance corrections. Music education students at UW-Eau Claire need basic training in Smartmusic and the music department’s various techniques classes are a great way to introduce and establish Smartmusic skills. Students and faculty will spend over 200 hours independently and together analyzing and drawing conclusions regarding method books that are Smartmusic capable. Dissemination will consist of a results document distributable to interested parties.

Cassandra Ann Venske (187)
Faculty Mentor/Collaborator: Gretchen Peters
Gender Inequality in Conducting

In professional music performance groups, membership has become more equal between the genders, with blind auditions increasing the percentage of female performers; however, the percentage of female conductors does not reflect this trend. I wanted to find if this inequality existed at the collegiate level in the state of Wisconsin. I gathered all of the National Association of Schools of Music accredited post-secondary institutions that had at least one large ensemble comprised of solely student membership (defined as concert band, orchestra, or a large choir) and the conductors of each ensemble. From this data, I identified patterns of gender related to conducting, and compared these patterns with those at the University of Wisconsin-Eau Claire (UWEC). At UWEC, there are three concert bands, one symphony orchestra, and four choirs. Currently, there are two female conductors at UWEC, contributing to a total of 12 female conductors since UWEC become coeducational. I then explored literature that offered theories as to why women are seen less frequently in the role of conductor. For the number of female conductors to increase, performers and audiences need to recognize the inequality and call for more females on the podium.

Samuel Kaminski Clark (172)
Faculty Mentor/Collaborator: Gretchen Peters
History of Women in the Music Department at UW-Eau Claire

The purpose of this project was to investigate the roles of women in the music department at UW-Eau Claire during the 1910s, 1920s, and 1930s. The context of the project stems from “A Year of Inclusivity,” an ongoing theme this academic year in the music department that highlights the contributions of women and minorities to the field of music. Information was gathered by consulting early editions of the Periscope, an annual campus publication detailing various student organizations and their accomplishments. The descriptions of the numerous vocal and instrumental ensembles, as well as direct quotations about the educators that led them, helped to develop a consensus on the roles women took on during the early years of the department. It was
ultimately discovered that women served as both educators and conductors of ensembles before men pre-dominantly took over the latter role in the 1940s, and that they helped to establish a particularly strong and well-respected music program on campus.

**Samuel Kaminski Clark (173)**  
Faculty Mentor/Collaborator: Gretchen Peters  
*“Penrod” and the Perception of Characters in Blackface at UW-Eau Claire*

The purpose of this project is to examine the multiple components of minstrel shows that were performed annually at UW-Eau Claire in the late 1920s and early 1930s, as well as other theatrical performances featuring characters in blackface. In both instances, these characters were often comical and portrayed as having low intelligence. This falls under the umbrella of musical exoticism, a facet of musicology frequently and thoroughly studied. The campus Periscope, an annual publication of student events and organizations, has provided numerous cast photos and lists of repertoire performed at minstrel shows, as well as the campus organizations that staged the performances. Additionally, early issues of the Spectator provided specific names of the individuals involved, as well as a more comprehensive list of repertoire. Consulting these two archival sources will hopefully show how complex and intricate each minstrel show was, and may also explain their overwhelming popularity on campus. This project will also focus on the production of “Penrod,” a play by Booth Tarkington performed by the campus group Strut and Fret during the 1933-34 school year, and will examine how elements of minstrelsy contributed to the play’s warm reception and overall success.

**Danielle Christine Tully (188)**  
Faculty Mentor/Collaborator: Gretchen Peters  
*Sigma Alpha Iota in Support of Women in Music*

The project focuses upon how Sigma Alpha Iota (International Music Fraternity) has helped women find a place in the American musical world, with specific consideration given to the organization’s support of women composers. This project is not only significant because it contributes to the Music and Theatre Arts Department’s “Year of Inclusivity,” but also because it helps establish the tradition of this service organization on campus of which I am a member. For this project, the history of the Epsilon Omicron chapter of Sigma Alpha Iota at the University of Wisconsin Eau Claire was explored, including the residency of Libby Larsen, a well-known female composer from Minneapolis who is also a SAI sister. In addition, the programs that document the history of concerts in our department have revealed further insights into SAI’s support within the department. Through the use of SAI publications, including records on the history of sponsored composition projects, and newspaper articles from around the country, the organization’s support of women composers at the national level is being explored. Strong support from the national organization is demonstrated through the many composition competitions that they have held for American women. I also hope to find a trend of individual chapters having connections with and supporting women composers through residencies or recitals.

**Amanda Lynn Hicklin (174)**  
Faculty Mentor/Collaborator: Gretchen Peters  
*Exoticism and Appropriation at the University of Wisconsin-Eau Claire*

This project identifies the frequency with which performances in the music department display elements of exoticism and/or cultural appropriation, and determines the different issues related to this phenomenon. Exoticism is the practice of referencing real or perceived aspects of a culture other than the creators and/or the consumers in a work of art, and while at times the result can be innocuous, at other times it can be offensive and disrespectful. Cultural appropriation is the process by which one cultural group adopts aspects of another culture for its own purposes and without permission. The ultimate goal is to foster conversation and thought about ethical programming in the arts. This university has a substantial music education program, and so it is crucial for each student in the program to understand these issues so that we can be ethical in selecting music for our classrooms, but also to make sure that our students understand this pervasive issue. After combing through the programs from the 2011-12 school year, it was found that twenty-three cultures had been appropriated and/or exoticized through thirty-three pieces. Five pieces were chosen to represent different facets of
these issues through more in-depth discussion.

**Daniel Joseph Mockenhaupt** (170)
**Faculty Mentor/Collaborator:** Nicholas S. Phillips  
**American Vernacular in New Solo Piano Music**

This project surveyed the solo piano works of American composers primarily from the 20th and 21st century (with some earlier exceptions), and the ways in which these composers incorporated vernacular elements into their compositions. Through this survey, we explored what “vernacular” meant, what vernacular elements were present, and traced the early usage of these. We then surveyed living composers and their music looking specifically at the ways these composers incorporate vernacular elements into their music, as well as the techniques they used. Finally, we compared that to earlier American composers and their works to look for similarities and differences. What we found were incredibly creative uses of vernacular elements in solo piano music that span multiple genres.

**Jena Marie Skalisky** (171)
**Faculty Mentor/Collaborator:** Amanda J. Profaizer  
**Dracula: A Hair and Makeup Designer’s Dream**

The purpose of this study was to research and develop Victorian hairstyles and wigs as well as make-up designs for the production of *Dracula*. In order to decide how the hair and makeup was going to look, I had to research hair and makeup of the period, special effect make-up, and learn to ventilate a wig. I started my research by looking in books with pictures from the time period, as well as costume archives and other mediums; the research helped me pick and choose specific looks that I wanted to create for the show. I then tested the looks with the director, which were either approved or revised; also, I began the process of ventilating a wig. Ventilating is latch-hooking individual hairs into a lace front real human hair wig; this was important because it helped me have a better understanding of how the wig worked for the character, and how it worked with the entire look. Overall, my experience was positive and helped me learn; because of the research and skills, my designs helped enhance the dark mood of the show and the actor’s performances.

**Jordyn Elizabeth Beranek, Danielle Anne Bronshteyn, Michaela Rose Tures** (189)
**Faculty Mentor/Collaborator:** Mitra M. Sadeghpour  
**Opera and Sustainability**

Opera utilizes vast amounts of resources to produce. It is expensive, requires a lot of materials, and can be taxing on human resources as well. Several larger opera companies, such as the Sydney Opera House, are taking bold and highly publicized steps toward reducing their environmental impact. At the same time, many smaller opera programs and companies are using practices, sometimes without even realizing it, which make the opera they produce more sustainable. This work provides a summary and overview of the accompanying research document, which contains a case study of that *Die Fledermaus* production, strategies and recommendations for sustainability, and opera education outreach to prolong the lifetime of the art form of opera, and concepts for sustainable design. This study is one of the first to take an interdisciplinary approach to sustainability as it relates to opera. It is significant to the field of sustainability because it shows the need for developing creative strategies for sustainability and shows that sustainable practices can be applied to all fields. It is significant to the world of opera because of the need to adapt opera to survive in a modern time, financial, and resource-constrained atmosphere.

**Katie Elizabeth Griffin** (191)
**Faculty Mentor/Collaborator:** Amanda J. Profaizer  
**Far Away-Costume Shop**

This grant was specifically designed to facilitate the theatre department’s creation of different types of hats for the show Far Away by Carol Churchill. It was a great learning tool for students interested in fashion and the workings of a theatre costume shop because the hats were used as costumes and also as props. We added on
to some hats that we had in storage and we also build quite a few from scratch. We experimented with new shapes and various materials. Based on the costume designer’s sketches we were able to better our knowledge and understanding of costume crafts. We were able to assemble 25 wearable hats that were used on stage in during the performance. The hats were an integral part of this production and we were able to make it a success.

Health Sciences

Biology

Justin William Mabin, Nicole Jean Jerdee, Stephanie Ann Gilsdorf, Alexandra Josephine Bunda (34)
Faculty Mentor/Collaborator: Sasha A. Showsh

Methicillin-Resistant *Staphylococcus aureus* Isolates Capable of Transferring Methicillin-Resistance Obtained from the University of Wisconsin-Eau Claire Campus

Methicillin-resistant *Staphylococcus aureus* (MRSA) is an antibiotic-resistant strain of the bacterium *Staphylococcus aureus* that is responsible for many community and hospital-acquired infections world-wide. A survey of the UW-Eau Claire campus was conducted to indicate the relative presence of MRSA in academic and recreational buildings. Twenty samples were identified as possible MRSA. Of these twenty samples, one potential methicillin resistant donor was selected (36-14). To determine the ability of MRSA isolates to transfer the methicillin resistance, a series of conjugation experiments were conducted with the potential donor (36-14) and a recipient *Staphylococcus aureus* strain (SAS 805). The resulting transconjugant samples (products of the donor and recipient matings) were then plated on MSA plates containing spectinomycin (donor sensitive) and oxicillin (recipient sensitive). Colonies capable of growth on both oxicillin and spectinomycin were comparatively screened against the donor (36-14), recipient (SAS 805) and a positive MRSA control using polymerase chain reaction (PCR) based identification to genotypically distinguish the presence of the methicillin resistance gene (*mecA*). The frequency of transformation of the methicillin resistance gene was determined to be 7.6x10. The results of this study have provided evidence supporting horizontal transfer of the *mecA* gene between staphylococcal species.

Kelsey Mae Stuttgen (87)
Faculty Mentor/Collaborator: Julie A. Anderson
External Collaborator: Edgar Hicks, Mayo Clinic

*Incidence of P. acnes in Rotator Cuff Repairs*

*Propionibacterium acnes* is a bacterium linked to the skin condition, acne. It has been reported that the proportion of patients with shoulder *P. acnes* infection following shoulder surgery was significantly higher than that of patients with lower limb *P. acnes* infection following lower limb surgery. In collaboration with Dr. Hicks, an orthopedic surgeon at Mayo Clinic in Eau Claire, WI, we hypothesized that the incidence of *P. acnes* in shoulder repairs would be higher than the incidence of *P. acnes* in lower limb repairs done in Eau Claire hospitals. The number of *P. acnes* infections and the total number of surgeries performed were collected from all orthopedic surgeons in Eau Claire who perform rotator cuff repairs. The incidence of infection was determined by comparing the number of infections in the rotator cuff repair to the total number of rotator cuff surgeries. Our results indicate that the incidence of *P. acnes* in rotator cuff repairs is higher than the incidence of infection with *P. acnes* in lower limb repairs. One possible explanation is that the rotator cuff contains more sebum-producing glands, which contain *P. acnes*, than lower limb areas.
Voice Characteristics of Teenage Singers

Normative voice data is limited in the adolescent population. Clinical assessment of voice disorders requires normative samples for comparison when identifying abnormal voice characteristics. The current study seeks to create a sample of typical voices in the adolescent age range (14-19 years of age) for use in regional voice clinics. Voice recordings of various speech and singing tasks were obtained from high school and college students in Eau Claire and surrounding areas. Analyses of these recordings will be completed on the Computerized Speech Lab (KayPentax, Montvale, NJ) to determine voice characteristics, such as fundamental frequency and perturbation measures, per standard speech-language pathology practice. Data gathered from the analyses will provide researchers and area clinicians a normative sample to use when assessing individuals in this age group for voice disorders.

Glottal Fry as a Therapy Technique for Vocal Nodules

Nodules are benign growths on the vocal folds resulting from vocal abuse. Nodules cause negative changes to the voice, and can even cause pain. Treatment for nodules usually involves voice therapy with a speech-language pathologist; severe cases may require surgery. Glottal fry therapy has been proposed as a therapeutic technique to treat vocal nodules; however, limited evidence is available to evaluate its efficacy. The aim of this study was to assess the effectiveness of glottal fry therapy for vocal nodules, as compared to typical voice therapy techniques. Two participants with vocal nodules completed typical voice therapy in addition to glottal fry therapy. Perceptual, stroboscopic (viewing the vocal folds), and acoustic changes within the vocal mechanism were assessed and compared to a group of retrospectively gathered data from individuals with vocal nodules who received only the typical voice therapy. Preliminary assessment of perceptual measures revealed little to no change; however, acoustic measurements and stroboscopy ratings showed improvement in the participants' vocal functioning. Preliminary qualitative data revealed a positive impact on the participants' quality of life and communicative functioning. This suggests that adding glottal fry to a typical voice therapy regimen could be effective in reducing the nodules and improving the voice.

Investigating Barriers among Eau Claire Nurses and Nursing Students to Addressing the Healthcare Needs of Low-Income Patients

Low-income patients face barriers to optimal health due to struggles with food security, housing, and transportation. Clinicians can play an important role in connecting low-income patients with community resources to address these challenges, but may not understand or value healthcare equitability and often don’t know the income status of their patients at the point of clinical contact. Our project surveyed practicing Eau Claire nurses and UWEC student nurses to investigate their attitudes towards healthcare equity and low-income patients, knowledge of the prevalence of poverty in Eau Claire, and practice with regard to offering low-income patients help in connecting with resources. A third of practicing nurse respondents do not believe healthcare equity is important; although 68% of them report difficulties working with low-income patients because of income status, 36% say they believe patients in Eau Claire generally have equitable healthcare. Graduate UWEC student nurses who believe healthcare equity is important are significantly (P = 0.01) more likely to believe that it is important for clinicians to know the patient’s income level at the point of clinical contact. Improved nurse awareness of challenges faced by low-income patients and greater commitment to addressing those challenges may
improve health outcomes for these patients.

**Kinesiology**

Carolyn Rose Apfelbach, Emily Ann Behrens, Devin Marie Schoen, Kimberly Carol Schumacher, Kelsey Elizabeth Sparks (7)

Faculty Mentor/Collaborator: **Marquell J. Johnson**

*Physical Activity, Nutrition, and Obesity in Adults with Intellectual Disability*

Current research suggests that individuals with Intellectual Disabilities have higher rates of obesity, physical inactivity, and poor nutritional intake when compared to individuals without disabilities. There have been few studies to examine the interaction of these three components. This study will examine the physical activity and nutritional intake of adults with intellectual disabilities to determine if they meet the current recommendations and their impact on obesity. A total of 20-40 adults with intellectual disability ages 18+ years residing in Western Wisconsin will be recruited. Anthropometric information will be recorded for measures of obesity, and demographic questionnaire will be completed by each participant. Nutritional intake behavior will be measured via questionnaire (pre- and post-activity monitoring). Physical activity behavior will be measured via questionnaire and accelerometry (Actical) for 7 consecutive days. Though data collection is currently in progress, we hypothesize that adults with intellectual disability will not meet the recommendations for daily physical activity and/or nutritional intake, will present greater BMI as compared to those without disabilities.

Stephanie Marie Wolf, Devan Arielle Galbraith, Bailey Christine Ringold, Kaitlyn Joann Wallace, Savannah Susan Grancorvitz, Maggie Jo Reilly, Melanie Ann Fischer (8)

Faculty Mentor/Collaborator: **Saori I. Braun**

*Objectively-Measured Sedentary Behavior and Metabolic Risk among Office Workers*

Sedentary behavior (SB; activities that require low levels of energy expenditure) is becoming more common among office workers. Evidence suggests that SB is connected to dyslipidemia, abdominal obesity, and high blood pressure, all of which are characteristics of metabolic syndrome. The participants in this study are classified office workers at UW-Eau Claire. This research uses accelerometers, actical (worn on wrist and waistband) and activPAL (worn on thigh), to measure amounts of sitting, standing, and stepping activities engaged during office work on 5 consecutive days. Participants will also be assessed for body mass index, blood pressure, blood lipids, fasting blood glucose, and waist circumference. The statistical approach to be employed is correlation analysis examining the association between time spent in SB in the workplace and metabolic risk factors. Data collection will be in progress until the end of April. Researching SB during work hours will give insight into the connection of how the physical inactivity affects metabolic risk factors. In an advancing technological society, it is necessary to raise awareness that the risk of SB can have on overall health of office workers.

Megan Victoria Harrison, Katherine Marie Skog, Ethan Lee Skog, Keith Douglas Roehl, Ryan Jay Vande Linde (9)

Faculty Mentor/Collaborators: **Jeffrey M. Janot, Saori I. Braun**

*Effects of Compression Band Treatment on Muscle Recovery Post Eccentric Fatiguing Exercise*

Exercise induced muscle soreness causes an increase in pain and a decrease in performance, and multiple studies have examined the effectiveness of various means to reduce or eliminate delayed onset muscle soreness. Compression garments (CG) have been shown to reduce muscle swelling and soreness. The purpose of this investigation is to explore the effectiveness of a new type of CG known as Voodoo Floss on quadriceps strength and perceived soreness. Over a three-week data collection period, each subject will complete a baseline session to assess peak torque and total work using the HUMAC NORM Isokinetic Extremity System, and 1-RM of concentric quadriceps strength using a standard leg extension machine. During weeks two and three, participants will go through an eccentric fatiguing leg extension protocol (85% concentric 1-RM, 7 sets of 10 repetitions) followed by a 3-minute active recovery (bodyweight squats), either with or without the CG on the non-dominant leg. Two days later, subjects will use a Visual Analogue Scale to report muscle soreness and have
their peak torque and total work tested, again using HUMAC NORM. Upon completion of data collection, differences in peak torque, total work, and perceived soreness will be compared across three conditions.

Megan Marie Kidd, Kayla Mae Franklin, Alyssa Nicole Bender, Lauren Claire Braun, Nicole Marie Rendler (23)
Faculty Mentor/Collaborators: Saori I. Braun, Matthew S. Wiggins
Implementation of a 4-Week Balance Protocol to Impact Quality of Life in Cancer Patients

As a result of various cancer treatments, balance, fall risk, and quality of life (QOL) of cancer survivors are often negatively compromised. There has been no prior research conducted examining balance ability and its association with QOL in cancer patients. The purpose of the study is to examine this relationship. A total of 8 female cancer patients from the UW-Eau Claire Cancer Recovery Program (experimental group) and 10 discharged cancer patients from Marshfield Clinic in Eau Claire, WI (control group) have been recruited via convenient sampling to participate in this study. A 4-week balance program, a 5-10 minute session that consists of 5 different exercises engaged twice a week, will be implemented among the experimental group. Measures of balance and fall risk will be obtained using a balance system (Biodex SD 950-440). QOL will be assessed by employing the Functional Assessment of Cancer Therapy-General (FACT-G) survey. We will employ an independent samples t-test to compare changes in QOL from pre- to post-intervention between groups (alpha of .05). Results from this initial project should provide insight regarding the potential usefulness of balance protocols for cancer patients to improve their QOL.

Alyssa Kimberly Yoder, Stephanie Leanne Nelson, Christine Marie McIntyre (25)
Faculty Mentor/Collaborators: Saori I. Braun, Mary J. La Rue
Perceived Body Image and Weight-Control Behaviors in Division III Collegiate Athletes

Body image is an issue that is becoming a growing concern and is prevalent among society and athletics. It is important for healthcare providers to investigate the psychosocial aspects of eating disorders and body image in order to help various athletic populations. The primary purpose of the study is to raise awareness of body image and altered eating behaviors that may have gone unnoticed in an unexpected sport population. We intend to measure athlete’s views on body image dissatisfaction through an online questionnaire that is divided into three sections: Sociocultural Attitudes towards Appearance Scale-3 (SATAQ-3), risks for eating disorders through the Eating Attitudes Test (EAT-26), and personal body perception through a Sex-Specific Body Mass Index (BMI) Figural Stimuli Silhouette. A group of male and female athletes from 6 individual performance sports and 4 team sports will be recruited. The analysis will consist of a comparison examining the difference in eating behavior score and perceived BMI between individual performance and team sports. Our hypothesis is that individual performance athletes will display higher eating behavior scores and poorer body image compared to athletes on team sports because of the external stress placed on body image related performance.

Jenna Lea Chinburg, Michael Steven Doersch (36)
Faculty Mentor/Collaborator: Robert C. Stow
An Investigation of the Functional Movement Screen to Detect Asymmetries in Adolescent Movement Patterns and Its Correlation to Previous Injury and Change through Training

Our study was intended to investigate the use of the FMS (Functional Movement Screen) to identify asymmetries in adolescents (ages 9-17), to detect any relationship between past injury and FMS scores, and to assess the impact of a summer training program on FMS scores. Incorporating the FMS as a component of a pre-participation examination to detect musculoskeletal alterations during adolescence would allow athletic trainers to identify youths who would benefit from individualized functional movement training to prevent future musculoskeletal injuries. A total of 37 adolescents from four different youth summer programs: local youth hockey association, YMCA, middle/high school summer training program, and community youth summer program participated in this study. Participants completed a pre and post-test survey and all seven FMS testing patterns with the assistance of a trained licensed athletic trainer (LAT) and two senior athletic training students. No particular training program increased scores significantly compared to the others, but three of the four programs showed improved FMS total scores. Due to the limited amount of FMS research available on the adolescent population further studies should be performed to determine whether or not a correlation exists.
Jonathan Purvis, Jenna Lea Chinburg, Robert Lee Blume, Michael Steven Doersch (37)
Faculty Mentor/Collaborator: Saori I. Braun, Robert C. Stow
The Effect of Predisposing Factors and Concussion Rates on DIII College Football Players: A Retrospective Study

With concussions representing one of the most serious sports injuries and a higher incidence among football players, athletic trainers need to be aware of potential factors that are not manipulative. The purpose of our study is to investigate the effect of predisposing factors and past concussion history on the rate of concussion in Wisconsin Intercollegiate Athletic Conference (WIAC) Division III college football players. Many factors are attributed to concussion susceptibility such as mechanism of injury (MOI; contact vs. noncontact), age, and position. By determining the factors that increase risk of concussion, we can identify individuals more prone to injury. An electronic Qualtrics survey has been sent to 8/9 head athletic trainers in the WIAC via e-mail to gather information on predisposing factors and individual concussion reports from the years of 2009-2013. Though data collection is currently in progress, we plan to employ a multiple regression analysis to examine the impact of position, age, MOI, and environmental factors on the rate of concussion. Based on current data, we presume concussion rates have leveled off or decreased overall within the WIAC over the timespan researched; additional investigation on predisposing factors will potentially help to continuously reduce the concussion rate among football players.

Kristin Marie Jaskolski, Shane Patrick Murphy, Chuentao Ho, Caitlin Suzanne Hooge (38)
Faculty Mentor/Collaborator: Saori I. Braun
The Acute Effects of Graston Technique on Power, Work, and Torque Output in Collegiate Female Track and Field Athletes.

Graston Technique will decrease power, work, and torque output in collegiate female track and field athletes. Graston Technique is a therapeutic instrument utilized by clinicians, in altering soft tissue function by sliding the instruments edge over a specific area. Questions remain with respect to the impact of lower extremity Graston treatment on an individual's ability to perform athletically, post treatments. A total of 18 collegiate female track athletes 19.68 ± 1.11 years participated in two testing sessions; only one of which consisted of receiving a Graston Technique treatment of five minutes to the quadriceps. Power, work, and torque output were measured by using an isokinetic machine. The data collected was analyzed by utilizing SPSS 19.0 Paired samples t-tests with an alpha level of .05 to compare the differences of the outputs in two conditions (non-treatment vs. post-treatment). The analysis indicated no significant differences (p>.05) in power, work and torque output values between with or without treatment prior to isokinetic testing. The findings of the study revealed minimal effects of Graston Technique on work, power, and torque outputs, supporting the use of Graston Technique without negatively influencing on performance in the athletic population.

Martin Kent Barnard, Edward Madolimov, Jacob Simon Wszelaki (39)
Faculty Mentor/Collaborator: Saori I. Braun
The Effects of Bilateral Kinesiotape Application on Vertical Jump and Broad Jump

The popularity of Kinesiotape (KT) use is increasing in professional-level and Olympic competitions to improve physical performance diminish pain, or both; however, little conclusive data exists, especially regarding its effectiveness on lower extremity functional power. Therefore, the purpose of the study is to examine the impact of KT application on vertical and broad jump performance in healthy, college students. A total of 20 male and female, college-age participants will be split randomly into two groups: KT group (application from the anterior superior iliac spine to the proximal patella with a 75% tension) and placebo group (with no tension). Both groups will undergo pre-test with no KT application as a baseline assessment. Once participant signs the consent form, he/she will complete a general demographic questionnaire, watch instructional videos on vertical and broad jumps, perform a 10-minute standardized warm-up, and undergo a testing session (2 practices, 3 true trials per jump test). On the treatment day, KT will be applied to each participant (with or without tension) prior to testing. While data collection is in progress, we expect that KT group will display greater increase from baseline to treatment day in vertical and broad jump tests than do placebo group.
Jeffrey Michael Quednow, Joseph Allen Meier, Timothy Allen Sedlak (24)  
Faculty Mentor/Collaborator: Saori I. Braun  
The Effects of High Intensity Interval-Based Kettlebells and Battle Rope Training on Grip Strength and Body Composition in College-Aged Adults

The aim of this current study is to evaluate the changes in body composition and hand grip strength following high intensity interval training (HIIT) utilizing kettlebells and battle ropes. Subjects in the experimental group consist of 13 college-aged students (9 females; 4 males) ages 18-25 years. The control group consisted of age- and sex-matched college students. Subjects in both groups complete a pre- and post-test consisting of height, weight, grip strength via handgrip dynamometers and body composition via skinfold calipers. The experimental group completes a 5-week training session while the control continues their normal workout routines. Experimental group will undergo 5 weeks of HIIT for 3 sessions per week, consisting of a 20-minute protocol with an exercise work-to-rest ratio of 1:1 (15sec exercise; 15sec rest) alternating 2 minutes of kettlebell exercises with 2 minutes of battle rope exercises totaling four sets of each of the five exercises. A repeated measured ANOVA will be employed using SPSS 19.0. The data collection is currently ongoing; therefore, results are inconclusive at this time. If the hypothesis is correct, improvements in grip strength and body composition from the protocol can contribute to better overall health and less disability throughout the lifespan.

Zachary Daniel Bils, Brandon Jon Lorrig, Mitchell William Olson (22)  
Faculty Mentor/Collaborator: Saori I. Braun  
The Effects of Graston Technique on the Quadriceps Strength and Fatigue in Division III Football Players

Graston Technique (GT) is a soft tissue mobilization modality that utilizes stainless steel instruments to re-align scar tissue, release soft tissue restrictions, and assist in tissue healing through mechanisms similar to cross-friction massage. This therapeutic instrument is becoming increasingly popular; however, there is little literature that documents the effect of GT treatment time of 10 minutes or longer and its effect on fatigue during physical exertion. As a result, our study will focus on the effect of GT time on muscle torque and perceived fatigue in NCAA Division III football players at UW-Eau Claire. We will conduct a counter-balanced, single-blind study that will assess if two different GT treatment times (8 and 15 minutes) cause fatigue in the quadriceps musculature during post-treatment isokinetic testing. The HUMAC-NORM isokinetic dynamometer will be utilized to assess the torque output of the quadriceps in the dominant leg, along with a visual analog scale (VAS) to assess perceived fatigue. A baseline isokinetic test will be administered on all subjects to assess torque output independent of a GT treatment. Data collection is currently in progress, as we expect to see a difference in the torque of the quadriceps between 8 and 15 minutes of Graston application.

Mathematics

Kristoffer Michael Seem (236)  
Faculty Mentor/Collaborator: Mohammad Aziz  
Skew-Normal Regression for Identifying the Risk Factors Related to Low Infant Birth Weight in US

The purpose of this research was to give a more accurate depiction of the risk factors that are associated with low birth weight infants in the US. Identifying the risk factors associated with low birth weight infants can help determine behaviors that are harmful to the development of a fetus. To determine the risk factors, a skew-normal regression (SNR) analysis was used on birth data obtained from the state of Washington. The regression analysis was run on only low-birth-weight infants and significant factors identified by SNR were weight gain of mother, age of parents, educational levels, race, in contrast with the previously found factors, which include the age of the father, gestational period, weight gain, diabetes, genital herpes, the weight of the mother before a pregnancy. Therefore when skew property of low birth weight data is considered, we obtain risk factors that were not identified by traditional regression models. Results show that there are a multitude of factors that are of importance to consider when it comes to the growth of a fetus, however more research is needed in order to determine the primary causes of low birth weight.
Nursing

Brooke A North, Nicholas Hans Jaeger (200)
Faculty Mentor/Collaborator: Charlotte K. Sortedahl
Preparing the Future Workforce: A Pilot Survey of Hospital Nurse Leaders

The *Future of Nursing* report identifies the urgent need to educate nurses at all levels to be leaders (Institute of Medicine, 2010). There is a lack of descriptive research regarding what hospital nurse leaders believe are imperative leadership concepts that students and new nurses should possess. The American Association of Colleges of Nursing framework for educating baccalaureate nurses notes that graduates should possess knowledge and skills in communication and leadership to provide high quality care (2008). We interviewed seven hospital nurse leaders to identify the leadership concepts and professional behaviors that they believe nursing students and new nurses should possess. Qualitative content analysis revealed five major categories: change, conflict, communication, leadership and self-awareness. A 102-item survey was developed and mailed or e-mailed to 185 contacts and distributed within 86 organizations across six states. Eligible participants of the survey were registered nurses in the hospital who were unit managers, department managers, service-line managers, administrators, executives, or nurse educators. Preliminary results from 221 completed surveys revealed communication as the highest ranked category. Nurse leaders identified leadership concepts and behaviors nursing students and new nurses should possess; their responses will be useful for nurse educators as they educate future nurses.

Michelle Marjorie Markwardt, Danielle Michael Hibbard (201)
Faculty Mentor/Collaborator: Shelley-Rae Pehler
Validating a Proposed Nursing Diagnosis of Longing using Expert Nurses

This research project is the second phase of a multistep process to create a nursing diagnosis for the human experience of longing. Nursing diagnoses are used in practice to plan care for patients to meet identified patient needs. In this phase, expert registered nurses were asked to identify if the definition, defining characteristics and related factors found in the literature during the first phase, the concept analysis step, are present in patients that are experiencing longing. Surveys were sent to members of professional nursing organizations following Fehring’s Method for Nursing Diagnosis Validation. Data analysis included converting Likert scale responses to weighted ratios. Any defining characteristic that achieved a score of .50-.79 was identified as a minor characteristic, while a score of equal or greater than 0.80 was identified as a major characteristic. These minor and major characteristics will be used, along with the frequency of the related factors and definition, in the next phase of this project. During the third step, patients will be asked to validate if the developed nursing diagnosis describes their experience of longing.

Melissa Lynn Dennis, Amy Marie McDonald, Jacquelyn Sue Pearson (220)
Faculty Mentor/Collaborator: Rita A. Sperstad
Inquiry Concerning Information Received, Choice(s) Made, and Satisfaction of Pain Management during Women’s Childbirth Experience

According to Hidaka and Callister (2012), if a woman’s pain management expectations are unmet, it can lead to an overall less satisfying childbirth experience. There are several variables which contribute to a woman’s expectations and satisfaction with childbirth. These may include: the childbirth educator, childbirth classes, and the attending physician. Three senior nursing honors students focused on normal birth as their honors topic, and the nursing honors faculty advisor convened to inquire about satisfaction and pain during childbirth. The purpose of our faculty-student research was to assess the information received, choice(s) made, and satisfaction with pain management during the experience of childbirth. A formal review of scholarly literature was completed and analyzed. Based upon the literature analysis, an interview tool was developed. Implementation of the research was planned with a sample of women who were between 24 and 48 hours postpartum within the hospital setting. Tape recorded one-on-one interviews were anticipated to be done. However, constraints with IRB approval with the health care institutions were unable to be accomplished, thus implementation was not carried out. This poster presentation will depict the scholarly project completed by this research team. Les-
sons learned from the research process and recommendations for future implementation will be suggested.

**Adwoa Lynn, Jessica Ann Holbach (221)**
Faculty Mentor/Collaborators: Rita A. Sperstad, Rachael L. Haupt-Harrington
Assessment of Student Engagement with Team Based Learning in Nursing

Benner, et al. (2010) radically calls for transformation in nursing education to meet the professional health care challenges ahead. Team-based learning (TBL) is a unique teaching strategy that when used properly initiates four kinds of transformations: 1) small groups into teams, 2) a technique into a strategy, 3) the quality of student learning, and 4) the joy of teaching for many teachers (Michaelsen, et al., 2004). A junior nursing theory course initiated the TBL strategy in fall 2011 to improve active learning, student engagement, and students’ critical reasoning skills. In fall 2013, a faculty/student research project (funded by CETL-Scholarship of Teaching and Learning) was initiated with the purpose to assess student engagement in a sample of undergraduate students before and after participating in a nursing course using the TBL strategy. The Classroom Survey of Student Engagement (CLASSE student) (Ouimet & Smallwood, 2005) was adapted and used as a pre/post-test to measure student engagement in the fall 2013 and spring 2014 semesters. Participants were invited to participate in a mid-semester course focus group facilitated by student researchers. Individual Team Peer evaluations completed at mid-semester were also collected. Results from the fall semester 2013 will be presented and implications for teaching and learning discussed.

**Diane Angelica Sanchez, Kathryn Grace Hankins, Erika Dawn Comdohr, Acacia Fawn Crow (230)**
Faculty Mentor/Collaborator: Susan D. Moch
Exploring Disparities in Advanced Directive Completion

This exploratory study is aimed at identifying factors that may deter completion of advance directives (ADs) for various populations. Factors that contribute to disparities in healthcare concerning ADs are important to study so that differences among racial, ethnic, and cultural groups can be identified. Diverse populations are increasing in the United States, and research indicates that some groups are less likely to complete ADs. The team of students completed a literature review and explored beliefs and values which connect with ADs of four population groups: African American, Hispanic/Latino, Native American and Hmong American. Through this research, factors contributing to disparities in the completion of ADs among these populations were identified. The findings are organized according to barriers for ADs per population. Overall themes include poor provider-patient communication, low health literacy, patient values, spiritual beliefs, and family-centered decision making. Much of the intervention research on this topic is directed at health literacy, increased provider communication, use of volunteers and other ways to increase compliance. Through this research, factors that deter completion of ADs for certain groups were identified. By continuing their research, the team hopes to gain more information about these factors via discussion with community members.

**Clare Sievert, Elin Zimmerman, Rebecca Culver (250)**
Faculty Mentor/Collaborators: Donna Rozar, Susan Moch
External Collaborators: Jennifer Vaughan, Sacred Heart Hospital, Jill Barth, Sacred Heart Hospital

**Academic Service Partnership to Decrease Heart Failure 30-Day Readmissions**

According to the American Heart Association, approximately 5.7 million Americans are living with heart failure with costs exceeding an estimated $38 billion yearly. Among Medicare recipients, heart failure is the most frequent reason for hospitalization, with a 30-day readmission rate as high as 27%. Aggressive strategies to reduce heart failure readmission rates are being sought and implemented by hospital organizations due to the financial and health implications. A concern regarding heart failure 30-day readmission rates has been identified by a hospital clinical facilitator who contacted a faculty member and team of undergraduate students for collaboration in project completion and evaluation. A joint clinical and university educational team conducted a scholarly literature review, evaluated current heart failure patient education materials, and researched and gathered educational tools from other sources. Also, the team developed evidenced-based heart failure patient education materials to improve inpatient heart failure teaching in an effort to decrease 30-day readmission rates. The project team is considering possible future strategies that will be included in a white paper on
evidenced-based research to decrease readmission rates. Project evaluation will include overall heart failure readmission rate comparison between years. In addition, nursing staff perspectives on pre and post education will be analyzed.

Physics and Astronomy

Kathleen Ann Widmer, Roxanne Harriet Accola (231)
Faculty Mentor/Collaborator: Matthew M. Evans
Implementing Telemedicine in Rural Wisconsin

Telemedicine poses a promising solution for the health care disparity in rural areas. Access to health care providers and specialists is often limited, and patients may have limited resources to travel to larger cities to receive the care they need. Telemedicine programs allow patients to meet with specialists in larger cities while traveling only a limited distance to their local clinic. This project will provide insight for evaluating the efficacy and future potential of such programs as they are improving the quality and accessibility of health care in patients in rural areas. In addition, it examines the strengths and advantages in an existing telemedicine program within the Mayo Clinic Health System in Eau Claire and outlying clinics, along with areas cited that have either have changed or are still in need of improvement. Interviews were conducted with specialists in Eau Claire and practitioners in rural clinics involved in the implementation of the program.

Psychology

Forrest James Toegel, Elizabeth Mary Kerber, Michael Anthony Heiberger (40)
Faculty Mentor/Collaborator: Michael I. Axelrod
Investigating Smoking on a University Campus

Strong evidence suggests inhaling secondhand smoke may have substantial negative effects on one’s health (Barnoya & Glantz, 2005). An increasing number of universities have begun implementing policies to limit or prohibit smoking on campuses (Americans for Nonsmokers’ Rights, 2014). The present study was designed to investigate smoking on a university campus in relation to the university’s smoking policy. Naturalistic observations were conducted in several designated non-smoking areas, selected on the basis of relatively high foot traffic, and at several areas designated in the university smoking policy, selected for their proximity to high traffic non-smoking areas. Researchers recorded instances of smoking in designated areas in addition to other variables believed to be associated with smoking on campus including location, time, temperature, and weather conditions. Results show that more instances of smoking occurred in designated non-smoking areas than occurred in designated smoking areas. Results also suggested that variables correlated with smoking on campus might be predictive of smoking in designated non-smoking areas.

Watershed Institute for Collaborative Environmental Studies

Jennifer Marie Schmitz, Christopher Conrad, Zachary Patrick Kroening, Ian Charles Wetzel, Cory Adam White, Kristen Ann Walters, Bethany Lyn Valentine, Alayna Marie Spengler, Jonathan Dahlen (107)
Faculty Mentor/Collaborator: Crispin H. Pierce
External Collaborator: Jonathan Dahlen, UW-Stout
PM2.5 Airborne Particulates Near Frac Sand Operations

The rapid growth of hydraulic fracturing for oil and gas extraction in the U.S. has led to more than 110 permitted “frac” sand mines and processing plants in Wisconsin. Potential environmental health risks include: increased truck traffic, ecosystem loss, and groundwater and air pollution. Emitted air contaminants include fine particulate matter (PM$_{2.5}$) and respirational crystalline silica. Inhalation of fine dust particles increases mortality, cardiovascular disease, lung disease, and lung cancer. The current U.S. EPA annual PM$_{2.5}$ standard of 12 µg/m$^3$ is likely to protect the public from silica exposure risks. However, use of a filter-based ambient particulate...
monitor found PM$_{2.5}$ levels of 5.82–50.8 µg/m$^3$ in five 24-hour samples taken around frac sand mines and processing sites. Therefore, PM$_{2.5}$ monitoring around frac sand sites is needed to ensure regulatory compliance, inform nearby communities, and protect public health.

**Humanities**

**American Indian Studies**

**Savannah Christine Rigert (195)**  
Faculty Mentor/Collaborator: **Heather Ann Moody**  
*Needs Assessment for the Ho-Chunk Priory Project*

On September 23, 2013, the University of Wisconsin-Eau Claire entered a partnership with the Ho-Chunk Nation of Wisconsin. The intent of the partnership is to collaboratively create cultural and economic opportunities for Ho-Chunk students. One project includes the creation of a living-learning community at The Priory. The Priory is a former Benedictine monastery located three miles from the main university campus. A living-learning community (LLC) is a group of students living together within a particular residential area who share a common thread, which in this case would be Ho-Chunk/American Indian specific. A LLC will provide the social and academic support students need to realize a culturally enriching educational experience and will provide culturally responsive support to meet the needs of Ho-Chunk/American Indian students. The partnership is groundbreaking on many levels, and no other UW System institution has engaged in this type of partnership with a Native American community. In order to address the needs of both partners, a needs assessment was vital to determining not only programming needs but also space requirements to house the programs.

**Languages**

**Anneli Nelson Williams (241)**  
Faculty Mentor/Collaborator: **Johannes Strohschank**  
*The Port Washington Civil War Draft Riot: German Perspectives*

On November 10$^{th}$, 1862, a primarily German immigrant Civil War draft riot occurred in Port Washington, Wisconsin. The events following the disturbance led to the arrest and imprisonment of several rioters, prompting legal action regarding President Lincoln's suspension of habeas corpus. This led to the Wisconsin Supreme Court becoming the first appellate court to declare Lincoln's suspension of habeas corpus in areas not subject to martial law as unconstitutional; the US Supreme Court, however, did not come to this conclusion until the war was over. UWEC graduate student Susan T. Falch's dissertation, “The Port Washington Civil War Draft Riot: National Implications of a Local Disturbance,” delves into the riot and its ramifications. In my research, I am examining two local newspapers, “Die Seebote” and “Banner und Volksfreund,” and their articles upon the riot to aid Ms. Falch in presenting the German perspective towards the draft, riot and subsequent legal proceedings. My findings to this point have reflected strong dissent from the German populace towards Lincoln’s suspension of habeas corpus.

**History**

**Danica Marie Seyfert (203)**  
Faculty Mentor/Collaborator: **Erin K Devlin**  
*University of Eau Claire Oral Histories: Campus Life Rules & Regulations for Women of the 1940’s-60’s*

The goal of this project is an examination of gender issues which were prevalent on the University of Wisconsin Eau Claire campus during the 1940s-60s, especially in regards to women and the rules expected of them. Oral histories were collected from male and female alumni in order to preserve their memories as well as make
them available to future researchers and the public. After contacting alumni by letter and phone, interviews were held and recorded. Once completed, they were transcribed and submitted to the University’s archive.

The first round of interviews conducted by student researchers lacked responses relating to gender issues so the second round of the study reworked some of the questions that would be asked. The second round of interviews held more variety connecting to the gender issues on campus, creating better diversity in what was being told. The collection of these interviews can give an important look into the lives of the women who lived on campus during this era.

Rachel Ann Joslin-Zirngible (218)
Faculty Mentor/Collaborator: Patricia R. Turner
Changing Attitudes on Gender in Pre and Post-WWI Britain

Articles and books on WWI often argue that WWI ushered in a new era of gender expectations for women and men. The purpose of this project is to find out if this was a completely new change in attitudes about gender or if these changes began earlier. Our research also addresses whether or not these changes endured after the war. This project seeks to fill the gap in existing research of how these time periods compare. From a review of primary sources from before WWI we created hypotheses of the characteristics of traditional and non-traditional men and women before, during, and after WWI. We systematically examined the women’s journal the *Girl’s Own Paper* and the men’s journal *Wide World Magazine* identifying whether articles and stories contained characters representing traditional or non-traditional ideas of masculinity and femininity based on our hypotheses. The content analysis revealed that the largest shift in gender attitudes occurred during the war, but gender attitudes were still more non-traditional after the war than the years before the war. Non-traditional expectations for women were acceptable both before and after the war, yet men were expected to act more traditionally in both time periods.

Jessica Lynn Schummer (219)
Faculty Mentor/Collaborator: Patricia R. Turner
It All “Ads” Up: Women’s Roles in American Tobacco Advertising from 1880-1920

I argue that women’s roles in American tobacco advertising from 1880-1920 quickened the rise of consumer culture, shifted women’s rights issues to the forefront, and caused a lasting social change in accepted morals and values. I set out to prove that women were important players in the sale of tobacco in the era prior to national magazine advertising in America. My research questions many historians’ assumptions that women’s sexuality was their sole influence on the tobacco industry. I use multiple primary sources from 1880-1920 to prove women’s influence in other spheres, including cigar ribbon quilts, trade cards, and visual advertising not influenced by women’s sexuality. I use these primary sources and the statistics of rising numbers of women smokers to show increasing political and social independence among women during this time period. My main conclusion is that women played significant roles in the tobacco industry from 1880-1920, which was a male-dominated sphere for most of its history, and that these roles heavily influence the way historians should perceive the history of women in consumer culture in America.

Math and Computer Science

Computer Science

Justin Lyndon Feiock, Corey Douglas Feiock, Nicholas Alan Hasz (246)
Faculty Mentor/Collaborator: Peter J Bui
Social Gaming with Chromecast

Although personal smart devices are becoming a widely used gaming platform, there is currently no way to use these devices to collaborate with each other by displaying public information on a television screen. With the release of the Google Chromecast, methods are available which allow the streaming of content to a television screen. With this new technology, the ability to interact with an application both on a local device and a
remote screen is possible. This project explores using these separate pools of data by having both local interaction from each user on their Android devices, and public information on a centralized screen. We explore our intent by implementing a multi-player Texas Hold’em application. This system revolves around one centralized JavaScript based application which runs on the Chromecast. It then utilizes an Android application on separate devices which connect to the Chromecast. The devices will then receive their private information, such as their hand. The Chromecast will render the public information, such as the flop, turn, and river cards on the television screen.

**Cody Raethke (247)**  
Faculty Mentor/Collaborator: Christopher R. Johnson  
**LIDAR Visualization**

The purpose of this project was to find a way to display the 3D data representing the topography of the earth generated by LIDAR, a technology that uses lasers to measure the distance to the earth at a number of points. There are applications that can display the data, but we wanted to develop a more user-friendly program that can display the data in a web browser, using WebGL. In order to convert the raw data to a 3-dimensional object, we used Delaunay Triangulation to form triangles out of sets of points. We used Javascript and Three.js to display the data in a web browser using WebGL. Currently our research is still in progress, but we have managed to display the 3D models formed from the data, and we expect to be able to view the topography of various areas around Eau Claire, possibly even the UW-Eau Claire campus.

**Conor James Sherman, Adam Yakub Al-Ibrahim, Zachary Thomas Forster (248)**  
Faculty Mentor/Collaborator: Christopher R. Johnson  
**3D Visualization for Analysis of Superconductivity**

Facilitating the discovery of the parameters necessary for a material to maintain superconductivity is desirable throughout the material science community. Although numerous findings resulting from the use of 3D rendering already exist, it will remain a novel aspect of the computer science field while the need for conceptualization of abstract ideas persists. By interpreting a set of data from the material science department, we provide a new outlook on an otherwise abstract idea. This is accomplished through the development of an application for 3D visualization utilizing WebGL and OpenGL ES. While progress remains ongoing, we can conclude that 3D rendering continues to enhance the study of other fields. Through the collaboration of multiple disciplines, 3D rendering has reaffirmed its ability to shed new light on an existing concept. Lastly, the resulting application can be generalized to obtain the parameters to maintain superconductivity for any set of relevant data.

**Taren Jerald Leitzke (249)**  
Faculty Mentor/Collaborator: Daniel E. Stevenson  
**Analyzing Modified JPEG Images**

This project’s purpose is to create a free, open-source program on the internet that will tell someone how likely it is an image was modified and will highlight the modified areas. This project is significant because many pictures out there have been altered in some way, and while most are harmless, there are many that may cause harm in some way. Last year, we studied quantization tables, metadata, and error analysis to help determine how the techniques could be used to determine if an image was modified. This year, I used NetBeans’ drag-and-drop graphical user interface (GUI) ability to make a Java program that incorporates all the code that was written last year for the quantization tables, metadata, and error analysis techniques. The project is still in progress. Most importantly, it is hoped that in the future a better way to determine the percentage for the probability an image was modified can be found. It is also hoped that more analysis of the data can be included in order to generate charts for the user. This will likely include updates to the interface, and ideally the interface could also be made a bit more clean and polished in the future.
John Neil Rankin, Travis Alan Boettcher (255)
Faculty Mentor/Collaborator: Peter J. Bui
A Web Portal For An Animation Render Farm

Distributed parallel computing has been becoming increasingly important in both industrial and scientific endeavors; it is imperative that students are introduced to challenges and methods of high performance and high output computing. Due to the growing demand for increasingly complex digital 3D modeling and animation, last year, we built a software application that harnesses the computing resources of multiple networked machines to speed up the rendering of digital animated videos. This collaborative animation rendering system is called DSABR (Distributed System for Automated Blender Rendering). Using DSABR and computing resources at both UWEC and the Center for High Throughput Computing at UW-Madison, we were able to reduce the rendering time for a video that took 72 minutes on a single machine down to 5 minutes using our system. Although we have working product, we wanted to deliver DSABR this year as a Software as a Service. By creating a Web portal, we have created an easy User Interface where users can sign in, upload their blender file, set a few parameters, and be able to render their videos while utilizing DSABR.

John Kevin Fisher, Robert Martin Fisher (256)
Faculty Mentor/Collaborator: Peter J. Bui
Dark Nebula: Using the Cloud to Build a RESTful Web Service

Today, many web sites are now taking advantage of cloud computing systems to rapidly build scalable web services. In order to gain experience and learn about this field, we constructed an application to harness this technology. Specifically, we built our application using the cloud computing platform, Google App Engine, to make a URL shortener. URLs, which are used to navigate web browsers are often complex, making them difficult to memorize and share with peers. Our application receives complex URLs, condenses them, and stores them seamlessly using Google App Engine’s cloud. This web service can be accessed via a traditional web browser, but its notable feature is its RESTful API, or Representational State Transfer Application Programming Interface. Testing this web service revealed nuances and issues associated with programming with cloud computing systems.

Mathematics

Joseph Mathew Radlinger (137)
Faculty Mentor/Collaborator: Dandrielle C. Lewis
Classifying Subgroups in a Central Product of Groups

In group theory, the construction of new groups from old groups is very important. Classifying the subgroups of these newly constructed groups is not trivial. A central product of two groups is the quotient of a direct product with an amalgamated center. The goal of our project was to characterize subgroups in a central product of two groups. On the poster, we will present the background material on central products, provide an example to illustrate this concept, present our results from this research project, and discuss future work.

Maxwell T Dylla, Yeng Matthew Chang (212)
Faculty Mentor/Collaborator: Chris R. Ahrendt
Solution Behavior of the Two Dynamic Riccati Equations over Various Time Scales

The classic Riccati differential equation is well developed in the literature and has many applications in the field of physics. In this work, we examine the behavior of two dynamic Riccati equations over time scales, one of which has no analogue in the differential case. Note that time scale calculus unifies differential equations and difference equations. The focus is on asymptotic solution behavior of both dynamic Riccati equations on the time scale $\mu Z$, where $\mu$ is in the real numbers. The asymptotic solution behavior for both of these equations can be described using a band structure, where successive points in the solution can be predicted by the band that previous points reside in. Furthermore, the solution behavior of these two equations is found to be similar
for μ greater or equal to 0 and less than 2 but different for μ greater or equal to 2. We explore this difference in behavior by examining equilibrium solutions for each dynamic Riccati equation.

**Alexander Stanley Lasiuk (208)**
Faculty Mentor/Collaborator: James S. Walker

*Dissonance Analysis, Methods and Effectiveness*

Dissonance in music is the “movement of the music” otherwise described as roughness. In computing dissonance in music, we can compare and contrast different types of music styles from various regions. Computing dissonance analysis is done through Fourier transforms, looking at spectrograms, and comparing frequencies as well as amplitudes. We have examined one formula for accomplishing this created by Sethares, and compare it with a slightly modified method. The modified method has some variable changes, but looks very similar. We can show that the modified method is better in certain situations by consulting music theory texts. We will present our findings and show how, and what programs we used to analyze dissonance of sound. Hopefully this will open up new avenues for comparing and contrasting different music styles.

**Cassandra Marie Dale, Alexander Stanley Lasiuk (183)**
Faculty Mentor/Collaborator: Abra Brisbin

*A Comparison of Two Models with Multiple Phenotypes of Dogs with Cardiac Ventricular Fibrillation*

Families, or pedigrees, in which multiple individuals are affected by a trait can provide valuable information about the location of genetic variants which influence the trait. We have compared two methods of pedigree-based analysis on cardiac ventricular fibrilation in dogs, a trait composed of four correlated phenotypes. We will present a comparison of the results of both methods. We will also present a method to compute relatedness (kinship coefficients) in inbred pedigrees, which allows the association mapping method MultiPhen to take the subjects’ pedigree into account.

**Michael Charles Loper, Bryan Christopher Picchiottino, Isaac Joseph Anderlik, Thao Phuong Tran (186)**
Faculty Mentor/Collaborator: Michael R. Penkava

*The Moduli Space of 5|0 Dimensional Complex Associative Algebras*

Algebraic structures are familiar objects of study for undergraduates in physics and mathematics. In our research, we are attempting to classify all of the algebras on a 5|0 dimensional complex space. To do this, instead of looking at algebras as sets of rules, it is helpful to consider algebras as objects in a given space. This area of research is significant to physicists and mathematicians alike. In this new view, we encode our algebras as something called a codifferential. We are interested in knowing whether our algebras are structurally the same as (isomorphic to) other algebras in the space. We are able to determine if the algebras are isomorphic by comparing their codifferentials; when they are equivalent, then they determine isomorphic algebras. The set of all equivalence classes within a certain dimension is called the moduli space of algebras of that dimension. The method of construction relies on the fact that any finite dimensional non nilpotent complex associative algebra is either semisimple or is an extension of a semisimple algebra by a nilpotent ideal of smaller dimension. While this work is still in progress, ultimately we hope to give a complete classification of the 5|0 dimensional moduli space.

**Austin William Goodrich, Jasmine Mei Lin Nielsen (205)**
Faculty Mentor/Collaborator: Aba Mbirika

*Arbitrarily Large Regions of Invisible Integer Lattice Points*

Can one find arbitrarily large squares or cubes of integer lattice points in which every point is not visible from the origin? The answer is yes; we call these invisible regions “hidden (or invisible) forests”. Approximately 40% of all integer lattice points are invisible in the plane from the origin and this can be shown by an application of the Chinese Remainder Theorem (CRT) along with a prime matrix can be used to locate hidden forests, but not necessarily those that are closest to the origin. However, we believe that the CRT can predict the closest forests by permuting the prime
matrix entries. We have determined that for an invisible forest to exist, the various coordinates must have a certain number of prime factors. This number depends on the size of the forest. For a $2 \times 2$ to exist, each $x$ and $y$ coordinate-value must have a minimum of 2 prime factors. In comparison, a $2 \times 2 \times 2$ must have at least 4 prime factors for every coordinate-value. We have also discovered $2 \times 2 \times 2$ and $4 \times 4$ hidden forests, however, it is unknown whether or not closer forests exist. We are currently analyzing this question.

Taylor Martin Rand, Katie Elizabeth Beck (206)
Faculty Mentor/Collaborator: Dandrielle C. Lewis
*Sonia Kovalevsky High School and Middle School Mathematics Day Assessment and Workshop Design: “Di-versity in Math: Gaming to Promote Exposure!”*

The Sonia Kovalevsky High School and Middle School Mathematics Day is a project that aims to expose high school and middle school young women to opportunities available in math and science by creating fun and exciting experiences through workshops, plenary talks, panel discussions, and a math competition. This year our goal was to encourage diversity in math and to increase underrepresented group participation. This was achieved, as we had representation of diversity through the leaders and students that attended. For this project we developed game-themed, exciting, interactive workshops that use manipulatives to introduce and expand the math concepts of geometry, probability, statistics, algebra, trigonometry, and calculus. We created a geo-caching activity where the girls use iPads to solve math challenges and to navigate through their respective routes. We also created a math competition titled “Math Jeopardy”. All the developed activities were created to actively engage the young women and excite them to continue their studies in math and science. Questionnaires were distributed to the girls, asking them to reflect on their experiences. To continually achieve success in promoting women and diversity in the STEM fields, we plan on using this feedback to assess our day.

Alexa Ray Syryczuk, Christopher Allen Magyar (207)
Faculty Mentor/Collaborator: Ursula A. Whitcher
*Construction 4 Dimensional Tops and Analyzing Fano Polygons*

The polar duality transformation takes a polytope with integer lattice points to its polar dual. If the polar dual is also a lattice polytope then we refer to the polytopes as reflexive polytopes. Reflexive polytopes have been classified in 2, 3, and 4 dimensions, with 16, 4,319 and 473,800,776 classes reflectively. The goal of these classes is to get a better understanding of their relationship to string theory and extending to high dimensions. A lattice polytope that contains the origin is known as a top. Bouchard and Skarke have classified the 3 dimensional tops corresponding to each class of reflexive 2-dimensional base polytopes. We describe two related projects examining reflexive polytopes in several dimensions. In 3 and 4 dimensions our examinations dive into combinatorial questions, while in 2 dimensions the investigation is mainly number theoretic. We use triangulations of 3 dimensional reflexive polytopes to construct new, “exceptional” examples of tops. We specifically analyze exceptional tops from different reflexive simplices. We construct polynomials from these polar dual Fano polygons, the 2 dimensional reflexive lattice polytopes, and show there exists a symmetry between the solutions of these polynomials over finite fields.

Jordan Michael Jenkins (213)
Faculty Mentor/Collaborator: James S. Walker
*Mathematical Analysis of 20th Century Classical Music: Ottorino Respighi’s Pines of Rome*

Classical music in the 20th century reached a new level of complexity in music theory. Italian composer Ottorino Respighi’s orchestral work *Pines of Rome* is one of these works. Mathematical analysis of this music adds new insight into how this music functions outside of theoretical analysis. In this project the fourth movement of *Pines of Rome*, entitled “Pines of the Appian Way,” is analyzed using spectrogram processing in Audacity, rhythmic layering in the form of circular graphs, and measuring of musical dissonance (non-harmonious clashing) through a computer program. This is done alongside the musical score to see how the two methods line up. After comparison of each method, most of what is contained in the score is evident through mathematical means of analysis, and adds insight into what makes the music sound the way that it does.
Adam Nicholas Schneider (214)
Faculty Mentor/Collaborator: James S. Walker
*Discovery of Offbeatness in Rhythm and Correlation between the Western System*

This project created a new, weighted, measure of the off-beatness of rhythms, which is a calculation determined by if the rhythm is predominantly on the beat or on the upbeat (thus off-beat). This calculation is done with a clock that corresponds to how many notes are in the rhythm. I divide the clock evenly as many times as possible and use this information determine how many each number is “hit,” this is the on-beat because the symmetry makes this beat feel “normal.” I then subtract the total number of even divisions by how many times the number is hit, this is the “off-beatness value” of each number. I compare the numbers to the rhythms I am interested in looking at and I compared this new measure with an unweighted measure constructed by Touissant, which only gives the numbers a value of 1 if it’s hit or 0 if it’s not hit. The comparison showed that the weighted measure was better able to distinguish between a variety of rhythms found in world music. I also discovered a pattern: the higher the off-beatness, the less applicable that rhythm is to traditional time signatures. For instance, the lower the off-beatness, the more likely the rhythm could be applied to 4/4 time.

Grant Mackenzie Roth (215)
Faculty Mentor/Collaborator: Christopher W. Davis
*Distinguishing Colored Links*

A link is an array of circles with various numbers of twists in space which never cross each other. To give a better picture, one should imagine a collection of strings tangled up with their ends fused together. Classically in link theory tools were studied which treat all of these strings the same. The recent idea of coloring the components of links has spawned a collection of new tools which do distinguish the components. Using these tools we construct examples of links whose components cannot be interchanged, but which are elementary in the sense that if a single string is removed then the link comes undone. This work represents an ongoing project.

Lyle David Paukner (216)
Faculty Mentor/Collaborator: Jessica J. Kraker
*Penalized Regression Computation and Simulations*

Linear multiple regression explores the relationship of a response variable $y$ to predictor variables $x_1, x_2, \ldots$, and $x_i$ by relating $y$ to the predictors via the model: $y = b_0 + b_1 x_1 + b_2 x_2 + \ldots + b_k x_k + \varepsilon$ where $b_0, b_1, b_2, \ldots, b_k$ are constants and $\varepsilon$ is “noise” In this context, we examine the problem of “sparseness” of predictors, i.e., when an $x_i$ has very few observations with non-zero values of the variable under consideration. This implies that we see the effect of $x_i$ in the model for only a few data points. We consider this in the specific realm of high-dimensional data, when the number of predictors $p$ is close to, or even larger than, $n$, the number of individuals for which data is available. Conventional regression models either have no solutions or, at best, have solutions that are highly sensitive to even small changes in the data. Thus, “penalized” regression methods are used, which add a constraint on the values fit by the model. Using various penalized regression models, a cross-comparison of the different methods on simulated data will identify situations (for sparse-predictor data) in which one method is preferred over another. We include situations in which only a subset of available predictor variables are significant within the true model.

Mitchell Lee Lemons, Austin David Riedl (234)
Faculty Mentor/Collaborator: Colleen M. Duffy
*Algebra Associated with the Hasse Graph of the N-Dimensional Semi-Hypercube*

The primary goal of our project is to determine the structure of an algebra that is associated to the n-dimensional semi-hypercube and its symmetries. We can consider a unit n-cube with one vertex at the origin, keep only those vertices with an even number of 1’s, and form new faces. Each symmetry of the n-dimensional semi-hypercube can be thought of as acting on the coordinates of the vertices. For each symmetry we construct the (Hasse) graph consisting of fixed k-faces of the semi-hypercube under the action. From each Hasse graph, we count the downward paths between each pair of levels in the graph to determine the structure of
the algebra. We have been able to determine a formula giving the number of fixed k-faces and how they are connected dependent only upon the symmetry acting on the semi-hypercube. Furthermore, we have determined part of the generating function that describes the algebra, which also is only dependent upon the symmetry.

Logan Paul Cooley, Caleb Hewitt (237)
Faculty Mentor/Collaborator: Vicki M. Whitledge
An Actuarial Approach to Scholarship Funding

The purpose of this research was to conduct sensitivity analysis for scholarship donations. We tested certain factors such as inflation rate, interest rate, deferral years, dollar amount, and number of scholarships given per time period. We used a model that allowed us to run many different scenarios, making changes to individual variables. Our goal was to see which variables made the biggest changes to the donation amount required. The results of this research can show potential donors a recommendation for the magnitude of their donation and how many years of scholarships their donations will provide.

Michelle Leann Pflughoeft, Aleksandra Gojko Mandic, Guoxi Lei (184)
Faculty Mentor/Collaborator: Abra Brisbin
Statistical Association Mapping with Three Way Ancestry

Using ancestral background can improve the ability to detect genes that are associated with diseases. Ancestry that is a mixture from three populations, such as is observed in many Latino individuals, poses challenges for traditional methods of analysis. In this poster we compare methods of analysis in association mapping with three way ancestry. We found that the optimal method depended on whether the effect of ancestry interacted with the genotype, and whether the effect was due to genome-wide ancestry or local ancestry.

Mathematics and Physics and Astronomy

Nicholas Carl Glaeser (235)
Faculty Mentor/Collaborators: Alexander J. Smith, Paul Jonathan Thomas
Computational Model of Water on the Asteroid Ceres

The 2014 discovery of water plumes on the dwarf planet Ceres, from data obtained by the Herschel Infrared Space Observatory is notable. It represents the fourth known reservoir of liquid water in the solar system, after Earth, and the outer solar system moons Europa and Enceladus. Liquid water is of considerable importance in the universe due to its ubiquitous role in life on Earth. We present the results of a computational thermal model of a liquid water - ice system representing the crust of Ceres. This system is heated by sunlight (Ceres is 2.8 times further away from the Sun than the Earth) and radioactive heating in its rocky core. We show calculated results for the likely steady state depth to the liquid water layer for a variety of plausible assumptions.

Natural and Physical Sciences

Biology

Gavin Reid Sunde, Timothy Donald Lauer, Jordan Teal Montpetit, Anna Patricia Rice, Thomas Stanfield Smith (57)
Faculty Mentor/Collaborator: Derek J. Gingerich
Characterization of Lines Identified in a Genetic Screen for Genes Involved in Red Light Responses in the Model Plant Arabidopsis thaliana

LRB1 (Light-Response BTB1) and LRB2 are two genes in the red light signaling pathway in the model plant Arabidopsis thaliana, acting as negative regulators of the pathway by reducing levels of Phytochrome B (PhyB), the primary red light photoreceptor in plants. Plants with mutations in both the LRB1 and 2 genes have increased
sensitivity to red light making them, among other things, more shade-tolerant. In order to identify additional genes which have roles in red light responses we conducted genetic screens to identify mutations that suppress or enhance the shade tolerant phenotype of \(lrb1/lrb2\) mutant plants. These screens identified more than 400 separate lines of plants that have suppressor or enhancer phenotypes. Results from characterization of some of these lines (including detailed phenotypic analysis and examination of PhyB protein levels) will be presented. Mapping and identification of the mutations responsible for the suppression/enhancer effect may implicate new genes in red light signaling and responses in plants.

Alyssa Jean Colwitz (1)
Faculty Mentor/Collaborator: Todd A. Wellnitz

Water Bears on Trees – Does Tardigrade Diversity Change as a Function of Bark Roughness?

Tardigrades, or water bears, are unique, microscopic invertebrates found on moss, lichen and tree bark. While quite common, tardigrades are also extremophiles that can tolerate environmental conditions inhospitable to most organisms. Little is known about their patterns of distribution and abundance in and around the UW-Eau Claire campus, so we designed a study to examine tardigrade communities found on trees in Putnam Park. We wanted to determine if tree species having different bark characteristics and growing in different habitats influenced tardigrade diversity. We hypothesized that trees having rough bark would show more diverse communities than smooth-barked species, and that trees growing closer to the Chippewa River would show greater tardigrade abundance. We will sample four tree species having different bark characteristics – basswood, green ash, river birch and silver maple – on the upper and lower terraces of Putnam Park. Four individuals of each tree species will be sampled from each terrace, giving a sample size of 28 trees. In the laboratory, bark samples will be soaked in water and tardigrades will be extracted, identified and counted. We expect tardigrade community composition to be a function of bark roughness, not tree species richness, and that lower terrace communities will be more diverse.

Ong Xiong, Nacy Joua Xiong (2)
Faculty Mentor/Collaborator: Todd A. Wellnitz

The Intersection of Sensory and Chemical Information in the Anti-Predator Response of \(Daphnia pulex\)

\(Daphnia pulex\) (common water flea) alter their morphology and life history while under predation stress, signaled by exposure to predator-induced chemical signals, called kairomones. \(D. pulex\) have been shown to lengthen their tail-spine and produce more offspring in the presence of fish kairomones. We investigated whether sensory information about predation risk could modulate the anti-predator response. We expected that \(D. pulex\) exposed to fish kairomones under dim light, which would reduce the ability of fish to find their prey, would result in a reduction of the anti-predator response. We allowed \(D. pulex\) to reproduce under bright or dim light and with or without fish. We counted the number of offspring and measured their relative tail-spine length. Results show that \(D. pulex\) exposed to kairomones under dim light had nearly twice as many offspring as those under bright light \((t=2.14; \ p<0.10)\). The greater number of offspring may have resulted from increased survivability under dim light and lower energetic expenditures on anti-predator defense. This is supported by data showing that \(D. pulex\) exposed to kairomones had shorter tail spines under dim than bright light \((\text{ANOVA, } p<0.10)\), and also those \(D. pulex\) that were not exposed to kairomones \((\text{ANOVA, } p<0.10)\).

Sarah Marie Schieffer, Nicole Lynn Bauer, Brandon Jeffrey Urhammer, Sarah Rogers Bartholomew (3)
Faculty Mentor/Collaborator: Todd A. Wellnitz

The Effects of Lake Productivity and Campsite Usage on Rusty Crayfish Abundance within the Boundary Waters Canoe Area Wilderness

The invasive rusty crayfish, \(Orconectes rusticus\), has wide-ranging and negative effects on lake ecosystems. In 2012, a class project began assessing the relationship between \(O. rusticus\) abundance and lake productivity in the Boundary Waters Canoe Area Wilderness (BWCA). Here we expand on this research and study \(O. rusticus\) abundance in relation to BWCA campsites. We counted the number of crayfish near \((<10 \text{ m})\) and distant \((>15 \text{ m})\) from campsites during daytime and nighttime hours using active sampling (timed visual counts) and passive sampling (minnow traps). Captured crayfish were identified, sexed, and had their carapace length measured.
Lake productivity was measured using a secchi disk. Our data show that rusty crayfish are more active at night and more abundant near campsites. Combining our data with the 2012 study, we found a positive relationship between *O. rusticus* abundance and lake productivity, suggesting that rusty crayfish either respond to, or are a factor in, lake eutrophication. These results suggest that enhanced food resources near campsites (e.g., from discarded leftovers and fish remains) may trigger rusty crayfish congregation, making it a factor to consider in assessing their populations. Overall, we found that *O. rusticus* had invaded more BWCA lakes than was previously known.

**Marissa Hansen, Hunter Joseph Promer, Meghan Marie Smith, Gina Rose Ann Wagner**
Faculty Mentor/Collaborator: **Todd A. Wellnitz**

*Substrate Preference in *Orconectes rusticus* – Does Size Matter?*

Competition for habitat can play an important role in determining species distributions. In many streams of the upper Midwest, the invasive rusty crayfish, *Orconectes rusticus*, has displaced native crayfish. It is known that *O. rusticus* aggression plays a role in excluding resident species; however, less is known about species-specific habitat preferences. We hypothesized that *O. rusticus* displaces natives by occupying preferred streambed substrates; specifically, we predicted that crayfish prefer either small substrates in which they can burrow, or larger substrates that form crevasses they can occupy. To test this, *O. rusticus* and native crayfish will be presented with a series of five substrate sizes scaled by crayfish body length: 3x, 2x, 1x, 0.5x and <0.5x. Choice experiments will test two substrates at a time until all permutations are compared. Rusty and native crayfish species will be tested separately to determine their substrate preference, and then together to determine competitive outcomes. We predict that: 1) *O. rusticus* will prefer large, crevasse-forming substrates to small substrates in which they can burrow because of lower energetic cost, 2) substrate choice will depend on crayfish body size, with smaller crayfish preferring smaller substrates, and 3) *O. rusticus* will win all competitive contests with natives.

**Justin William Mabin (28)**
Faculty Mentor/Collaborator: **Daniel P. Herman**

*Multiplex Polymerase Chain Reaction Assignment of Community and Hospital Acquired Methicillin-Resistant* Staphylococcus aureus *Isolates from Ecuador, SA*

Methicillin-resistant *Staphylococcus aureus* (MRSA) is an antibiotic-resistant strain of the bacterium *Staphylococcus aureus* that is responsible for many community and hospital-acquired infections world-wide. A research project aimed at determining the prevalence and genotypes of MRSA in Ecuadorian hospitals was conducted as there was a lack of data regarding the prevalence of MRSA in Ecuadorian hospitals. Swabs from patients and staff in Ecuadorian hospitals, as well as from community members, were collected. The samples were then screened using cultural and polymerase chain reaction (PCR) based identification techniques to determine MRSA prevalence. Further genetic analysis to determine subtypes of *S. aureus* present in Ecuadorian hospitals utilizes the variable staphylococcus cassette chromosome mec (SCCmec). The mobile genetic element SCCmec confers methicillin resistance in *Staphylococcus*. A multiplex PCR procedure for assigning subtypes of *S. aureus* was performed to amplify multi-loci sequence types of a large heterologous element in methicillin resistant *S. aureus* species. All forty-two presumptively MRSA samples were subtyped. Thirty-five samples were found to be Type IV, a community acquired-MRSA strain. One sample was found to be Type V, two samples were Type III and four were found to be untypable as they did not display a genotype of any of the five subtypes.

**Seyeon Kim (29)**
Faculty Mentor/Collaborator: **Damani N. Bryant**

*Is There a Sex Difference in Estrogen Regulation of AKT Signaling in Prenatal Neurons?*

Estrogen protects female brains from traumas like stroke. For example when a male and female get a stroke at the same time, the female is more protected from damage and will recover faster. However when women reach menopause, this neuroprotection is lost. The biological question I’m asking is which cellular pathway may be responsible for the sex difference. It is possible that Akt (also known as Protein Kinase B) phosphorylation may be the pathway that is responsible for neuroprotection in females. To answer this question, primary
cortical neurons from rat pups will be sorted by sex and will be starved in low glucose and then these sorted neurons will be exposed to estrogen for fifteen minutes. After exposing sorted neurons to estrogen, samples will be immunoblotted using antibodies to observe two things: the amount of PhosphoAkt and amount of Akt. If female neurons have significantly higher PhosphoAkt to Akt ratio than male neurons then this could indicate that through estrogen stimulated Akt phosphorylation, female neurons may be protected against traumas. When we find the cellular pathway of estrogen and PhosphoAkt, it could be useful for other medical research for preventing and treating brain injuries like strokes.

Daniel Frank Ferrise (30)
Faculty Mentor/Collaborator: Damani N. Bryant
Sexual Differences in Neuroprotection of pERK/ERK due to 17-Beta-Estradiol Treatments

Alzheimer’s disease is an important disease, affecting both women and men. One area of study is the effects of 17-β-Estradiol (E2) on neuro-protection. Females have a sharp increase in Alzheimer’s onset following menopause, when E2 production decreases greatly. The purpose of this study is to determine where the cell signaling differences inlay. Our point of interest is whether phosphorylated ERK and total ERK (pERK/ERK) concentrations are altered in response to E2 treatments with male and female rat pup neurons. Rat pup neurons will be collected and plated, treated with E2 or an ethanol control, and collected so western blots can be run to determine basal and estrogen-induced levels of pERK/ERK. Based on preliminary data, we expect to see a decrease in ERK phosphorylation in males. Furthermore, we do not expect to see a decrease in ERK phosphorylation in females.

Benjamin Ziebart (31)
Faculty Mentor/Collaborator: Damani N. Bryant
Dimorphic Response of Neurons to Estrogen

Our research is intended to understand why there is a sex difference in the brain’s response to estrogen. Specifically, we want to understand which signal transduction pathway used is important for this sex difference. Rat neurons being used as a model system will help us understand why males and females respond differently to the hormone estrogen on a cellular scale. To do this, we have employed the technique of western blot or immunoblotting to label our protein of interest which is cAMP response element binding protein (CREB). This has allowed us to quantify and identify the response that this protein has to different levels of estrogen treatment and the difference between the sexes. Our research will show whether or not female neurons show a stronger response to estrogen indicated by the amount of activated CREB proteins. If CREB is activated only in one sex, future studies will stimulate or block this pathway to confirm that this pathway is important for the sex difference in the brain’s response to estrogen.

Luke Thomas Mike (32)
Faculty Mentor/Collaborator: Damani N. Bryant
Testosterone Mediated Neuroprotection from FasL-Induced Apoptosis within Purkinje Cells

Neurodevelopmental disorders such as those of schizophrenia, autism, and medulloblastoma are generally found in greater incidence in males and have all shown to have a detrimental effect on the number of Purkinje Cells (PCs) within the cerebellum. Testosterone is a sex steroid hormone which fulfills responsibilities regarding the masculinization of the male brain during development and has been shown to have neuroprotective properties. Determining testosterone’s impact on the survival of PCs during development is of particular importance if we are to identify how such diseases arise. In an effort to do just this, the Fas Ligand (FasL), an apoptotic (programmed cell death) inducer, theorized to play a role in neurodevelopment, was used to assess PCs’ susceptibility to death after the first testosterone surge in rats (embryonic day 19). Assessment of susceptibility to death utilized both Live/Dead assays and immunocytochemistry. At the conclusion of this study, we will know whether testosterone is neuroprotective against FasL-treated PCs and begin to theorize its potential role in neurodevelopmental disorders such as schizophrenia, autism, and medulloblastoma.
Erin Marie Leisen, Annie Jean Szmanda (33)
Faculty Mentor/Collaborator: Daniel P. Herman
Prevalence of MRSA Colonization of Patients and Staff in a Regional Hospital in Cuenca, Ecuador

Methicillin-resistant *Staphylococcus aureus* (MRSA) is an antibiotic-resistant strain of the bacterium *Staphylococcus aureus* that is responsible for many hospital-acquired infections world-wide. Very little information is currently available on the prevalence of MRSA colonization of patients and staff in Ecuadorian hospitals. During the summer of 2012, nasal swabs were collected from 550 volunteers in a regional public hospital in Cuenca, Ecuador to determine the prevalence of MRSA colonization within the hospital. The nasal swabs were inoculated onto mannitol salt agar supplemented with 4 mg/ml oxacillin to select for potential MRSA. Mannitol fermenting colonies were further examined using Gram stain and catalase tests. Colonies consisting of catalase positive Gram positive cocci were tested further using a latex agglutination test to detect bacteria producing coagulase and/or protein A. Isolates that were oxacillin-resistant, mannitol fermenting, catalase positive, Gram positive cocci with a positive latex agglutination reaction were presumptively identified as MRSA. Thirty-two presumptive MRSA isolates were identified from the 550 volunteers that were sampled resulting in a prevalence of 5.8% for MRSA colonization. These results indicate that MRSA is present within the Ecuadorian hospital examined, and the potential for hospital-acquired infections exists.

William H. Meger, Tom Smith (58)
Faculty Mentor/Collaborator: Derek J. Gingerich
Generation and Analysis of *Arabidopsis thaliana* Plants With Mutations in the Red Light Response-Mediating Light Response BTB (LRB) and Phytochrome Interacting Factor (PIF) Genes

The ability to respond to the amount and quality of light is vital to plant growth and development. For this reason, plants have evolved a sophisticated set of light-sensing and response pathways, which are used to extract detailed information about their environments. The *Light Response BTB (LRB)* and *Phytochrome Interacting Factor (PIF)* genes have been shown to be critical mediators of red light responses in the model plant *Arabidopsis thaliana*. The LRB genes are proposed to encode proteins that regulate levels of the Phytochrome B red light receptor, while the PIF genes encode transcription factors that are key regulators of red light responses. The precise relationship between the LRB and PIF genes in red light signaling is unclear, however. We are taking a genetic approach to address this question, by creating plants with mutations in different combinations of LRB and PIF genes. By comparing the growth and light responses of these lrb/pif mutants to wild-type, lrb mutant, or pif mutant plants we can gain a better understanding of the relationship of these two families of genes and their participation in the phytochrome-mediated red light response pathway in plants.

Cynthia Kay Koenigsberg, Claudia Adina Seravalli (59)
Faculty Mentor/Collaborator: David Lonzarich, Winnifred M. Bryant
Variability in Ostariophysan Fish Brain Anatomy in Relation to the Neural Pathway of Innate Fear Response

Fish within the superorder Ostariophysi (e.g. minnows, catfish, suckers) exhibit a response of innate fear upon exposure to skin extracts of other fish, or Schreckstoff’s substance. Naturally, the study of innate fear has applications in medical research as a model of mammalian stress. The neuro-anatomy of Zebrafish, in particular, is well known due to their use in medical research, but brain anatomy in other ostariophysans varies and has yet to be thoroughly examined. We seek to examine the brain structures of fish in the ostariophysi superorder and determine a protocol for immunohistochemical staining in order to accurately measure the neural activity during an innate fear response. We have collected and compared cross sectional and gross anatomical images of various species of fish within the ostariophysi superorder. We have also tested various protocols for using immuno-labelling to locate the creek chub neural activity of c-Fos, a protein that is expressed in the brain in response to Schreckstoff’s substance. We plan to use our results to ultimately characterize the innate fear response in ostariophysian fish, and by examining the brain structures of different fish we will be able to characterize the neural pathways of the response.
Christopher Ryan Bader, Nicole Lynn Bauer, Cory A. Depatie, Sarah Marie Schieffer (60)
Faculty Mentor/Collaborator: David Lonzarich

How Birthdate Matters in Bluegill

Bluegill (*Lepomis macrochirus*) are a common component of lake and backwater river habitats. Lakes and rivers differ dramatically in many abiotic and biotic conditions; this suggests that a fish species inhabiting both environments may exhibit morphological traits, growth, and survival patterns specific to their environmental setting. Our main goal is to evaluate effects of environmental setting and birth date on individual growth. Previous research indicated five morphological traits likely to show environmentally induced variability: caudal peduncle length and depth, anal fin totals, eye size, and body depth. Approximately 800 juvenile Bluegill were collected from Pine Lake and the lower Chippewa River, July and September 2013. Age estimates were obtained from daily growth rings in the otoliths of juvenile Bluegill. All fish were measured for length and weight. A frequency distribution was constructed to analyze survivability patterns among two spawning periods in lakes and rivers. Shifts in the distribution of birthdate can indicate selective mortality, targeting either fish born early or late in the spawning season depending on the direction of the distribution shift. Our findings are still preliminary, but the research suggests that river and lake environments exert different selective pressures on the morphology, growth and survival of Bluegill.

Andrea Nicole Swanson, Sarah Renee Steffen, Alyssa Marie Vogt, Kayla Rose Weiheing, Darellynn Mae-Yuin Oo (61)
Faculty Mentor/Collaborator: David Lonzarich, Evan R. Weiher

Fish Trait Diversity in Shallow Water Habitats of a Large River

Fish ecologists have long been interested in understanding the factors that regulate the community structures in river habitats. Recent work on this subject has focused on examinations of fish trait diversity as a method for revealing rules of community assembly. During summer 2013, fish communities were studied in the lower Chippewa River, Wisconsin; a water body that contains ~70% of all fish species in the state. Our objective was to explore determinants of fish community structure in shallow water habitats (i.e., backwaters, riffles and bars) of this river by measuring species-specific morphological traits associated with movement and feeding. Seventy-two habitats were sampled in summer 2009, and 21 were resampled in 2013. Fish from 30 common species were measured for 25 different morphological traits. Using these traits and fish survey data from 2009 and 2013, we ordinated species into multidimensional trait space to characterize patterns of trait diversity within and between specific habitat types. Although preliminary, our analyses suggest that fish species are sorted into specific habitat types based on shared swimming traits, but that coexistence within a given habitat is based on differences in species-specific feeding strategies.

Justin Anthony Walkoviak, Katlynn Marie Kralewski, Erinn Mary Larsen Van Alstine, Kristine Gabriela Brown, Bethany Lyn Valentine (62)
Faculty Mentor/Collaborator: David Lonzarich

Factors Contributing to Variability in the Occurrence of Alarm Cells in a Minnow Species

Fish from the superorder *Ostariophysi* (e.g. minnows, suckers, and catfish) possess specialized epidermal cells called alarm substance cells. Following predation events, chemical alarm substances are released, triggering a fear response and increasing the sender’s inclusive fitness. The most accepted hypothesis proposes an immune system function for these cells. In previous research conducted by UWEC undergraduates, examinations of museum specimens from two minnow species revealed that variability in alarm cell densities was strongly correlated with body size, mucous cell densities, epidermal thickness, and to a much lesser extent, black spot parasite body burden. The purpose of this research was to develop a more comprehensive, quantitative understanding of the effects these, and other factors, have on variability in alarm cells densities by studying a widespread minnow, the Western Blacknose Dace (*Rhinichthys obtusus*). Dace were collected in late summer 2013 from different streams around Northwestern Wisconsin. Our subsequent analyses have included five biological variables (size, condition, mucous cell densities, epidermal thickness and black spot parasite load), all of which have been examined in relation to alarm cell densities. Path analysis will be used to quantify the effects of
parasites in shaping patterns of variability in the density of alarm cells in fish epidermis.

Justin Anthony Walkoviak, Zachary Stephen Nonn, Amanda Jean Reed, Quinn Bennett Collins, Nathan Daniel Peterson, Kate Marie Beaton (63)
Faculty Mentor/Collaborator: Evan R. Weiher
Beta Trait Diversity Along a Shade Gradient in Pine Barrens in Western Wisconsin

Biotic and abiotic filters can act to limit the variability of functional traits between communities. This variability is also known as the beta trait diversity. Communities with low trait variability are likely deterministically assembled from the regional species pool. The types of filters that likely exist in pine barren include interspecific competition, nutrient availability, shade from tree canopy cover, and soil moisture. The objective of this study was to determine the effects these filters have on the assembly of plant communities within a pine barren in West Central Wisconsin. The environmental filters listed above were measured, vascular plant species were identified, and samples of stems and leaves were collected from a total of 80 one square meters plots. Measured functional traits included specific leaf area, leaf dry matter content, leaf size and shape, plant height, and stem density. Monte Carlo simulations will be used to test if the trait diversity is greater than or less than what would be expected under random or neutral assembly. We expect that traits of plants within shaded communities will be more similar than would be expected by random chance, suggesting more deterministic assembly in shaded plant communities.

Andrew Michael Rankin, Breana Rae Meyer (64)
Faculty Mentor/Collaborator: Chris H. Floyd
The Yellow-Bellied Marmot as a Model Study Organism for Monitoring the Effects of Climate Change in the Great Basin

One of the most striking effects of climatic change is the upslope shift in distributions of montane species. While higher elevation habitats provide refuge from an increasingly hotter climate, the amount of suitable habitat decreases the closer a species gets to the summit. Such habitat disruption threatens montane species with extinction. The effects of climate change are particularly severe on insular mountain ranges, such as those that characterize the Great Basin in western North America, where narrow uplifts form islands of montane habitat surrounded by “seas” of arid lowlands. Understanding the effects of climate change on montane species in the Great Basin requires accurate information on habitat requirements. We are studying the habitat requirements of the yellow-bellied marmot (Marmota flaviventris), a large rodent that lives in burrows dug into rocky, montane meadows in the Great Basin. Our research focuses on marmot populations at relatively dry, warm, low-elevation sites, which represent the extreme limits of marmot habitat. Our observations during June 2013 suggest that these otherwise marginal sites contain relatively cool microenvironments that allow marmots to persist. We also found evidence that marmots have since gone extinct in a mountain range where they were documented during the last century.

Cody Ronald Fisher, Monica Tlachac (88)
Faculty Mentor/Collaborator: Julie A. Anderson
Localization of Candida albicans Mbp1 Using a Gfp Fusion Protein

The yeast Candida albicans is the most commonly isolated yeast in human disease. Infection involves a shift from a unicellular form to an invasive, multicellular form and the Mbp1 protein plays a role in this morphological transition. C. albicans MBP1 is expressed in a S. cerevisiae MBP1 knockout strain in order to assess whether the MBP1 protein carries out similar functions in both organisms. Our results show that C. albicans MBP1 suppresses a synthetically lethal mbp1Δ/swi4Δ mutant, indicating a functional replacement of S. cerevisiae’s Mbp1. We hypothesize C. albicans Mbp1 is involved in pathogenesis through the regulation of cell cycle genes. If Mbp1 is indeed a gene regulatory protein, it is localized to the cell nucleus. To investigate the cellular location of Mbp1, a version of Mbp1 that is tagged with a fluorescent marker protein (GFP) is being generated. We are using two approaches: a quick-change protocol involving PCR (J.W. Bok, G. Fischer and N. Keller, personal communication), and a recombineering approach. The process of creating an Mbp1-GFP fusion protein and microscopic images of cells expressing the Mbp1-GFP fusion will be presented.
Andrew Timothy Schultz, Robert Glenn Olson (89)  
Faculty Mentor/Collaborator: Daniel S. Janik  
Does Short-Term Blocking of a Mouse’s Exercise Wheel Reduce the Efficacy of Non-Photic Clock Resetting Agents?

Circadian clocks are an important part of biological organization. For these clocks to be effective in helping organisms to adapt to their environment, they have to be reset occasionally. We have found three manipulations that, when administered in the middle of the sleep period, can reset the mouse’s circadian clock: transition to complete darkness, administration of yohimbine, and administration of methamphetamine. Recently we have had an indication that these manipulations may not exert their effects directly on the clock, but may do so by increasing locomotion. To test this, we will administer these stimuli to mice in the presence and absence of a functioning exercise wheel. If the stimuli work at least in part via their effect on locomotion, we predict that mice with a functional wheel will show greater resetting than those without a functional wheel.

Breana Rae Meyer, Joel Harrison Smith, Kelsey Mariah Pischke, Joseph J. Weirich (90)  
Faculty Mentor/Collaborator: Deborah Ann Freund  
Biodiversity and Deforestation in Cambodian Community Forests

In the 1970s, Cambodia was devastated by civil war at the hands of the genocidal Khmer Rouge regime. This resulted in the large-scale destruction of Cambodia’s national infrastructure. Although Cambodia has made considerable progress in the past several decades, its progress has often been through the unsustainable exploitation of its natural resources. The severe rate of deforestation in Cambodia has caused concern as the region is also a species “biodiversity hotspot,” and therefore a global conservation priority. In an attempt to preserve their way of life, a number of villages in Oddar Meanchey province have banded together under the United Nations Reducing Emissions from Deforestation and Forest Degradation (REDD) program to form several “community forests” to stop the exploitation of their environment. To help support the REDD program, four community forests were surveyed in the summer of 2013 to document bird and mammal species and establish a baseline biodiversity inventory in the area. Mammals were documented using Bushnell Trophy Cam HD Wireless 119599c cameras deployed on trails and tracks were photographed. Bird species were photographed and audio recorded during morning and afternoon transects. At least sixty-four birds and sixteen mammals have been recorded, several of which are threatened or endangered.

Erik Michael Lindberg, Elizabeth Ann Beilke, Gregory Thomas Nelson, Brady Michael Olson (6)  
Faculty Mentor/Collaborator: Deborah Ann Freund  
Effects of Groasis Waterboxx on Growth of Juvenile Endemic Plant Species in the Galapagos Islands

Isolated archipelagos exhibit a high degree of endemism and are of ecological significance due to the insights into the processes of evolutionary biology they illuminate, thus making them a priority for conservation efforts. The Galapagos Archipelago is the best preserved in the world, however, this is a relative descriptor as the islands are still wrought with many ecologically disruptive invasive species. Invasive plants have been difficult to control and are out-competing native plants. In an attempt to bolster the establishment of declining native species the Charles Darwin Research Station launched the Waterboxx initiative. The Waterboxx was designed to increase growth rates and survivability of young plants by providing a consistent water source and limiting competition effects. To assess this functionality plant height was measured for Waterboxx and non-Waterboxx (N=450) juvenile plants of various species across islands and ecological zones for three months. In general, plants receiving the Waterboxx treatment displayed greater initial growth rates, indicating improved plant health and resilience. These results suggest that the Waterboxx is a viable option for re-establishment for endemic plant species and restoration efforts across the islands. Further research is necessary to determine the long term efficacy of these practices.
Lien Anh Thi Nguyen, Bailey Kathleen Kramer (92)
Faculty Mentor/Collaborator: Tali D. Lee
The Interactive Effects of Warming and Elevated CO$_2$ on Leaf Physiology of C3 and C4 Grasses

Models predict that increasing CO$_2$ concentrations have and will continue to increase Earth’s mean surface temperature by 0.3 – 6.0°C. Temperature and CO$_2$ increases are predicted to have impacts on CO$_2$ assimilation during photosynthesis, and therefore impact the role of vegetation in the global carbon cycle. Our objective was to evaluate the effects of these climate drivers on the physiology of grasses with differing photosynthetic pathways, Bromus inermis (C$_3$) and Andropogon gerardii (C$_4$). We hypothesized that the effects of elevated CO$_2$ would be greater for the C3 than the C4 grass and that warming would enhance this response more for the C4 compared to the C3 grass. We measured gas exchange of field-grown plants under factorial combinations of temperature (ambient, ambient+2°C) and CO$_2$ (80, 580 ppm) treatments. Contrary to our predictions, C4 grass photosynthesis was more responsive to elevated CO$_2$ than the C3 grass and was negatively impacted under the warming treatment. While elevated CO$_2$ had no effect on water conductance in either species, warming resulted in a decrease in C4 grass conductance. This led to elevated CO$_2$-induced increases in water-use efficiency for both species. These surprising results suggest that photosynthetic pathway might not be a useful tool to predict species responses to global change.

Alyssa Nicole Kruger (93)
Faculty Mentor/Collaborator: Lloyd W. Turtinen
Borrelia Burgdorferi in Ixodes Scapularis Adult Female Ticks, Wisconsin 2010-2013

Our four-year study surveyed questing adult female Ixodes scapularis tick populations from 21 west-central Wisconsin counties for the presence of Borrelia burgdorferi bacteria. This bacterium, which is transmitted by a tick bite, is responsible for Lyme disease in humans and other animals. Students in Biology 306 (Infectious Disease Ecology) and faculty in the Biology Department have collected tick by sweeping methods or visual detection on clothing. DNA was extracted from individual ticks and processed by a real-time polymerase chain reaction (qPCR) to detect the B. burgdorferi rec A gene. Ticks positive for the bacteria were identified by the presence of a 222 base pair DNA product with a melting temperature (T$_m$) of 82°C. The DNA size was verified by gel electrophoresis. Some 222 base pair products were also sequenced to verify homology to the rec A gene. One hundred twenty-two (35.7%) of 341 adult female ticks collected from all regions during the period from spring 2010 through spring 2013 were positive for Borrelia burgdorferi. Prevalence of positive ticks appeared to increase each year throughout the state, and in Eau Claire County itself. However, because of our random sampling methodology, statistical significance could not be established. Despite this, there are serious implications in our findings that will be discussed.

Gregory Thomas Nelson, Miles Prosper Easland, Morgan Ann Euteneuer, Derek A Huebsch, Anna Kirsten Johnson (244)
Faculty Mentor/Collaborator: Todd A. Wellnitz
External Collaborator: Dave Chaffin, University of Minnesota.
Earthworms in the Boundary Waters Canoe Area Wilderness: An Invasive Species Investigation

Invasive species are drivers of extinction events and important from a conservation biology perspective, especially in protected areas such as the Boundary Waters Canoe Area Wilderness (BWCAW). Earthworm species were introduced to North America by colonialists and can alter soils, vegetation, and invertebrate communities. While exotic worms are known to be present in the BWCAW, no quantification or assessment of their invasion has been made. Study sites (N=10) were randomly chosen campsites along a pre-determined route. Three, 900-cm$^2$ plots placed randomly along a 150-m transect set perpendicular to the shore were sampled at each site. Worms were extracted using dissolved mustard water and sent to the Great Lakes Worm Watch for identification and analysis (n=144). All three worm ecotypes were present in the study area and were found at each site. Worm presence was not correlated with distance from campsite ($R^2=0.021$), suggesting that people are not driving their distribution within the study area. Elevation was the best indicator of worm presence ($R^2=0.21$), suggesting that environmental conditions such as soil type and moisture are influencing the spread.
of worms. Our results indicate that the BWCAW may already be heavily invaded and that conservation efforts should focus on worm management.

**John Michael Eaton, Joseph J. Weirich (91)**
Faculty Mentor/Collaborator: **Paula K. Kleintjes Neff**

*Floral Resource Availability on Native vs. Reconstructed Prairie for the Federally Endangered Karner Blue Butterfly (Lycaeides melissa samuelis)*

We assessed floral resource availability for pollinators on native prairies (n=3) and reconstructed prairies (n=8) in the KBB State Acres for Wildlife Enhancement (SAFE) Conservation Reserve Program, Eau Claire County. During two flight periods (June and July, 2013) we sampled 5 randomized 2-m circular plots along each of 5 transects/site (n=25) in order to determine the total percentage (%) of each nectar species in bloom versus all blooming resources available/site. On native prairies, up to 9 species of blooming nectar species were available during each flight (71-100% native species). On SAFE sites, up to 7 nectar species (28% native) were available during first flight and up to 11 species (72% native) were available during second flight. Native sites provided the greatest percentage of known Karner nectar sources (Lupinus perennis, Lithospermum canescens, Phlox pilosa, and Euphorbia corollata), of which two are also obligate larval host plants of endangered Lepidoptera. SAFE sites had few and mostly non-native ‘weedy’ species, although during second flight over 50% of the available species belonged to 4 of 11 intentionally planted nectar species (Rudbeckia hirta, Asclepias tuberosa, Mondarda fistulosa and Dalea purpurea).

**Delaney Christine McCullough (5)**
Faculty Mentor/Collaborators: **Mary Elger-Lonzarich, Joseph R. Rohrer, David Lonzarich**

*A Preliminary Study of Deep Water Mosses*

Aquatic mosses are a poorly studied, but conspicuous component of aquatic plant communities in deeper water lakes. Earlier work by our lab uncovered a rich and potentially diverse assemblage of mosses in Pine Lake, among the deepest and clearest water lakes in Wisconsin. This study was undertaken for the purpose of characterizing the diversity and distribution of aquatic mosses in Pine Lake, and to add identification features to the Pine Lake Field Guide. Locations for point-intersect sampling were achieved by using a UTM grid overlying a bathymetric map. From each site, we collected a bottom sample with a remote sampler and measured water depth, temperature, dissolved oxygen, pH and carbon dioxide. Collections were made from 67 sites ranging in depth from 9 to 21 meters, and mosses were found in 16 of those sites, to a maximum depth of 13.6 meters. We encountered the four previously documented moss species in addition to Sarmentypnum exannulatu. All but one site contained more than one moss species, suggesting that these species have overlapping requirements for temperature, light, pH and carbon dioxide. Further exploration of deep water moss communities is central to expanding our limited knowledge of this important component in the aquatic environment.

**Chemistry**

**Samuel Wayne Powell (121)**
Faculty Mentor/Collaborator: **David E. Lewis**

*Tagging Nitrogen in Biological Systems*

Fluorescent chemicals have long been used to monitor biological systems. The current usual way to tag amine groups is to convert them into amides. This fundamentally changes the chemistry of the nitrogen from a base, which is positively charged in a biological system, to a neutral compound that is uncharged. We propose to use the Amadori rearrangement to tag the amine group without converting it to an amide. This reaction results in the conversion of an aldose to a 1-deoxy-1-amino2-ketose, and we propose to prepare the required fluorescent aldose derivatives by linking a fluorescent 4-amino-1,8-naphthalimide derivative to a suitable aldose derivative, which will then be used to label the amines.
Michael Joseph Schmidt (122)
Faculty Mentor/Collaborator: David E. Lewis
Does the Strong Base in the Vitamin K Carboxylation of Glu Residues Actually Exist? A Free Radical Mechanism for γ-carboxylation

Free radical mechanisms for the vitamin K-dependent γ-carboxylation of proteins are proposed. In this mechanism, a hydroxyenolate is generated by the reaction of a peroxo bis-enolate with the side chain of tryptophan, and there is no need for a strong base to generate the active nucleophile. It is known that the propeptide is a component of the fully functional active site of the vitamin K-dependent gamma-glutamyl carboxylase, and is required for the proper formation of the products of the reaction. Our computations suggest that a key Asp or Glu residue in the propeptide may play an important role in improving the base strength of lysine 218 in the active site, and substantially lowering the initial activation energy required for the initial deprotonation reaction. An energy profile for the reaction is proposed, and computations of model systems provide support for the involvement of triplet radical pairs in the reaction.

Ronald Joseph White (94)
Faculty Mentor/Collaborator: Thao Yang
Synthesis and NMR Structural Study of a Modified Mucin Peptide

The project was to synthesize a mucin peptide with the sequence Gly-Val-Thr-Ser-Ala-Tyr-Asp, in which the Proline residue has been substituted by a Tyrosine residue. Mucin peptide is derived from mucin protein, which is a cell surface O-glycosylated membrane-bound protein that acts as a protective barrier on the apical surface of epithelial tissues. Upon completion of synthesis, the peptide sequence was analyzed using 2D nuclear magnetic resonance (NMR) spectroscopy. 2D NMR spectroscopy experiments (TOCY and ROESY) were used to make complete assignment of all of the protons on the peptide. The NMR assignments indicate the correct peptide has been synthesized.

Sean Marcus Olson O'Connell, Samuel Robert Swanson (118)
Faculty Mentor/Collaborator: James E. Boulter
Absorbance of Colloidal Suspensions of Magnetite Nanoparticles across the Solar Spectrum

We are developing solar thermal absorbing materials made from thin films of magnetite nanoparticles colloidal suspensions. To be effective solar thermal absorbers, materials must be strongly absorbing in the ultraviolet and visible (UV-Vis) regions of the spectrum; this maximizes solar heating of the solar absorber. They also have to also have very little emission in the infrared (IR), so that heat loss in the form of IR emission can be minimized. The colloidal suspensions are characterized by measuring their absorbance using UV-Vis and IR diffuse reflection spectroscopy. This light range was selected to simulate the solar spectrum. Since magnetite nanoparticles are highly absorbing in the visible region of the light spectrum, very little light is reflected and the experiment must be carefully designed so that enough light remains to characterize the suspensions. Parameters that are adjusted include the matrix in which the colloids will be suspended, the thickness of the layer of the suspension, and the concentrations of the solutions. We will present the results of the absorbance of the suspensions, and we will present our experimental setup, with emphasis on the optimization of the collection of light.

Benjamin Joseph Klug (119)
Faculty Mentor/Collaborator: David E. Lewis
Time for an Oil Change? The Answer in One Drop

Past research in our lab has found that fluorescence of 4-amino-1,8-naphthalimide dyes can be used to track the acidity levels of motor oil in combustion engines. The lubricating property of standard motor oil exceeds 100,000 miles. Therefore, oil is only changed because the base package has been depleted and corrosive acid is produced. By using two separate fluorescent dyes, both the base and acid levels in motor oil can be tracked. We have created a cost-efficient, prototype instrument that uses these dyes to monitor the life of oil. Oil analysis in internal combustion engines using the best available methods usually requires a sample size of 30-50 mL,
which involves accessing the oil pan, (i.e. time and money). Our device uses a sample size of 1-2 drops, which can be collected from the end of the dipstick without need for access to the oil pan. This simplification of the process allows for frequent and easy testing (i.e. allowing the maximum running length between oil changes). This would greatly reduce the amount of time and money spent monitoring the quality of motor oil.

Luke Patrick Anderson (120)
Faculty Mentor/Collaborator: David E. Lewis
Formation of Stable Enol Compounds

This project came about as an attempt to prepare new warfarin derivatives with varying functionality. These compounds were to be used to prepare new hydroxycoumarin anticoagulants, but the finding that they exist exclusively as enols was both unexpected, and scientifically interesting. There are relatively few organic compounds of this type that exist exclusively as the enol. The purpose of this project is to look at the reactions of 4-hydroxycoumarin with substituted cyanocinnimate esters. Various compounds were synthesized and then characterized using spectrophotometric methods. The anticipated outcome of these various reactions is stable enols with unique properties. These newly synthesized compounds can do interesting chemistry with a variety of other organic compounds that can be the study of further research.

Kaya Nirvana Sims, Nathan Paul Fuhrman (123)
Faculty Mentor/Collaborator: Patricia Anne Cleary
Data Analysis and Model Comparison of Ozone above Lake Michigan

The non-attainment status of federal ozone standards in the region surrounding Lake Michigan demonstrates the efficient ozone production in both urban and off-shore air masses. Routine measurements of ambient ozone in the air mass over Lake Michigan were conducted from 2008-2010 using ferry routes from Milwaukee, WI to Muskegon, MI, that created an exhaustive data set of off-shore observations at the lake level. Combined with temperature data, the observational data from these transects were evaluated for spatial and temporal trends and compared to the national ozone air quality forecast model to test the ability of the model to predict ground level ozone in the region. The model bias was found to be consistently high and complex trends emerged with respect to ferry location and time of day or month. The extent that these trends can be used to pinpoint difficulties in determining the parameters of the photochemical and meteorological conditions over Lake Michigan in the model will continue to be investigated.

Lindsey Ann Kuettner (124)
Faculty Mentor/Collaborator: Patricia Anne Cleary
Measurement of Ozone in Air Masses over Lake Michigan

The non-attainment status of federal ozone standards in the region surrounding Lake Michigan demonstrates the efficient ozone production in urban and off-shore air masses. The measurement of ozone in air masses over Lake Michigan have been conducted from 2008-2010 via routine ferry routes from Milwaukee, WI to Muskegon, MI, which is the most exhaustive data set of off-shore observations at the lake level where exposure is most likely. The measurement of ozone, sulfur dioxide, and nitrogen dioxide levels of shoreline Lake Michigan had been conducted in 2009 via Differential Optical Absorption Spectroscopy (DOAS) in Kenosha, WI. A series of HYSPLIT back trajectory models showing the dispersion of pollutants from those transects will be compared to the observational data in an effort to show a correlation between high ozone and the lake-breeze meteorological effects on trace gases O_3 and NO_2. Ozone is formed photochemically in urban plumes when favorable meteorological conditions are present and has an atmospheric lifetime longer than NO_2. NO_2 contributes to ozone formation but also indicates fresh emissions from fossil fuel combustion, thus HYSPLIT trajectories of 24 hours or less will be used to analyze the paths of air-masses containing both NO_2 and O_3.
Justin Jay Dressler, Sarah Ann Miller (147)
Faculty Mentor/Collaborator: Bart J. Dahl
*Terphenyl Diactone pH and Redox-Driven Molecular Switches*

The physical properties of terphenyl-containing compounds are known to be highly dependent on molecular geometry, specifically the dihedral angle. Compounds capable of dihedral angle modulation should be useful molecular switches. Planar conjugated aromatics have desirable optical and electronic properties, whereas these properties are highly attenuated in non-planar analogs. Unfortunately, planar compounds tend to be insoluble in most organic solvents. We have synthesized several terphenyl dilactones containing solubilizing substituents, where the two lactones “tether” between the two phenyl rings should force a planar geometry. By varying the pH or redox conditions, we should be able to reversibly and rapidly open and close the “tether” and thus switch the molecule in and out of planarity. We will describe the synthesis and characterization of these compounds as well as show preliminary studies of their pH and redox switching.

Joel Gabriel Patrow (148)
Faculty Mentor/Collaborator: Bart J. Dahl
*The Synthesis and Halochromism of 6-Aryldibenzo[b,d]pyrylium salts*

We are interested in a very rare class of oxygen-containing charged polycyclic aromatic hydrocarbons containing the 6-aryldibenzo[b,d]pyrylium moiety. This moiety is isomeric with the 9-aryldibenzo[b,e]pyrylium (xanthylum) unit, found in numerous important dyes, such as rhodamine. This unit is also a further benzannulated analog of the flavylum ion, found in many naturally occurring pigments, such as anthocyanins. We report the synthesis of several new 6-aryldibenzo[b,d]pyrylium salts as well as their reversible spectroscopic and optical character in varying pH environments (halochromism). Progress toward the synthesis and study of other analogs containing longer conjugations pathways will also be reported. Reversible disruption of conjugation, and thus intramolecular charge transfer, occurs upon addition of a nucleophile to these compounds and we are exploring the structures of these products as well.

Augustus Joseph Olthafer (149)
Faculty Mentor/Collaborator: Sanchita Hati
*Analysis of the Structure-Dynamics-Function Relationship of G-Protein Coupled Receptors*

The presence of G-proteins and G-protein coupled receptors (GCPRs) are highly ubiquitous in upper eukaryotic organisms. With nearly 60% of all modern pharmaceuticals targeting GCPRs, the understanding of these proteins’ dynamical-functional-structural relationship is critical for designing better drug molecules. A wide variety of GCPR proteins exist, differing by the ligands they bind, their cellular responsive mechanisms and their intrinsic properties. These proteins are classified into six classes based on their sequence and functional similarities. In an attempt to strengthen our understanding of the structure-function relationships of various types of GPCRs, the intrinsic dynamics of GPCR proteins were explored. A variety of computational programs were employed to simulate protein dynamics and compare/contrast the intrinsic dynamical patterns of various GPCRs. More precisely, the role of GPCRs’ active site dynamics in recognizing and binding the appropriate ligand and how these intrinsic dynamics differ between different classes of GPCRs have been the main focus of the current study. The preliminary results of this study will be presented.

Mariah Esther Dorner (150)
Faculty Mentor/Collaborator: Sanchita Hati
*Normal Mode Study of the Internal Dynamics of Various Classes of Cytochrome P450 Enzymes*

Traditional methods of protein classification are largely based on the ideology that the amino acid sequence of a protein determines its structure, which in turn governs its function. Recently, protein dynamics has been identified as a major contributor to protein function, where dynamics are considered independent from, yet complementary to protein sequence and structure. As the mobility of a protein is an intrinsic property that is encrypted in its primary structure (amino acid sequence), we have aimed to classify an important family of enzymes based on their internal mobility patterns and dynamics. The Cytochrome P450 (CYP) enzymes constitute
a diverse superfamily of more than 8,700 proteins, which share a common tertiary fold and only 20% sequence homology. These enzymes are monoxygenases involved in bioactivation, detoxification mechanisms, drug metabolism, and synthesis of normal cellular compounds. In the present study, the Swiss modeling tools ANOLEA and PROCHECK were used to analyze the structures of proteins from each of the six classes of CYP systems. Normal mode analysis through WebNMA was then used to obtain dynamic information. Herein, I will present the preliminary results of our (CHEM 406 students, Fall 2013) attempt to classify the CYP proteins based on their intrinsic mobility patterns.

Heidi Lynn Schmit, Ryan Dean McMunn (151)
Faculty Mentor/Collaborator: Sanchita Hati
Biochemical Studies to Explore the Inter-Domain Communication Pathways in *Escherichia coli* Prolyl-tRNA Synthetase

Aminoacyl-tRNA synthetases (AARSs) are a family of enzymes that catalyze the covalent attachment of amino acids to their corresponding transfer-RNA (tRNA) strands. These enzymes are involved in an important reaction step required for the proper synthesis of viable proteins. AARSs are multidomain proteins, with each domain having a particular function. Previous research studies on AARSs have shown that protein dynamics play a crucial role in the communication between domains within these enzymes. Correlated motion, specifically, between residue pairs has been proven to have a significant role in domain-domain communication. We specifically work with prolyl-tRNA synthetase (ProRS), which is the enzyme that attaches the amino acid proline onto a tRNA<sup>Pro</sup>. Using molecular simulations and bioinformatics, several pathways of residue-residue interactions between domains of *Escherichia coli* ProRS have recently been traced. These residues on the predicted pathways are engaged in correlated motions, which are important for promoting communication between the different domains of the enzyme. Currently, we are performing site-directed mutagenesis and kinetic studies to investigate the effects of mutations of selected “on-pathway” residues on catalytic activity of ProRS. Preliminary results of this study will be presented.

Ashley Elizabeth Sexton (152)
Faculty Mentor/Collaborator: Stephen Drucker
*Cavity Ringdown Spectrum of 2-Cyclohexen-1-one in Its Lowest Singlet Excited State*

The molecule 2-cyclohexen-1-one (2CHO) participates in a variety of photochemical reactions. The lowest electronic excited state of singlet spin, known as the S<sub>1</sub> state, typically mediates the photochemistry of 2CHO. The goal of this study was to characterize the structure and dynamics of 2CHO in its S<sub>1</sub> state. We have used the cavity ringdown (CRD) technique to record the laser absorption spectrum of 2CHO in the 350-370 nm region. We are analyzing the spectrum to determine fundamental frequencies of the C=C and C=O stretch vibrations in the S<sub>1</sub> state. We will compare the experimental frequencies with those predicted using high-level computational chemistry techniques. The present data set complements our previously published CRD spectrum of 2CHO near 385 nm [Rishard et al., *Journal of Physical Chemistry A*, vol. 112, p. 38 (2008)]. A newly constructed, computer-automated frequency doubling system has facilitated our present survey of 2CHO in the near-UV spectral region. Determination of the C=C and C=O stretch vibrational frequencies will close a gap in the current knowledge of excited-state properties of 2CHO and of enone molecules in general.

Ariel Elena Schuelke, Kristin Nicole Sahr, Elizabeth Maura Brandes (153)
Faculty Mentor/Collaborator: Roslyn M. Theisen
*Development, Synthesis and Characterization of Biomimetic Model Complexes*

This project involves the development, synthesis and characterization of new bioinorganic model complexes that mimic the active site of a biologically relevant dioxygenase enzyme, Quercetin Dioxygenase (QDO). The goal of this research is to understand how the unique active site of this enzyme cleaves the O-heteroatomic ring of quercetin by evaluating the functionality of a series of metal complexes with ligand systems similar in structure to the active site of QDO. Synthesizing new biomimetic functional model complexes provides an opportunity to examine biological reactivity on a small scale through systematic and comparative studies. We will investigate [Cu(salen)]<sup>+</sup> and [Cu(BPG)]<sup>+</sup> complexes that have N2O2 and N3O ligand environments, respectively.
Nicole Marie Weiss, Yu Hin Benny Chan, Anna West Waller (154)
Faculty Mentor/Collaborator: James A. Phillips

A Low-Temperature IR Spectroscopy and Computational Study of CH$_3$CN–HCl

We are interested in how bulk, inert environments, such as solid neon, affect the hydrogen bond interaction between hydrogen chloride (HCl) and acetonitrile (CH$_3$CN). To prepare the 1:1 complex formed from HCl and CH$_3$CN, we used a technique called matrix isolation. This involved preparing dilute gas mixtures containing HCl and CH$_3$CN in neon. These mixtures were bled into a high vacuum chamber where the sample was frozen at 6K, and the CH$_3$CN–HCl complex formed in the solid sample. We characterized the complex via infrared (IR) spectroscopy, as the shifts of the HCl stretching frequency correlate with the strength of the hydrogen bond interaction. The HCl frequency of CH$_3$CN–HCl in solid neon was observed at 2677 cm$^{-1}$, and this frequency differed from those previously measured in argon (2662 cm$^{-1}$) and nitrogen (2566 cm$^{-1}$) matrices. Computational techniques were used to model these effects and better understand their physical basis. Furthermore, these computational results facilitate a comparison between CH$_3$CN–HCl and H$_3$N–HCl, which exhibits extreme frequency shifts across various media.

Samuel Charles Fehling, Alexander Michael Strom (177)
Faculty Mentor/Collaborators: Sudeep Bhattacharyay, Sanchita Hati

Principal Component Analysis to Explore Transition Pathway of the Conformational Change in E. Faecalis Prolyl–tRNA Synthetase upon Substrate Binding

Aminoacyl tRNA synthetases (AARSs) catalyze the esterification of transfer RNAs with their cognate amino acids. These multi-domain enzymes undergo conformational changes upon substrate binding. To understand the molecular mechanism of the population-shift from substrate–free conformations to bound conformation(s), we analyzed the substrate–bound and substrate–free conformations of E. Faecalis Prolyl-tRNA Synthetase (ProRS) by performing Principal Component Analysis (PCA) of the molecular dynamic simulation trajectories. In the present study, three approaches are taken for analysis: 1) PCA of individual all–atom molecular dynamics simulation trajectories for substrate–bound and substrate–free ProRS (PDB Code: 2J3M) systems, 2) PCA on the combined MD trajectories of substrate–bound and substrate–free ProRS, and 3) PCA of active site MD trajectories for each system. Our analyses of individual molecular dynamic simulations indicate substrate–bound and substrate–free principal components are intrinsically different; no conformational overlap was identified for these two systems. PCA of MD trajectories demonstrated that active site dynamics are fundamentally distinct between substrate–bound and substrate–free systems.

Caitlin Gibson Bresnahan, Clorice Rose Reinhardt (178)
Faculty Mentor/Collaborator: Sudeep Bhattacharyay

Interactions of Flavin with Aromatic Molecules

Flavin is the primary electron-proton mediatory group in many enzymes. These tricyclic heteronuclear isooalloxazine ring systems occur primarily as two cofactors: flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD). In most cases, these cofactors remain noncovalently attached to the enzyme matrix and catalyze a very diverse set of chemical reactions. The catalytic diversity of flavin cofactors arises in part due to its ability to undergo coupled electron and proton (hydride) transfers. One of the key elements of the flavin’s versatile chemistry lies in the interplay of its redox changes and stacking interactions with π-electronic systems. Although, recent theoretical studies were successful to model hydrogen bonding interactions, the role of π-π stacking interactions on the redox properties of flavin have remained only partially revealed. These interactions are dominated by weak van der Waals forces and are difficult to model by theory. In the present study, the π-π stacking interactions of flavin and other aromatic molecules have been studied using improved semi-empirical and density functional theories. Impact of these interactions on thermodynamic and kinetic properties of flavin’s reduction was investigated in detail. The preliminary results demonstrate that π-π stacking interactions significantly impact the transition state of the hydride-transfer reaction.
Mobilization of Copper Ions from Insoluble Copper Compounds by Methanobactin

Copper is an essential nutrient for life as well as an environmental toxin. Microbes are likely a very important part of the global copper cycle and the bioweathering of copper minerals. We have looked at the ability of a secreted bacterial copper-binding molecule, methanobactin, to mobilize copper from pure insoluble copper oxides and sulfides as models for bioweathering of corresponding natural copper minerals. We followed the mobilization of copper spectrophotometrically in the presence of methanobactin and other known chemical copper binding agents. We find that methanobactin has a very high affinity for both Copper (I) and Copper(II) and can easily extract copper from all of these minerals, in particular Cu(I) minerals (saturation reached in less than 2 hours for Cu(I) minerals). In addition, unlike another Cu(I) chelating compound such as BCS, methanobactin can stabilize the normally unstable Cu(I) ion for long periods of time even in the presence of water and oxygen. These data suggest that in areas where these methanotrophic bacteria are common, secreted methanobactin could have a significant impact on soluble copper concentrations and weathering of copper-containing minerals.

Imaging the Subsurface of the Duluth Bay Barrier: Duluth, MN & Superior, WI: Ground Penetrating Radar

The twin port cities of Duluth, MN and Superior, WI on the southwest side of Lake Superior are encapsulated by the Duluth Bay Barrier. The bay barrier is composed of two spits, Minnesota Point and Wisconsin Point, which are divided by the natural channel of the St. Louis River outlet. Studying the internal stratigraphy through ground penetrating radar (GPR), helped show how erosion, littoral drift, human activity, and lake level change have affected the morphology of the bay barrier. Several cross barrier and parallel transects were collected on both spits. The pulseEKKO 100 GPR system was used for data collection with 50, 100, 200 MHz antennae. Data was processed, plotted, and analyzed through pulseEKKO software. Radar stratigraphic analysis showed multiple reflection patterns, revealing three distinct sediment packages indicated by unconformities and changes in geometric characteristics. All contained Sigmoidal features dipping lake-ward, suggesting evidence that the bay barrier system is a progradational feature fed by littoral drift from the southeast.

Spectral and Socioeconomic Assessment of Land Use/Land Cover Changes in Chippewa and Eau Claire Counties, WI

Assessment of changes in land use and land cover (LULC) is integral for urban and regional planning, natural resource sustainability, and a host of other ecological phenomena. Over the past decade, the cities of Eau Claire, Chippewa Falls, and Altoona that constitute a large portion of population within Chippewa and Eau Claire Counties have shown visible increase in population and its associated infrastructural development. A current update of LULC changes in this metropolitan area is lacking and more importantly the factors behind such changes are currently elusive. This study assesses land use/land cover changes in the Chippewa and Eau Claire Counties, Wisconsin between 2000 and 2010 and probe into the socioeconomic drivers that triggered such changes. Landsat-5 Thematic Mapper (TM) satellite images were used to produce LULC data for 2000 and 2010 respectively. This study employed a hybrid classification approach that encompasses object-based and expert system techniques. Nine LULC classes were produced for the counties. United States Census data at the block group level was spatially regressed on key LULC classes in a bid to capture the drivers of LULC change in the study area and more importantly to quantify the extent of influence the drivers exerted on the change.
Brittany Grace Charlton, Nicholas Dean Topper, Nicholas Hans Jaeger (113)
Faculty Mentor/Collaborator: Harry M. Jol
External Collaborators: David Nobes, Resource Management and Geography, University of Canterbury, David Kennedy, Geological Sciences, University of Melbourne

Forever Changing: The Evolution of Farewell Spit

Farewell Spit, also known to the Maori people as Tuhuroa, is located on the northernmost part of the South Island, New Zealand. This little studied coastal spit is 25 km long and is mantled by a wind-blown landscape - sand sheets and dunes. We investigated an active barchan dune that is migrating west to east across the spit. A 143 m transect was collected across the dune using a Sensors and Software pulseEKKO 100 ground penetrating radar (GPR) system. To image the subsurface aeolian layering, three antennae frequencies were utilized in the survey - 50 MHz (0.5 m step), 100 MHz (0.25 m) and 200 MHz (0.10 m). The dune’s topography, which was incorporated in processing the geophysical data, was measured with a Topcon laser leveler to be 6.7 m above the tidal flats. Initial results show steeply dipping reflections that downlap onto a lower continuous, horizontal reflection. The reflections are interpreted as sandy beds of a migrating barchan dune over a sandy tidal flat. To confirm our interpretation, a hand-auger (4+ m deep) provided continuous subsurface moist, sandy, sediment samples from within the core of the dune. In addition, during the time we collected this data, the dune migrated approximately 1.0 m. The project demonstrates the use of using various geomorphic tools in trying to better understand a complex coastal aeolian environment.

Jeremy Daniel Huhnstock (126)
Faculty Mentor/Collaborator: Christina M. Hupy

Reintroduction of Elk in the Black River State Forest: Using a Predictive Habitat Model and Cost Path Analysis to Predict Areas of Elk/Vehicle Collisions

The Wisconsin Department of Natural Resources plans to reintroduce Elk into the Black River State Forest. Several concerns have arisen regarding this reintroduction, including vehicle/elk collisions. This research project will identify areas of high potential for vehicle/elk collisions. The results from this project could be used to place “Elk Crossing” signs warning motorists of the likelihood of an elk crossing. The reintroduction of elk into the Chequamegon-Nicolet National Forest in 1995 will be used as a case study for investigation of elk/vehicle collisions. In 2001, the Wisconsin Department of Natural Resources created a proposal to reintroduce elk into the Black River State Forest. A GIS model will be created to define characteristics of high crash areas in the Chequamegon-Nicolet National Forest. This model will then be applied to the Black River State Forest. Data will include elk/vehicle crash locations from the Wisconsin Department of Natural Resources, land use, land cover, digital elevation model, and shapefiles provided from the Wisconsin Department of Natural Resources will be used as data to help find my answer. In conclusion of my ongoing project, the results of my project will identify high risk areas in the Black River State Forest for elk/vehicle collisions.

April Rose Leistikow (127)
Faculty Mentor/Collaborator: Christina M. Hupy

Western Wisconsin’s Contribution to the Production of Natural Gas in the United States – Analysis with LiDAR data

Technology is becoming more advanced and more resources are required to sustain present day lifestyles as populations increase. The latest advancement with energy is extracting natural gas form shale rock which is a process called hydraulic fracturing. This process forces open fissile shale rock with small resistant sand grains so the gas can be removed. Western Wisconsin has sand that is suitable for this process. Cambrian geologic units The Jordan Formation, the Wonowoc Formation, and the Mount Simon Formation all contain well rounded quartz grained sand with a strong resistance to pressure, and all three are prevalent in Western Wisconsin. By using LiDAR (light detection and ranging) data, sand mines in Western Wisconsin can be investigated in great detail. Specifically, Eau Claire County sand mines with be used for the study. LiDAR data is extremely detailed and can be processed and analyzed in ArcGIS (geographic information systems). Volumetric analysis was performed on specific sand mines to estimate how much sand has been extracted from those areas. Infor-
Information about how much sand is needed for fracking can be projected on a national level based on how many mines there already are and what the demand is for this kind of energy.

Claire Elizabeth Edel, Sean Michael Morrison (115)
Faculty Mentor/Collaborator: Harry M. Jol
External Collaborators: John W. Johnston, Department of Geography & Environmental Studies, Wilfrid Laurier University, Andrew J. Breckenridge, Geology, University of Wisconsin Superior, Walter Loope, United States Geological Survey

Stratigraphic Analysis of Lake Superior's Conway Bay Barrier Using Ground Penetrating Radar: Huron Mountains, Michigan

The goal of the research was to investigate the shallow subsurface stratigraphy of Conway Bay’s barrier along the shore of Lake Superior in the Huron Mountains of Michigan’s Upper Peninsula. Ground penetrating radar (GPR) uses electromagnetic signals to noninvasively image the structure of sediments beneath the surface. Data used for the study were collected across the Conway Bay barrier perpendicular to the shoreline using a pulseEKKO GPR 100 system and 50 MHz antennae. Step size was 0.5 m and the antennae were separated 2.0 m. Near surface velocity measurements of 0.1 m/ns were calculated from a common midpoint survey to determine depth of reflections. Data were processed, plotted in wiggle trace format, and corrected for topography using data collected with a laser level. Facies packages that can be seen in the profile include sigmoidal reflections, parallel and subparallel reflections. Resulting patterns are interpreted to show various types of shoreline processes, including progradation, which have built up the Conway Bay barrier during Lake Superior’s Nipissing high lake level phase.

Nicholas Dean Topper, Nicholas Hans Jaeger, Brittany Grace Charlton (111)
Faculty Mentor/Collaborator: Harry M. Jol
External Collaborator: David Nobes, Geological Sciences, University of Canterbury

Investigation of the Internal Stratigraphy of Alpine Fault Rupture Induced Coastal Dune Formations in South Westland, New Zealand Using Ground Penetrating Radar

Visible from aerial imagery, sand ridge formations can be seen building outward from and parallel to the coast in South Westland, New Zealand near the mouth of the Haast River. These coastal formations are a result of tectonically induced sediment pulses down the Haast River from episodes of shifting along the Alpine fault. To better understand the internal stratigraphic profiles of these coastal features, ground penetrating radar (GPR) was used parallel and perpendicular to dune ridges. The pulseEKKO 100 GPR system was used with 50MHz, 100MHz, 200MHz antennae with varying step sizes and separation. To gather topographic information that would geometrically correct each survey line, the Topcon RL_H3CL laser leveling system was used. GPR data was processed using automatic gain control in the wiggle trace format using pulseEKKO software. Subsurface velocities were obtained from a common midpoint survey that was also included in the processing. Preliminary processing of this data shows progradational sediment layering with continuous and semi-continuous dipping reflections. The continued investigation of the stratigraphy of these coastal formations using GPR will lead to an enhanced understanding of geomorphic processes that affect the coastal processes near Haast, New Zealand as well as other coastal locations affected by similar processes.

Sean Michael Morrison (128)
Faculty Mentor/Collaborator: Christina M. Hupy
External Collaborator: John Ridge, Yellowstone Trail Association

Mapping the Yellowstone Trail with GIS

Originally funded by small town South Dakota businessmen, the Yellowstone Trail was the first transcontinental automobile route linking Plymouth, Massachusetts to Seattle, Washington. However, the Yellowstone Trail Association stopped maintaining the trail in the late thirties primarily due to the advent of numbered highways. Much of the historic routes have been lost or paved over. Extensive research has mapped the original routes of the Yellowstone Trail using satellite imagery as well as contour and historic maps. This project collects relevant data, roads, railroads, government boundaries and topographic data, into an ArcGIS database to produce a
series of maps that can be used to assist in the mapping of the historic Yellowstone Trail as well as map the current driving route of the Yellowstone Trail.

**Sean Michael Morrison (129)**  
Faculty Mentor/Collaborator: Harry M. Jol  
External Collaborators: Walter Loope, USGS, Connor Jol, Roosevelt Elementary  
*Radar Facies Analysis of the Grand Island Tombolo*

Coastal landforms along the North American Great Lakes record historic lake levels in their sedimentary structure. Grand Island is the largest island on the southern shore of Lake Superior. A 0.75km wide, 2km long sandy depositional feature, a tombolo, connects bedrock highs on the island. A ground penetrating radar (GPR) transect reveals the tombolo's internal architecture. The transect was collected with a pulseEKKO 100 GPR system with 100MHz antennae and 1.0m antennae separation with 0.5m step size. Velocity was determined to be 0.1m/ns after analysis of a common midpoint survey. A Topcon RL-H3CL laser level was used to collect topographic data to adjust the profile to changes in relief. Four radar facies were interpreted from the transect. Radar facies range from northward dipping inclined reflections (dips from 7.1° to 12.8°), interpreted as strandplains, to sigmoid and hummocky reflection, interpreted as shoreface progradation during lake level rise, to continuous horizontal to inclined reflections (dips from 2.3° to 11.8°), interpreted as shoreface progradation during lake level fall. The boundary between shoreface progradation during lake level rise and a buried strandplain is believed to result from historic Lake Superior lake level known as the Houghton Low.

**Mark Michael Green, Patrick Adam Keicher (110)**  
Faculty Mentor/Collaborator: Harry M. Jol  
*Aquifer Characterization through GPR and Borehole Analysis, Eau Claire Municipal Well Field, Wisconsin*

Traditionally, aquifer characterization is conducted by extrapolating stratigraphy between boreholes and producing a fence diagram. However, the point-source nature of boreholes can produce inaccurate models, so a better methodology is needed. Ground penetrating radar (GPR) is a geophysical method using electromagnetic signals and provides a non-invasive way to image the subsurface. Our project’s goal is to improve characterization of the aquifer supplying the Eau Claire municipal well field by correlating borehole data with GPR profiles to produce stratigraphic models at a higher degree of accuracy than traditional methods. Using a pulseEKKO 100 system, GPR data was collected across a 60 m transect to a depth of 23 m with a 0.5 m step size at 100 MHz. The results show horizontal to sub-horizontal reflections interpreted as braided stream deposits on a former terrace of the Chippewa River. Borehole data was collected to a depth of 30 m with grain sizes ranging from silts to fine gravel. Combining these data will ultimately lead to more accurate models than those produced using only point-source data. This method is effective in many settings and can provide hydrogeologists with an accurate, cost-effective way to characterize aquifers without relying on costly point-source data.

**Geography and Anthropology and English**  
**Jerrod Lee Hrdlicka, Nicholas Dean Topper, Ryan Christopher Alger, William Duane Ullrich (112)**  
Faculty Mentor/Collaborators: Harry M. Jol, Blake R. Westerlund  
External Collaborators: Phillip Larson, Mankato St. University, Greg Stock, National Park System  
*Ground Penetrating Radar Investigation of El Capitan Moraine: Yosemite National Park, CA, USA*

The research project involved analysis of sedimentary stratigraphy within the El Capitan moraine located in Yosemite Valley, California, USA. The cross valley moraine is a result of the latest glaciation period approximately 15-20 thousand years ago, the Merced River flows through the south side of the moraine. Limited subsurface research on the moraine has been conducted due to conservation practices by the National Park Service. Due to the non-invasive nature of ground penetrating radar (GPR), our class was given permission to collect data along and across the morainal complex. A pulseEKKO 100 GPR system was used with 50, 100, and 200MHz antennae. Varying step sizes and antennae separation was used to look at the subsurface layering. The Topcon RL-H3CL laser leveling system was used to collect the topography of the surveyed area which was used
to geometrically correct the GPR data. The data revealed sedimentary layering reaching depths of 44m below the surface of the moraine. Further analysis of the GPR data revealed horizontal and sub-horizontal layering patterns within the formation. The continued investigation of the stratigraphy via GPR will enhance the overall understanding of the glacial and geomorphic history of Yosemite Valley.

Geography and Anthropology and Computer Science

Nathaniel Scott Wick (131)
Faculty Mentor/Collaborators: Cyril O. Wilson, Christopher R Johnson

Collaborative Environmental Monitoring: A Mobile Web GIS Perspective

Geographic Information Systems (GIS) is increasingly moving away from desktop to the Web through mobile applications. This is facilitated by Web 2.0 wherein users have the ability to publish and download data to and from the web respectively. These changes in Web infrastructure created new methods for the creation and dissemination of information. One such method is crowdsourcing, which empowers citizens to remotely contribute information to a centralized database acting as human sensors. The Web GIS mobile application developed in this project is designed to aid citizens to identify invasive species and record their locations. This information is then uploaded to a database which multiple organizations have access to. This project integrates crowdsourcing concepts with mobile technology to investigate and solve a wide array of environmental issues in the Driftless Area of the United States. Various organizations including Trout Unlimited, Wisconsin Department of Natural Resources (DNR), Minnesota DNR, and Iowa DNR invested money and time into trout stream rehabilitation projects. This mobile application provides an efficient method for interagency communication, which will promote invasive species removal and enhance environmental quality.

Geology

Kelsey Marie Franko (159)
Faculty Mentor/Collaborator: Katherine R. Grote

Estimation of near-Surface Soil Density Using Electrical and Electromagnetic Geophysical Techniques.

Soil density is an important parameter for a variety of applications in agriculture, geology, and geotechnical engineering. Conventional methods for measuring soil density are expensive, time-consuming, and destructive, so soil density is often not adequately characterized. This experiment explores the potential of geophysical techniques for estimating soil density. Geophysical techniques are largely non-invasive, allow temporal monitoring, and are often useful for mapping large areas, so they offer significant advantages over conventional techniques for soil density estimation. This experiment explores the potential of five geophysical techniques (ground penetrating radar (GPR), time domain reflectometry (TDR), low-frequency electromagnetics, electrical resistivity, and magnetic induction) for estimating soil density. Geophysical data were collected over an undisturbed plot area, then conventional soil density and water content measurements were acquired. The soil was then tilled, and data collection was repeated with all techniques. All geophysical techniques showed changes after tilling, as did the conventional measurements of soil density and water content. The techniques which showed the most correlation with soil density were TDR and GPR methods. Additional research exploring the potential of these techniques for soil density estimation under a wider range of field conditions is now planned.

Christopher Edmond Stovern, Ellyn Marjorie Swenson (140)
Faculty Mentor/Collaborator: Robert L. Hooper

Minor and Trace Element Analysis Using Analytical Transmission Electron Microscope (TEM)

Modern transmission electron microscopes (TEMs) are ideal for examining colloidal and nano-particulates that are ubiquitous in low temperature environmental samples of water, soil and air. A wide variety of elements of special health concern are commonly found in these particulates. To determine sensitivity and reproducibility,
major, minor and trace elements were analyzed. Fifteen well characterized standard reference materials (SRM) from the U.S. Geological Survey, Smithsonian and National Institute of Standards and Technology including silicate minerals (n=10); and both natural and synthetic glasses (n=5) were analyzed. To minimize beam damage, low emission currents and long counting times (300 sec) were used. For each SRM twenty or more individual grains were analyzed and one grain was analyzed ten to twenty times to determine the difference between instrumental and systematic errors including sensitivity to long-term beam damage and sample heterogeneity. Soda-lime glasses and high-silica natural glasses proved to be both heterogeneous at the nanometer scale and beam sensitive, losing significant alkali metals during time trials. Silicates and basaltic glass were far more homogeneous and resistant to beam damage and several make ideal nano-probe (TEM) reference materials. First row t-metals, P, S, and Cl are quantifiable in silicate matrices down to ~100ppm. Heavier elements (Ba, Sr, and Pb were only quantifiable when exceeding 500-1000ppm.

Ellen Katherine Buelow, Samantha Sue Taylor, Brian Christopher Nehring (141)
Faculty Mentor/Collaborator: J. Brian Mahoney
External Collaborators: David Kimbrough, San Diego State University, Greg Hoke, Syracuse University, Jose Mescua, CONICET in Mendoza Argentina, Laura Giambiagi, CONICET in Mendoza Argentina, Julieta Suriano, Universidad de Buenos Aires, Colegio ICEI
International Fellows Program Argentina 2014: Educational Outreach Coupled with Andean Basin Research
In August 2013 three UW-Eau Claire undergraduate students participated in an international immersion experience combining geologic research and educational outreach in the south-central Andes. The students designed a series of laboratory exercises that introduced Argentinian High School students to earthquakes, volcanoes, and plate tectonics, utilizing the Andes as a natural laboratory. The fundamental goal was to encourage science literacy and interest among the students. In the first week, a short course was presented to 150 students (grades 9-12) at Colegio ICEI, engaging the students in discussion on the geology of the Andes and its importance to society. During the last two weeks, UW-Eau Claire students collaborated with scientists from CONICET, the Universidad de Buenos Aires, Syracuse University, and San Diego State University on regional planning sessions, stratigraphic analysis, geologic mapping, and geochronologic and geochemical sampling transects. Within the Andean system, there are dramatic along-strike differences in magmatism, structural style, uplift rates, and basin development driven by geometric variations of the subducting plate. Our objective is to document patterns and rates of orogenic exhumation through basin analysis, this project focusing on the Miocene-Cacheuta basin located on the east flank of the Andes. This project is the foundation for continual student/faculty research documenting geological evolution of the southern-central Andes.

Jacob Walter Haas (142)
Faculty Mentor/Collaborators: J. Brian Mahoney, Kent M. Syverson
Regional Petrographic Analysis of Cambrian Sandstone in Minnesota and Wisconsin: Quantifying Mineralogy and Potential Sources of Airborne Particulate Matter within “Frac Sand” Targets
Two Cambrian sandstone units in Minnesota and Wisconsin, the Wonewoc and Jordan formations, are sources of high-quality “frac sand.” The rapid increase in mining and processing of frac sand has led to concerns about potential health hazards, particularly silicosis from airborne respirable silica. A regional petrographic analysis, focused on the Wonewoc (n=17) and Jordan (n=27) fms., provides insight into detrital and matrix compositions. Petrographic examination illustrates similarities and differences between the Wonewoc and Jordan fms., and suggests geographic variations in sandstone mineralogy. Both units primarily contain detrital monocystaline quartz (65-70%) and void space (18-22%). Cement composition varies both by formation and geographically within formations. Silica cement is essentially absent, with silicified zones <2m thick limited to restricted horizons in the upper Jordan Fm. in the southern region. Textural analysis indicates both formations have undergone multiple diagenetic events. Frac sand processing is designed to minimize crushing of the strong framework quartz grains, so fine particulate matter primarily should be derived from interstitial cement. These analyses indicate that interstices in the Wonewoc and Jordan fms. contain mainly void space, calcite, hematite, authigenic potassium feldspar and sericite. Interstitial silica is rare.
April Rose Leistikow (144)
Faculty Mentor/Collaborator: J. Brian Mahoney

*Tectnostratigraphic Evolution of the Montana Fold and Thrust Belt South of the Helena Salient: Proterozoic/Cambrian Structure and Stratigraphy West of Dillon, Montana*

The close spatial and temporal relationship between Late Cretaceous magmatism and structural deformation within and adjacent to the Helena Salient in western Montana is clear, but less obvious are the fundamental crustal elements that controlled the initial geometry of the system. Stratigraphic and structural variations within Mesoproterozoic and lower Paleozoic strata may fundamentally control the geometry of the superposed Cretaceous fold and thrust belt system. Geologic mapping in the Ermont 7.5’ Quadrangle (west of Dillon, Montana) was conducted to assess the pre-deformational stratigraphy south of the Helena salient. The Ermont mapping area contains a geographically restricted stratigraphic package named the Quartzite of Argenta below the Paleozoic units. Spectacular boulder conglomerates in the basal Paleozoic section suggest significant Neo- to Cambrian structural deformation. Detrital zircon samples from both the Quartzite of Argenta and the Flathead sandstone will constrain stratigraphic correlations and the paleogeographic setting. In addition, Cretaceous to Tertiary bimodal volcanic successions overlie deformed Paleozoic strata. Ongoing geochemical analysis of these successions will constrain the origin and evolution of the syn- to post-depositional magmatic system.

Scott Alan Wipperfurth, Aleisha Christine Johnson, Todd Andrew Lindblad (145)
Faculty Mentor/Collaborator: Phillip D. Ihinger

*3-Dimensional Mapping of Hydrous Impurities in a Single Quartz Crystal Sampled at Windgällenhütte, Switzerland*

The spatial distribution of chemical impurities in gemmy quartz reveals the thermal evolution of their host hydrothermal fluids and documents syn- and post-crystallization chemical diffusion. We present micro-FTIR spectroscopic analyses of three hydrous species (LiOH, AlOH, and molecular water) from a single crystal collected at the classic Alpine locality of Windgällenhütte, Switzerland. High-resolution crystal mapping of impurities was achieved through micro-infrared traverses across several mm-thick polished wafers sectioned perpendicular to the c-axis. Lower impurity concentrations were observed both near the crystal terminus and proximal to the m prism faces. Our results demonstrate that diffusion toward the prism faces occurred predominantly during growth, whereas diffusion toward the terminus occurred after the cessation of crystal growth, consistent with the simulations of Henke et al. (2008). This study can be applied to other Alpine hydrothermal veins to shed light on the varying factors that control crystal evolution (Johnson et al., this volume).

Aleisha Christine Johnson, Scott Alan Wipperfurth (146)
Faculty Mentor/Collaborator: Phillip D. Ihinger

*High-Resolution Infrared Characterization of Hydrothermal Quartz: Toward Identifying the Chemical Signature of Varying Fluid Regimes Within the Swiss Alps*

Vein quartz crystals document the thermal and chemical evolution of their host hydrothermal fluids. In the Swiss Alps, four distinct crystal morphologies are associated with four distinct metamorphic regions characterized by different temperatures of formation (Mullis et al., 1994). Little is known regarding the relationship of temperature to the distinguishing features of the varying typomorphs. Mapping the distribution of hydrous impurities at high spatial resolution can yield powerful insights into the growth and post-growth evolution of hydrothermal quartz (Ihinger and Zink, 2000). We present high-resolution micro-FTIR analyses that document the abundance variations of three hydrous impurity species (LiOH, AlOH, and molecular water) from crystals sampled from the four Swiss metamorphic zones. Samples were sectioned into mm-thick polished wafers and characterized by the high-resolution technique described by Wipperfurth et al. 2014 (this volume). Infrared spectroscopic analyses show distinct diffusion profiles in all crystals, and provide valuable insights into the thermal history of individual crystals from each of the four Alpine regions.
Scott Alan Wipperfurth (155)
Faculty Mentor/Collaborator: Phillip D. Ihinger
Serpentine Dehydration and the Mobility of Europium

Two distinct styles of continental crust formation, correlative in time, have been identified in the literature (Taylor and McLennon, 1995). However, much is still unknown about the mechanisms for generating new continental crust and why they shifted in Earth history. Continental crust created after 2.6 Ga in subduction arcs displays a prominent negative anomaly in the rare earth element (REE) europium, compared to the element budget of its mantle source. Intra-crustal differentiation with subsequent delamination of a lower Eu-enriched eclogitic crust has been proposed as a mechanism for the Eu depletion observed in upper continental crust, but concerns related to rock mechanics in the rigid lithosphere have yet to be satisfactorily addressed. We hypothesize that the complementary Eu enrichment is to be found in the dehydration residue of subducting slabs. We present exploratory experiments that investigate the nature of Eu mobility during the dehydration of oceanic crust. Serpentinite, the dominant rock type found in sinking slabs, was collected from the Franciscan Complex of northern California. Starting materials were powdered and loaded in 1 atm tube-furnaces and held at temperatures between 500 and 600 °C for run durations varying from days to weeks. Run products were analyzed with XRD for phase identification and ICP-MS for REE abundances.

Scott Alan Wipperfurth, Gabriel Thomas Stuntz (156)
Faculty Mentor/Collaborator: Phillip D. Ihinger
Controlled Pressure Release in Rapid-Quench Cold-Seal Experimental Apparatus

Externally heated rapid-quench cold-seal pressure vessels can maintain temperatures up to 1000 °C and pressures up to 2 kbars. These conditions simulate shallow felsic magma chambers, as well as most metamorphic environments in the Earth’s upper crust. The experimental apparatus is both safe and relatively easy to use, making it ideal for conducting faculty-undergraduate student collaborative research projects. We employ National Instruments hardware with LabVIEW software (see Kast et al., 2014 in this volume) to monitor, record, and control the pressure and temperature of eight individual cold-seal vessels. Our apparatus is unique in its use of computer-controlled heating tapes that provide the ability to maintain steady state and/or induce controlled rates of pressure release within individual vessels. This design allows for running experiments with prescribed pressure changes for an unlimited number of distinct ramping cycles. Such controlled cycling of pressure enables, for the first time, the ability to conduct experiments to determine crystal and/or bubble nucleation rates in volatile-bearing rhyolitic magma. Here we present results that characterize the maximum and minimum pressure-release rates achievable in our apparatus.

Kate Marie Beaton, Michael James Chang (157)
Faculty Mentor/Collaborator: Katherine R. Grote
Monitoring the Effects of Road Salting on Chloride Concentrations in Surface Water and Groundwater in Eau Claire, Wisconsin

In cold regions, road salting improves the safety of roadways impacted by snowfall events. Runoff from these roadways can negatively affect surface water and groundwater supplies through high chloride concentrations. This project investigates chloride concentrations in surface water and groundwater in Eau Claire, Wisconsin. Measurements were taken from nine stream sites and two groundwater wells. Samples were acquired to capture both background chloride concentrations and concentrations soon after road salting or melting had occurred. Data were analyzed to determine the effects of rapid warming and absolute temperature on chloride concentrations. Results show that road salting has a significant impact on chloride concentrations in surface water and groundwater. Higher chloride concentrations are observed after precipitation and warming events, especially if the temperature exceeds 3⁰C, but rapid warming at temperatures below 3⁰C does not correlate with higher chloride concentrations. Frequent sampling of one stream shows that chloride concentrations can change rapidly after road salting or warming, so automated monitoring of chlorides is necessary to capture the maximum chloride concentration. Finally, comparison of chloride measurements in surface water and groundwater show that both water bodies respond similarly to road salting, although the groundwater response is
delayed when compared to the surface water response.

Kelly Lynn Schwierske (160)
Faculty Mentor/Collaborator: Geoffrey S. Pignotta
External Collaborator: George Hudak III, Natural Resources Research Institute
The 2.7 Billion Year Old Mt. St. Helens of Northern Minnesota: Petrography, Geochemistry, Structural Geology and Economic Potential of the Neoarchean Gafvert Lake Sequence

The Gafvert Lake sequence comprises part of the Vermilion District in the Wawa-Abitibi Terrane in northeastern Minnesota and is located in Minnesota’s newest state park, Lake Vermilion State Park. The Neoarchean Gafvert Lake sequence is a 2.7 billion year old volcanic and plutonic complex similar to those found in modern subduction zone settings. The results of this project provide a better understanding of the geological, volcanological, geochemical, tectonic and mineralization processes, as well as age relationships associated with its development. Field, petrologic, and structural relationships suggest that the Gafvert Lake sequence volcanic rocks are dominantly intermediate in composition and comprised of a series of flows, welded tuffs, and volcaniclastic breccias. The volcanics are intruded by a very coarse crystalline to porphyritic tonalite to granite complex called the Gafvert Lake intrusive complex. The volcano-plutonic complex is cut by several steeply dipping, east-west trending, dextral shear zones with stretching lineations that are shallowly east plunging. Ongoing petrographic and geochemical analyses will be used to fully characterize the Gafvert Lake sequence and help determine the geologic and geodynamic setting of the Vermillion District during the Neoarchean.

Forest Ryan Friedrichs (175)
Faculty Mentor/Collaborator: Samuel Robert Castonguay
Geochemistry of the Green Mountain Shield Volcano, Eastern Oregon, USA

The Green Mountain shield volcano is located ~50 km southeast of Newberry Volcano and geologically at the intersection of the Oregon High Lava Plains province and the northernmost Basin and Range Province. This study aims to understand the subsurface architecture of the shield volcano. Green Mountain is composed of three types of volcanic features of assumed temporal relations from preliminary geologic mapping. From youngest to oldest, these consist of: cinder cones near the top, the flows emanating from the central vents, and exposed tuff rings beneath the flows. If these volcanic features are the result of a shared magma chamber, we expect the chemistry to reflect crystal fractionalization within the chamber. However, if these features did not share a common source but the magma was created by the same process, the chemistry of each should not show evidence for crystal fractionation. To test the hypotheses, we collected 27 samples from the volcanic features that make up Green Mountain and will extract minor and major element geochemistry using X-ray fluorescence (XRF).

Steven Carl Brost (176)
Faculty Mentor/Collaborator: Phillip D. Ihinger
High Resolution FTIR Spectroscopic Characterization of Hydrous K-feldspar from the Swiss Alps

Feldspar is the most common mineral in the Earth’s crust. Every natural feldspar contains measurable amounts of hydrogen serving as one of the largest reservoirs for water on Earth. Bound hydrogen is coupled with specific chemical impurities distinguishable through the characteristic stretching energy of the X-OH hydroxyl bond. The abundance and type of hydrous impurity, incorporated into the crystal lattice during crystal growth, provide valuable insights into the thermodynamic conditions of the host geologic environment of feldspar crystals. We collected several gemmy crystals of hydrothermal K-feldspar (adularia) from the Swiss Alps and present here the first high-resolution (100-μm spot size) FTIR spectroscopic measurements on feldspar. Earlier studies of water in K-feldspar focused on igneous host rocks and have not attempted to discern internal variations in the impurity abundance within single crystals (e.g., Johnson, 2006). These studies have identified different absorption bands within K-feldspars from different igneous environments. We show that individual Swiss hydrothermal K-feldspars each show every major absorption band that has been observed in their igneous counterparts. In addition, internal variations in impurity abundances of single crystals show potential for discerning variations in the fluid conditions present during crystal growth and/or post-crystallization thermal
Ryan Joseph Conway, Travis Richard Lindberg (158)
Faculty Mentor/Collaborator: Katherine R. Grote
Geophysical Investigation of Bedrock Depth at the WRR Superfund Site in Eau Claire, WI

Near-surface geophysical methods can provide valuable information for understanding the stratigraphy of sites with groundwater contamination. In this study, geophysical measurements were made to delineate the soil-bedrock interface at the Lowes Creek County Park Superfund site in Eau Claire, Wisconsin. The groundwater at this site is contaminated by dense non aqueous phase liquids (DNAPLs) as a result of chemical waste processing by WRR Environmental Services. For remediation efforts to remove the DNAPLs to be effective, bedrock depth and topography must be delineated. Limited borehole data suggest that depth to bedrock varies from 17m to greater than 45m over a small area. The borehole data are insufficient to adequately characterize the bedrock topography, but suggest that a complicated system of buried valleys may be present. Seismic refraction, microgravity, resistivity, and electromagnetic data were collected in the areas where greater bedrock depths were suspected. Results from all geophysical techniques correlated well with borehole measurements, but seismic refraction and microgravity data were primarily used to estimate bedrock depth and topography due to greater penetration depths. Using data from both borehole measurements and geophysical estimates of bedrock depth suggests a buried meandering stream channel that should be the target of DNAPL remediation.

Jacob Jeffrey Kast (254)
Faculty Mentor/Collaborators: Phillip D. Ihinger, Kim W. Pierson
A LabVIEW Program for Controlling Pressure and Temperature in Rapid-Quench Cold-Seal Experimental Apparatus

Rapid-quench cold-seal pressure vessels are ideal for conducting experiments at conditions relevant to the Earth’s upper crust. Rapid quenches are achieved by lowering the experimental charge from a hot vessel (placed inside a furnace) into an underlying cold vessel through the use of a magnetically levitated elevator rod. At run conditions, the cold portion of the apparatus contains a significant fraction of the fluid pressure medium, such that small changes in the ambient temperature around the cold vessel can leverage large changes in the internal pressure of the fixed-volume system. We employ LabVIEW software to monitor, record, and control, for the first time in cold-seal apparatus, both pressure and temperature by applying small temperature adjustments to heating tape wrapped around the cold vessels. A PID algorithm is used to vary the voltage appropriately. The heating tape is controlled using a NI-9174 cDAQ (Compact Data Acquisition) and a digital module. Through pulse-width modulation generated by a LabVIEW virtual instrument, the experimental vessels can ramp to and hold desired pressures and/or temperatures for prescribed cycles. When errors occur in the program, the user is automatically contacted via email.

April Rose Leistikow (143)
Faculty Mentor/Collaborator: J. Brian Mahoney
Tectonostratigraphic Evolution of the Montana Fold and Thrust Belt South of the Helena Salient: Proterozoic/Cambrian Structure and Stratigraphy west of Dillon, Montana

The close spatial and temporal relationship between Late Cretaceous magmatism and structural deformation within and adjacent to the Helena Salient in western Montana is clear, but less obvious are the fundamental crustal elements that controlled the initial geometry of the system. Stratigraphic and structural variations within Mesoproterozoic and lower Paleozoic strata may fundamentally control the geometry of the superposed Cretaceous fold and thrust belt system. Geologic mapping in the Ermont 7.5’ Quadrangle (west of Dillon, Montana) was conducted to assess the pre-deformational stratigraphy south of the Helena salient. The Ermont mapping area contains a geographically restricted stratigraphic package named the Quartzite of Argenta below the Paleozoic units. Spectacular boulder conglomerates in the basal Paleozoic section suggest significant Neo- proterozoic to Cambrian structural deformation. Detrital zircon samples from both the Quartzite of Argenta and the Flathead sandstone will constrain stratigraphic correlations and the paleogeographic setting. In addition, Cretaceous(?) to Tertiary bimodal volcanic successions overlie deformed Paleozoic strata. Ongoing geo-
chemical analysis of these successions will constrain the origin and evolution of the syn- to post-depositional magmatic system.

**Materials Science Center**

Phillip Jay Conor, Elizabeth Ganz Stubbs, Dylan Gary Karis, Michael Jon Schneider (180)
Faculty Mentor/Collaborator: Elizabeth M. Glogowski
*Synthesis and Systematic Study of Smart Diblock Copolymer PEG-PDMAEMA*

Smart polymers are polymers that dramatically change their properties in response to an external stimulus, such as temperature or pH. Smart polymers have numerous applications in industry, including medicine, cosmetics, and plastics. We use a specific polymerization process to control how long our polymer chains are, because the smart properties depend on polymer chain length. These polymers are characterized using proton nuclear magnetic resonance (1H-NMR), gel permeation chromatography (GPC), ultraviolet-visible spectroscopy (UV-Vis), fluorescence, and dynamic light scattering (DLS) to determine both polymer chain length and smart polymer properties. We have synthesized and characterized diblock copolymers of PEG-PDMAEMA with different molecular weights that ultimately affect the smart polymer behavior.

Jason David Luhmann, Joseph H Christian (210)
Faculty Mentor/Collaborator: Matthew C. Jewell
*Chromium Plating of ITER Magnet Wires*

Chromium (Cr) plating of wire strands for ITER (nuclear fusion reactor) magnet cables provide protection for copper and superconducting components of wire strands during production and prevent excessive current sharing between wire strands during operation. Cr plating offers protection during the five stages of cabling that the wire strands undergo and during heat treatment process where the superconducting component is formed. Hexavalent Cr plating has typically been used to plate wire strands due to its robust mechanical properties, however one manufacturer has utilized trivalent Cr plating for all superconducting wire strands in its ITER magnet cable, due to the plating process being more environmentally friendly. The trivalent and hexavalent plating was compared via Optical and SEM-EDS microscopy, X-ray diffraction (XRD), X-ray fluorescence (XRF), and Nano-indentation to determine the level of protection and the intrinsic mechanical property differences between the two types. The mechanical properties are similar and protection levels are on par with or better than currently accepted performance, which means a more environmentally friendly plating process can be used for ITER magnet cables.

Anneliese Emma Laskowski (181)
Faculty Mentor/Collaborator: Jennifer A. Dahl
*Microwave-Assisted Synthesis of Triangular Silver Nanoplates: Influence of Seed Clusters*

A bimodal mixture of silver nanoparticles consisting of spheres and triangular nanoplates was synthesized from aqueous silver nitrate and poly(vinylpyrrolidone) with the aid of a microwave reactor system. Although the reagent ratios are similar to those used in analogous benchtop preparations, it was found that the use of a microwave reduces the reaction time significantly – from days to minutes. The rapid kinetics of the reaction suggests that the products should consist entirely of spheroidal nanoparticles. It is known that freshly prepared solutions of silver nitrate contain a high population of silver(I) trimers, while aged solutions contain mostly free silver(I) ion. We propose that the ratio of spheroidal:triangular particles is proportional to the relative population of trimers in solution prior to initiation of the microwave reaction.
Tayo Aliake Sanders (182)
Faculty Mentor/Collaborator: Jennifer A. Dahl
Fabrication and Evaluation of Gold Nanoparticle Films for Enhanced Performance of Photovoltaic Materials

The structural dynamics of thin films of surfactant molecules can be characterized by their behavior in a Langmuir trough, where the molecules reside at the air-water interface. Parameters such as molecular order, film density, and surface pressure are easily addressed, and multilayer superstructures can be fabricated using this classic surface science strategy. Less common is the use of a Langmuir trough for the fabrication of organized two-dimensional arrays of alkanethiol-capped gold nanoparticles. Here, hydrophobic nanoparticles are introduced to the air-water interface as a solution in hexanes; as the solvent evaporates, the floating nanoparticles can be compressed into a monolayer within the Langmuir trough. Preliminary studies have explored the use of a dithiol crosslinking ligand to improve film morphology; it has been found that the addition of alkanedithiols prior to film compression yields covalently bound soft networks of nanoparticles with greatly improved collapse pressures. These crosslinked films show great potential for use as a backside reflector in photovoltaic devices by enhancing photocarrier generation. We are reporting the fabrication of several composite films containing alternating layers of crosslinked film and transparent conducting oxide. These will be further analyzed with ellipsometry and conductive studies to assess real-world applicability.

Nicholas J Sullivan, Carl Koepke (211)
Faculty Mentor/Collaborator: Matthew C. Jewel
External Collaborators: Carl Koepke, non-UWEC undergraduate
Characterization of Distinct Nb₃Sn Post-Reaction Microstructures

Nb₃Sn superconducting wire is a brittle material used in large magnet arrays such as in experimental fusion reactors and particle colliders. This brittleness is a problem as the magnets degrade significantly over time because magnetic Lorentz forces cause filament fractures within the wire. There are several architectures of wire in use, manufactured by several companies. The goal of this study is to understand the effects of pre-reaction architecture on the wires’ post-reaction microstructure using backscattered SEM images of wire cross sections and image analysis. An understanding of the post-reaction structure, such as the size and position of void structures, filament bridging, or Sn distribution may provide insight on the significance of post-reaction structures, and make future wire manufacturing designs more consistent, of higher performance, and greater mechanical strength.

Kao Zoua Yang (240)
Faculty Mentor/Collaborator: Marcus T. Mc Ellistrem
Gold Nanoparticles and Shape Influence from Methanobactin

Methanobactin is a biological molecule that is secreted by methanotrophic bacteria (that is, bacteria that live on methane gas). Methanobactin’s role is to bind, reduce, and chaperone Cu₂⁺ ions from the environment back inside the bacterium. In addition to copper, methanobactin has been shown to bind a wide variety of metals and in some cases to reduce them. Our research project involves the study of methanobactin’s chemistry with gold, namely the reduction of Au³⁺ to Au⁰ (that is, reducing gold ions to gold atoms). The gold atoms then combine to form gold nanoparticles. With appropriate concentrations of the gold and methanobactin, nanoparticles of various sizes (and to some extent, shapes) are produced in water at room temperature. My presentation will provide evidence for the reduction of gold ions and the formation of gold nanoparticles.

Joseph H Christian, Jason David Luhmann (209)
Faculty Mentor/Collaborator: Matthew C. Jewell
Nanoindentation of Cr Coated Superconducting Wires

Copper wires carrying superconducting filaments are coated with chromium to help tune the electrical resistivity by increasing the overall resistance. Failing wires due to chromium damage have been noticed by a company responsible for coating and cabling these superconducting wires together. The company uses two different styles of chromium, hexavalent and trivalent. The level of damage, which affects the superconducting
properties of the wire, leading to failure, is different for the two kinds of chromium. Traditionally, hexavalent is used due to its good mechanical properties, but trivalent is a more environmentally friendly approach. The company would like to find out if this damage is coming from an intrinsic problem with chromium itself, or if this is an extrinsic problem due to their cabling process. We decided to test the moduli and hardness of the different types of chromium through nanoindentation since the coating on these wires is around 1-2um. We are crafting our techniques using the ideas of microhardness by checking minimum penetration on bulk samples and proximity limitations of the indents. This technique will allow us to use the nanoindentor to investigate the mechanical properties of various wires, and offer the nanoindentor as a quality assurance tool.

Kelsey Ann Steinke, Jacob Martin Pederson, Kyle Thomas Tollefson, Nokoma Lee Kohl-Blomsness (239)
Faculty Mentor/Collaborator: Douglas J. Dunham

Developing Silicon Carbide Nanowires to Decrease the Size of Electronics

Currently, electronic components are limited by their mechanical and thermal durability and can only operate effectively to their inherent maximum conditions. This limitation is largely due to the comparatively low melting point of silicon, the most widely used semiconducting material. Silicon Carbide (SiC) has the mechanical and electrical properties that would be ideal for electronics used in extreme conditions. Specifically, it is very durable, has a high thermal conductivity, and is a better semiconductor. We are able to produce SiC nanowires mainly using Silicon Monoxide (SiO) and Carbon Nanotubes (CNT). We are currently exploring the effects of combinations of certain variables on the characteristics of the nanowires, namely length and diameter, both of which measurements are obtained through Scanning Electron Microscopy (SEM). We also use X-Ray Diffraction (XRD) to determine the composition of the nanowires, and whether there are impurities or residual reactants after the process is complete. Currently, we are looking for ways to control the growth parameters of the nanowires, which include not just the diameter and length, but also the direction of growth. This is just one step toward the long-term goal of incorporating them into circuitry.

Physics and Astronomy

Jacob Jeffrey Kast (253)
Faculty Mentor/Collaborator: Kim W. Pierson

Autonomous Self-Balancing Inverted Pendulum Robot-Physics

Two-wheeled robots that can balance themselves are known as “inverted pendulums”. Given their nimble maneuvering capabilities, they have a wide array of applications. The algorithms that control the robot balancing and the other necessary electronic subsystems involve the integration of a large array of sensors. The goal of this project is to create a simpler balancing algorithm that integrates an accelerometer and a gyroscope into an inertial tilt sensor. The data from these two sensors was combined through the use of a recursive digital filter to produce a noise-free tilt angle reading that is used in a balancing algorithm to control the motors to keep the robot upright. This project included constructing the robot, researching different types of recursive digital filters and testing various control algorithm models to find a stable design.

James Truchinski (136)
Faculty Mentor/Collaborator: Paul Jonathan Thomas

Electrostatic Dust Migration on Rotating Asteroids

On solar bodies lacking atmosphere, such as the Moon and asteroids, electrostatic levitation of dust via photoionization is a common phenomenon that migrates dust particles over meter-scale distances. Using Maple, we numerically model this effect for rotating asteroids, including the effects of non-inertial reference frame forces and non-spherical asteroid shape creating an ellipsoidal gravitational field. Our model results give a determination of the variation of dust accumulated over long periods of time on the surface of a rotating asteroid.
Nathaniel James Lading (135)
Faculty Mentor/Collaborator: Matthew M. Evans
*Variable Focal Length, Liquid Lens Optics Using Electrowetting Techniques*

Electrowetting is a process that employs a controlled electrostatic field that can be used to change the shape of small droplets of conducting liquid. Using this technique, adjustments in voltage applied to the field can create drastic changes in shape and focal length of the liquid. This process can be replicated in miniature lenses that can be used for finely controlled optical systems that require an option other than cumbersome, glass lenses. For this research, individual droplets of varying conductivity were placed on an aluminum electrode and were subjected to direct voltages of up to 120 volts. This created the electrostatic field that affects the shape of the liquid drop. The focal length of these droplets can be extrapolated from the change of contact angle in response to the applied electrostatic field. The purpose of this research is to discover whether an array of liquid-filled micro-wells that operate using electrowetting techniques could be a more feasible option than classical glass lenses.

Travis Ryan Yeager (232)
Faculty Mentor/Collaborator: Lauren E. Likkel
*Confirming Iron Carbides in Shock Melted Meteorites*

Cohenite is a rare metal found mainly in iron meteorites, and is the result of carbon bonding with metals, primarily iron. It was recently recognized that stony meteorites can also contain Cohenite. Our hypothesis proposes that Cohenite can form near shock melted regions in meteoroids. The shock melting would be the result of high speed collisions between meteoroids in space. The finding of Cohenite has the potential to give an insight into the history of meteorites, showing us whether or not the meteoroids underwent any sort of shock heating, melting part of the meteorite. We have documented the occurrence of Cohenite in stony meteorite samples.

Austin David Riedl (233)
Faculty Mentor/Collaborator: James E. Rybicki
*Magneto-Resistance in Organic Light-Emitting Diodes and the Impact of X-rays*

The goal of our research is to understand the impact that x-rays have on the magneto-resistive properties of organic light-emitting diodes (OLEDs). Understanding organic magneto-resistance (OMAR) is of particular interest to the emerging field of organic electronics because this effect is unique to organic materials. In order to conduct our research, we fabricated OLEDs using two distinct methods then measured and compared their OMAR. We then exposed some devices to x-ray radiation and re-measured their OMAR. We observed some very small, previously unreported, OMAR in some devices and we observed a significant difference in the OMAR of devices exposed to x-rays compared with devices that were not exposed. Our research continues as we use XPS to identify precisely what x-rays do to the organic layer of the OLEDs which results in the drastic change in OMAR that we observe.

Peter James Kiefer (134)
Faculty Mentor/Collaborator: George J. Stecher
*Accelerometer Measurements of a Disc in Flight*

The physics of flying disc flight is complex and few measurements have been made of discs in flight. We explore the flight characteristics of a Discraft Ultra-Star flying disc. By mounting an MMA 7455 three-axis accelerometer and an Arduino Nano microcontroller on the underside of the disc, we were able to make in-flight measurements of the disc's acceleration. We discuss the electronics of the setup and our findings about both the rotational and translational flight behavior of the disc.
Physics and Astronomy and Computer Science

Zacharie Adamados Zens, Hyoki Lee (259)
Faculty Mentor/Collaborators: Kim W. Pierson, Peter J Bui

*Integrating MAVLink with LABView: An Arduino-based Autonomous Robotics Platform*

This project involves computer interfacing to robotic systems. The goal was to integrate an open-source robotics command and control communication protocol called MAVLink into the computer interfacing language LabVIEW. This allows easy development of robotic control programs for widely available inexpensive Arduino-based autopilot controlled boards. The control boards can be incorporated into robotic systems used in teaching and research in geographic, geologic, agricultural, search and rescue, and atmospheric scientific investigations. The MAVLink protocol was reverse engineered, and implemented into a preliminary LABView interface for communicating with a MAVLink controlled hexrotor flying robotic system. To develop this interface, we analyzed MAVLink protocol, designed an algorithm for parsing data streams, and developed a LabVIEW program to intercept and process data packets. Our success in constructing a MAVLink protocol module in LabVIEW allows future students to take advantage of inexpensive Arduino-based robotics systems.

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Watershed Institute for Collaborative Environmental Studies

Danielle Anne Bronshteyn (117)
Faculty Mentor/Collaborator: James E. Boulter

*Quantitative Analysis of Atmospheric Carbonyl Compounds by HPLC-TOF/MS*

Atmospheric organic compounds containing a carbon-oxygen double-bond, carbonyls, are of interest because of their contribution to particulate and smog chemistry, which impacts public health. The conventional analysis method involves cartridge sampling and capture using derivatization with 2,4-dinitrophenylhydrazine (DNPH) followed by analysis with high-pressure liquid chromatography with spectrophotometric detection (HPLC-UV/Vis) using spectrum- and retention time-matching. This method has difficulty distinguishing interferences from the compounds of interest. Time-of-flight mass spectrometry (TOF/MS) provides a high mass resolution, which can give positive identification based on structure and mass. Several compounds were considered as alternatives to DNPH, and dansylhydrazine (DNSH) was found to provide the best resolution with the TOF/MS. Representative carbonyl compounds containing common structural features were used with an internal standard to develop instrumental response factors. Gas sampling is carried out by loading DNSH onto solid phase extraction (SPE) cartridges. A gas manifold was used to establish capture efficiencies and limits of detection of the cartridge sampling procedure. One analysis challenge was contamination, which was minimized by the use of an inert atmosphere glovebox for cartridge, sample, and internal standard handling. We will present the HPLC-TOF/MS method, response factors, and limits of detection.

Social Sciences

American Indian Studies

Kristina Lynne Malec (194)
Faculty Mentor/Collaborator: Heather Ann Moody

*Unemployment in Native American Communities*

Many Native American reservations in the nation struggled with the serious problem of unemployment. It is an issue linked as a root cause to a multitude of other problems that indigenous reservations experience, including high rates of poverty, poor health, low academic achievement, teen pregnancy, and violence. Research was conducted using a mixed methods approach of qualitative and quantitative data to look for what factors cause unemployment in Native American communities. The quantitative data was researched via statistics taken from the top ten poorest Native American reservations, and the qualitative data was compiled using
prior literature already written on reservation unemployment. The end result of this research showed a direct correlation between the ten reservations with the highest unemployment rates in the nation and four different causation factors: seclusion, lack of job market, dependency, and lack of land rights.

**Center for Alcohol Studies and Education**

**Kyra Jaye Beckman, Yan Lin Lee, Samantha Jean Stimac (202)**
Faculty Mentor/Collaborator: Peggy O’Halloran

*Evaluation of Alcohol Diversion Courses Offered to Youths Cited for Underage Drinking for Eau Claire County*

This project aimed to evaluate the effectiveness of underage drinking diversion programs in Eau Claire County (ECC), identify best practices to use as guidelines for improvement, and develop recommendations regarding a practical evidence-based approach for diversion in ECC. For this project we 1) Conducted a literature review to identify evidence based practices for underage drinking diversion programs; 2) Developed and completed a survey to gather information on ECC courses; and 3) Analyzed county recidivism data for individuals who were cited for first lifetime underage drinking in 2012 and opted to take a course compared to those who did not during the same time frame. Recidivism was defined as receiving a subsequent underage drinking citation or other drinking related violation. The literature review revealed 7 practices of evidence-based alcohol education courses: normative education, goal setting, pre/post testing, resistance skill training, alcohol use monitoring, brief motivational interviewing, and skills to identify risky drinking situations. We collected information on 7 of the 10 ECC courses, and found that courses differed in the degree to which they employed evidence based practices. Results indicated that participants in an alcohol education course were somewhat less likely (15%) to recidivate than those who did not participate (26%).

**Communication Sciences and Disorders**

**Amanda Rumpca (164)**
Faculty Mentor/Collaborator: Marie A. Stadler

*Toys vs. Technology: A Comparison of Methods to Teach Prepositions*

The goal of this research project was to determine if there was a significant difference in the effectiveness of intervention using an iPad application or using toys to teach the prepositions “above” and “below”. The evidence base to support the use of iPad technology in the field of speech-language pathology is limited, and the use of the iPad during intervention has increased within the field in recent years. Therefore, additional research about the effectiveness of iPad-based intervention techniques is necessary to provide the best therapy to clients. In this study, thirteen preschool children were divided into two groups. One group was taught the prepositions “above” and “below” using the iPad app *The House of Learning* and the second group was taught using toys. Each child was seen for five sessions or until he/she demonstrated mastery of the concepts. A comparison of pre- and post-test scores between the two groups suggests that both intervention techniques were equally effective in teaching these language concepts.

**Communication and Journalism**

**Paige Nicole Johnson (82)**
Faculty Mentor/Collaborator: Won Yong Jang

*New Approaches to Alcohol Interventions on Drinking Behavior in Hmong-American Students*

Binge drinking is a most serious public health concern and is related to several negative consequences on college campuses today. This study looks into the new approaches to alcohol intervention on drinking behavior in Hmong-American Students. This study tests the hypothesized Structural Equation Model of alcohol use to determine if interpersonal communication, deliberation, and drinking expectancies would mediate alcohol
advertising effects on drinking in alcohol intervention situations. This study will offer a new intervention idea for how educators go about creating anti-drinking campaigns differently to diverse young populations. From this study we will be able to better tailor alcohol prevention and cessation programs for diverse populations of college-age individuals.

**Katelin Suzanne Wrobel, Maggie Leigh Nelson, Jordan David Glenna, Kaitlyn Mary Ford, Kyle P Bacon (83)**  
Faculty Mentor/Collaborator: Mary F. Hoffman  
*Love in the Club: Perceptions of Nonverbal Behavior in Social Settings*

Communication researchers have established that appearance and other nonverbal factors influence initial perceptions of romantic/sexual attraction (Brown, Cash, & Noles, 1986; Graham & Jouhar, 1981). In order to expand on this area of study, this project investigates what young adults, 18-25, attend to in nonverbal cues regarding attractiveness of the opposite sex. We sent a Qualtrics survey to young adults utilizing snowball sampling. The survey asks participants to view images highlighting variables including clothing, gestures, and facial expression. Participants then answer questions about their perceptions of the subject of the photograph and indicate how likely they are to approach the subject of the photograph. Results should provide insight on how this highly socially-active segment of the population responds to nonverbal cues in social settings.

**Kelsey Ann Chapman, Marissa E Jones, Elizabeth Ellen Pape, Jenna Nicole Stromberger, Adam Zachariah Borremans (97)**  
Faculty Mentor/Collaborator: Mary F. Hoffman  
*The Impact of Workplace Friendships on Job Satisfaction and Perceived Productivity*

Our study investigates the perceived relationship between workplace friendship and productivity and satisfaction. Organizational communication professionals have long been interested in the impact of interpersonal relationships in the workplace (Feeley, Hwang & Barnett, 2008; Morrison, 2004). To contribute to this field of study we will distribute a qualitative survey to a variety of young adults professionals recruited through snowball sampling. The survey will focus on perceptions of workplace friendships, addressing questions such as how workplace friendships effect productivity and satisfaction and how communication changes within the workplace between friends. We expect to find a perception that workplace friendship increase productivity and satisfaction. Feeley, Hwang and Barnett (2008) suggest that friendship in the workplace relates to sharing knowledge, experience and helping behavior; and assists in organizational effectiveness and by association, productivity. However, research also indicates that informal relationships between people within organizations can potentially hinder organizational functioning (Morrison, 2004). Our study should help us determine whether people perceive that their workplace friendships have positive or negative impacts on productivity and satisfaction. Additionally, we anticipate that participants will perceive that workplace friendships positively impact the ability to maintain work-life balance.

**Pilar Ellis Blomquist, Hanna Emily Goral, Riley James Lemke, Laura C Atchley, Leslie Rae Egner (98)**  
Faculty Mentor/Collaborator: Mary F. Hoffman  
*Perceptions of Nonverbal Communication and Technology Use in Intimate/Romantic Relationships*

This study investigates male and female perceptions of nonverbal communication and technology use in dating settings. We will conduct interviews with six focus groups, three groups of 5-7 men and three groups of 5-7 women. Participants will view several photographs showing nonverbal behaviors surrounding the use of technology in dating environments. After viewing the photographs, they will be asked to give their interpretation of what is happening in each situation and how they would feel if they were in that particular situation. Participants will answer the questions on their own worksheet, and then participate in a facilitated discussion as a large group. We expect to be able to describe and compare how different sexes perceive certain nonverbal communication behaviors relevant to technology use in dating situations.
Rachel Lynn Debner (101)
Faculty Mentor/Collaborator: Martha J. Fay
“Should I Stay or Should I Go?”: Conflicting Loyalties among Moldovan Youth

Weick (1995) has argued that people make sense of the world through a process that includes building narrative accounts through interaction with others; this process helps them understand their thoughts (Abolafia, 2010) and reduce the complexity they experience when dealing with change (Kumar & Singhal, 2012). This study explored the messages surrounding young adult decisions of whether to leave their home towns or stay in the previously Soviet republic of Moldova when seeking a career. The context reflects a complex interplay between young adult identities—as situated within the family, the country, and the world—conflicting loyalties, and uncertainty regarding career prospects in an economy still struggling with the effects of a major shift in political control. Recorded data and field notes from ten interviews with youth from both rural and urban areas of Moldova were analyzed based on a grounded theory approach (Glaser & Strauss, 1967). Results reveal a common theme of equivocal communication (as conceptualized by Bavelas, 1990), as these young people simultaneously express the certainty that better career opportunities are somewhere other than “home” and the uncertainty of leaving a family and country they love.

Kaleb Tehl Aalderks, Chelsey Jo Kaas, Eva Mae Eng Ng, Michael James Kobinsky (99)
Faculty Mentor/Collaborator: Mary F. Hoffman
The Reality of Reality Television: Perspectives on Gender Communication

Modern day media can have a formidable influence on the perceptions of its consumers. This study looks at the perceptions that reality TV viewers form of gender-linked behaviors. As a newer genre of television program, reality television is a relatively unstudied medium in regards to research on gender in the media. Previous studies have looked at the way gender is perceived in film and television and the influence it can have on its viewers. For example studies found that the way some women were portrayed in television programs had an influence on what viewers perceived the actual profession and gender to be like in real life (Dagaz & Harger, 2011; Jette, Wilson & Sparks, 2007). Participants were asked to view a video clip and respond to a qualitative survey designed to elicit perceptions of characters. Focus groups were then used to investigate further perceptions of gender. We expect to see the majority of participants placing reality television show characters into socially constructed classifications of gender.

Rachel Lynn Debner, Katherine Jean Allan, Ariana Marie Hadjimarkos, Rachel K Kisby, Roxanne Nicole Thorelli (100)
Faculty Mentor/Collaborator: Mary F. Hoffman
Employee Motivation in the Workplace

Our study investigates which organizational factors employees perceive to be most motivating. Organizational scholars are interested in understanding how expectations are communicated in the workplace and their effect on the motivation of employees (Biron, Farndale, & Paauwe, 2011; Hall, Levy, & Rosen, 2006; Kuvaas, 2011). Our study focuses on the experiences of 12 employees in a small, Midwestern organization. We first conducted an interview of the owner/manager of the company to gain background information about the company’s procedures regarding employee training, communication of expectations, and distribution of feedback. We sent qualitative surveys to the employees to explore their perception of motivation and expectations. At the conclusion of this study, we expect to be able to identify which elements employees perceive to most strongly influence their levels of motivation.

Abigail Elizabeth Vidmar (80)
Faculty Mentor/Collaborator: Won Yong Jang
How Do News Agencies Cover Non-Communicable Diseases (NCDs)?

This study analytically compares how different news agencies frame Non-communicable diseases (NCDs). According to the World Health Organization, NCDs (such as cancer, cardiovascular diseases, chronic respiratory diseases, diabetes, and mental illnesses) are the leading global killer. News agencies across the globe deter-
mine the voices heard and issues covered for NCDs, which in turn influences the attitudes, policies, discussions, and opinions of public health. Through LexisNexis database, articles were collected from the United News of India, AllAfrica, and Agence France-Presse news agencies. The content’s topics, themes, and sources were analyzed on SPSS.

Zachary Marin Stehlin (81)
Faculty Mentor/Collaborator: Won Yong Jang
Global Media Analysis of Global Climate Change

This research involves dissecting global media markets and how our news agencies around the world analyze global climate change. The goal is to show the similarities and differences among North America, Europe, Africa, China, and India in regards to how global climate change is portrayed. The first phase of this process was to code all news stories during the UN Climate Change Conference in the years 2011 and 2012. Dissecting the articles to decipher various aspects of what is published, such as source, geography, and topic, have been documented. By coding these articles, we will be able to find out the main differences between the several regions in the world.

Economics

Lainee Jean Hoffman, Aaron Matthew Lickel, Jonathan Robert Pumper, Lucy Jane Ramquist (65)
Faculty Mentor/Collaborator: Eric M. Jamelske
Examining the Influence of Incentives on Vegetable Consumption of Children Participating in an Afterschool Program

Children’s fruit and vegetable intake is well below USDA recommended guidelines which has contributed to rising rates of obesity and other health problems. There is a developing literature examining the influence of incentives on children’s fruit and vegetable intake. In this study, we observe vegetable consumption of 150 children attending an afterschool program, first establishing a baseline intake and then using a variety of incentives to increase consumption. We also explore how the presence of less healthy alternatives impact children’s vegetable consumption. During the baseline phase vegetables were served to children 42 times with children eating at least half 52.8% of the time. During the incentive phase children were served vegetables 47 times and the consumption rate increased to 57.6%. Children were also served vegetables in the presence of cookies and chips two times during the baseline phase and four times during the incentive phase. Cookies and chips crowded out vegetable intake in the baseline phase; the percent of children eating at least half the vegetable dropped below previously observed levels. However, the consumption rate for vegetables in the presence of cookies and chips increased during the incentive phase. These results show providing incentives can positively influence children’s vegetable intake.

Emy Lynn Marier, Elora Victoria Leene, Wesley Lawrence Meives, Helue Alejandra Vazquez Valverde (55)
Faculty Mentor/Collaborator: Eric M. Jamelske
Examining Adult Public Opinion on Climate Change in the United States and China

The United States and China are of particular interest in the discussion on climate change because they are the world’s two largest emitters of greenhouse gases. Meaningful global action to address climate change must involve both countries, and thus a better understanding of how Chinese and Americans view climate change is of great interest. Between September and November 2013, we conducted surveys of US (n=1,306) and Chinese (n=2,047) adults to broaden our understanding of public opinion on climate change in these two important countries. Our results show Chinese respondents are more likely to believe human caused climate change is happening and are also less likely to see disagreement among climate scientists regarding anthropogenic climate change. In terms of policy, the Chinese show greater support for joining an international agreement to address climate change compared to Americans. Lastly, Chinese respondents are more willing to support policies to address climate change that would result in a higher cost of living. Overall, our research shows striking differences in public opinion on climate change among adults in China and the US. This information adds
valuable insights to inform the discussion regarding the importance of climate change as both a national and international issue.

**Daniel Miles Steiner, James Francis Markert, Madeline Rose Thun, Samuel Charles Levitus (53)**
Faculty Mentor/Collaborator: **Eric M. Jamelske**
*Comparing Employment by Sector in the United States and Minnesota, 2007-2013*

In 2008, the United States was hit with what has come to be called *The Great Recession*. Much attention has been given to the level of employment during the recession and the subsequent recovery. This project compares employment levels across seven sectors between 2007 and 2013 for the United States and Minnesota. Nationally, 2013 total non-farm employment was down 1.1% from 2007 with over 1.5 million fewer jobs. The state of Minnesota fared better, gaining almost 6,000 jobs as total non-farm employment rose by 0.2% over the same period. Of the sectors studied, four sectors in the US and three in Minnesota had 2013 employment below 2007 levels. Manufacturing employment saw the largest decline in both the US and Minnesota, shedding nearly 1.9 million jobs nationally and over 36,000 jobs statewide. In contrast, employment in the health and education sector increased significantly in both the US and Minnesota, gaining almost 2.5 million jobs nationally and over 61,000 jobs statewide. The recession also had varying employment effects within Minnesota. In particular, employment in the Minneapolis metropolitan area increased by 0.7% compared to a rise of 0.3% in the St. Cloud metropolitan area.

**Sara Renee Fisher, Alyssa Ashley Dalsky, Scott Brian Olson (54)**
Faculty Mentor/Collaborator: **Eric M. Jamelske**
*Comparing Employment by Sector in the United States and Wisconsin, 2007-2013*

In 2008 the United States was hit with what has come to be called *The Great Recession*. Much attention has been given to the level of employment during the recession and the subsequent recovery. This poster graphically and statistically compares employment levels across seven sectors between 2007 and 2013 for the United States and Wisconsin. Nationally, 2013 total non-farm employment was down 1.1% from 2007 with over 1.5 million fewer jobs. The State of Wisconsin was slightly harder hit, losing more than 64,000 jobs as total non-farm employment fell by 2.2% over the same period. Of the sectors studied, both the US and Wisconsin had four sectors with 2013 employment below 2007 levels. Manufacturing employment saw the largest decline in both the US and Wisconsin, shedding nearly 1.9 million jobs nationally and over 40,000 jobs statewide. In contrast, employment in the health and education sector increased significantly in both the US and Wisconsin, gaining almost 2.5 million jobs nationally and over 26,000 jobs statewide. The recession also had varying employment effects within Wisconsin. In particular, employment in the Milwaukee metropolitan area fell by 3.9% compared to a drop of only 0.4% in the Eau Claire metropolitan area.

**Mitchell Eric Fischer, Tiffany M Christner, Nicholas Earl Douglass, Jisu Kim (66)**
Faculty Mentor/Collaborator: **Eric M. Jamelske**
*Examining the Influence of Incentives on Fruit Consumption of Children Participating in an Afterschool Program*

Children’s fruit and vegetable intake is well below USDA recommended guidelines which has contributed to rising rates of obesity and other health problems. There is a developing literature examining the influence of incentives on children’s fruit and vegetable intake. In this study, we observe fruit consumption of 150 children attending an afterschool program, first establishing a baseline intake and then using a variety of incentives to increase consumption. We also explore how the presence of less healthy alternatives impact children’s fruit consumption. During the baseline phase fruit was served to children 79 times with children eating at least half 76.6% of the time. During the incentive phase children were served fruit 40 times and the consumption rate increased to 85.7%. Children were also served fruit in the presence of cookies and chips two times during the baseline phase and four times during the incentive phase. Cookies and chips crowded out fruit intake in the baseline phase; the percent of children eating at least half the fruit dropped below previously observed levels. However, the consumption rate for fruit in the presence of cookies and chips increased during the incentive phase. These results show providing incentives can positively influence children’s fruit intake.
The Eau Claire Basket (ECB) consists of publicly traded companies with an employment presence in the region. The 2013 ECB included 46 companies with each company receiving an equal share of a hypothetical initial $100,000 investment. This poster presents a graphical and statistical summary of the ECB and its top performers in 2013. The ECB got off to a good start rising 16.1% in the first quarter. The ECB continued climbing in the second and third quarters with increases of 7.4% and 6.7% respectively. The ECB closed the year strong rising an additional 10.3% during the fourth quarter. Overall, the ECB performed extremely well in 2013 returning $46,676.57 on the initial $100,000 investment. Despite this strong performance, some ECB companies struggled in 2013. The bottom five performing companies were J.C. Penney Co., Inc. (JCP), TTM Technologies, Inc. (TTMI), General Growth Properties, Inc. (GGP), Seneca Foods Corp. (SENEA) and Xcel Energy, Inc. (XEL). Three of these companies saw slight gains in value for the year with XEL, SENEA and GGP returning $163.90, $106.55 and $61.10 respectively on the initial investment of $2,173.91. In contrast, TTMI lost almost $150 while JCP was by far the worst performer losing nearly $1,200.

In this paper, we will review the history of private banknotes in the United States. Then we will introduce the ration coupons which served as private money in China from the 1950s to 1990s. We will also compare the Free Banking Era in the United States with the private money period in China in order to identify the similarities and differences between these two countries. Our research is thus novel and relevant, which may contribute to the understanding of private money and economic history.

The United States and China are of particular interest in the discussion on climate change because they are the world’s two largest emitters of greenhouse gases. Meaningful global action to address climate change must involve both countries, and thus a better understanding of how Chinese and Americans view climate change is of great interest. Between September and November 2013, we conducted surveys of US (n=2,335) and Chinese (n=1,670) college students to broaden our understanding of public opinion on climate change in these important countries. Our results show Chinese respondents are more likely to believe human caused climate change is happening and are also less likely to see disagreement among climate scientists regarding anthropogenic
climate change. In terms of policy, the Chinese show greater support for joining an international agreement to address climate change compared to Americans. Lastly, Chinese respondents are more willing to support policies to address climate change that would result in a higher cost of living. Overall, our research shows striking differences in public opinion on climate change among college students in China and the US. This information adds valuable insights to inform the discussion regarding the importance of climate change as both a national and international issue.

Jacob Raleigh (35)
Faculty Mentor/Collaborator: David L. Schaffer
Explaining Wage Differentials by Race, Gender, and Education

In the US today, the spread of wages is greater than at any time in the past. Wage inequality is at an all-time high. We look at detailed data from the Current Population Surveys of the US Census Bureau covering the years 1971 to 2010 in order to understand these wage patterns. We use a wide range of statistical methods to sort out the effects of education, race, and gender on wages. Our analysis shows that the wage distribution has been widening for this entire time period. We are able to explain about one-third of the changes based on education, race, and gender. In addition to these three factors, we also determine the effects of a wide range of other factors.

English

Robin Jean Jungwirth, Clare Olivia Koopmans (223)
Faculty Mentor/Collaborators: Erica J. Benson, Lynsey K. Wolter
Removing the Linguistic Security Blanket: Uncovering Linguistic Prejudices

Uninformed perceptions about language may underlie prejudicial beliefs about speakers—for example, “People are too lazy to speak ‘proper’ English.” Our aim is to determine whether UWEC students have linguistic misperceptions that lead to harmful prejudices. In the fall of 2013, we presented 18 closed-ended questions regarding common language myths and an open-ended question asking respondents to describe “a friend, relative, or acquaintance who speaks well” to students in English 221, an introductory linguistics course. We discovered that students tried to be politically correct about openly negative statements, obscuring their true beliefs. However, we found that participants are linguistically secure, believing their dialect of English is superior. Most respondents described white, middle-class, Northern speakers as educated, intelligent, and professional—implying that speakers who don’t fit this demographic are the opposite. We detected hidden linguistic prejudice: students made unfair judgments about speakers of different dialects. Misinformed judgments about language are easier to make than overtly insulting comments about race, class, region, gender, or age; however, they have a similar detrimental impact. We hope to improve linguistic awareness in students by targeting myths of linguistic security and dialectal variation in a revised curriculum for English 221 at UWEC.

Gregory Thomas Nelson (245)
Faculty Mentor/Collaborator: Ruth J. Cronje
Forming an Identity at the Community Table

Despite the prevalence of poverty in the contemporary economy, low income still carries a heavy social stigma. This stigma serves as a social barrier to low-income people to availing themselves of resources, working to remove themselves from poverty, and possibly taking civic actions as fully-fledged citizens. Scholars of sociology, political science, rhetoric, etc. have investigated the ways in which mainstream stigmas infect the self-perceptions of the stigmatized. An individual’s “identity” construction serves as the conceptual conduit herself and her society, contextualizing herself within dominant value systems and, in turn, shaping society through collective reinforcement of certain values. This ethnographic study explores “identity work discourse” among guests of the Community Table in Eau Claire. Using participant-observation methodologies, we attended multiple meals at the Community Table to observe ways that guests articulate an identity, salvaging their self-worth from dominant negative stigmas. Conversations with guests were candid and driven by what was important to
the people there. Our observations were consistent with previous research that noted three general strategies the impoverished use to cope with stigma: distancing, embrace, and fictive storytelling. In addition, we noted a novel identity strategy: expressions of disgruntlement regarding the political/economic system that they find oppressive.

Geography and Anthropology

Hannah Dorothy Bristol (125)
Faculty Mentor/Collaborator: Ryan D. Weichelt
Placement of Methane Digesters in West Central Wisconsin

The transport of manure has long been an issue for Wisconsin dairy farmers. Farmers are contending with conflicting policies over the amount of manure that is held on their farms and the amount of manure that is able to be trucked elsewhere. It is difficult for farmers to move large amounts of manure due to weight restrictions for trucks travelling on Wisconsin roads for certain times of the year. Digesters are a green energy alternative and could potentially provide some economic benefits for the farmers involved. In order to resolve the weight restriction issue and reduce long-distance transportation, this research investigates the strategic placement for a communal methane digester in the West Central region of Wisconsin in relation to large dairy operations. Through network analysis, a form of geospatial analysis, the ideal location for the digester can be found. The network analysis considers distance to farms along the road network in the region and gives priority to larger farms. Data for this research includes farm locations and sizes within West Central Wisconsin and a road network provided by the Environmental Systems Research Institute (ESRI). The mean center and weighted mean center of these locations is also included in the analysis.

Corrin Francis Turkowitch (257)
Faculty Mentor/Collaborator: Jeff R. DeGrave
Empowerment and Electricity, Community and Coffee: Microturbines in Central Honduras

In the cloud forests of central Honduras, the ingenuity of two men, Hector Oviedo and Adalid Zavala, led to the design, construction and implementation of small hydroelectric turbines, or ‘microturbines,’ throughout the rural countryside. The installation of the microturbines has led to new social and economic challenges as they relate to the human-environment relationship. Through the assistance of Farmer to Farmer—a western Wisconsin-based fair trade cooperative—I was able to conduct the majority of this research during a ten-day trip through Honduras this past winter. Farmer to Farmer’s mission is to not only provide direct profit to coffee farmers, but also increase cross-cultural dialogue to assist with sustainable coffee production. While researching and traveling in Honduras one must grapple with the reality of media perceptions, the consequences of climate change, the challenges of gender inequality, and ultimately the people’s reactions to such challenges. Although negative reactions may be sensationalized, many responses are rooted in creative necessity, as is the case with the microturbine project. This research offers alternative voices in sustainability and challenges systemic exploitation for the creation of energy in order to bring forth a more just planet.

Claire Elizabeth Edel, Kelsey G. White (116)
Faculty Mentor/Collaborators: Robert J. Barth, Harry M. Jol
Imaging the Internal Structure of Effigy Mounds with Ground Penetrating Radar

Our project investigated the effectiveness of using ground penetrating radar (GPR) to study the internal structure of effigy mounds in order to gain insight into their construction and possible contents. The effigy mound tradition is estimated to have existed during the Late Woodland period from 500 to 1200 AD and is characterized by the construction of effigy mounds and the presence of various artifacts, including uniquely thin pottery. Mounds built as part of the effigy mound tradition are primarily concentrated in southern Wisconsin, northern Iowa, and parts of Minnesota and Illinois. The data analyzed in our project were collected noninvasively using GPR, which utilizes electromagnetic signals to image the subsurface. Data were collected at the Indian Mounds County Park of Jefferson County, Wisconsin using a pulseEKKO 1000 GPR system with 225 and 450 MHz anten-
nae. Reflection patterns interpreted in the profile include subparallel horizontal and parabolic reflections which aid in better understanding effigy mound construction techniques.

Geography and Anthropology and English

Rachel K. Kisby, Alexander Paul Koch, Brittany Grace Charlton, Sandy Mee Thao (96)
Faculty Mentor/Collaborators: Harry M. Jol, Blake R. Westerlund
Yosemite Valley: A Historical and Cultural Experience

During the fall of 2013, a group of UWEC students and professors conducted research in Yosemite National Park. We did a literary study on the Miwok Indians, the first inhabitants who settled in the valley and conducted interviews with Julia Parker, a renowned basket weaver and representative of her ancestors in the park. We also read information on John Muir and visited some of the major sites in the valley that he wrote about during his lifetime. John Muir is a well-known author, naturalist and advocate for the preservation of the park. In addition to our cultural research, we looked at the plant life on the El Capitan Moraine located in Yosemite Valley. We conducted a 1 meter by 100 meter transection, recording all types and maturity levels of trees. The majority of the trees that grew on the moraine were seedlings and categorized as either Incense Cedars or Ponderosa Pines. Both of these species are commonly found in the valley. We found that it was important to study the cultural history of the park in order to understand the significance of our scientific findings and to provide an overall backdrop for the trip.

Information Systems

Heidi Ann Klein (204)
Faculty Mentor/Collaborator: Thomas S. Hilton
Information Systems Ethics in U.S. Financial Institutions: A Ten-Year Perspective

The problem we investigated was how ethics opinions of information workers within U.S. financial institutions have changed over the past ten years with the continued evolution of the Internet. This research is significant because information systems (IS) are increasingly at the very foundation of today’s economy. This research gathered data to compare to similar data from ten years ago. The data was collected from Information workers in U.S. financial institutions regarding information systems ethics. The online questionnaire contained three sections. Section 1 concerned use of employer IS resources for entertainment, section 2 concerned use of employer IS resources for gain, and section 3 concerned employer monitoring of employees. The current data was compared to the former data to ascertain ethical differences that have evolved over the time period encompassing the continued evolution of the Internet. We are still gathering data, but we expect to be able to identify ways in which ethical perceptions have changed over this period of time.

Languages

Jodie Rose Wangen, Danielle Rae Martin (109)
Faculty Mentor/Collaborator: Carlos G. Garcia
Analysis on the Impact of Ethnic Diversity within Businesses from Two Cities: Eau Claire and Marshfield, with a Focus on Three Main Business Categories: Restaurants, Hospitals, and Manufacturers

This research project was designed to examine how ethnic diversity impacts the communities of Eau Claire and Marshfield, Wisconsin, and if these communities are adapting to the growing Spanish speaking population. After studying Spanish and Business at the University of Wisconsin – Eau Claire, we wanted to conduct research to further investigate subjects related to diversity. The university incorporates diversity into many of its classes, so this research could also lead to further benefits for the rest of the student population and the community. For approaching this question, we drafted surveys (in English and Spanish) and distributed them to different types of businesses in both cities. These surveys were often met with resistance, but we gathered results
and came to the conclusion that even though the population of Eau Claire and Marshfield are not necessarily highly diverse, there could still be a benefit from having diversity classes and training offered to the public to help with the adjustment. Certain categories, such as hospitals and restaurants, show the most need for these programs. An indirect result gathered was that companies are intimidated to talk about diversity. For further research we recommend conducting interviews instead of distributing surveys.

Management and Marketing

Sarah Jo Farino (69)
Faculty Mentor/Collaborator: Sydney Chinchanachokchai
The Effects of Multitasking Behavior on Consumer Creativity

Multitasking is commonly seen and inevitable among today’s consumers, especially teenagers. For example, students do homework and watch TV at the same time. Consumers sometimes encounter situations in which they need to use their creativity to modify or enhance the performance of a product, or even create a new product. The purpose of this research is to examine how multitasking behavior affects consumer creativity and what type of multitasking would have more a positive effect on consumer creativity. We hypothesize that multitasking may lead to higher creativity in a problem solving task compared to performing only one task. The experiment included three conditions – single task, sequential multitasking, and concurrent multitasking. In the single task condition, participants completed a problem solving task, which required them to generate as many ideas as possible for uses of common objects such as a paper clip and a coffee mug. In the sequential multitasking condition, an additional task - drawing task - was introduced and the participants performed two tasks sequentially. Finally, the concurrent multitasking condition asked the participants to perform both tasks simultaneously within a limited time. We expect to see higher levels of creativity in the multitasking conditions, which incorporate multitasking.

Political Science

Kevin Lawrence McGraw-Stevens (167)
Faculty Mentor/Collaborator: Justin W. Patchin
The Empirical Status of Cyberbullying Research

Cyberbullying is a problem that is prevalent among youth due to their embracement of technology that allows constant online communication and interaction. Cyberbullying research is an emerging field in the realm of criminal justice that requires extensive research. Despite the need for research, the level of inconsistency between researchers in the use of definitions, methodologies, and samples makes it difficult to analyze the conclusions of existing studies. The current study used snowball sampling (a non-random sampling technique) to find studies that had been conducted about cyberbullying. A meta-analysis, which is an analysis of separate studies for the purpose of finding common patterns, was then performed on these studies in order to examine for common patterns, such as definitions and methodologies used and the presence of similar findings in these studies. While prevalence rates found for cyberbullies and cybervictims were often similar across studies when reported, several studies failed to report these rates or used inconsistent criteria to determine these rates. Implications of the current study illustrate a need for the use of random sampling, a necessity for reporting prevalence rates, and the importance of developing and implementing consistent methods and definitions in the research of cyberbullying.
Preston Alexander Florianschitz (166)
Faculty Mentor/Collaborator: Jason D. Spraitz
*Persistent Sexual Abuse by Clergy and Techniques of Neutralization: A Content Analysis of Priest Files from the Milwaukee Archdiocese*

The sexual abuse problem in the Catholic Church has received considerable attention by the media in recent years. Despite this, the academic literature on the topic is scant. Using Sykes’ and Matza’s theory, this study examines the techniques of neutralization used by accused priests in the Archdiocese of Milwaukee. Priests’ personnel files, which were made publicly available by the Archbishop of Milwaukee in July 2013, were analyzed using a qualitative content analysis of all direct statements and correspondences from the accused. The findings indicate that many priests denied responsibility or injury in an effort to justify their persistent sexually abusive behaviors, but that no discernible patterns of technique use emerged. The need for continued research using recently released personnel files from other dioceses also is discussed.

Demetrius Evans (106)
Faculty Mentor/Collaborator: Peter C. Myers
*The Idea of Color-Blindness in the Political Thought of Bayard Rustin*

Race neutrality or colorblindness as perceived within today’s academic circles is a hot bed of controversy. In principle, colorblindness represents a desirable societal outcome. Critics say, however, that color-blind or race-neutral policies in practice ignore past injustices that continue to have harmful effects in marginalizing people of color. I argue that Bayard Rustin’s concept of colorblindness challenges such critics, in that Rustin consciously designed color-blind policies with a purpose of addressing continuing racial inequalities. With special attention to primary and secondary works by and about Bayard Rustin, I will analyze his political thought and explain further his arguments in favor of what we now call coalitional politics—of groups working together across lines of race or color to achieve reforms. My research aims to reveal how his conceptualization of colorblind policies through integration reflects a realistic idea of coalitional politics.

Psychology

Katie Marie Beck, Kellie Kristine Risberg (12)
Faculty Mentor/Collaborator: Mary Beth Leibham
*Exploring College Students’ Perceptions of Their Peers with Disabilities*

An increasing aspect of diversity in higher education is disability. In order to promote full inclusion of students with disabilities, it is important to understand how disability is perceived by various members of the campus community. The current study will examine college students’ perceptions of learning disabilities. Further, since approximately one third of the students registered with the UWEC Services for Students with Disabilities (SSD) office are receiving services/accommodations because of a documented psychological disability, we will also examine students’ perceptions of major depressive disorder. Specifically, using a Qualtrics survey, participants will rate the degree to which they agree with statements about how most people view individuals with learning disabilities and major depressive disorder (e.g., “Most college students think less of a person with a disability.”). We predict that students who have more experience with disabilities will have more positive perceptions than students who have less experience with disabilities. We also predict that students who are majoring in education will have more positive perceptions of disabilities than students who are majoring in business and social sciences. In addition to providing us with information on the campus climate surrounding disability, we hope that this research will help raise disability awareness.
While there is a great deal of electroencephalography (EEG) research related to alcoholism, there are fewer EEG studies investigating drinking at a non-alcoholic level. Our previous findings with undergraduate participants suggest that exposure to full alcohol beverage containers may increase EEG activity in the beta range (8-12 Hz), which is associated with arousal and attention. We seek to verify these findings by increasing the number of participants and to examine moderating variables such as biological sex and extent of alcohol-related problems as assessed by the Alcohol Use Disorders Identification Test (AUDIT). We expect greater beta activity increases in those who have higher scores on the AUDIT. Such findings would increase knowledge about the neurocognitive basis of college drinking patterns.

Tara Young, Tyler Ramonda Bridges-Parlet (15)
Faculty Mentor/Collaborator: Jeffrey A. Goodman
Women’s Attitudes Towards Straight and Gay Men

Recent studies have shown that ovulating women can better determine men’s sexual orientations (Rule, Rosen, Slepian, & Ambady, 2011). This finding holds implications for human mate selection as well as discrimination against non-heterosexual individuals. This study aimed to replicate findings by Rule et al. (2011) and explore women’s endorsement of stereotypes regarding sexual orientation minority groups. Heterosexual women (n = 188) not using hormonal contraceptives rated their perception of the sexual orientation of 20 men and answered questions regarding their interest in short and long term relationships with these men. Participants also answered questions about their general attitudes toward straight and gay men. We failed to replicate previous findings from Rule et al. (2011) indicating that individuals could detect sexual orientation at above average chances, regardless of ovulation status. However, women’s perceptions of men’s sexual orientations drove their evaluations of those men; they reported significantly less interest in relationships with perceived gay men than perceived straight men. In accordance with commonly held stereotypes, women also rated perceived gay men’s partner compatibility lower than perceived heterosexual men’s. Our findings are discussed in light of their applicability to human mate selection and discrimination against non-heterosexuals.

Holly Nicolet, Ariel Rose Kocher (73)
Faculty Mentor/Collaborator: Blaine F. Peden
What Kind of Beverages do College Students Prefer?

A casual observation on the University of Wisconsin-Eau Claire campus led two researchers to wonder whether more students drank coffee in the morning than the afternoon, and whether the students’ beverage choices determined their moods. This inspired them to conduct a naturalistic observation study without intervention on students aged approximately 17-25 located on their campus. The study involved 118 participants observed over two days for four different periods lasting 45 minutes each. The independent variables were gender (male or female), time of day (morning or afternoon), and beverage of choice (hot drink, cold drink, or water); and the dependent variables were beverage of choice (which acted as both variables) and facial expression (neutral, smiling, or frowning). Cohen’s Kappa determined the data was appropriate by determining interrater agreement for gender (κ = 1.0), type of beverage (κ = 1.0), and facial expression (κ = .89). Chi-Square tests for independence determined correlation between variables and deemed the only significant association was the time of day and beverage carried, $\chi^2(2, N = 118) = 11.45, p = .003$ and Cramer’s V = .311. These results support the initial hypothesis that people drink warm drinks in the morning and people drink colder drinks in the afternoon. This offers implications for beverage companies to market to college students at marked times of the day.
Hannah Rose Geis, Kelly Suzanne Hughes (10)
Faculty Mentor/Collaborator: Mary Beth Leibham
Exploring Honors Students’ Levels of Academic Motivation, Perfectionism, and Test Anxiety

Goal orientations, perfectionism, and test anxiety are all important constructs within student learning. Goal orientations reflect students’ motivation toward learning, and include two dimensions: mastery goals and performance goals. Students with mastery goals often strive to understand course content and further their knowledge, whereas students with performance goals often focus on obtaining good grades and appearing competent. Perfectionism consists of three dimensions: adaptive perfectionism, maladaptive perfectionism, and non-perfectionism. Adaptive perfectionists have high standards, and are confident that they will meet these standards. Maladaptive perfectionists also have high standards, but are not confident in their ability to meet these standards. Non-perfectionists do not have high standards. We are interested in exploring the potential relationships among goal orientations, perfectionism, and text anxiety, and more specifically, the potential differences between university honors program students and students not in the honors program. We predict that honors students will report lower cognitive test anxiety, higher levels of both mastery approach and performance approach goal orientations, and higher scores in adaptive perfectionism than the non-honors population. Understanding the links among these constructs could help college instructors create learning environments that enhance learning.

Kelly Suzanne Hughes, Hannah Rose Geis (11)
Faculty Mentor/Collaborator: Mary Beth Leibham
GPA Satisfaction: Do Perfectionism, Academic Major, and Honors Enrollment Matter?

Perfectionism is an important construct that has been associated with various aspects of college student development including anxiety and procrastination. We know that it is multidimensional in nature; individuals can be classified into one of three perfectionism dimensions. Adaptive perfectionists have high personal standards and feel that they consistently meet those standards. Maladaptive perfectionists have high personal standards but feel that they consistently fail to meet those standards. Nonperfectionists do not have high standards in comparison to perfectionists. The current study will examine college students’ levels of perfectionism with particular emphasis on the associations among perfectionism, academic major, participation in the University Honors Program, and self-reported satisfaction with grade point average (g.p.a.). We expect that maladaptive perfectionists will report less satisfaction with their current grade point averages than either adaptive or nonperfectionists. We also expect that students in competitive majors (e.g., nursing) will be less satisfied with their current grade point averages than students in less competitive majors. Finally, we expect that students in the University Honors Program will be more satisfied with their current grade point averages than other students, given the requirement of maintaining a minimum g.p.a. of 3.5 in order to graduate with Honors.

Robert John Larson (13)
Faculty Mentor/Collaborator: Jeffrey A. Goodman
Effects of Policy Source and Timing of Consequences on Policy Support

Policy issues vary greatly in the scope of time in which their consequences are felt. Research has also shown that membership in social groups (e.g., party identification, race, gender) account for a significant proportion of variance in attitudes toward environmental policy (Guber, 2013). We hypothesize that support for the proposed solution to a policy problem will vary as a function of whether the policy’s consequences are proximal or distal, and whether the policy is proposed by an ingroup or outgroup. The current study sought to examine the relationship between timing of consequences, policy source, and future orientation in the consideration of policy. Participants (n = 131) were asked to respond to a series of questions measuring their support for a policy dealing with financial aid solvency. Results indicated that participants were more likely to see the problem as solvable by practical means when the policy came from an ingroup rather than an outgroup source. Participants also evidenced differential patterns of trust for the policy authors and decision-makers between ingroup and outgroup conditions. These results will be interpreted in light of evolutionary and social identity theories.
Hemapreya Selvanathan, Cody Butcher, Elizabeth Renee Miner, Ashley Leola Timdal, Sathya Baanu Jeevanba

Faculty Mentor/Collaborator: Jeffrey A. Goodman

Implicit Effects of Religious Priming on Prejudice and Prosocial Behavior

The relationships between religion, prejudice and prosocial behavior are complex. Our lab has provided evidence that believers express higher levels of prejudice than nonbelievers toward various minority groups (Blacks, Muslims, lesbian and gay individuals and women who have had an abortion). However, believers and nonbelievers did not differ in terms of their propensity to help different groups, with the exception of an abortion rights group. The current study aimed to extend our understanding of the relationship between religious beliefs, prejudice and helping behaviors into the realm of implicit processes. We primed believers and nonbelievers with religious, secular, or neutral concepts. Participants earned “lab dollars” and were then given the option to keep their earnings to trade for treats or to donate part of their earnings to a minority group (a community center for lesbian, gay, bisexual, transgender and questioning individuals). Finally, they completed measures of religious orientation, mood, and empathy. We anticipate that priming religious concepts will increase rates of donation among nonbelievers, but decrease levels of donation of believers. Our findings will be discussed in light of their contributions to the understanding of the relationships between religious beliefs, prejudice, and prosocial behavior.

Emily Ann Graham, Tara Young

Faculty Mentor/Collaborator: Angela G Pirlott

Age Preferences across Sexual Orientations

Age preferences research with gay men and lesbians suggests sex differences underlie mate preferences: Gay and heterosexual men prefer younger partners and this age gap increases with men’s age. Lesbian and heterosexual women prefer older partners, this remains stable across women’s age. We sought to extend the literature by examining whether these age preferences replicate for bisexuals, given their interest in both sexes. Heterosexual, bisexual, and gay/lesbian men and women (n=600) reported the youngest and oldest ages they deemed appropriate for potential mates; bisexuals reported preferences for both sexes. To determine whether age preferences shifted relative to perceiver age, we correlated participants’ age with their youngest and oldest preferred partner age relative to their own age. Across sexual orientations, men’s oldest partner age preference decreased with men’s age whereas women’s oldest age preference remained consistent across their ages—slightly older. Men’s youngest age preference decreased strongly with men’s age. Older women reported a willingness to date younger men; this relative age gap increased with women’s age. No results significantly differed by perceiver sexual orientation or target sex for bisexuals, only by perceiver sex; demonstrating evolved sex differences in mate preferences across sexual orientation groups and target sex.

Bryan Tomes Yanagita, Shawn Ryan McGrath, Chance Austin Boley

Faculty Mentor/Collaborator: Carla Hames Lagorio

A Cross-Strain Analysis of Impulsivity

Delay discounting is a commonly utilized measure of impulsive choice. This procedure evaluates how the value of an outcome decreases as its receipt is delayed over time. In these procedures, subjects typically make repeated choices between having a “smaller-sooner” outcome (e.g., $10 now) versus a “larger-later” outcome (e.g., $50 in 3-months). Sensitivity to these delays can be assessed using a hyperbolic discounting model, and quantified as a numerical value (k-value). K-values are widely thought to indicate individual differences in impulsivity and have been conceptualized as something of a “trait variable” or a candidate behavioral marker for a variety of addictive behaviors (e.g., substance abuse, gambling). The current study compared k-values of two rodent strains (Fisher 344 and Sprague Dawley) thought to differ in levels of impulsivity. Results of this work will be discussed, along with our continued research which will investigate how different environmental factors can potentially influence impulsivity levels.
Many children with developmental disabilities lack the ability to communicate with therapists; therefore it is difficult for therapists to evaluate the components of teaching procedures the children may prefer. The current study utilized a forced choice paired stimulus procedure to determine whether children diagnosed with developmental disabilities demonstrate a consistent preference for instructions delivered by a parent or those delivered by a program therapist and the relative effectiveness of preferred and non-preferred instructors. Experimental sessions consisted of instructor choice trials followed by blocks of maintenance tasks. Instructor choice trials consisted of a combination of forced- and free-choice trials in which researchers instructed participants to select a picture of either a parent or a therapist. Following the instructor choice trials, the selected instructor delivered a block of maintenance tasks to the participant. Instructor preference was evaluated through instructor choice during free-choice trials. Instructor effectiveness was evaluated through the percentage of maintenance trials correct throughout the experimental session. Results suggest that the current procedure is a successful indicator of preference for and effectiveness of instructors.

Andrea Sue Ruder, Nicholas Andrew Vermiglio, Marta Louise Rusten, Taylor Jane Vossen (44)
Faculty Mentor/Collaborator: Angela G Pirlott
The Effects of Intrasexual Competition Threats on Sexual Orientation Prejudices

Our research combines the affordance management and fundamental motives approaches to examine how perceived threats and opportunities driving sexual prejudices vary by perceivers’ goals. Specifically, we examined how intrasexual competition threats shift prejudices and behavioral reactions towards particular sexual orientation targets. For heterosexuals we expected enhanced memory for attractive same-sex heterosexual and bisexual targets because they afford greater intrasexual competition threats. To test our hypotheses, we activated an intrasexual competition threat (competing with same-sex dating competitors) relative to control (failing an exam). Participants then saw photos of attractive same-sex targets labeled as heterosexual, bisexual, or gay/lesbian. To test their memory for these targets, they later saw a larger set of photos and reported whether they previously saw them. We conducted a 2 (condition: intrasexual competition vs. control; between-subjects) x 3 (target sexual orientation: gay/lesbian, bisexual, straight; within-subjects) mixed ANOVA on memory. For women, although intrasexual competition threats failed to enhance memory for heterosexual and bisexual targets, it increased women’s memory for lesbian targets relative to control. Our research highlights how motivational states of heterosexuals affect behavioral reactions towards different sexual orientation minorities, demonstrating the malleability of sexual orientation prejudices.

Marta Louise Rusten, Taylor Jane Vossen (45)
Faculty Mentor/Collaborator: Angela G Pirlott
Understanding the Sexual Prejudices of Gay Men and Lesbians

Our research sought to understand the sexual orientation prejudices held by non-heterosexuals. We utilized an affordance management perspective (e.g., Pirlott & Neuberg, 2014), which suggests cognitions and behaviors exist to manage perceived threats and opportunities (i.e., affordances) posed by others in the social environment. Stereotypes about particular groups reflect these perceived affordances and prejudices arise as behavioral reactions to mitigate these threats. 409 non-heterosexual participants rated their perceptions of the affordances posed by and affective prejudices toward six sexual orientation groups. Gay men and lesbians’ prejudices were directed exclusively toward heterosexual men. Perceptions that heterosexual men create uncomfortable sexual situations drove anxiety; perceptions of physical safety threats drove fear; and perceptions that heterosexual men are bad parents, hold opposing values, and cheat on their partners drove moral disgust. For gay men, anger was driven by perceptions that heterosexual men pose threats to values and resentment was driven by perceptions that they threaten values and sexual autonomy. For lesbians, perceptions that heterosexual men carry disease and are promiscuous drove physical disgust whereas perceptions of discrimination
threats drove anger and resentment. This research has important implications for understanding the social interactions and tensions between gay men and lesbians and heterosexual men.

**Katelyn Marie Morrison, Luke Heidtke (47)**
Faculty Mentor/Collaborator: April L. Bleske-Rechek
*Causal Inference from Descriptions of Experimental and Non-experimental Research: Public Understanding of Correlation-Versus-Causation*

The human tendency to conflate correlation with causation has been lamented by various scientists (Kida, 2006; Stanovich, 2009) and vivid examples of this mindware gap can be found both in media representations of research and peer-reviewed empirical reports. However, there is little systematic data on the extent to which people conflate correlation with causation. In each of three studies, we presented people with one of four research vignettes generated from the combination of two independent variables: whether the vignette described an experimental or non-experimental design, and whether the vignette revealed a positive or negative association. Upon reading their assigned vignette, participants selected from a number of potential inferences that could be drawn from the findings. Across the three studies, participants drew causal inferences from non-experimental vignettes as often as they did from experimental vignettes and more frequently for causal statements and directions of association that fit with intuitive notions than for those that did not. Our findings imply that people in the community regularly conflate correlation with causation; we suggest that those who conduct research and represent research to others need to explicitly address the conclusions that can and cannot be drawn from their findings.

**Brynn Elizabeth Schaal, Joann Marie Martin (49)**
Faculty Mentor/Collaborator: Blaine F. Peden
*An Unobtrusive Study of Students’ Sustainability Habits in University Coffee Shops*

Sustainability is a growing interest within several communities due to the increasing threat of climate change. With the aim of generating large-scale change, smaller changes that focus on behavior modifications and policy incentives must be implemented. When researching and implementing these policies, it is also important to foresee whether certain behaviors or choices greater appeal to specific groups. This study intended to discover sex differences in choice of hot beverage container. There were 71 participants observed in the W. R. Davies Student Center at the University of Wisconsin-Eau Claire. Observers recorded data in The Cabin and outside Intermezzos Café. The study employed a coding sheet for container choice, whether participants opted for a cardboard sleeve, and the sex of the participants. This naturalistic observation study suggests UW – Eau Claire students, regardless of sex, rarely employ the use of thermoses or other reusable containers when purchasing hot beverages. Taxing students who opt for “to-go” cups and/or cardboard sleeves is one method in which the University of Wisconsin – Eau Claire could raise sustainability habits. These small-scale policy changes could save the university thousands of dollars each year while also creating a more sustainable community.

**Lori M Durgin (51)**
Faculty Mentor/Collaborator: Jennifer J. Muehlenkamp
*Consequences of Self-Objectification and Body Discrepancies*

Previous research suggests that media depictions adversely affect women’s perceptions of their own bodies by creating an unrealistic body ideal and increasing tendency to see themselves as objects (e.g., self-objectify) (Calogero, Pina, Park & Rahemtulla, 2010; Fredrickson & Roberts, 1997). With growing emphasis on male physique in the media, men may experience similar negative outcomes as women, such as self-objectification, body image discrepancies, disordered eating, and social anxiety. The purpose of this study was to examine whether objectification theory is applicable to men’s body image experiences. We hypothesized that men who self-objectify will show greater body-image discrepancies than men low on self-objectification, and that self-objectification will be associated with higher social anxiety and disordered eating scores. Approximately 300 undergraduates ages 18 and older will complete an online questionnaire asking about body image, disordered eating, social anxiety, and perceptions of attractiveness of themselves and the opposite sex. Data collection is underway and will be completed in time to present results at CERCA. The results from this research have the
potential to further understand how objectification theory explains risk difficulties such as social anxiety and disordered eating, as well as evaluate whether objectification theory is valid for explaining risk within males.

Shaina Heimerl (71)
Faculty Mentor/Collaborator: Catya von Karolyi
Variations in Mental Rotation

We employed an electronic (e) computer-based version of the Mental Rotation Test (MRT) that included two counterbalanced variations. A short version, which included 12 items and a long version, which included 24 items—the same number as the original Vandenberg and Kuse (1978) MRT. In the original version, items were presented in a fixed order. In our eMRT, items were presented in a previously randomized, fixed order. In addition, we employed redrawn MRT figures (see Peters, Laeng, Latham, Jackson, Zaïyoua, & Richardson, 1995) due to degradation of the original stimuli. Our first hypothesis was that responses to the short eMRT form would be comparable to responses to the long eMRT form. A significant gender gap in performance, favoring males, has been found in MRT performance. Thus, our second hypothesis was that genetic males would outperform genetic females on both the short and long forms of the eMRT. Thirty males and thirty females enrolled in psychology courses (n=60) responded to a Qualtrics-based survey and completed both the long and short versions of the eMRT. Results are discussed.

Katie Ann Plamann, Mallory Coral Dernbach, Bethany Raye Franklin (74)
Faculty Mentor/Collaborator: April L. Bleske-Rechek
Tradeoffs: Gender Differences in What Matters Most in Work, Family, and Life

One widely emphasized goal in modern society is the attainment of gender parity in occupational prestige and end salary. However, previous research has documented gender differences in a number of dimensions that are predictive of occupational prestige and salary, including people’s work values, life values, vocational preferences, and personality traits such as dominance and nurturance. Although some of these differences have been documented across cultures and some have been revealed among men and women educated in environments that promote gender egalitarianism, no study has explored the links among these dimensions. In addition, existing measures of men’s and women’s work and life values are limited in that participants are not forced to acknowledge tradeoffs, such as that having power at work and having friends at work are often at odds, as are valuing close relationships (benevolence) and valuing achievement. In the current study, we aim to modify existing measures of values to address that limitation and to assess how individual differences in work values, life values, vocational interests, and personality traits are interrelated. We expect that although within-group differences will be larger than between-group differences, we will see group (gender) differences across multiple dimensions.

Zachary Daniel Donovan, Tom Gugel, Hemapreya Selvanathan, Hannah Rose Geis (75)
Faculty Mentor/Collaborator: Mickey K. Crothers
Psychological Correlates of Mindfulness in Healthy Young Adults

Research demonstrates the efficacy of mindfulness-based treatments for a variety of medical and psychological challenges. However, there is a gap in empirical literature as to how mindfulness operates in psychologically healthy individuals, which this study aims to fill. The purpose of this study is to investigate the psychological variables that may correlate with naturally occurring mindfulness in healthy college students. Specifically, this research explores the relationship between mindfulness scores and participants’ scores on measures of Big-Five personality characteristics, self-actualization, aggression, openness to spiritual experience, emotional intelligence, hope, affect, perfectionism, avoidance or revenge tendencies, forgiveness, and conflict style. Participants will be approximately 150 UW-Eau Claire undergraduate students. The study will be administered through paper-and-pencil self-report surveys to groups of participants in a classroom setting. Mindfulness is predicted to be positively related to the personality characteristics of openness to experience, agreeableness and conscientiousness, self-actualization, quest religiosity, emotional intelligence, positive affect, forgiveness, and non-dominant conflict styles. We anticipate possible negative correlations between mindfulness and neuroticism, aggression, negative affect, perfectionism, avoidance and revenge tendencies, and dominant conflict styles.
styles. These findings may serve to inform ways in which mindfulness can be applied in clinical settings to benefit individuals who demonstrate naturally occurring mindfulness.

**Amanda Elizabeth Landwehr, Elise Browne (76)**
Faculty Mentor/Collaborator: **Mickey K. Crothers**

*Non-Military Students’ Perceptions of Military Student Peers*

The objective of this research is to determine perceptions of military students (as viewed by the general student body), and to ascertain whether perceptions of military students at a public university differ from those at a public technical college. This project is significant because very little research has been conducted on military students, and very rarely does research cross the border between four-year universities and technical colleges. This research will yield information regarding what students in the general student body do and do not know or accurately understand about their military student peers. We developed an online survey that was distributed to students through their email by professors at their respective schools. We are looking for patterns in students’ perceptions regarding male versus female military students, and are exploring for possible stereotypes or stigmas that might emerge. The results of this research are important to universities and technical colleges because the findings will shed light on how military students are perceived by students without a military background, and may serve as a foundation for efforts to correct inaccurate stereotypes, create an optimally welcoming learning environment for military students, and build more positive relationships between military and non-military students.

**Amanda Ruth Cowan (78)**
Faculty Mentor/Collaborator: **Blaine F. Peden**

*Citing and Referencing in APA Style: Preliminary Insights*

Documentation, citing and referencing the theoretical, methodological, and empirical literature, is a defining characteristic of scholarly rather than popular works. Teaching and learning about how, who, what, where, when, and why to cite/reference challenges instructors and students alike. Although these problems apply to all disciplinary genres, we focus on APA style as an exemplar. Numerous lectures, tutorials, handbooks, and the *APA Publication Manual* itself devote much space to the various formats for citations in text and references in a list. The focus on format overshadows discussions about who, what, where, when, and why to cite and reference, disciplinary tacit knowledge assumed to result from osmosis. The available literature also provides little insight into student views about the role that citations and resources play in a research report. Our sample of undergraduate psychology students briefly explained their views about the role and function of citations and references. We expect our preliminary analysis to reveal that (a) students have a narrower focus (i.e., on format and minimum number) rather than broader focus (i.e., on who, what, where, when, and why to cite and reference) and (b) the limits of learning disciplinary skills by osmosis. We conclude by discussing techniques for systematic instruction.

**Molly Anne Barlow, Arianna Rose Kuhnert (79)**
Faculty Mentor/Collaborator: **Blaine F. Peden**

*Effects of Fear and Sex on the Level of Political and Daily Environmental Behaviors*

Concerns regarding the current state of the environment have been becoming more prevalent within the global society. The United States Environmental Protection Agency and Greenpeace are two organizations that provide perspective on different environmental issues. Researchers conducted their study to examine how education and knowledge impact an individual’s likelihood to display eco-friendly behaviors, and whether that individual would take political action or demonstrate daily eco-friendly actions. Researchers used a 2 (fear vs. no fear) x 2 (male vs. female) x 2 (political changes vs. lifestyle changes) mixed subjects design for this study. Researchers used Qualtrics to compose a survey as a means to conduct their experiment. Qualtrics randomly assigned participants to the various conditions and used questions to rate the participants’ level of concern for the environment. The study concluded that the level of fear did not have an effect on participants’ level of concern with the environment, the type of environmental change did not have an effect on participants’ level of concern with the environment, but gender did have an effect on participants’ level of concern with the envi-
Molly Anne Barlow, Mark Aaron Vanden Avond (102)
Faculty Mentor/Collaborator: David C. Jewett
The Effects of Pramipexole on Repeated-Acquisition Performance in Long-Evans Rats

Pramipexole is a dopamine agonist used clinically to treat Parkinson’s disease and restless leg syndrome. We used a three-step repeated acquisition paradigm to test the effects of pramipexole on error rates in eight Long-Evans rats. During training sessions, subjects were required to emit a specific sequence of responses from a set of three response alternatives. The sequence of correct responses changed daily and error rates were measured. Once stable performance on the sequences was established (error rates +/- 10% of the mean), the sequence that produced the lowest error rate (easy) and the sequence that produced the highest error rate (difficult) was determined for each subject and pramipexole was tested under these sequences. Pramipexole was administered to the subjects subcutaneously using 2% dimethyl sulfoxide as a vehicle. Under easy sequence conditions, overall error rates for the session were significantly higher than control rates following 0.01-0.1 mg/kg pramipexole. In the difficult sequence, the overall error rates for the session were significantly higher than control error rates following 0.1 mg/kg pramipexole. The error rates in the easy sequence were affected at smaller doses than the error rates in the difficult sequence.

Mark Aaron Vanden Avond, Molly Anne Barlow (103)
Faculty Mentor/Collaborator: David C. Jewett
Effects of Bupropion and Naltrexone on the Discriminative Stimulus Effects Produced by 22 Hours Food Deprivation

We have developed and refined a food-deprivation discrimination paradigm that may serve as an animal model of ‘hunger’. A drug combination of bupropion and naltrexone is being investigated clinically for the treatment of obesity. We examined the ability of combinations of bupropion and naltrexone to reduce the effects of acute food deprivation in rats trained to discriminate between 2 and 22 hrs food deprivation in an operant choice paradigm. Generalization testing began after the discrimination was acquired (~90 daily sessions). During generalization tests, subjects were food deprived for 22 hours. Fifteen minutes before the tests, subjects were administered saline or bupropion (1 – 10 mg/kg, s.c.). After each test, increasing doses of naltrexone were administered (1 – 10 mg/kg, s.c.). Food intake was measured for 1 hour after the test session. Combinations of bupropion and naltrexone did not affect the discriminative stimulus effects of 22 hrs deprivation, although the drug combination did significantly reduce post-session food consumption. These findings suggest the combination of bupropion and naltrexone alters food consumption by mechanisms other than those related to ‘hunger.’

Tara Young, Emily Ann Graham (104)
Faculty Mentor/Collaborator: Angela G Pirlott
Mate Preferences across Sexual Orientation

Evolutionary theorists cite sex differences in minimal parental investment as giving rise to sex differences in mate preferences, and some researchers propose that similar mechanisms underlie gay/lesbian mating behavior (e.g., Bailey et al., 1994). The current study extends previous research by examining differences in long-versus short-term mate preferences and examining bisexuals’ mate preferences towards both male and female targets, thus enabling further tests of whether mate preferences shift as a function of target sex. 600 gay/lesbian, bisexual, and heterosexual participants rated the importance of 19 long- and short-term mate preferences based on a modified version of Buss and Barnes’ (1987) mate preferences questionnaire. For short-term relationship preferences, heterosexual and lesbian women’s mate preferences overlapped strongly as did heterosexual and gay men’s. For long-term relationships, men and women’s preferences overlapped on many traits. Gay and bisexual men rated long-term relationship traits as less important relative to other groups, and gay men, lesbians and bisexuals rating same-sex targets evaluated reproductively-relevant traits as less important than heterosexuals. These findings demonstrate the robustness of sex differences in mate preferences but also show important nuance in characteristics specific to reproduction that might be less important for groups whom reproduction is perhaps less likely.
Bethany Raye Franklin, Carly Mychl Murray, Arianna Marie Brown (105)
Faculty Mentor/Collaborator: April L. Bleske-Rechek
Schadenfreude: Circumstances in Which Men and Women Feel Pleasure in Response to Others’ Misfortune

“Schadenfreude” is a feeling of pleasure in response to another’s misfortune. Systematic research suggests that schadenfreude is felt most often toward same-sex peers who are disliked or whose previous good fortune is perceived as undeserved. Because most research on schadenfreude has involved experimental investigations of academic misfortune, we tested hypotheses about contexts outside of academics in which men and women are likely to experience schadenfreude. In Study 1, we collected nominations from over 150 college students on situations in which they had experienced schadenfreude. Common targets were same-sex peers, and individuals reported feeling schadenfreude in a variety of contexts, including another’s social embarrassment, loss of physical attractiveness, mating difficulty, physical injury, and academic or occupational demotion. In Study 2, we gave a short list of frequently-nominated misfortune circumstances to a new sample of young men and women, who ranked them in order of most to least likely to inspire pleasure. We will report on the circumstances most likely to elicit pleasure across the sample as a whole and differentially for men and women. We will discuss the utility of an evolutionary perspective for predicting and understanding when men and women feel this mixed emotion of happiness over another’s misfortune.

Whitney Elizabeth Joseph, Heather Ann Williquette, Bryan Andrew Donovan (46)
Faculty Mentor/Collaborator: April L. Bleske-Rechek
Attraction and Attractiveness in Male-Female Dyads: Do Dating Couples Differ from Cross-Sex Friends?

Heterosexual dating partners tend to be similarly attractive and similarly attracted to one another. In heterosexual cross-sex friendship dyads, however, men report more attraction toward their female friends than women do to their male friends. In the current study, we aim to determine whether women in cross-sex friendship dyads are systematically more attractive than their male friends are, a finding that would explain the sex difference in attraction and also support previous research implying that men are more likely than women to engage in friendships with members of the opposite sex to whom they are attracted. We approached male-female dyads on campus and surveyed the partners independently about their perceptions of their own attractiveness, their counterpart’s attractiveness, and their attraction to their counterpart. We also asked each member of the dyad to report the status of the relationship. Finally, we photographed each dyad and asked outside judges to rate the attractiveness of each member of the dyad. We will report the results of preliminary analyses that compare dating couples and male-female friendship dyads on 1) ratings of partner’s attractiveness, 2) attraction to one’s partner, and 3) outside judges’ perceptions of male versus female partner’s attractiveness.

Carlee Shea Schneider, Megan Lynn Skrbec (48)
Faculty Mentor/Collaborator: Blaine F. Peden
Who’s to Blame?: Effects of Perpetrator Gender and Victim Confrontation on Perception of Blame

The purpose of this study was to analyze participant’s perception of blame and victimization based on the gender of the perpetrator and the presence of verbal conflict previous to the domestic abuse behavior. Previous research has found that in “ordinary” violence, slapping, shoving, and throwing things at a partner were symmetrical across both genders (Straus, 2011). This means that females are just as likely as males to be the perpetrator in mild forms of domestic violence. We presented participants with one of four different scenarios describing a mild domestic violence situation, two in which the perpetrator was male, and two in which the perpetrator was female. The scenarios also described different levels of confrontational behavior, confrontation or non-confrontation, displayed by the victim previous to the violence. We discovered that participants were more likely to blame male perpetrators than female perpetrators for the violent behavior. The data also revealed that participants were more likely to blame the perpetrator less for the violence if the victim displayed confrontational behavior previous to the violence.
Andrea Janet Giachino, Kayla Marie Knez (72)  
Faculty Mentor/Collaborator: Blaine F. Peden  
Arg!! Who Stole Me Music?

In today’s technology driven world, illegal downloading, file sharing and video streaming are common practices that face minimal deterrence. In 2003, roughly 35 million Internet users engaged in the act of illegal music downloading (Wingrove, Korpas, & Weisz, 2011). The researchers looked at whether online theft exposure influenced the ratings of level of theft and likelihood to participate in such acts. A 2 (in person vs. online) x 2 (male vs. female) between subjects design implemented through a Qualtrics survey collected the data. After division based upon gender, participants were randomly assigned to levels of the independent variable scenario. Measurement of the dependent variable occurred through rating statements on a Like Me-Not Like Me Scale and Likert Scale. These included items such as “transmitting software files from a server” and “duplicating a hard disk copy of software or music”. The study concluded that a significant interaction of in person scenario and high rating of online theft existed. This can potentially influence the way Internet based companies and music corporations control for illegal online actions, as well as ways to discipline the act of online theft.

Michael Joseph Kosiak (17)  
Faculty Mentor/Collaborator: Angela G Pirlott  
Life History Theory and Condom Use Intentions

Life history theory suggests that an individual’s ecosystem influences their allocation of resources and effort towards different aspects of survival—investment in physical development versus reproduction (Pianka, 1970). Harsh, unpredictable environments elicit fast life history strategies—high rate of reproduction and increased risk-taking behavior, whereas abundant, predictable environments evoke a slow life history strategy—low reproduction rates and greater parental investment. Individuals living in unpredictable environments engage in risky sexual behaviors because the long-term costs of such behaviors have been historically lower than the short-term benefits of procuring a reproductive opportunity, which may otherwise not be guaranteed. Our goal in this study is to examine the effects of environment on one type of sexually risky behavior – failure to use contraception. To test this, participants will read a story activating either a harsh/unpredictable or an abundant/predictable environment, and report condom use intentions. We will then run a 2 (condition) x 2 (participant sex) ANOVA on condom use intentions. We hypothesize environmental harshness causally influences condom use behaviors, such that, participants in the harsh condition will report decreased condom use intentions relative to the abundant condition. This study has important implications for public health considerations of environmental influences on sexual health decision-making.

Social Work

Justin William Mabin, Christine Marie Johnstad, Molly Lynn Bray, Jordan Tyler Mabin (27)  
Faculty Mentor/Collaborator: Lisa Quinn-Lee, Susan D. Moch  
Use of Oxygen at End-of-Life: Attitudes and Beliefs Survey

Current research on the practice of prescribing oxygen at the end of life points to an uncertainty in whether or not oxygen use at the end of life directly affects the timeline of the dying process. Little information is available as to the benefits of oxygen use over alternative methods to relieve dyspnea at the end of life. The purpose of this research was to understand the use of oxygen at the end of life in contemporary palliative care practice. Twenty-five palliative care directors throughout Wisconsin completed a survey which asked a series of questions about attitudes, beliefs, and practices regarding oxygen use at the end of life. A mixed methods approach was utilized. Half of the respondents believe that oxygen correlates to prolonging the dying process. 96% of facilities have a standard “comfort care” protocol or order set for their patients addressing oxygen use. Only two facilities do not administer oxygen at the end of life. An important finding is that addressing quality of life of patients is often the main objective in prescribing oxygen. Emotional comfort of patients (50%) and family (63%), as well as caregiver’s need for tangible evidence that they are assisting the patient were reported as additional reasons for using oxygen at the end of life.
The purpose of this research was to improve the current understanding of the transition from military service member to UWEC student (and the effect on their families), and identify UWEC campus support systems and services that are helpful and would be more helpful towards veteran students and families. Although the literature provides an understanding of the experiences of military undergraduates, it appears that inadequate attention has been given to conducting research with veterans, including student veterans. Nineteen students who are either veterans or current military personnel participated in this study. The student participated in an interview where they were asked a series of open-ended questions that were created by the research team. These sixteen open-ended questions posed to the participants allowed them to describe their experiences and perceptions in their own words. Qualitative research methods were used for this study. Interview responses were transcribed and coded in NVivo statistical software program. Patterns and themes within the data were identified, analyzed, and reported through thematic analysis. The data is still being analyzed, but the results we expect to be able to report are that, overall, student military service members’ and veterans’ experiences at University of Wisconsin-Eau Claire are positive.

Sociology

Bethany Lynn Kozicki (168)
Faculty Mentor/Collaborator: Kathleen A. Nybroten
A Monthly Subscription to Gendered Sexuality: A Content Analysis of Sex Advice from Lifestyle Magazines

This study investigates the social construction of gendered sexuality found within popular lifestyle magazines like Cosmopolitan and Men’s Health. Using a qualitative content analysis strategy, we examine in what ways the sex advice directed towards men and women differ within these magazines. Both groups of magazines focused on heterosexual relationships with greater amounts of advice given to women in comparison to men. Among our preliminary finding are that male sexual satisfaction is typically depicted as natural and necessary for men while female sexual satisfaction is depicted as inconsistent and less important for women. This research contributes to our understanding of how social media reinforces gendered sexual scripts and influences perceptions of normality within relationships.

Jessa Brynn Quick, Jordan Rae Gilbertson, Kaylee Rose Hable-Guild (169)
Faculty Mentor/Collaborator: Kathleen A. Nybroten
Transition to Parenthood: Life after Baby

Becoming a parent significantly changes a couple’s relationship and life style. This study examines 4 aspects of individual and relationship well-being following birth of first child: relationship satisfaction and conflict; leisure time; division of household labor; and differences in child bonding for mothers and fathers. Using a convenience sample, we interviewed sets of parents with children under the age of one on each of the four aspects. Our results indicate that women tend to evaluate their relationship more positively following the birth of a child in comparison to men and reported bonding with their child more quickly than men. Women reported a more unequal division of household labor, possibly due to the fact that they were the ones staying home with the baby. Couples reported the same amount of shared leisure time after the baby, but the focus of their attention changed. We compare our result to other research studies on the transition to parenthood.
Morgan Kay Gerke (192)
Faculty Mentor/Collaborator: Jeff S. Erger
Social Identity and Food: Can the Feeling of Belonging Protect from the “Freshman 15”? 

This study tests changes that occur in eating habits during the transition between high school and college living predicted by Social Identity Theory, which we apply to posit that interaction with health-focused others increases health-based awareness and actions. An email survey was sent to first year students during the first week of classes, with a second survey at the end of the semester. Change scores were calculated and multiple regression analysis performed using those change scores. We found that students who ate dinner with their families in high school and students who ate dinner with their floor-mates in their first semester of college reported less weight gain. Eating breakfast or lunch with others was unrelated to weight gain. Students who felt more in control of their eating habits also experienced less weight gain. Seeing weight gain as “normal” increased, and this growing acceptance of the prevalence of weight gain was related to changes in their 1) ideas of how healthy the food is on campus, 2) their closeness to other people on campus, and 3) their identity as “healthy eaters.” In contrast, messages from others about healthy or unhealthy eating showed little relationship to behaviors or attitudes.

Watershed Institute for Collaborative Environmental Studies
Alexander Michael Handeland (224)
Faculty Mentor/Collaborator: David Soll
Waste-to-Energy Plants

Europeans have constructed systems that capture burning waste, also known as Waste-to-Energy plants. These plants use modern technology to burn trash and create energy. Not only do these plants capture harmful emissions that would be released, they also keep trash from being stored in landfills, which releases methane into the atmosphere. The United States, however, is weary of the environmental impact and the cost of investing in these plants. Americans instead prefer to ship their trash from cities to locations across the country and store them in landfills. This shipping of waste is enormously expensive, and is more detrimental to the environment than the minute amount of dangerous emissions generated by Waste-to-Energy plants. City and state officials can take two important steps to help reverse the situation. First, they can launch educational campaigns that explain to their citizens that reliance on long-distance waste disposal is potentially more costly and environmentally damaging than building Waste-to-Energy plants. Second, they can expand the growing network of anaerobic digesters plant that turn food waste into electricity to demonstrate the viability of using waste to create electricity.

Andrew Christian Baudhuin (227)
Faculty Mentor/Collaborator: David Soll
Roundabouts: Safer For Cities and Better for the Environment

Roundabouts are a relatively new traffic installation in the United States, but are becoming more prevalent as city engineers discover their benefits. The Washington State Department of Transportation (WSDOT) has done multiple studies that have found roundabouts are safer than traditional stop lights. One study conducted by the Insurance Institute for Highway Safety found a 37% reduction in overall vehicle collisions and a 90% reduction in fatal collisions. Roundabouts are also safer as a mixed-use traffic construct than stop lights, considering the same study found a 40% reduction in pedestrian and bicycle collisions. Part of a healthy city is an ability to create pedestrian and bicycle friendly roadways. The city of Eau Claire, therefore, would benefit from adding roundabouts into their new comprehensive health plan. As part of the new health plan, Eau Claire is looking into building complete streets, which allow for vehicle, bicycle, and pedestrian traffic. This research will identify specific locations where Eau Claire could benefit from the introduction of roundabouts. It will also recommend plantings that could be employed in roundabouts to enhance the aesthetic appeal of Eau Claire’s streetscape.
Billions of rural residents struggle to obtain adequate water supplies. Potential solutions must reflect cultural and physical differences. My research highlights three responses that are effective, sustainable, as well as economically suitable. These solutions are suitable for these locations, but could also be applied to numerous other areas that have similar characteristics. In parts of India, Ultraviolet Disinfection has proved an effective solution. In Nigeria, hand pumped wells have shown excellent result, but need to be coupled with rainwater collection systems to reduce the need to stand in long lines for water. In Argentina, rural villages have shallow wells that are becoming increasingly contaminated. A possible solution is a solar treatment system. By identifying the factors that account for a successful water system, this research can promote more widespread use of technologies that are both effective and culturally appropriate.

Celeste Alexandria Scola, Shawny Jo Gabriel, Ellen Elizabeth Hagstrom, Jenna Lee Rosquist

Planning efforts are underway at the University of Wisconsin-Eau Claire to promote bicycling as an alternative commuting mode to campus. Commuting by bicycle provides health and environmental benefits. A survey was conducted to provide information to campus planners about biking behaviors and needs, support for a bike registration and tracking program, and bike safety. An online survey was developed using Qualtrics and disseminated to university listservs and Facebook. Of the 445 survey respondents, 67% were female and 91% were students. Although 58% of respondents indicated that they never biked to campus, 38% reported biking every day or at least 2-3 times per week. Those biking at least 2-3 times per week indicated that they would benefit from additional bike lanes, covered bike parking, and safer bike routes. These same respondents indicated that they would pay an average of $12 to participate in a bike registration and tracking program and recommended use of gift cards and bike maintenance facilities to encourage program participation. Surprisingly, 80% of respondents reported that they do not wear helmets when biking on campus. Results from this survey are being used to prioritize campus biking infrastructure investments and policies to enhance bike commuting and safety.

Casey Renee Bloechl, Julian Kane Faledas, Alicia Joy Swanson, Breana Rae Meyer

University campuses are purchasing local and organic foods due to interests in food safety, environmental protection, and support for local farmers. However, college students may have different perspectives about local versus organic foods. An intercept survey in Hilltop Center at the University of Wisconsin-Eau Claire was conducted to examine student awareness about local and organic foods. Of the 163 respondents, 68% were female, and the average age was 19 years. A greater percentage of respondents were familiar with organic foods (55%) than with local foods (45%). However, a higher percentage of respondents felt that local foods were more available on campus (43%) than organic foods (33%). More females indicated familiarity with local foods than males. A significantly higher percentage of females indicated that they would consume local foods compared to males (p = .001). Finally, compared to males, a significantly higher percentage of females agreed that local foods benefit health (p = .005). Views about organic food did not differ by sex. These findings suggest that male and female students have differing perspectives about local foods but not organic foods. These results suggest that outreach efforts about the value of local foods must engage all segments of the student population.
Nursing

Randi Nicole Winchester, April Lynne Unterberger (228)
Faculty Mentor/Collaborator: Leah Olson-McBride
An Examination of Burnout and Resiliency among Personal Care Assistants in the Chippewa Valley

This research project seeks to further understand burnout and resiliency within personal care assistants in the Chippewa Valley. Personal care assistants are paid workers that ensure that persons with disabilities or the chronically ill maintain appropriate levels of physical and emotional well-being by offering individual support. The purpose of my research is to (1) understand the prevalence and factors that are associated with burnout within personal care assistants (2) understand the prevalence and factors that are associated with resilience within personal care assistants, and (3) examine any correlation between the factors that are associated with burnout and resiliency within personal care assistants in the Chippewa Valley. In order to explore the burnout and resiliency factors of this particular sample of caregivers, the researchers will use a mixed methods approach. Qualitative data will be collected through semi-structured interviews while the quantitative data will be collected via the Maslach Burnout Inventory (MBI) and the Areas of Worklife Survey (AWS). This study aims to fill the gaps of understanding the potential needs of personal care workers with the goal of educating those employees, supervisors, and agencies on what may assist PCAs in reducing the chance of burnout in the workplace.
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