Celebration of Excellence in Research and Creative Activity

(24th Annual Student Research Days)

Abstracts of Student Presentations

University of Wisconsin-Eau Claire

April 27 and 28, 2016
Presentations in W.R. Davies Center
**Poster Sessions and Exhibits:**
Ojibwe Ballroom, 3rd Floor

**Poster Student Presentation Times:**
Wednesday, Apr. 27  4:00 - 6:00  
Thursday, Apr. 28  2:00 - 4:00

**Oral Sessions and Films**
Wednesday, Apr. 27  9:00 - 1:15  
Thursday, Apr. 28  9:30 - 2:00

**Reception**
Dakota Ballroom  
Thursday, Apr. 28  4:00

**Map of Davies Center with CERCA rooms labeled:**
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<td>First Year Spotlight</td>
<td>Council Oak</td>
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<td>4:30 pm - 6:00 pm</td>
<td>Students set up posters</td>
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Acknowledgements

Many people helped to make this *Celebration of Excellence in Research and Creative Activity* (24th Student Research Days) possible, and we thank them for contributing their part cheerfully and efficiently:

**Christine Henricks and the Event Production crew** - for attending to a million details of preparing to hold this event in Davies Center.

**Tim Cree and the Custodial Services student crew** - for carefully transporting poster panels and our CERCA supplies from their storage location to Davies Center.

**Facilities Management** - for braving the elements to hang the CERCA banner above the Davies Center door.

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

**Michael Shults, Jeremy Boettcher, and Josh Gallagher** - for performing at the CERCA Event reception.

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

From *Learning and Technology Services, LTS Training* - for providing training in poster design and creation; **Mike Skarp** - for application software assistance; **Sarah Brower** and the **Help Desk staff** - for managing the increased load of poster printing with apparent ease; **Mark Andrle, Tina Wolfgram** and the **Printing Office staff** - for providing us with our printing needs; and **Bill Hoepner and Shane Opatz** - for recording the event on camera.

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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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CERCA Art Displays

Lobby outside Ojibwe Ballroom
Wednesday, April 27 8:00-6:00 pm
Thursday, April 28 8:00-4:00 pm

Collaboration: From Creation to Performance
Daniella Painter, Timothy Igel, Zach Bartsch, Paul Nuyda, Austin Williams, Sara Babino, Nadean Marron, Phillip Schladweiler, Zachary Oliphant, Steven Witzeling
Faculty Mentors/Collaborators: Jill Olm, Chia-Yu Hsu

This research project explored strategies for collaboration between music composers and visual artists in order to make connections between creative disciplines. Student researchers paired themselves into groups of two, one visual artist and one composer. The five collaborative groups decided to select the common theme of “Harmony” to establish a shared point of departure. Student pairs then created their own collaborative strategies to produce both musical and visual artworks. This research project was not only about the artistic products that were produced, but also research about the collaborative process and its relationship to creativity. This collaborative research produced five new musical scores written for a variety of instrumental arrangements and five new visual artworks in a variety of mediums (see Music Performance abstract on page 17). These unique creative outputs became possible only through this collaboration. This research hopes to encourage cross-disciplinary collaborations as a method to both utilize and expand the creative process and to allow for unexpected interchanges and products.

Artwork for CERCA
Mackenzee Pierog
Faculty Mentor/Collaborator: Li-Ying Bao

Growing out of a design class project, an array of advertising materials were created for the CERCA event. Using themes of new ideas (light bulb) and an array of the tools of research, posters, web materials, fliers, name tags and other designs were created.
CERCA Oral Sessions

Therapeutic Interventions

Menominee Room

Wednesday, April 27
9:00 – 9:50 am

Comparison of the Effectiveness of Specific Rhythmic Accompaniment Patterns on Piano to Elicit Paired Association Physical Response on Tambourine or with Gestures Performed by Residents on a Dementia Unit.

Brogan Resch
Faculty Mentor/Collaborator: Lee Anna Rasar

Two factors seemed to affect the successful replication of rhythm patterns by nursing home residents with dementia the most and they need to both be considered: how much the pattern that was demonstrated reflected the rhythm of the lyrics of the song and how much the pattern that was demonstrated reflected the piano accompaniment. In some cases these two factors were very similar, but the piano needed to play the melody for the residents to recognize the songs, so the patterns at some points were truly accompaniments and not just based on the melodic line which presents the rhythm of the lyrics. The residents participated the most and demonstrated the most accuracy on songs with rhythm patterns demonstrated that were closely approximating the rhythm of the lyrics and the rhythm of the most repeated piano accompaniment sections in the song. The rhythm patterns that elicited the least participation and that were least accurately replicated were the ones which were not based on an even division of beats and subdivided beats. This lack of symmetrical organization of beats and silence also included tied eighth notes and quarter notes.

Brief Mindfulness-Based Anxiety Reduction Intervention: Program Design and Preliminary Findings.

Sarah Loew, Stephanie Beck, Tom Gugel, Zachary Donovan, Carlee Schneider
Faculty Mentor/Collaborator: Mickey (Marie) Crothers
External Faculty Mentor/Collaborator: Ann E. Brand, The Center

The purpose of this study was to examine the efficacy of a brief mindfulness-based intervention for anxiety reduction. Mindfulness can be defined as a state of active attention to the present moment, in which thoughts, feelings, and physical sensations are observed from a stance of psychological neutrality. Mindfulness strategies seek to replace ruminative and/or avoidant thinking with neutral acceptance of distressing thoughts and emotions (Kabat-Zinn et al., 2012). Building upon previous research, the authors developed a brief anxiety reduction intervention combining mindfulness training and psychoeducational elements. The anxiety reduction program was comprised of six, 90-minute group sessions delivered on a weekly basis. Participants (after attrition) were 8 college students who indicated a problematic degree of anxiety in the two screening phases. Participants’ levels of anxiety, distress tolerance, emotion regulation, and mindfulness were measured at pretest and post-test. Change scores (between pretest and post-
test) were used to evaluate program efficacy. Analyses are underway at the time of abstract submission. If the treatment proves effective in reducing anxiety symptoms as compared with previous longer-term interventions, its use may enable clinicians to provide an effective, efficient, and affordable treatment option for individuals with anxiety.

Performing Arts and Literature

Menominee Room
Wednesday, April 27
10:00 – 10:50 am

Roustabout: The Great Circus Train Wreck
Barry Inman
Faculty Mentor/Collaborator: Amanda Profaizer

The purpose of this research project was to discover the fashion trends in Circus people from 1918 and also people who practiced Jazzercise during the 1980's. However, with this particular production the costumes are not to be perfectly historically accurate due what costumes these characters have access to. Through electronic research and primary sources I was able to co-design Roustabout with the assistance of my wise and intelligent mentor, Amanda Profaizer.

Environmental Perception in Peter Grimes
Alex Munger
Faculty Mentors/Collaborators: Tulio Rondon, Jan Stirm

Dr. Jan Stirm introduced me to ecocriticism through her fall 2015 course, “Green Shakespeare,” providing the basis for the analytical approach of this current project.

I incorporate two prominent goals of ecocriticism: the expansion of the scope of place, and the dissolution of the binary representation of nature and society. Both goals strive towards an understanding of the interconnectedness of the world we are a part of. Opera, as an interdisciplinary medium, allows for ecocriticism (initially developed in literary analysis) to also inform musical interpretation and analysis. While past analysis of Peter Grimes has taken place almost exclusively within the social sphere, an understanding of the ecological implications within the opera uncovers a wealth of material traditionally closed off by an anthropocentric, or socially-focused reading. Through an analysis of the title character’s ecological perceptions, I extend previous sociological interpretations of the work, arguing for an awareness of Peter’s beneficial ecological perceptions that promote communication, rather than exploitation and silence. The latter, represented by the citizens at large, eerily echoes contemporary negative outlooks regarding ecological perception. Understanding Peter’s interpretation of his surroundings provides a necessary jolt to challenge the actions of contemporary society in this critical ecological time.

4 Oral Presentations, Performances, and Films
Cultural Viewpoints

Menominee Room
Wednesday, April 27
11:00 – 11:50 am

Mediated Public Diplomacy: How News Agencies Cover Global Climate Change
Joshua Borst Bergfeldt
Faculty Mentor/Collaborator: Won Jang

Climate change is no longer grounds for scientific contradiction and as such is a major policy issue both at the national and international level. The United States and China are of specific interest, due to their large size, heavy reliance on fossil fuels, and general influence internationally. They are to some degree setting the benchmark that other countries are expected to achieve, therefore no impactful global policy can be enacted without the heavy involvement of both the U.S. and China. We present an empirical comparative content analysis focusing on the unique framing of climate talk related information with regards to respective news agencies for the years 2013, 2014, and 2015. We focus on comparing the varying content involved in climate change related news coverage, taking into consideration the implications of differing governmental systems, and differing perspectives within different media system models. The findings of this study demonstrate the possibility for a comparative analysis of news coverage at international scale, and identifying the relationship between national interests and the framing of news coverage.

Derek Dahlk
Faculty Mentor/Collaborator: David Soll

In the late nineteenth century, the logging industry began to fade in northern Wisconsin. Timber companies, which still owned vast tracts of land, sought the aid of the state immigration department in marketing to unsuspecting immigrant farmers. However, the short growing season and stump-riddled fields frustrated most settlers’ attempts to farm in this harsh landscape. By the 1920s, train lines built for the lumber companies began to bring new passengers and tourists to the northern lands. The expansion of cities and road networks created a heightened demand for recreational experiences. Many urban Americans romanticized rural landscapes and longed to reconnect with nature. Results of this newfound natural enthusiasm was a boom in resorts that catered to urban dwellers seeking to hunt and fish in style in the Northwoods. One understudied aspect of this resort boom is the way in which resort associations recast the image of native peoples to entice tourists to the woods. Instead of being “savages,” the common depiction in the age of lumbering, natives were re-cast as peaceful curiosities, enchanting spectacles for white tourists eager for new recreational and cultural experiences. I draw on resort brochures and past research to explore this opportunistic embrace of native culture.
Science and the Environment

Menominee Room
Wednesday, April 27
12:00 – 1:15 pm

**Development of a Multi-Platform Volunteered Geographic Information Application for Monitoring Invasive Species of Asian Carp in the Upper Mississippi River System**

David Leifer
Faculty Mentors/Collaborators: Cyril Wilson, Martin Goettl

Since their introduction into North America, Grass carp, Silver carp, and Bighead carp have significantly damaged aquatic environments by outcompeting native species for resources. Tracking these non-indigenous aquatic species is critical for determining the deployment of control barriers such as alarm pheromones. Volunteered Geographic Information (VGI), a geographic information systems (GIS) framework, is used to gather information on public phenomenon over space and time. VGI for recording sightings of non-indigenous aquatic species has not been fully investigated by the scientific community. This study developed a mobile responsive VGI Web GIS app to facilitate the recording of the presence of Asian carp within the Upper Mississippi River system. To facilitate the collection of this invasive species by the community, a feature template was developed in an enterprise geodatabase and published to ArcGIS for server. In order to prevent volunteers from entering incorrect information, range domains were set to limit numeric fields and coded value domains were applied to string fields. Web development languages manipulating the jQuery mobile API and the ArcGIS API for JavaScript were used to modify a simplified attribute editing module form the Dojo library. This app has the potential to increase location and metadata accuracy by eliminating lag time between transferring field notes to electronic records, a current system of tracking Asian carp. The Web GIS VGI app will alert authorities to pinpoint where barrier techniques are needed to halt the spread of Asian carp to other aquatic environments.

**Airborne Particulate Sampling using Direct Reading Instruments around Frac Sand Facilities**

Jacob Kentnich, Ella Keenan
Faculty Mentor/Collaborator: Crispin Pierce

The goal of our research is to identify any possible acute or chronic health outcomes from inhalation of frac sand particulates. There are currently 135 sites in the state of Wisconsin collectively mining 30 million tons of sand per year. We study particulate matter that is of 2.5 microns of size (PM2.5) because these microscopic particles embed themselves deep in the lung tissue. Frac sand, also known as silica sand, is a known human carcinogen which can lead to lung cancer and silicosis. We use direct reading instruments to monitor the ambient air quality of communities that are susceptible to frac sand dust. Comparisons are made with the Department of Natural Resources (DNR) database on daily air quality to determine if the quality of air is of difference around frac sand facilities. On average, PM2.5 should not exceed a level of 12 micrograms per cubic meter.
**Wisconsin Black Bear Management: The Fifth Zone**
Niklas Anderson
Faculty Mentor/Collaborator: Christina Hupy

Wisconsin hunters harvests more Black Bear every year than any other state in the nation. With this success, more than 100,000 hunters apply to hunt bear every year. The Wisconsin Department of Natural Resources must develop with a management plan on how to sustain the Black Bear population in Wisconsin. There are currently four bear management zones within the state. The purpose of my research is investigate whether a fifth zone should be added. The central forest region of the state of Wisconsin is listed within Zone C. Using GIS I will explore why the central forest region would be a worthy candidate for the new zone due to the differences in habitat and vegetation found in the rest of Zone C. This would improve how the Wisconsin Department of Natural Resources manages the Black Bear population. My research will use statistical analysis to find where a fifth zone could be added. This will be conducted by utilizing the abundance of Black Bear harvest data that the Wisconsin Department of Natural Resources has while also using Wiscland1 vegetation data and setting up the analysis to use the upcoming Wiscland2 by building a data flow model.

**First Principles Investigation of the Electrolyte/Li2S Interface in Lithium-Sulfur Batteries**
Zachary Wawrzyniakowski
Faculty Mentor/Collaborator: Ying Ma

Lithium ion batteries are widely used in consumer electronics, however, their low capacity makes them ineffective to use at powering large machines, such as electric cars, and offers a short lasting discharge time in smaller devices. The Lithium Sulfur (Li-S) batteries has a much higher theoretical capacity than Lithium ion batteries, which would make them better contenders for powering large devices, as well as improving performance on smaller devices. Lithium Sulfide (Li2S) is a promising cathode material for Li-S batteries with many advantages, although the activation process in Li2S is unclear. In this work, first principles computational approach based on the density functional theory has been used to investigate the atomic structural evolution of Li2S during the initial activation process. In particular, the effects of electrolytes was studied by ab initio molecular dynamics simulations of the electrolyte/Li2S interface. The simulations started from generating the equilibrium electrolyte structures using the melt-quench process, and then different interfacial systems were constructed using different Li2S orientations. These simulations provide an atomistic description of the activation process in Li2S that may be helpful to improve the performance of Li2S as the cathode materials for Li-S batteries.
Studies of College Students

Menominee Room
Thursday, April 28
9:30 – 10:30 am

*Trends in and Perceived Effectiveness of Student Study Locations at University of Wisconsin Eau Claire*

Tahtina Martinez, Olivia Baehman, Kacey Block, Madelyn Blohm, Tong Chang, Deena Hamdan, Paris Huth, Hannah Kleist, Alyssa Layton, LiRyan Lee, Justin Martell, Zoua Moua, Alyson Quass, Mariah Ruehle, Katelynn Schorer, Chee Vang, Mary Vang, Mai Nhia Xiong, Mong Xiong, Peter Xiong, Xai Xiong, Charouny Yang

Faculty Mentor/Collaborator: Holly Hassemer

The purpose of our research is to describe the most common study locations used by University of Wisconsin-Eau Claire (UWEC) students and how effectively students think they study in these locations. There is some other research that looks at college student study habits; however, our research is unique because we are researching students' experiences at UWEC. Our research team will recruit students from various classes to take our brief semi-structured interview. Participants will be asked to identify their three most common study locations. The researchers will then gather qualitative data about each location by asking the participants to describe their perceptions of that location. A thematic analysis of the data will illuminate trends related to where students are studying and how effective they perceived different locations to be. In the end we hope to find where the most common and most effective study locations are for UWEC students.

*Aligning Course Outcomes and Assessments across Languages and Levels*

Sarah Kaprelian

Faculty Mentors/Collaborators: Jessica Miller, Tomomi Kakegawa

Aligning outcomes with national standards and proficiency guidelines is important because clear outcomes help teachers and students know what is expected within and across courses. First, we reviewed research on proficiency development and on the standards put forth by the American Council on the Teaching of Foreign Languages (ACTFL). We learned that consistent articulation within a curriculum facilitates learning, and that proficiency-based outcomes have a significant positive impact on students’ language skills (Glisan et al., 2013). We then matched ACTFL-published “Can-Do Statements”, from Novice Low to Intermediate Mid levels, to language courses from 101 to 202. For that, we took into consideration Departmental outcomes and research describing the number of contact hours needed to reach each target level (Thompson et al., 2014). Our literature review led us to next consider designing Integrated Performance Assessments (IPA) to assess our proposed outcomes, as they were shown to be effective tools. Those assessments are entire units based on a cultural theme. They evaluate all modes of communication, in both spoken and written language: interpretive, interpersonal, and presentational. We designed IPAs in French, German, and Japanese, which will be presented to illustrate why they make powerful teaching and learning tools combined with outcomes.

8 Oral Presentations, Performances, and Films
Exploring the Effectiveness of Writing to Learn Strategies
Haley McKee, Katie Beck
Faculty Mentor/Collaborator: Abby Hemmerich

The purpose of this preliminary analysis is to build the framework for future studies exploring the effectiveness of “writing to learn” teaching interventions in undergraduate courses in the Communication Sciences and Disorders (CSD) department. “Writing to learn” activities refer to brief and informal writing tasks completed during class. These writing tasks were believed to assist students in furthering their understanding of course content. The participants were sophomore-level students in the CSD undergraduate program at the University of Wisconsin – Eau Claire. As part of one of their foundational courses, they were asked to respond to writing prompts at the end of each class period to reflect on their learning or foreshadow upcoming concepts. Student writing samples were transcribed, followed by qualitative coding to analyze the accuracy and depth of students’ understanding. Concept-based descriptions of student learning will be described for reflections, and student inferential learning will be described for foreshadowing samples. General comparisons to student performance on assessments will be included as well. A major outcome of this study is a plan for a prospective study of a “writing to learn” in the classroom.

Impacts of On-Campus or Off-Campus Employment on UWEC Students’ Experiences
Denise Kannegiesser, Jesse Amaral, Shannon Amberson, Hanna Catron, Cierra Dove, Dylan Dowd, Nicole Holewinski, Teing Lor, Nicole Maksen, Riley May, Kemal Munn, Savannah Pauls, Jennifer Peterson, Marlee Pronschinske, Elizabeth Schwab, Kayla Weltzin, Hannah Wiebert, Mitchell Witthoft, Chia Xiong, Loralei Zimbauer
Faculty Mentor/Collaborator: Holly Hassemer

The purpose of this project is to explore the impacts that working on-campus or off-campus has on the experiences of University of Wisconsin-Eau Claire students. Through researching this connection, we hope to show both the advantages and the disadvantages of working while in college. Although, there are national studies like this, ours is unique in that it is focused strictly on University of Wisconsin-Eau Claire students. As students ourselves, we know it can be difficult to decide whether or not it is a good idea to work while being a full time student. The findings of this study may help students make that decision. We will be gathering both qualitative and quantitative data through surveys from a random and confidential cross-section of UW-Eau Claire students. A thematic analysis of the data will illuminate trends and commonalities of employed student. We expect the results gathered here in Eau Claire to be very similar to those found in national studies on the impacts of employment and student experiences.
**Immersion Experience Presentations**

**Ho-Chunk Room**
**Wednesday, April 27**
**9:00 – 9:50 am**

**Sports Sciences and Kinesiology in Japan**
**Student participants on the International Immersion**
Faculty Mentors/Collaborators: *Saori Braun, Yoonsin Oh*

Last July, 9 students and 2 faculty traveled to Japan to participate in the University of Tsukuba called "Tsukuba Summer Institute." This one week institute brought together students who are majoring or minoring in the Kinesiology discipline from overseas. The program included workshops taught in Japanese and English on topics related to health and sports sciences, Japanese traditional sports, and interaction with the campus community through evening social activities. During the second week, students visited Tokyo to further their understanding of Japanese culture and visit the site of the 2020 Tokyo Olympics. Students will be discussing how they immersed themselves in the Japanese culture as well as other cultures outside of the United States.

**Women’s Lives and Experiences in Nicaragua**
**Sarah Luman, Anna Schwanebeck**
Faculty Mentors/Collaborators: *Meghan Licón, Analisa DeGrave*

Over Winterim, 11 students and 2 faculty traveled to Nicaragua for an immersion program that aims to give students an understanding of the struggle for women's rights in Nicaragua. Students will meet urban and rural women who had and continue to have important roles in Nicaraguan history, the revolution, the economy, and social movements. Central to the program was a focused analysis of the intersections of gender, race, and class within a uniquely complex socioeconomic environment. Students lived with host families and interacted with the local community through various presentations, field trips, and cultural experiences, which include visits to women's cooperatives, women's centers, and one health care center.

**Ho-Chunk Room**
**Wednesday, April 27**
**10:00 – 10:50 am**

**Kessa Albright, Jenna Jandrt, Rashawn Williams**
Faculty Mentors/Collaborators: *Joshua Nesja, Nicole Schultz*

Over Spring Break 2016, over 25 students and faculty/staff leaders traveled to Selma, Alabama to explore the issues of poverty and community segregation. Participants completed an 8-hour King Nonviolence Training Seminar, met with community leaders involved in current school integration and community development efforts, finished a service learning project, met with leaders of the historic Selma Voting Rights Movement, and participated in nightly activities with

**10 Oral Presentations, Performances, and Films**
African American youth from the community. Students will be presenting on the program, and what they learned.

**Exploring Cultural Identity in Louisiana: A Domestic Immersion Experience**

*Linda Xiong, Caitlin VanDrisse, Angela Perez, Loralei Zimbauer*

*Faculty Mentors/Collaborators: Leah Olson-McBride, Holly Hassemer*

Fifty UWEC students traveled to south Louisiana over spring break 2016. By visiting places, meeting with residents, and interacting with the geography, these students built a richer understanding of the complex cultural identity of this region of the country. This CERCA presentation will highlight the students’ experiences and their impacts on students’ worldviews and understanding of regional identity.

**Ho-Chunk Room**  
**Wednesday, April 27**  
**11:00 – 11:50 am**

**Hmong Cultural Practices in Fresno, California**

*Pachia Vue, Jackson Yang*

*Faculty Mentors/Collaborators: Ka Vang, David Jones*

During May 2015, UWEC students and faculty traveled to Fresno, California to learn about roles, responsibilities, values, and belief systems of the Hmong culture. In addition, they explored and experienced an in-depth view of Hmong cultural ceremonies and various cultural traditions—the very same traditions and ceremonies that are increasingly fading away as the Hmong people are assimilating into the mainstream culture. They will be presenting on these topics and what they learned from the experience.

**Hmong Cultural Immersion in Thailand**

*Johnny Yang, Pachia Vue, Mizone Vue*

*Faculty Mentors/Collaborators: Ka Vang, Joseph Orser*

Over Winterim, 11 students and 2 faculty leaders traveled to Thailand to learn about the Hmong living in Thailand from a variety of different perspectives. Thailand has the fourth largest population of Hmong in the world, and students travel to several provinces in the country – Bangkok and Chiang Mai -- to connect the experiences of the Hmong people in Thailand to those living in the United States. Students observed and participated in everyday life in Hmong villages, discussed contemporary issues with locals, and observed a process of cultural production in which Thai Hmong are active in creating representations of Hmong culture for distribution and consumption globally. They will be speaking about their experience and what they learned.

**Ho-Chunk Room**  
**Wednesday, April 27**  
**12:00 – 12:50 pm**

**Globalization in China**

*Student participants on the International Immersion*

*Faculty Mentor/Collaborator: DeeAnne Peterson-Meyer*

Last summer, UWEC students traveled Hong Kong and mainland China for three weeks. They
worked with our long-time partner university, Jinan University on Zhuhai campus, to attend a rich curriculum of classes around international business and cultural experiences. Further, they were paired with Jinan University students and developed friendships with peers who became lifelong friends. Students also have business site visits in Shenzhen, Guangzhou, and Hong Kong to learn about how Chinese businesses operate in the global market.

*Globalization in India*

**Student participants on the International Immersion**
*Faculty Mentors/Collaborators: Ann Rupnow, Ganga Vadhavkar*

This program through the College of Business consisted of 14 students and 2 faculty traveling to Delhi, India over Winterim term. The program covered topics related to business, economy, politics, society, religion, history, and culture in India. Students spent two weeks at Shri Ram College of Commerce in New Delhi, and had lectures and business visits related to globalization, international business, and commerce. Students also interacted with Indian students and visit local cultural sites in New Delhi, and had a weekend excursion to the Taj Mahal and other cultural sites is included to explore the diversity within Indian culture. Students will be presenting on what they learned in relation to these topics.

*Ho-Chunk Room*
*Thursday, April 28*
*11:00 – 12:15 pm*

**New York City Aspiring Artists**
*Zach Bartsch, Gina Cruciani, Grant Forss, Clara Kennedy, Hannah Kennedy, Alex Munger, Michael Shermann*

Faculty Mentors/Collaborators: *Alan Rieck, Chia-Yu Hsu, Kenneth Pereira*

12 UWEC music and theatre students and 3 faculty traveled over Spring Break to New York City to be engaged in the study of composition, voice performance, applied instruments, and theatre. Students performed, studied, attended performances, conducted interviews, and interacted daily with artists and people from a wide variety of backgrounds and perspectives. Students also collaborated, interacted, and shared music with students from the Brooklyn High School for the Arts and York College. They will be presenting on what they learned from this one-week high-impact practice.

**Sustainable Portland: The Social Justice Dimension of Environmental Initiatives**
*Emilio Taiveaho, Catherine Jacoby*

Faculty Mentors/Collaborators: *David Soll, James Boulter*

Over Spring Break, UWEC students and faculty traveled to Portland, Oregon on a program exploring the human justice dimensions of environmental sustainability to reach a more sophisticated understanding of what true 'sustainability' is. Students toured "green" initiatives that have been driven by a predominantly White value system and accomplished through official channels, and contrasted these top-down projects with low-cost grassroots initiatives implemented by people living in neighborhoods originally settled by residents displaced by urban renewal. They will be presenting on these topics.

12 Oral Presentations, Performances, and Films
**Partners in Health and Safety**  
**Student participants on the Domestic Immersion**  
**Faculty Mentor/Collaborator: Lisa Schiller**

For 5 days during the fall and spring semester, UWEC Nursing students travel to large dairy farms in Western Wisconsin. They provide screenings, immunizations, and education to mostly Latino farm workers at these large dairy farms. Students integrate knowledge of agricultural health and safety and understanding of rural and Latino culture into their nursing practice, by providing on-site education and basic health screening. The program includes preparation in collaboration with partners, culturally sensitive services to farm workers, and debriefing sessions upon completion of the experience. Students will be presenting on what they learned during these experiences.

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**Women's Studies Award Winners**

**Ho-Chunk Room**  
**Wednesday, April 27**  
**2:00 – 3:50 pm**

**Rape Culture and Heteronormativity**  
**Claire Gutknecht**  
**Donna C. Turell Award**

Education is one of the most important vehicles of information in western societies. As such, it is the job of educators to provide students with a comprehensive education so students are able to be productive and involved members of our society. The education in America on issues like rape culture and heteronormativity are severely lacking at every level, from elementary to post-secondary school, creating a deficiency in the education and awareness of our society as a whole. Heteronormativity and rape culture are pervasive issues that affect the lives of all Americans, as such, this project served as an attempt to supplement or provide that missing piece of education for a group of students living in the residence halls. This paper analyzes the reasons for the lack of education on these topics in our culture as well as details the steps that were taken to comprehensively remedy that lack of education, and the outcomes that were achieved through the implementation of the project.

**Beyond Binaries**  
**Sierra Lomo**  
**Mickey Crothers Award**

Beyond Binaries is a watercolor and ink series about the invasion of an individual’s comfort as society objectifies and defines them within the confines of binaries. Non-conforming individuals are always being examined, poked, and prodded as if they were a bug under a microscope, and these seven images capture this experience and raise awareness of this harmful behavior. The scale in this series plays an important role between the relationship of the viewer and the figure. Body parts of the individual are enlarged to recreate the invasive process of trying to deduce someone’s identity through their clothing, body hair, and body form. In the full body picture, the figure stands or perhaps lies prone to the viewer. The rest of the images then zoom in on specific features such as their body hair, underwear, pelvic area and torso. Finally, the figure’s face is
solemn, and their eyes are closed as this all takes place. The title is inspired after my work with the Eau Queer Film Festival during the summer and fall of 2015.

**Courage with a Difference Face**  
**D'Karlos Craig**  
*Virgiline & Joseph See Award*

A series of poetry that contains the strength of sacrificing of one’s self, a young man D’Karlos Craig, a native of Minneapolis, MN. I am non-traditional student at UWEC and these poems contains the contentment of a pensive mind. The series of poetry includes “The Inevitable of Life,” “Grandma’s Pound Cake,” “The Strength of a Woman,” “A Love worth Waiting For,” and “Dear Brother, I Thank You.” Each poem contains a story of the highs and lows of my life that happened during a trial testing. “The Inevitable of Life” links to a time of trial and error, when I was down on my faith because of tragic events. “Grandma’s Pound Cake” describes the experience I had during the course of my family’s grief. This shows the love and support of my love ones! “The Strength of a Woman” connects to an event of my life when I realized the dominance of a woman’s presence had a sensible effect on my accomplishments. “A Love worth Waiting For” displays the pursuit of someone loving themselves and how obvious it is to despise its value and worth. “Dear Brother, I Thank You” captures my daily life gaining my strength back; it pays homage to the guidance and mentorship I received.

**The City Stargazers**  
**Rebecca Anderson**  
*Tillie Olsen Award*

Set against the backdrop of Chicago in the 1950s, my story follows a teenage girl, Bonnie, as she comes to terms with her attraction and feelings towards her friend, Jo. The two girls live in separate apartment buildings, and their bedroom windows are directly across the dividing alley way from one another. Historical fiction is at its strongest when discussing not the dilemmas and debates of the time where the fiction takes place, but rather when it addresses the issues of the modern day. As such, within this story, I am able to use the rigid social structure of the 1950s to highlight Bonnie’s internal struggles, as well as convey the idea that these are struggles that members of the LGBTQIA community go through today.

14 Oral Presentations, Performances, and Films
A Study of Different Methods of Performing Shakespeare
Laura Schlichting
Faculty Mentor/Collaborator: Arthur Grothe

This project began with the question, “How are college student actors training to address the performance demands of the classical theatre?” The research project then moved to the study of different methodologies used to teach effective performance of Shakespeare’s works to student actors. This study included Clues to Acting Shakespeare by Wesley Van Tassel, Acting Shakespeare by John Gielgud, and Playing Shakespeare by John Barton. This work was conducted over the summer of 2015 and in looking at various techniques the researchers became extremely interested in the Unrehearsed Shakespeare method. The student researcher was able to attend a workshop led by Bill Kincaid (Western Illinois University) at the American College Theatre Festival. The work of this project culminated in several workshops with the goal of teaching the fundamentals of understanding Shakespeare and how to approach performing his works. Then, the researchers were able to bring Mr. Kincaid to campus to further elaborate on the work that had done and to help as consultant for the preparation of an “Unrehearsed Shakespeare” performance. The evening performance was a success and a majority of the students involved expressed their interest developing their understanding and technique in approaching classical texts.

Lake Hallie Lives: An Architectural and Oral History Project
Brett Dekan, Pa Nhia Xiong
Faculty Mentor/Collaborator: Patti See

We recorded the oral histories of some of the residents who have lived on Lake Hallie the longest, and we completed an architectural survey of the oldest houses on the lake. The house surveys serve as an illustration of the changes of Lake Hallie. The differences in infrastructure as well as the residents who live there assist in understanding the socioeconomic influence of the area. We researched dates built (or dates residences were moved to the lake), type (single family, etc.), use (residence, business), size (square footage), and history of ownership. We accessed the Chippewa Valley Museum City Directories and UWEC Archives to document the past home owners and their significance. We also consulted with the village of Lake Hallie's Clerk Office and those in Chippewa Falls and Eau Claire. The final product is a 23 minute video that tells the history of Lake Hallie with still photos and audio clips from the oral histories.
hope we captured what Lake Hallie means today as well as what it used to mean for its aging residents.

**Woodland Theater**
**Thursday, April 28**
**11:30 – 11:55 am**

**NOWHERE (NOW HERE)**
Emilio Taiveaho
Faculty Mentor/Collaborator: Jose Alvergue

Following the tradition established by Third Wave Feminists with the publication of This Bridge Called My Back, my performance, titled NOWHERE (NOW HERE), uses poetry to engage the intersecting psychological and sociological conditions of racialization, disruption, displacement, dis-ease, discomfort, and marginalization experienced by transnational subjects in 20th- and 21st-century American society.

In its basic composition, NOWHERE (NOW HERE) brings together physical and intellectual material from my life experiences as an immigrant—weaving Quito, Ecuador, Winona, Minnesota, Helsinki, Finland, and Eau Claire, Wisconsin into a praxis of lived geographic history. My purpose is to challenge concepts of transnationalism with experiences of transnationality, and develop a language for validating transnational identity without surrendering the individual experiences to universalization—following in the footsteps of feminist thinker Cherrié Moraga, who argues, “This is how our theory develops. We are interested in pursuing a society that uses flesh and blood experiences to concretize a vision.”

The performance of NOWHERE (NOW HERE) is intended to unsettle conventional patterns of thought by elucidating the intimate relation between artistic production, daily life, and politics, and seeks to inspire critical reflection on contemporary transnational politics, and current concepts of liberal participation, as modes of democratic identity.

**Woodland Theater**
**Thursday, April 28**
**12:00 – 12:25 pm**

**Creating a Pasticcio Opera: Using 19th-Century Italian Bel Canto Opera to dramatize the Mexican Folk Tale: The Legend of Popocatépetl and Iztaccihuatl**
Alex Munger, Sebastian Armendariz
Faculty Mentor/Collaborator: Kenneth Pereira

*Popo and Ixta* is a work created within the pasticcio opera tradition, weaving Italian music and English words to tell an ancient Aztec tale. The tradition of pasticcio opera dates back to the 18th century, in the operas of Handel and Gluck. It continues today as a viable medium, with the Metropolitan Opera producing a pasticcio of their own, *The Enchanted Island*, for their 2011-12 season. Within this work, the masters of Bel Canto Opera—Donizetti, Rossini, and Bellini—provide the musical and thematic foundation upon which to construct the legend of Popo and Ixta. Musical semantics and logistic concerns (i.e. ensemble type: duet, trio, etc.) served as the guiding factors for choosing the music. The different works, separated from their original libretti and contexts, are repurposed to tell the origin story for two of the grandest geological landmarks.

16 Oral Presentations, Performances, and Films
seen from Mexico City: the active volcano Popocatépetl, and the dormant volcano Ixtaccíhuatl. The story speaks of love, loss, and loyalty, while incorporating elements inherent to Romantic era opera, such as naturalism, romanticism and nationalism. A desire to produce a new work for the UWEC Opera Workshop, while exposing students to foundational operatic repertoire formed the impetus for this project.

Woodland Theater
Thursday, April 28
12:30 – 12:55 pm

*From Dance Research to Dance Action*
Hannah Hebl
Faculty Mentor/Collaborator: Julie Fox

The task of my research project is to hone my skills as a choreographer. Through a generous grant from the ORSP, I attended a 3-week dance intensive at SUNY-Purchase with Doug Varone and Dancers. While this was a concentrated intensive experience from one choreographer’s point of view, it was a style that opened me up to the possibilities of theatrical dance that resembled life in a refreshingly honest fashion. Upon returning home to Eau Claire, my project advisor Julie Fox aided in the design of a 6-week session of dance classes that were open to the public. This teaching experience helped to form clarity in my communication of dance ideas while constructing a vocabulary of my own with which I created an original work. This piece entitled “Mothers en Façe” explores how one’s attention being consumed by a phone may be atrophying an ancestry of muscle memory for tasks like squatting and gathering, sensing the weather, picking up on social energy through nonverbal awareness. The most fascinating moments of the choreographic research occurred when dance resembled pedestrian life more than technical dance. I have concluded that my creative process is catapulted from colloquial pedestrian movement to a technically constructed sequence of movements; the art we call "dance."

Woodland Theater
Thursday, April 28
1:00 – 1:25 pm

*Collaboration: From Creation to Performance*
Daniella Painter, Timothy Igel, Zach Bartsch, Paul Nuyda, Steven Witzeling, Sara Babino, Nadean Marron, Phillip Schladweiler, Zachary Oliphant, Steven Witzeling
Faculty Mentors/Collaborators: Jill Olm, Chia-Yu Hsu

This research project explored strategies for collaboration between music composers and visual artists in order to make connections between creative disciplines. Student researchers paired themselves into groups of two, one visual artist and one composer. The five collaborative groups decided to select the common theme of “Harmony” to establish a shared point of departure. Student pairs then created their own collaborative strategies to produce both musical and visual artworks. This research project was not only about the artistic products that were produced, but also research about the collaborative process and its relationship to creativity. This collaborative research produced five new musical scores written for a variety of instrumental arrangements and five new visual artworks in a variety of mediums (see Art Display abstract on page 2). These unique creative outputs became possible only through this collaboration. This research
hopes to encourage cross-disciplinary collaborations as a method to both utilize and expand the creative process and to allow for unexpected interchanges and products.

Woodland Theater
Thursday, April 28
1:30 – 1:55 pm

Advanced Drill Writing Techniques: Visual Interpretation of Musical Sound
Jay Blaskowski
Faculty Mentor/Collaborator: Randal Dickerson

This project examined visual interpretation of sound in the context of marching band drill and body choreography. First, incoming freshman applications were analyzed for marching experience and this information was used to estimate the group’s ability level. Second, the musical repertoire was studied for style, mood, and visual design potential. Third, a complete visual package (drill design) was created using Pyware drill writing software. Special considerations were made for difficulty, musical balance, staging, and other choreographic possibilities. Finally, the drill package was edited and converted to drill charts which were distributed to each member of the BMB. The end result was a fully animated drill that was used by the BMB at all field show performances during the 2015 season.

Women’s Studies Capstone Presentations
Ho-Chunk Room
Thursday, April 28
1:00 – 3:00 pm

Acquiring the Tools to Give Back
Ariana Tellez

For my Women’s Studies Capstone project, I am working with El Centro de Conexión de Chippewa Valley. This is an organization aimed at working with and advocating for the Latino community to create a safe and inclusive space in Chippewa Valley and the surrounding areas. The goals of El Centro are to meet the “needs of families, policy issues, translation assistance, and community celebrations”. One way that El Centro attains their goals is through working collaboratively with other organizations and companies. I will be learning how to work collaboratively with organizations that El Centro works with, and I will also apply feminist theory and critical race theory to the work that I will do. From this experience I hope to learn about how institutions such as education, health services, government resources impact the Latino community. I also hope to learn about methods that the Latino community uses when faced with institutional oppressions, and how these institutional oppressions are challenged.

Coalition Building to Improve the Health and Status of LGBTQ+ People in a Mid-Sized Midwestern City
Anna Schwanebeck

In this project, Senior Capstone student Anna Schwanebeck works with the Eau Claire Safe

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Spaces Coalition in building a stronger Coalition. Throughout the semester, she is working with the Coalition to explore how to build an organization which uses a structure which empowers everyone involved through informed feminist organizing principles. Anna has worked with the Coalition to help define its Core Values, Vision, and Mission, as well as organizing events and helping the Coalition continue its forward momentum.

The Safe Spaces Coalition seeks to improve the Health and Well-Being of LGBTQ+ people in the Chippewa Valley, addressing the massive disparities in health and wellness outcomes in the LGBTQ+ communities of the US and Midwest. Through this collaborative internship, Anna is able to help the Coalition in achieving a cohesive structure with which to meet and go beyond those goals.

**Externship with Boys and Girls Club of Eau Claire**

*Abby Polipnick, Stephanie Holman*

Through our externship with the Boys and Girls Club of Eau Claire, we have striven to find ways to incorporate feminism into working with youth and teenagers. The Club promotes a safe and respectful environment in which staff members work to ensure the physical and emotional well-being of all children. By serving as resources primarily for the youth at the Boys and Girls Club, we have had opportunities to empower and help kids along their journey to become compassionate, thoughtful, and hardworking individuals. This externship has allowed us the chance to utilize the education we have had in Women’s Studies to think critically about difficult situations and injustices, to problem-solve in creative and feminist ways, and to apply feminist pedagogy to our everyday interactions with groups and individuals. It is our goal that through our externship with the Boys and Girls Club, we will become better able to understand the inner workings of social power, privilege, and oppression, specifically as to how it directly affects children; we hope to be successful in establishing means to create positive and feminist change in our communities.

**Incorporating Feminist Principles into Capstone Externships**

*Emilee Grunow*

The Options Fund of Eau Claire, the community partner with which I conducted my women’s studies capstone, is a grassroots organization dedicated to providing funding for abortions at no or low cost to those in need. Working with the Options Fund has not only provided me with an opportunity to better understand how grassroots movements are founded and sustained, but has allowed me to gain insight into the needs of underserved communities in Eau Claire. As a feminist student, working for the Options Fund has provided me with an opportunity to experience community organization at foundational levels, while helping provide resources and information to those in need. Understanding the political climate surrounding abortive care and prevention, particularly in Wisconsin, has shaped my understanding of the importance of reducing barriers and providing funding to those seeking abortions.
Reflecting on our Family Support Center Externship
Kaaren Austad, Brittney Reddan

While working with the Family Support Center (FSC) in Chippewa Falls, Wisconsin, our capstone externship was centered on promoting awareness of sexual assault in the greater Chippewa Valley. Family Support Center is a non-profit organization that seeks to empower individuals to live free from violence within the home and in the community through education, prevention, and intervention. We worked on planning events and outreach throughout the spring; focusing on April, which is Sexual Assault Awareness Month (SAAM). Through the events that we planned, we created connections between survivors, community organizations and other survivor supporters. One of the events for SAAM is “kNOw More” which is an event that lets survivors share their story, shows support to survivors, and has information booths for survivors and other supporters. This organization has feminist characteristics embedded within it that are drawn upon to create a survivor based approach that eliminates societal norms, like victim blaming and rape culture. The FSC also has an advocacy aspect that eliminates their hierarchy of power over the survivor. This enables the survivor to start regaining some control over different aspects of their life while the FSC helps them along the way when needed.

Reflection on our AIDS Resource Center of Wisconsin Externship
Nicole Sornson, Kallie Friede, Kristin Roberts

For the Women’s Studies Capstone, our group worked with the AIDS Resource Center of Wisconsin. Alongside prevention specialists, we coordinated an event that promoted safe sex and testing for HIV and Hepatitis C, and also worked with the needle exchange program. Through the AIDS Resource Center, this needle exchange program gave us a deeper understanding of the efforts in our community to prevent the spread of viruses and diseases such as HIV, AIDS, and Hepatitis C. As feminist students, we focused our efforts on outreach in the Eau Claire community as well as the greater Chippewa Valley by collaborating with the Eau Claire Health Department to organize a “Condom Crawl”. For our capstone, we concentrated on high risk groups, specifically injection drug users, men who have sex with men, people that engage in high risk sexual activity, and the LGBTQ community as these populations are at a higher risk for contracting HIV/AIDS and/or Hepatitis C.

Public History Presentations
Menominee Room
Thursday, April 28
2:00 – 3:30 pm

Faculty Mentor/Collaborator: John Mann

Through Daniel’s Eyes: The Photography of Daniel Bastian Nelson

This travelling exhibit has been created by students enrolled in John W. W. Mann’s public history seminar, with assistance from staff at the Chippewa Valley Museum. The exhibit focuses on the Daniel Bastian Nelson Collection of 415 glass plate negatives recently acquired by

20 Oral Presentations, Performances, and Films
McIntyre Library’s Special Collections and Archives. The exhibit explores five themes reflected in the collection. For each theme, the students, working in teams, conducted research and created interpretive panels to historically contextualize the accompanying photographs. Graduate students in the course created an introductory panel as well as a web site which serves as a companion to the exhibit.

‘Cameras Which Anyone Can Operate’: Nelson & His Cyclone No. 3
Lauren Anderson, Leah Penzkover, Jeremy Swick

This panel serves as an introduction to the exhibit. It provides biographical information about Nelson, discusses the advent of amateur photography, and gives an overview of the collection.

‘What a River Has Done Once’: Recurring Floods
Lauren Anderson, Levi Normand, Nicholas Schauer

Eau Claire emerged as a lumber town in part because of its location at the confluence of the Eau Claire and Chippewa Rivers. But if these rivers and nearby Half Moon Lake facilitated transportation and industry, they also brought devastating recurring floods. Nelson documented two of these with his camera, in 1905 and 1910.

‘A Pleasant Place to Live’: Eau Claire’s Built Environment
Makayla Elder, Shelby Miller, Leah Penzkover

Nelson was a carpenter by occupation, which perhaps explains why a significant number of the photographs in the collection capture images of the built environment. These provide a glimpse of Eau Claire in a time of transition from a town dependent on a dying lumber industry, to one with a more stable population and a more diversified economy.

‘A Rare Specimen’: Putnam Park
Erica Powers, Jessica Trampf, Sarah Westad

A number of the images in the collection show people enjoying the serenity of Putnam Park, one of several parks established in Eau Claire around the turn of the twentieth century. This reflected a larger trend: The City Beautiful Movement, a Progressive Era response to industrialization, immigration, and urbanization.

‘An Education for the Heart’: Outdoor Leisure Activities
Davis Bruso, William Erickson, Jeremy Swick

As towns like Eau Claire became more urban and industrial, residents placed a premium on leisure activities. During winter, Norwegian immigrants like Nelson helped to popularize ice skating and skiing. During summer, bodies of water beckoned. This time period also saw the emergence of spectator sports as popular pastimes, especially baseball. The contents of the Nelson collection reflects the increasing popularity of these outdoor leisure activities.

‘Passing the Day Away’: Saloon Culture & Its Critics
Sarah Beer, Lauren Gilstrap, Danielle Schroeder

Nelson frequented saloons on Water Street near his home in “Shawtown,” and documented their social life with his camera. Waldemar Ager, a Norwegian immigrant like Nelson, crusaded against alcohol consumption, promoting prohibition in the pages of his Norwegian language
weekly Reform. This panel considers the saloon culture of the early twentieth century, and its critics.

Undergraduate Poster Presentations
Education and Scholarship of Teaching and Learning

Academic Skills Center
Engaging Success from the Gate: How Does GEN 110 Impact First-Year Student Retention
Ka Vue, Jonathan Idarraga
Faculty Mentors/Collaborators: Audrey Robinson, Patti See

This quasi-experimental research was designed to determine whether there was a difference in the retention for first semester freshmen who completed General Arts & Science (GEN) 110: Strategies for Academic Success versus those who did not take the course. Educators, writers, and critics have conducted research that informs higher education on retention. These studies have provided strategies for increasing retention. One strategy that many institutions have implemented to aid in students’ persistence toward graduation is college success courses designed specifically for freshmen. Data analysis was conducted using existing archival data, such as final GEN 110 course grades, GPA and first-to-second-semester retention for each incoming fall semester freshman cohort for years 2012, 2013, and 2014. Data analysis included frequency tables and independent sample test to compare the freshman cohort groups who completed GEN 110 and those who opted not to enroll in the course each year. Findings indicate that there is no significant difference in retention between the first semester freshmen cohorts who completed the GEN 110 course and those who did not. Additional research such as a longitudinal study should be considered since what students learn in GEN 110 may not be fully applied until students’ third or fourth semester.

Chemistry and Psychology
Investigation of Student Attitudes and Understanding in Inorganic Chemistry
Laura Ley
Faculty Mentors/Collaborators: Roslyn Theisen, April Bleske-Rechek

Strengthening instruction in STEM fields can benefit student learning as well as foster positive attitudes towards the sciences. This project tries to answer the question whether there is a measurable difference in understanding of and attitudes towards chemistry of two groups: students who complete an online or a face-to-face inorganic chemistry course. Participants will have completed a 200-level, lecture-only inorganic chemistry course at University of Wisconsin-Eau Claire, a large, Midwestern, public, undergraduate-only institution. The goal of this study is two-fold: to gather information about the impact of online or face-to-face teaching modes on student understanding of and attitudes towards the subject of chemistry. In this study, online and face-to-face student attitudes and understanding will be assessed by several quantitative measures. Before the start of the course (pre-) and after the course has been completed (post-), a published, validated and reliable attitude survey on the subject of chemistry will be given to

22 Undergraduate Poster Presentations
student participants. To quantitatively assess student understanding of inorganic chemistry of all groups, several measures will be examined and statistically analyzed, such as exam and quiz questions. Our hypothesis is that students who are enrolled in an online or a traditional face-to-face course will have the same measurable outcomes in their understanding of and attitudes towards chemistry. Determining what the students gain from the online versus the face-to-face learning environment will help us to determine whether we should integrate similar types of online course offerings into other courses within STEM fields.

Communication Sciences & Disorders

**Online vs. Face-to-Face Instruction: A Comparison of Academic Achievement & Success**

Kayla Post, Katie Brellenthin  
Faculty Mentor/Collaborator: Abby Hemmerich  
Poster #14

Traditional classroom instruction involves face-to-face teaching and lectures, active learning pedagogies, such as team-based and problem-based learning, and interaction between faculty and students. With an increased involvement of the Internet in modern life, online courses have become an option on many college campuses. However, research regarding the effectiveness of pedagogy in the online format is in its infancy. The purpose of the current study was to analyze whether any difference in student achievement and performance existed between online and face-to-face versions of the same courses. Quantitative data gathered from a retrospective review of two years of an undergraduate neurology course and a graduate aphasia course were analyzed by comparing the exam grades and final grades in the online and face-to-face groups. To determine whether undergraduate preparation affected graduate work, researchers also looked for interaction effects in the performance of students based on which combination of instruction methodology they used when taking courses: both face-to-face, both online, online and then face-to-face, and face-to-face and then online. Qualitative analysis of student essays was also completed, to determine whether format of the course influenced

**Student Mindsets: Exploring the Undergraduate Research Classroom**

Magdalen Gadbois  
Faculty Mentors/Collaborators: Jerry Hoepner, Abby Hemmerich  
Poster #45

Undergraduate research experiences improve confidence and understanding in the research process, as well as subsequent coursework (Kuh, 2009). In the applied discipline of speech-language pathology/audiology, understanding the connections between research and clinical practice is important in development of future professionals. Intimidation by research amongst Communication Sciences and Disorders (CSD) students is common. Dweck’s research extensively describes fixed and growth mindsets that determine students’ effort in learning intimidating topics/concepts (Yeager & Dweck, 2012; Dweck, 2006). The current investigation examines the influence of mindsets on development of perspectives within a sophomore-level research course in CSD. Students completed a mindset survey (Personal Beliefs Survey; Flores, 2006) and reflections at the beginning and end of the semester. Survey results, paired with the reflections, will identify students’ mindset distributions and perceptions of research. Preliminary analyses show student intimidation by the work/effort and knowledge needed to produce quality research projects. Those perceptions shifted to a sense of pride in work, knowledge of
applications to coursework and the profession, and an understanding of the clinician-researcher relationship by the course finish.

**Education Studies**

**Analyzing UW Eau Claire Educational “Block” Students’ Attitudes Towards Science and Science Teaching**

Elizabeth Scott  
Faculty Mentor/Collaborator: Victoria Rosin  
Poster #79

The aim of the project is to find out how a university elementary science methods course and local in-school (practicum) teaching placement affect university preservice teachers attitudes towards science and science teaching. Researchers have indicated that elementary preservice teachers’ struggle with attitudes and teaching science (Appleton, 2002; Watters & Ginns, 2000; Yates & Goodrum, 1990) A way to improve preservice teacher outcomes for teaching science, is to provide positive teaching experiences with science (Cantrell, Young, & Moore, 2003; Ginns & Watters, 1999; Kenny, 2010). I propose to use an online survey and semi structured interviews. By using the anonymous online survey I hope to gather information about their attitudes about science before and after the course. The survey will also assess how comfortable they are with teaching science after their placement. By conducting semi-structured interviews with the preservice teachers after they complete the methods course and practicum I hope to be able to track their progression and see how their attitudes are impacted positively, negatively, or not at all. The goal of this research is to be able to evaluate whether the two components of the university’s method course are in alignment when preparing preservice teacher to teach science.

**Co-Teaching: Collaboration and Practice in Education Research**

Emma Nickerson  
Faculty Mentor/Collaborator: Janine Fisk  
Poster #102

The concept of co-teaching is being explored as a new model for increasing the quality of education in Wisconsin, and to be adopted as the student teaching model for the Education Studies programs. Our fall 2015 research question was: What is the perceived competency of our teacher candidates when utilizing the co-teaching method? Our long-term dissemination plan will be to introduce the co-teaching model into many more K-12 schools to help improve teacher effectiveness, teacher candidate preparedness, and academic gains. The data from the previous research will be utilized to inform the development of the Wisconsin Improving Teacher Quality (WITQ) co-teaching model. Through our continued research we hope to collect data that demonstrates academic gains, the effectiveness of co-teaching for all stakeholders: the K-12 student, the cooperating teacher, and the teacher candidate. As a result of the data that we collect, we hope that this co-teaching model will be adopted by the UWEC teacher education program.

**Honors**

**But Is It Just? A Model to Rate the Justice Orientation of Community-Academic Research Partnerships**

Deborah Thompson, Allison Fouks  
Faculty Mentor/Collaborator: Ruth Cronje  
Poster #53

As at many institutions, some faculty at UWEC are partnering with community agencies to
perform research to meet those agencies’ data needs. Such community-based research can be an important component of an institution’s civic engagement effort. Commentators such as Randy Stoecker and Harry Boyte have noted, however, that academics can function as technocrats when their epistemic power perpetuates oppressive power structures; they call for deliberate attention to establishing partnership conditions that empower equitable collaboration in determining research goals and methods and analyzing data, equitable ownership and access to those data, and reciprocal benefit to both academic and community partners. In our poster, we’ll share a “justice barometer” model we have devised to rate the justice orientation of community-based research partnerships at our institution and communicate the results of our effort to use this model to rate a pilot group of community-based research effort at UWEC.

Mathematics

Math 380: Research Methods in Mathematics
Danielle Brushaber, Elizabeth Schwalbach, ML Tlachac
Faculty Mentors/Collaborators: Carolyn Otto, Dandrielle Lewis

Math 380: Research Methods is an introduction to research in mathematics that prepares students for student/faculty research collaboration, the rigors of graduate study in mathematics, and equips students with skills that will aid in careers in academia or industry. The objective of creating the curriculum for Math 380 was to develop a course that will be a combination of lecture, interactive lectures, as well as active learning components. Our team of three students and two faculty developed a curriculum that will address other learning outcomes, namely, demonstrating proficiency in proof writing techniques, formulating questions in mathematics fields, demonstrating ability to communicate mathematics to peers and the mathematics community, and interpreting literature and/or results in mathematics fields. The team will present the collected data and the analysis of the assessment data.

Mathematics and Political Science

Embracing the Somali Immigrant Experience in Midwestern Public Schools
Mai Lee Kha
Faculty Mentors/Collaborators: Dandrielle Lewis, Stephen Hill

The purpose of this project was to study participants' understanding of the challenges of urban immigrant life in the United States today and, specifically, understanding of Somali culture, religious practices, life styles and school lives. Somali immigrants are increasingly migrating into communities such as the Minneapolis/St. Paul, Minnesota, New Richmond, Wisconsin and Barron, Wisconsin. However, communities and public school teachers know little about their culture, traditions, language, and life styles. Thus, the importance of this project is that UWEC participants gain a personal and professional understanding of Somali culture and immigrant experiences. In addition, they may effectively serve as cultural bridges. The findings indicated that through the combination of a week-long, full-day, field placement in Anne Sullivan School and Cedar Riverside Community Academy, and more than twenty four hours of classroom-based instruction, participants were able to gather information about Somali culture, traditions and religion from scholarly presentations, readings, and observations. Furthermore, participants were able to understand the privileges of the white, middle class Americans who are not immigrants.

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**Nursing**

*Facilitating Optimal Intercultural Clinical Immersion Experiences for Undergraduate Nursing Students and Faculty*

Leah Mott, Karen Nakano, Amanda Houle  
Faculty Mentors/Collaborators: Rosemary Jadack, Debra Jansen  
Poster #60

At our university, nursing students participate in high-impact clinical immersion experiences designed to introduce them to clients of diverse backgrounds. Students engage in 7-10 day experiences at a South Dakota Indian Reservation, a Texas perinatal clinic, an El Salvador palliative care hospital and orphanage, and/or Wisconsin dairy farms with Hispanic migrant workers. Little is known about student/faculty needs regarding these experiences. The study purpose is to identify student/faculty needs before, during, and after participation. To date, semi-structured interviews were conducted with 25 students and 4 faculty/clinical instructors who participated in/supervised intercultural clinical immersions. Interview questions address perceived needs and recommendations before, during, and after immersion. Content analysis is being used to identify interview themes; interrater reliability will be calculated. Preliminary student-identified needs include adequate experience preparation and accommodations for assignments/exams on return. Faculty-identified needs include time to prepare students and build trusting clinical site relationships. Students should be equipped with an understanding of history, healthcare practices, cultural traditions/beliefs, and any new required skills/interventions, and have opportunities to talk with prior participants. During experiences, flexibility and cultural exploration should be encouraged. Upon return, readjustment time and learning synthesis needs to be facilitated. Findings will be useful for advancing intercultural immersion experiences.

**Psychology**

*Exploring the Relationships Among Disability Attitudes, Implicit Beliefs about Intelligence, and Motivation for Major*

Katie Beck, Clare Stratton, Emily Torbenson  
Faculty Mentor/Colleague: Mary Beth Leibham  
Poster #101

Many UWEC students will work with individuals with disabilities in their chosen fields of study. Therefore, it is important to examine these students’ disability attitudes as well as their implicit beliefs about intelligence (i.e., mindsets), given that both attitudes and mindsets can impact one’s interactions with the people with whom they work. Additionally, it may be important to understand one’s motivation for pursuing such fields, as their reasons for entering these professions can also impact their interactions with others. The purpose of this study is to examine college students’ disability attitudes, mindsets, and motivation for choosing their major and the relationships among these factors. Understanding these links is important because many college students will subsequently work with individuals with disabilities. Approximately 200 UWEC students will complete surveys assessing their disability attitudes, mindsets, and motivation for choosing their major. We hypothesize that those students with more intrinsic motivation for their major will be more likely to have growth mindsets and more positive disability attitudes than students who have more extrinsic motivation for their major. This study has the potential to inform the higher education community of the importance of mindset and major motivation for students who will subsequently work with individuals with disabilities.

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A Primer on Electroencephalography
Sara Badour, Kelsey Rolefson, Gretchen Bye, Rachelle Belott, Calvin Verdegan, Stephen Hlavka, Summer Underwood, Ronald Lockington
Faculty Mentor/Collaborator: David Leland
External Student Collaborator: Claire Brennan, UW-Eau Claire graduate

Electroencephalography (EEG) is the non-invasive recording of brain electrical activity taken from the scalp. It is a valuable tool in fields such as Psychology, Neuroscience, and Medicine where it can help explore neural underpinnings of cognitive processes and help diagnose neurological conditions. EEG is an methodology that is accessible to undergraduate students and effective for use in faculty-student collaborative research. We will present on the procedures and tools used to record EEG, some of the popular methods to analyze the data, and both clinical and research applications.

Using Brief Experimental Analysis to Select Skill and/or Performance Interventions for Oral Reading Fluency
Juliana Burzynski, Samara Dulas, Anna Hamer, Haley McKee, Felicia Som
Faculty Mentor/Collaborator: Melissa Chaffin

Brief experimental analysis (BEA) utilizes single case design methodology to test drive interventions in order to select an effective intervention for an individual student (Burns & Wagner, 2008). Used in this way, BEA can guide intervention selection for learners who have failed to respond to standard instruction (Coolong-Chaffin & Wagner, 2015). This project examined how BEA procedures could be used to identify potentially effective skill and/or performance-based interventions targeting reading fluency for 12 students (grades 2-7) who demonstrated inadequate reading performance during the school year. In addition, an extended analysis was conducted to determine the effectiveness of the indicated intervention over time when used within the context of a comprehensive reading instructional package delivered during a summer reading program. Results indicated that a promising intervention was identified for each participant. In addition, the intervention led to large gains in words read correctly per minute during the reading program on intervention passages. Variable results were seen on generalization passages. These results extend the literature on BEA by demonstrating its use with interventions utilizing skill and/or performance-based interventions. The results also demonstrate how BEA-indicted interventions can be used within the context of a comprehensive instructional package for struggling readers during the summer.

Fine and Performing Arts

Music and Theatre Arts
Apple and Android Rhythmic Apps: The Perceived versus Actual Difference when Used in Individual Practice
Sarah Dipiazza
Faculty Mentor/Collaborator: Melissa Koprowski

The use of apps on tablets, phones, and other technology has grown rapidly over recent years, and the music classroom is no exception. Music teachers often direct students to metronome apps to help students with maintaining a steady pulse, but there are many other rhythmic apps available. In this research project, nine Apple and Android rhythm apps were studied in
relationship to their use to assist students (age range: middle, high, and college) with their rhythmic integrity, and the perceived versus actual difference it made in their performance when compared with a more standard approach of practicing without the use of Apps. While a majority of participants (particularly middle and high school) showed signs of rhythmical improvement and more joy in their practicing with the addition of apps incorporated into their practice, some participants (primarily college-age) found the apps to be distracting or were too much of a hassle to figure out how to use. Students should be encouraged to incorporate apps into their practice session and see if they have an increased sense enjoyment in practicing and/or improve with this addition.

Creating a Reference Guide to Contemporary Pedagogical Piano Literature
Alex Munger, Samantha Taleff
Faculty Mentor/Collaborator: Nicholas Phillips
Poster #23

This past summer we organized and expanded our UWEC Piano Pedagogy Library, with the main focus of building repertoire by contemporary pedagogical composers. During this process, we felt there was a need to present these works in a manner that was easy to digest, providing concise information regarding level, style, and technical demands. Modeling our project off of a preexisting model, Jane Magrath’s Guide to Standard Piano Literature, we compiled a reference guide for these works. While Magrath’s guide covered the traditional canon, our research catalogues composers writing today. Our research and organization of the repertoire consisted of playing through the pieces and levelling the works based on Magrath’s model. Presenting at the Wisconsin Music Teachers Association State Conference this past fall, we received helpful feedback regarding the usability of our guide, which also motivated us to continue expanding the variety of composers represented. This guide provides established piano teachers, as well as Piano Pedagogy students with a detailed, yet accessible resource for discovering new repertoire for their aspiring students. We believe our research and reference guide instills the support and performance of contemporary pedagogical works, promoting a musical community of teachers, students and composers.

Examining the Stages of Relationships through a Theatrical Lens
Dana Strothenke
Faculty Mentor/Collaborator: Arthur Grothe
Poster #8

Romantic relationships onstage show us conflict and resolution in easy packages, or do they? Examining the stages of relationships through their portrayal onstage tells us a different story. Why do we always seem to see unhealthy relationships portrayed? Do we ever see a true resolution in the conflicts between characters? Using Harville Hendrix’s ideals of Imago Therapy, we examine the portrayal of relationship stages. Through the analysis and study of several plays spanning modern theatre, we’ve found evidence of all stages of relationships except for the last, true love stage which Hendrix likes to call “Agape Love.” This type of love is the highest form of love; it is pure, honest, and charitable. The lack of representation of this stage in our media and theatre may be both a cause and effect for our increasing divorce rate and lack of satisfaction for couples today. We explore these implications and discuss why this might be and what this means for a population of people striving to find true love but having no examples to work from.
Health Sciences

Biology

Screening for Methicillin-Resistant Staphylococcus Spp. Dog Isolates Capable of Transferring mecA
Courtney Schauer, Kaiya Showsh
Faculty Mentor/Collaborator: Sasha Showsh
Poster #161

Methicillin-resistant Staphylococcus aureus (MRSA) is an antibiotic-resistant strain of the bacterium Staphylococcus aureus that’s responsible for many community and hospital-acquired infections world-wide. A survey of the dogs at the local Veterinary Hospital was conducted to indicate the prevalence of Methicillin-Resistant Staphylococcus spp. (donor strains). We used Mannitol Salt Agar (MSA) with oxicillin (4mg/ml) to collect 67 bacterial samples from 39 dogs. 38 samples displayed characteristics of MRSA and were designated potential methicillin-donors. PCR analysis determined only one donor to be MRSA. The MRSA isolate contained a plasmid. All the donors were screened for their ability to transfer the methicillin-resistance gene (mecA) to a methicillin-sensitive, streptomycin and spectinomycin resistant Staphylococcus aureus recipient (SAS 850). To determine the ability of the isolates to transfer the mecA gene, a series of conjugation experiments were conducted with potential donors and recipient. The resulting transconjugants (S. aureus SAS850 with methicillin resistance) were selected for on Columbia Blood Agar (CBA) plates containing streptomycin, spectinomycin, and oxicillin. Oxicillin resistant transconjugants were analyzed by PCR and coagulase test to determine the samples to be S. aureus. To date, 28 of the 38 donor strains have been tested and we’ve not been able to detect the transfer of mecA.

Communication Sciences & Disorders

A Case Study Exploring an Awareness-Based Therapy Approach for a Client with a Covert Stuttering Profile
Hailey Brost, Kelly Schroeder
Faculty Mentors/Collaborators: Vicki Samelson, Angela Sterling-Orth
Poster #16

A case study exploring an awareness-based therapy approach for a client with a covert stuttering profile. Stuttering is defined as a disruption in the forward flow of speech. Some individuals who stutter exhibit a profile that is labeled “covert” in that through deliberate and/or subconscious methods the individual is using strategies to significantly minimize or avoid moments of stutter. This study addresses a gap in the literature on interventions for covert stuttering. Our aim was to observe and explore the effects of an awareness-based approach with a client who exhibits a covert stuttering profile. The Overall Assessment of Speaker’s Experience of Stuttering (OASES) is a self-assessment which provides data specific to the client’s feelings and thoughts about their stuttering (Yaruss & Quesal, 2006). Data collection included pre- and post-OASES results, observations of therapy sessions, and interviews with the graduate student clinician and clinical supervisor. This intervention approach targets the client's overall awareness of speech and stuttering, therefore may be of significant value to clinicians who work with individuals who exhibit a covert stuttering profile. The results capture a client's journey to acceptance of stuttering. It was concluded the awareness-based intervention plan showed a reduction in negative feelings associated with stuttering and an increase in communication confidence.
Fluency Disorders: Speech-Language Pathologists' Current Practices and Perspectives
Megan Tweten, Kelsey Loch
Faculty Mentors/Collaborators: Jennifer Thistle, Angela Sterling-Orth
Poster #47

The purpose of this study was to investigate current concerns and standards of practice of speech-language pathologists’ (SLP) delivery of services to children with fluency disorders. Fluency disorders occur in 1-2% of people worldwide and in approximately 5% percent of people at some point in their life (Guitar, 2014). Due to the low prevalence of stuttering disorders, research shows that SLPs feel inexperienced, inadequately trained, and have difficulty selecting appropriate treatment approaches (Healey, Scott, & Ellis, 1995; Kelly, et. al, 1997). To determine SLPs' current perspectives, an online survey was sent to practicing SLPs in Minnesota and Wisconsin. Results indicated that 46% of SLPs feel adequately prepared when assessing and diagnosing fluency disorders. However, 48% of SLPs feel prepared but have some apprehension when providing treatment to children with a fluency disorder. Having the knowledge and skills to “provide all services competently” is crucial to fulfilling the code of ethics established by the American Speech-Language-Hearing Association (American Speech-Language-Hearing Association, 2010). In order to confidently serve these individuals, continuing education pertaining to fluency disorders is vital for this profession.

Pediatric Mild Traumatic Brain Injury Assessment & Management for Speech Language Pathologists
Taylor Turben, Carly Heyrman
Faculty Mentor/Collaborator: Thomas Sather
Poster #15

Within the last decade, optimal management of MTBI and potential sequela has received increased interest. Children ages zero to fourteen account for 500,000 emergency department visits annually relating to traumatic brain injury, resulting in a wide range of potential cognitive, physical and emotional effects. Multiple disciplines, including speech-language pathology (SLP), physical therapy, sports medicine and pediatric medicine, among others, are currently involved in the assessment and management of pediatric MTBI. There remains a great deal of discussion regarding optimal management strategies and best practices for clinical practice in the management of individuals with MTBI. Among SLPs, many protocols regarding the management of MTBIs lack standardization, and additionally, the wide variety of management strategies may result in potentially conflicting interventions and recommendations. In this project, we reviewed twenty-one articles regarding pediatric MTBIs, synthesized key points and themes within the literature and presented our findings to an area medical SLP department. This study served to review the literature encompassing MTBI protocols and to provide SLPs with preliminary information to support assessment and management of mild traumatic brain injuries within clinical practices. The findings and discussion support the justification of standardized treatment practices.

A Survey of Reading Habits and Empathy of Individuals with Autism Spectrum Disorders
Carly Kjornes, Emma Walters
Faculty Mentors/Collaborators: Deborah Elledge, Jennifer Thistle
Poster #17

Existing research suggests that neurotypical individuals who read fiction are metaphorically transported into narrative worlds and have higher levels of empathy than those who do not read fiction. A predominant characteristic of people with Autism Spectrum Disorders (ASD) is the

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inability to understand the perspective of others (Theory of Mind) which also impairs the ability to experience empathy for others. This survey research examined the current reading habits and empathy levels of individuals with ASD to explore the potential of incorporating fiction reading into language interventions to increase Theory of Mind and empathy. The findings indicated that people with ASD experience transportation when reading fiction at the same rate as individuals without ASD. Incorporating fiction reading into intervention may be a way to improve the theory of mind and empathy of individuals with ASD. The next step is to design an intervention study to test this hypothesis.

Teaching Letter Sound Correspondence to an Individual who Uses Augmentative and Alternative Communication
Ali Grandstrand
Faculty Mentor/Collaborator: Jennifer Thistle

Children who use augmentative and alternative communication (AAC) often require adapted teaching methods to learn early literacy skills. The aim of my study was to teach letter-sound correspondence to an individual who uses AAC due to difficulties using spoken language. Letter-sound correspondence is the ability for someone to hear a sound and identify the letter that sound goes with. Letter-sound correspondence is one of the earliest skills required to develop literacy. In learning letter-sound correspondence, the groundwork is being laid for future success in reading. I utilized a single-subject changing criterion design, where the criterion for success changes as the individual shows improved performance. In this study, the criterion that would change was specific target letters. The participant was seen for two teaching sessions per week for 11 weeks. Despite high performance during scaffolded learning opportunities, the participant was unable to independently demonstrate mastery of the first target letter sound and therefore did not advance to learning additional letters. My poster will include a discussion of possible changes to intervention to increase success for this individual in the future.

Kinesiology

The Acute Effects of Postural Restoration on Shoulder Range of Motion
Erika Stueck, Heather Dayton, Matthew Murphy, Emily Batley, Ryan Behnke
Faculty Mentor/Collaborator: Robert Stow

The purpose of our study is to increase shoulder range of motion (ROM) without increasing capsular laxity, which can increase an individual’s risk of injury. In order to accomplish our goal, we will incorporate the techniques of Postural Restoration (PR) presented by the Postural Restoration Institute™ that use diaphragmatic breathing to correct the posture of the rib cage and the position of the scapula in order to increase shoulder ROM. Methods: Approximately 40 university students (19-24 years old) without prior or current shoulder injury will be instructed to perform two PR techniques for the period of one week. Internal and external rotation will be measured throughout the study to determine the immediate and the lasting effects of PR. Results: Our data collection is currently in progress but will be completed by March 18th. Conclusions: We expect to see an improvement in ROM as the study progresses. Our hope is that our results will provide clinicians with a new method to improve shoulder ROM.
Effects of Graston Technique on Overhead Throwing Velocity in Collegiate Baseball Players
Taylor Tassoul, Melissa Beaupre, Parker Lemire
Faculty Mentor/Collaborator: Robert Stow
Graston Technique (GT) is a form of Instrument Assisted Soft Tissue Mobilization that utilizes stainless steel instruments to allow clinicians to detect soft tissue adhesions. The purpose of this study is to evaluate the effects of GT on the overhead throwing velocity of baseball players. Nine collegiate club baseball participants were involved in eight 30-minute treatment sessions, six participants being assigned to a control group. Study timespan was four weeks, treatments occurring twice a week with 48 hours between sessions. Sessions consisted of 10 minute heat application over the dominant posterior shoulder, 8 minutes of GT, and glenohumeral (GH) stretching in the motions of external rotation (ER), internal rotation (IR) and horizontal adduction. The two-way-repeated-measures ANOVA indicated significant effects on throwing velocity, ER, and IR (p<.05). Paired-samples-t-tests were employed, indicating no change in throwing velocity from baseline to posttest among GT group, while significant decrease was shown among control from pre-to-posttest. No change in IR occurred among GT group, while significant increase occurred in control from pre-to-posttest. Both groups increased ER. Use of GT may prevent throwing velocity decrease in apparently-healthy players. Further research can be done to examine GT effects during season among throwers with chronic GH conditions.

The Effect of Short Term Single-Leg Balance Exercises on Balance Scores of Female Collegiate Athletes
Simone Muller, Adam Estabrooks, Alena McGuire, Jennifer Merritt, Colleen McCullough
Faculty Mentor/Collaborator: Robert Stow
The correlation of injury and improper balance ignited an interest in ways to improve balance and decrease the chance of injury among athletes. To test if a female collegiate athlete’s balance can be improved by implementing a three week, single leg (SL) balance program. In this study, 23 female division three athletes, were randomly assigned into a control or experimental group. All athletes performed a SL balance pretest as well as a fall risk assessment using the BIODEX SD Balance machine. After three weeks, the participants will complete a posttest. Throughout the three weeks, the experimental group will perform a balance program including five different SL balance exercises three times weekly. These exercises will be monitored to ensure completion and proper technique. Current results are in the preliminary stage, but will be finalized in March, upon data completion. Descriptive statistics, t-tests, and Pearson’s Correlation will be used to analyze the data. We hypothesize that this research will show an increased overall balance in the experimental group. The results of this study could lead to finding methods that could assist with increasing an athlete’s balance and decreasing risk of injury caused by improper balance.Key words: BIODEX, balance, single leg, female athletes, injury.

Energy Expenditure in Functional vs Traditional Resistance Training as Measured Through Indirect Calorimetry.
Neil McMillan
Faculty Mentor/Collaborator: Jeffrey Janot
The purpose of this study is to compare differences in caloric energy expenditure (EE) during a traditional resistance training (TRAD) protocol to a functional (FUNCT) protocol. FUNCT exercises emulate movement patterns in everyday life and occupation, utilizing neuromuscular

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coordination, core engagement, and total body movements. FUNCT has shown similar or better performance benefits in comparison to TRAD. With exponential levels of chronic disease, FUNCT protocols may serve as a better adjunct to aerobic exercise to manage weight and improve health. 14 college-aged (18-27), recreationally trained participants (9 males, 5 females) were recruited. Each individual completed six total sessions. The first two sessions served to familiarize the participant and record resistance and settings for each respective exercise. The last four sessions consisted of two functional and two traditional sessions completed in a randomized order. Participants wore a metabolic analyzer to measure EE during those sessions. Following protocol completion, participants were asked to lie supine for 30-minutes to measure excess post-exercise oxygen consumption (EPOC). Preliminary data analysis shows significantly greater (p<.05) EE in the FUNCT and overall session EE (FUNCT plus EPOC). No difference was observed between session EPOC values. A FUNCT program will elicit a higher EE compared to TRAD.

Impact of Individual vs. Functional-Based Exercise Training on Balance in Middle-Aged and Older Adults
Megan Dobbertin
Faculty Mentor/Collaborator: Saori Braun
External Student Collaborators: Karli Chase-Jacobus, Katrina Peterson, Mikaela Burtis, Nik Shilts, University of WI-Eau Claire graduates

With the growing older population, there has been an increasing number of falls leading to limb injuries. Healthcare professionals recognize the need for balance training to be incorporated into the older population’s everyday lives to prevent injury and promote safer living, yet no specific balance training guidelines. The purpose of the study, therefore, was to compare the effectiveness of individual- vs. functional-based balance programs on Berg balance score and confidence level, measured via Activity Balance Confidence (ABC) Scale, in 29 middle-aged and older adults (mean age=59.88 ± 10.51 years). Participants were randomly assigned to either the Biodex group or a functional exercise group incorporating Yoga over a 5-week period, twice a week with each session lasting for 15 minutes. The two-way repeated measures ANOVA was employed, and the results indicated significant improvement in Berg balance score in the functional-based group from pre- to post-test, while greater improvement in ABC scale was seen in the individual-based group. Simple effect tests indicated both groups displayed a significant increase in the balance score from pre- to post-test. The findings of the study suggest the importance of incorporating both individual- and functional-based balance exercises to increase confidence and overall balance in the aging population.

Speed- and Circuit-Based High-Intensity Interval Training on Excess Post-Exercise Oxygen Consumption
Andreas Ezer, Sarah Gronemus, Lindsay Schleppenbach, Katelyn Widenski
Faculty Mentor/Collaborator: Jeffrey Janot

Due to the current obesity epidemic in the United States, there is growing interest in efficient, effective ways to increase energy expenditure (EE) and weight loss. Research has shown that high-intensity exercise elicits a higher Excess Post-Exercise Oxygen Consumption (EPOC) throughout the day compared to steady-state exercise. Currently, there is no single research study that examines the differences in EPOC resulting from high-intensity interval training (HIIT) modalities. The purpose of this study is to review the impact of circuit training (CT) and speed interval training (SIT), on EPOC in both regular exercising and sedentary populations. A total of...
32 participants were recruited from the UW-Eau Claire campus and evenly divided into regularly exercising and sedentary groups, according to self-reported physical activity levels. EPOC and EE were measured during two HIIT sessions using a Cosmed. Results from this study will offer insight on the most efficient way to maximize EE throughout the day.

**Management and Marketing**

*Developing Best Practices for Strong Educational Programs*

*Samantha Paider*

Faculty Mentor/Collaborator: *Douglas Olson*  
Poster #118

**Problem:** Health and aging services administration education field currently has an inadequate portfolio of programs across the country. The United States has a growing senior population, and, senior care organizations are under increasing pressure to transform, which requires good leadership (Dana and Olson, 2007). There is also evidence that strong leadership has a significant impact on the quality of care and service provided to seniors (Castle, et. al, 2014). All of these factors are occurring against a backdrop of increasing numbers leaving the health care administration field than are entering (NAB Testimony, 2000). The profession of long-term care (LTC) administrators is facing a crisis that needs to be addressed with a coordinated, well thought out plan.

**Rationale:** Since there are few strong senior care administration programs, the identification of key attributes, factors, and requirements for strong programs inside and outside the health care administration field is important for the future (NAB Testimony, 2000).

**Methodology:** A literature analysis will be conducted to identify key attributes, factors, and requirements of strong programs within and outside the health care administration field. Various accreditation standards, approaches, and best practices will be explored for valuable commonalities within the senior care administration education field. Summarized results will be shared with an expert advisory group for feedback. ACHCA members will also be solicited for their ideas at Convocation.

**Results:** This study will lay groundwork for exploration of a national strategy involving multiple stakeholders across the country. The literature results, key attributes, requirements, and factors will be present on the poster and available at Convocation.

**Conclusion:** Considerations and themes from literature analysis, summarization, and ACHCA member feedback will serve as a foundation and better position the Center to facilitate the building of a national strategy to advance health care administration programs.

*Development of Person-Centered Care Leadership with Practical Applications for the Customer Experience*

*Megan Van De Hey*

Faculty Mentor/Collaborator: *Jennifer Johns-Artisensi*  
Poster #119

With aging senior demographic and dwindling fiscal resources, long-term care is positioned for growth and a demand for culture change toward more person-centered care is critical in serving the current and next generation. Students who have been educated in long-term care administration participate in an experiential activity that allows them to experience living as a nursing home resident for a day. This identifies operational practices that can lead to positive resident experiences. Over the past three years, 138 students have participated in an experiential “Resident for a Day” activity. As part of a subsequent assignment, based on the Planetree framework, they each justified an “Always ExperienceSM” they thought every resident should experience in their facility, along with several specific practices (Always EventsSM) and

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measures to ensure that the Always ExperienceSM has occurred. A thematic analysis will be conducted. This will yield several exemplar action plans of desired outcomes, operational practices, and relevant measures to evaluate implementation to help administrators put necessary practices into place. In conclusion, long-term care providers are being compelled to advance culture change by promoting person-centered care strategies. When administrators better understand resident wants and needs, they can develop and implement practices within their organizations to maximize customer satisfaction.

**How Are Senior Care Organizations Responding to the Affordable Care Act?**

*Carmen Flunker*

Faculty Mentors/Collaborators: *Jennifer Johns-Artisensi, Douglas Olson*  
**Poster #93**

**Significance:** The Affordable Care Act (ACA) has led to several changes, including improving the health of older adults, enhancing the care experience, and being more efficient with sparse resources, in many cases through development of Accountable Care Organizations (ACOs) which are partnerships between insurance organizations, doctors, hospitals, senior care organizations, and others to coordinate delivery of care. However, there is little information available on how senior care organizations have been responding in the wake of these changes. This project’s goal is to explore how the long-term care industry is adjusting to these changes.

**Approach:** This fall, following a forum presentation by several senior care leaders, and based on the previously identified themes, researchers, in consultation with an expert advisory panel, developed an exploratory survey. This was distributed to 55-60 long-term care organizations administration team, to better understand how senior care organizations are responding to the ACA. Results: Survey data will be analyzed to characterize strategic approaches, operational changes and new delivery models senior care organizations have developed in response to the ACA, along with identifying necessary new leadership skills required to be successful during this time of change and transition.

**Nursing**

**Clinical Perspective of Holy Family Services in Weslaco, TX**

*Nicole Lauffer, Kyle Kackman, McKinzie Flores, Johanna Mormann Bautch, Hannah Pitz, Quinn Bradley*

Faculty Mentors/Collaborators: *Jill Hecker Fernandes, Rita Sperstad*  
**Poster #29**

Holy Family Services is the longest licensed free standing birth center in Texas. Since inception, the center’s vision has been to provide a place where women could have their babies in a safe, comfortable setting. The center, staffed exclusively by certified nurse-midwives and registered nurses, comprises a range of facilities: six birthing suites, a clinic, classroom, chapel, medical storage rooms, and housing for resident staff, volunteers, students, and visitors (Holy Family Birth Center, Inc., n.d.). Our clinical group traveled to Holy Family to practice our skills and provide assistance to the community and providers. Our goal was to analyze data regarding Holy Family and the center’s comparison to traditional medical centers. To accomplish this, our group spent time researching practices at Holy Family and Knapp Medical Center while comparing and contrasting outcomes and patient satisfaction. Our immersion allowed us to experience midwifery in a family-centered, culturally sensitive, holistic environment while participating in individualized care and teaching to patients (Holy Family Birth Center, Inc., n.d.). The immersion has affected the nursing profession by allowing students to experience cultural
differences and make correlations between compassion with midwifery and the medical profession while equipping students for a more compassionate approach to patients.

Farming Hope Eau Claire
Eva Riedesel, Kelly Peterson, Lindsey Pettit, Kathleen Widmer, Kaitlyn Moore
Faculty Mentor/Collaborator: Jill Hecker Fernandes

Farming Hope is an organization created in El Salvador, built on the premise that all human beings have potential. On a farm in Suchitoto, men and women who previously lived on the streets work to build new lives. The food grown at the farm goes back to the soup kitchen where these individuals first encountered an incredible woman that continues to give back to her community and has changed countless lives through her passion for horticultural and vocational therapy. The Students were so inspired after visiting El Salvador for a nursing clinical immersion experience, they knew that Farming Hope was a project that could be replicated in Eau Claire. Since returning from El Salvador in April 2015, the students created an official university organization that has grown to more than 100 members across campus and in the community. In addition the organization has built a partnership at the Community Gardens, and has been working with individuals from Positive Avenues, The Wellness Shack, and the Community Table to bring this project to life. Homelessness, mental health, and food deprivation are prevalent problems universally. Farming Hope aims to decrease these prevalent problems by building vocational skills and purpose in these individual’s lives.

Health Status Survey of Somali Immigrant in Barron County WI
Megan McHenry, Amanda Houle, Elisabeth York, Kathleen Widmer
Faculty Mentor/Collaborator: Mohammad Alasagheirin

The purpose of this pilot study was to describe the general health status of the Somali population in Barron County and to understand the health needs and challenges of the Somali community. This study specifically aimed to gain more information on the children physical growth, adult main chronic diseases and the diet and food behavior among the community dwellers. Data collected includes; height, weight, food security questionnaire, food frequency questionnaire and medical history questionnaires. We interviewed 55 families for total of 131 individuals. Our preliminary results showed none of children were stunted, 7.5% children were underweight, and 13.6% children were overweight or obese. Primary health concerns among adults were stomach problems and aches and pains. A total of 4% Somali adults reported having diabetes and 4% with hypertension. A food security questionnaire showed that around 90% of families were living in food secure household. This was a preliminary study, so only general conclusions can be made about the status of this population. In order to determine any underlying effects of a change in diet, more information will be collected.

Leadership in the Community - Clinical Immersion El Salvador
Karen Nakano, Haley Housh, Allison Miller, Kelly Peterson, Eva Riedesel, Leah Rolfzen, Kaitlyn Trobe, Courtney Walin
Faculty Mentor/Collaborator: Jill Hecker Fernandes

This presentation describes a community health clinical experienced by undergraduate nursing students in El Salvador. It allows them to develop relationships with locals, specifically the homeless people who visit “Casa Esperanza” or Hope House. Recent studies have found a lack of support networks for people who are homeless, leading to isolation and loneliness. 33-38% of homeless people spend the day either with other homeless people or alone. Isolation erodes
people’s resiliency and ability to cope. Homeless men and women lack basic amenities; they hope to have food to eat when hungry but they also need to be treated as human beings. Casa Esperanza is in San Miguelitito, one of many neighborhoods still affected by the civil war. The people who were not able to leave were forced to live in the streets. At Casa Esperanza, the students prepare and serve meals, talk with the clients, and perform clinical consults. In Fall of 2015, 24 consults were performed, providing various treatments: reading glasses for severe cataracts, vitamins, herbal remedies for sleep, relaxation exercises and much more. Often the clients lack human connection; the students created a client experience that shows respect for the clients, treating them as the person they are.

**National Survey for Essential Nursing Leadership Behaviors**
Shanna Ellefson, Katie Daley
Faculty Mentor/Collaborator: Charlotte Sortedahl

Background: The research aim is to determine essential professional behaviors baccalaureate nursing students should acquire by surveying hospital nurse leaders throughout the United States. Our research was based on the need to identify specific behaviors that nursing students need in order to prepare them to be leaders. Methods: This research is an extension of a pilot study conducted in the Midwest. The current national phase used a stratified sampling technique to recruit 10-25 hospitals from each state. Hospital nurse leaders who are registered nurses completed the survey. The survey addressed five main themes: communication, self-awareness, leadership, conflict, and change. IBM SPSS Statistics 20 was used to analyze 397 surveys from across 50 states. Results: Based on the Friedman test for rank order data, respondents ranked communication (Mean rank=1.29) as the most important followed by self-awareness (2.85). Change (3.41) and conflict (3.41) were ranked similarly. Leadership was ranked last (4.04). These survey results verified previous pilot survey results supporting communication as the most important professional behavior needed by future nurses. Further analysis is being conducted to gain better understanding of essential professional behaviors. Future projects include publishing the results to enable nurse educators to better prepare students as nurse leaders.

**Nursing and Watershed Institute**

*Evidence-Based Research in Public Health*
Pang Houa Xiong Yang, Kaitlyn Conway, Madeline Hynek
Faculty Mentors/Collaborators: Cheryl Lapp, Crispin Pierce

Evaluating an Academic-Service Partnership on Evidence-based Practice in Public Health. Public Health professionals are required to continuously improve the quality of service provided to the community. In order to achieve health and economic benefits, professionals need access to evidence-based research findings. The goal of our project is to utilize student efforts to provide high quality, evidence-based research to promote public health changes and influence policies. Undergraduate students will learn the significance of integrating research evidence into practice. The collaborative process involves an initial meeting with public health staff, submission of evidence based research request to students, and follow-up discussion of evidence found. Ongoing evaluation throughout this process has been conducted through site visits and participant feedback through email surveys. This has shown qualitative benefits for both public health agencies and students. In the future we plan on implementing a quantitative evaluation process for both students and public health staff.
**Psychology**

*Gender and Audit Score Significantly Interact to Effect Fluid Pour in a Simulated Alcohol Free Pour Task*

**Whitney Hasenberg, Meredith Watson, Charles Bakalars**

Faculty Mentor/Collaborator: Douglas Matthews

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Research has demonstrated that if college students are asked to pour a standard drink they will often pour more than a standard drink in a simulated alcohol free pouring task, an outcome termed the Overpouring Effect. Previous work suggests that subjects may also pour less fluid if they also are asked to pour for an unfamiliar peer. However, it is unknown if the gender of the unknown peer, as well as previous alcohol use, impacts fluid amount poured in a simulated alcohol pouring task. To investigate this, we had male and female subjects pour a standard 12 ounce beer first for themselves and then for either the male or female researcher in three different containers of various sizes. In addition, subjects completed the AUDIT and Barlett Impulsivity Scale along with a two week follow back drinking report. As expected, AUDIT score, Barlett Impulsivity score, number of days drinking and the number of days engaging in binge drinking all positivity and significantly intercorrelated (p < 0.05). Because of the strength of the correlation between AUDIT and drinking history, we used AUDIT as a proxy to determine subjects’ alcohol use history and divided subjects into either a low AUDIT group (zone 1 of AUDIT) or a moderate AUDIT group (zone 2 or greater of AUDIT). AUDIT grouping significantly predicted the amount subjects poured for themselves, the experimenter, and the difference between the subject and experimenter (MANOVA, F = 4.49, df=2,63, P=.03). Interestingly, the gender of the subject interacted significantly with the AUDIT classification in relation to the amount of fluid subjects poured. Specifically, female subjects with low AUDIT scores poured less fluid while females with high AUDIT scores poured more fluid. Conversely, males with low AUDIT scores poured more fluid while males with high AUDIT scores poured less fluid (two way ANOVA, F=4.344, df=1,64, p=.041). These data strongly suggest that subjects’ previous alcohol use and the dynamics of the gender dyad significantly impact fluid poured in a free pouring task.

**Watershed Institute**

*Airborne Particulates Around Frac Sand Plants Using EPA-Certified Instruments*

**Ethan Fuhrman, Ella Keenan, Jacob Kentnich, Hannah Brown, Joshua Burns, Maryanne Cowart, Pang Houa Xiong Yang**

Faculty Mentor/Collaborator: Crispin Pierce

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Environmental exposure to airborne pollutants, notably fine particulates (PM2.5 and smaller) and crystalline silica (quartz) is of growing concern in western Wisconsin due to the expansion of industrial sand mining for hydraulic fracturing. Exposures to PM2.5 are associated with cardiovascular and lung disease while exposures to crystalline silica are associated with lung diseases such as silicosis, silico-tuberculosis, and lung cancer, as well as nonmalignant renal and autoimmune diseases. Under current regulatory structures in Wisconsin and many other states, direct air quality monitoring is rarely required (currently just 15% of facilities in WI). This research constitutes the third phase of direct-reading, filter-based, and now EPA-certified instrument use to measure fine particulates around industrial silica sand (frac sand) mines, processing, and loading facilities in Wisconsin. Consistent with results from the first two phases,

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PM2.5 particulate levels were higher than regional DNR background levels. The most recent data show average PM2.5 concentrations of 9 μg/m³ in Bloomer, Wisconsin and 17 μg/m³ in New Auburn, WI, compared to the EPA average annual standard for PM2.5 of 12 μg/m³.

**Airborne Particulates Around Frac Sand Plants Using Handheld Instruments**

Joshua Burns, Ethan Fuhrman, Peter Husnik
Faculty Mentor/Collaborator: Crispin Pierce

Environmental exposure to airborne pollutants, notably fine particulates (PM2.5) and crystalline silica (quartz) is of growing concern in western Wisconsin due to the expansion of industrial sand mining for hydraulic fracturing. Exposures to PM2.5 are associated with cardiovascular and lung disease while exposures to crystalline silica are associated with lung diseases such as silicosis, silico-tuberculosis, and lung cancer, as well as nonmalignant renal and autoimmune diseases. Under current regulatory structures in Wisconsin and many other states, direct air quality monitoring is rarely required (currently just 15% of facilities in WI). This research constitutes the continued use of laser-based, direct-reading instruments to measure fine particulates around industrial silica (frac) sand mining and processing facilities in Wisconsin. Consistent with results from other phases of this research, PM2.5 particulate levels were higher than regional DNR background levels. Data from these instruments are compared to EPA-certified filter-based air monitoring instruments as well as concurrent regional DNR PM2.5 concentrations.

**Effects of Wind and Precipitation on Airborne Particulate Levels Around a Frac Sand Mine**

Hannah Smith, Pang Houa Xiong Yang
Faculty Mentor/Collaborator: Crispin Pierce

There are currently 135 sites in the state of Wisconsin collectively mining 30 million tons of sand per year. We measure particulate matter that is of 10 and 2.5 microns of size (PM10 and PM2.5) at these sites because these microscopic particles can embed themselves deep in the lung tissue. Frac sand, also known as silica sand, is a known human carcinogen which can lead to lung cancer and silicosis. The goal of our research is to determine whether there is a correlation between PM10 and PM2.5 particles in the air and wind speed/direction and/or precipitation. We use direct reading and EPA-certified instruments to monitor the ambient air quality of communities that are susceptible to frac sand dust. Comparisons are made with the Department of Natural Resources (DNR) database on daily air quality to determine if the quality of air is of difference around frac sand facilities. Initial findings suggest that wind speed and direction are not, and precipitation is related to PM 2.5 levels.

**Radon Community Knowledge Assessment in Eau Claire County, WI**

Tristin Christopher, Breanna Rheinschmidt, Zoe Papalia-Beatty
Faculty Mentor/Collaborator: Laura Suppes

This research explores knowledge levels of Eau Claire County residents before and after a radon education campaign by the Eau Claire City-County Health Department (ECCHD). Radon is naturally occurring, odorless, radioactive gas that causes lung cancer and is found in 5-10% of the homes in Wisconsin above the US Environmental Protection Agency guideline of 4 pCi/L. No previous research has been conducted to adequately measure the community’s knowledge of radon levels in Eau Claire County. Pre- and post-surveys assessing radon awareness among Eau Claire County residents were administered January 2015 and May 2015. The pre-survey was
administered before a radon education campaign by the ECCHD. The same survey was administered after the campaign to assess the community’s knowledge level change. Education materials were posted on billboards, social media and newspapers, and announced on the radio. There were 452 total participants from both surveys. Data were analyzed by selecting different areas of interest to compare with a standard T-test. Results suggest homeowners are more likely to have more knowledge about radon than non-homeowners. From this research we can determine if the ECCHD education campaign was effective and identify trends in the community related to knowledge of radon.

**Humanities**

**Chemistry**

*Translation of Markovnikov's Magistr Khimii Dissertation: A Progress Report*

Alexander Davis, Eugene Walsh III  
Faculty Mentor/Collaborator: David Lewis  
Poster #1

During June, 2015, we were able to obtain digital copies of the Magistr Khimii and Doktor Khimii dissertations of Vladimir Vasil'evich Markovnikov. The translation of these documents into English consists of two distinct phases. First, the pre-Soviet Russian of the original document needed to be translated (transliterated) into modern Russian—after the Russian revolution, four letters were eliminated from the Cyrillic alphabet entirely, and the spelling of many words was simplified. For example, only one vowel for 'i' now appears in modern Russian, and there are two, not three representations of 'e'; the hard sign, which was widely used in early Russian at the end of words is now used rarely, and then only in the middle of words. Following the modernization of the Russian, the translation into English is now being carried out. Herein, we will report our progress in the translation of the Magistr Khimii dissertation.

**Continuing Education/Languages**

*Guidelines to Adapt Local Grocery Stores' TV Ads to Attract Native Spanish Speakers*

Robin Swanson  
Faculty Mentor/Collaborator: Carlos Garcia  
Poster #55

The main idea of this project is to develop guidelines to adapt local grocery stores' TV ads to focus on Spanish speakers. Hispanics make up a large consumer market in the United States, with the U.S. Hispanic population accounting for almost fifty-six percent of the total population growth in the 2010 census. Western Wisconsin is experiencing a fast growth in Spanish speakers, and the local groceries stores are still advertising their stores and product focus 100% on native English speakers. We started by analyzing current demographics in Western Wisconsin, watching local grocery stores' current TV ads, and researching about the Spanish-speaking population's consumer habits related to groceries through scholarly research articles. We concluded that in order for a business to make their advertisements more relatable and thus more profitable to the company, they must adapt their commercials to not only the Spanish language but also the Hispanic culture. We have organized these findings into guidelines that will help local grocery stores if they want to adapt their advertising focus on native Spanish speakers.

40 Undergraduate Poster Presentations
Creating a Community for Women of Color Students
Ariana Tellez
Faculty Mentor/Collaborator: Asha Sen

While working in the Office of Multicultural Affairs, the presenter began preliminary research on the campus climate for women students of color at UW-EC. She found that retention rates for this demographic between their frosh and sophomore years was just 70%. Students of color always feel more comfortable in classrooms where they see their own interests represented. With this in mind, with her faculty advisor, she is creating an introductory class on women of color feminisms, which will provide incoming students with a basic understanding of the rich and varied feminist traditions, writings, and activism specific to minority women within the US. She will share her research findings and present curricular and pedagogical results.

Following the Wrong Rules?: A Linguistic Study of Novice Academic Writing
Nathaniel Woznicki, Robin Jungwirth
Faculty Mentor/Collaborator: Lynsey Wolter

Using a linguistic corpus, a collection of texts or written speech, one can efficiently research a group of writers or speakers and discover generalizations within that group. News and academic styles of writing are well-studied in the field of corpus linguistics, unlike novice academic writing. We constructed a corpus using 1,395 rhetorical analysis papers from various levels of the Blugold Writing Seminar to explore novice academic writing and its relation to secondary education methods and professional writing. Tense usage, nominalization usage, and rate of passive voice in these papers were all more similar to studies of news writing as compared to academic writing, suggesting that students are writing in a register more representative of professional news writing. We surveyed educational websites and interviewed teachers, and found that these aspects also seem to mirror advice given to students in secondary education classrooms. Based on the lack of professional academic articles and higher usage of news and web articles, it is possible that students are basing their writing off examples they commonly see in and outside the classroom, that of news writing. This corpus will allow further dissection of writing methods in education, specifically skills of incoming UWEC students.

History
1848 Óbuda Census
Trace Osborn, Eric Hagstrom, Sarah Mcklveen, Emily Herkert
Faculty Mentor/Collaborator: James Oberly

The aim of this research is to analyze the 1848 census that was taken in Obuda, a northern suburb of Budapest. This project is important because this is the first time that this census has been totaled and analyzed. The census contains data on houses, the number of people living in each house, and the age, profession, and religion of those people. The census sheets were photographed in the Budapest City Archives building and then broken down in Excel with code to more easily ascertain the data contained by our Romanian coworker Hunor. The outcome of this research is the breakdown of this data for the first time since its collection in 1848.
Biased Justice: Ethnicity, Gender, and Justice in Progressive Era Milwaukee
Lauren Gilstrap
Faculty Mentor/Collaborator: Oscar Chamberlain
Poster #28

This project analyzes the relationships between the Irish, Italian, and German-Americans in Progressive Era Milwaukee in the context of the justice system. A closer examination of newspaper accounts, arrest records, trial transcripts, and the Wisconsin Governor’s pardon files reveal the local attitudes, alliances, and prejudices that existed in Progressive Era Milwaukee. A particularly dramatic case, the 1914 trial of the Italian immigrant, Carmello Musso, for the murder of her husband, is analyzed. Within the courtroom and by consequence of the press, tensions surfaced between German-American District Attorney, Edward Yockey, the Irish-American elected Sheriff of Milwaukee County, Lawrence McGreal, and the Italian immigrant community that fought to protect Carmello Musso. The Carmello Musso case exposes ethnic, religious, gender, class, and political conflicts which collectively resulted in a biased justice system in Milwaukee during the early twentieth century.

Budapest Castle District 1941, 1946, and 2016 Comparison
Trace Osborn, Eric Hagstrom, Emily Herkert, Sarah Mcklveen
Faculty Mentor/Collaborator: James Oberly
Poster #36

The goal of this research was to study the changes in buildings and streets in the Castle District of Budapest. 1941 was pre-World War II, 1946 was in the immediate aftermath of the Battle of Budapest, considered to be one of the most destructive city battles in all of World War II, and in 2016 when the researchers were in Budapest. This was done by sampling the 1941 census for houses, done again with 1946 by doing the same, and finding and photographing the 25 houses while on site in January 2016. What was found was that many of the houses were still in existence in much the same manner they were in 1941. One still had damage from either World War II or the 1956 Revolution. A few of the houses are no longer in existence. This comparison shows the development of the Castle District over the course of World War II, the Communist Era, and now the emergence of capitalism.

“A Church, a Bar, and a Brewery”: Prohibition and Ethno-Religious Identities in Berlin, Wisconsin, 1910-1933
Danielle Schroeder
Faculty Mentor/Collaborator: James Oberly
Poster #6

In the mid nineteenth-century, large numbers of German and Polish immigrants began to arrive in Wisconsin, and they brought with them customs of beer and liquor-drinking. In response to the turbulent changes the country was undergoing, middle-class, native-born, and Protestant Americans started a grass-roots movement against the alcohol intemperance of immigrants and the working-class. The culmination of their efforts was the ratification of the Eighteenth Amendment in 1919. This paper studies how the residents of Berlin—a small, central-northeastern Wisconsin city with a heavy German-Polish population—reacted to Prohibition. Religious, ethnic, and class identities play a significant role in Americans’ relationship with alcohol and drinking. Therefore, this paper analyzes the demographic make-up of Berlin, and points out ways that identity influenced Berlinites’ stances on federal and statewide Prohibition. With information gathered from census data, temperance organization records, newspapers, circuit court records, and election data, this study pieces together the story of Prohibition within a small Wisconsin community. The study ultimately confirms what other scholars have
concluded about Prohibition—that opinions on the issue were split along ethno-religious lines, and that, in small towns and rural areas, the “noble experiment” was relatively successful.

**Ecuador to Hungary: South American Immigration in the Early 20th Century**

Eric Hagstrom  
Faculty Mentor/Collaborator: James Oberly  
Poster #5

The purpose of this project is to analyze the nature of European migration to South America in the early 20th century, in particular by using an example of a young woman’s journey from Hungary to Ecuador. Often the United States is seen as the sole country in the western world where immigrants fled to in the early 20th century, however I wish to paint a more advanced picture. Through analyzing a series of letters written by a young woman in South America back to Ecuador, I hope to paint that picture sufficiently so people can understand the nature of her journey. These letters span over two decades and describe the circumstances of which she was placed in while attempting to find a better life in South America. Concluding, I hope to show that the millions of people that left Europe in the 20th century not all came to the United States. Lastly, I want the readers’ to understand the real stories of immigration in the 20th century. Although not glamorous, we must understand the truths of individual’s journeys and how today we are all connected as a result of these Trans-Atlantic crossings.

**Genocide and Reconciliation in Rwanda: The Experiences of Children**

Sarah Mckiveen  
Faculty Mentor/Collaborator: Louisa Rice  
Poster #27

Although many aspects of the 1994 Rwandan genocide have been studied extensively, one story has received less attention from historians: the plight of children who endured the cruelties of this time. Throughout this genocide, the children trapped under the ideological regimes lost their “protected” statuses given due to their innocence. In fact, children were targeted aggressively by the perpetrators, both through victimization as an “inferior” human being, and recruitment and manipulation to become a perpetrator. Through the employment of an historical perspective to compare the experiences of children and adults within Rwanda, this project argues that children were understood in a very specific way during the genocide. Understanding this allows us to comprehend children’s roles as both perpetrators and victims, as well as how they have coped with their experiences in post-genocide Rwanda. By exploring children's experiences--principally through survivor testimonies--this project seeks to show how the conditions for children during the genocide can inform the process of rebuilding and reconciliation within the state of Rwanda.

**One City at a Time: Joe McCarthy’s Impact on State and National Politics**

Samuel Heiden  
Faculty Mentor/Collaborator: Joseph Orser  
Poster #4

The goal of this project is to look at both the personal life and the early political career of Senator Joe McCarthy to show how a man that has been so villainized by his country had a lasting impact on his state’s political culture. Most of the current research in this field has been focused on McCarthy’s time in the Senate during the height of the anti-Communist movement. This ignores the valuable portion of McCarthy’s political career which was spent in Wisconsin, not just winning elections, but changing the way elections were won. To do this I examined newspapers, campaign speeches and personal correspondences regarding his 1946 run for the Senate with the Republican Party. Through the study of McCarthy’s elections and personal life, I
conclude that he solidified the Republican Party base while also defeating a historically strong
Progressive Party candidate in addition to changing the way elections are conducted in
Wisconsin. To this day I can still see the McCarthy style campaign in my state when the
candidates show up at my door asking for my support.

Languages

The True Cause of the Punic Wars
Jacob Terpstra
Faculty Mentor/Collaborator: Matthew Waters

The goal of this research was to study the politics that lead up to the three Punic Wars between
the ancient states of Rome and Carthage in the third and second centuries BCE. This study is
best facilitated by the examination of the treaties between Rome and Carthage, especially the
treaty in the History of Philinus of Agrigentum. Philinus was a Greek historian from a southern
Sicilian town of Agrigentum and he lived during the first two Punic Wars. His account includes
a treaty that places the blame for this series of wars squarely on the Romans. The validity of
Philinus’ treaty has been an object of intense debate in modern and ancient scholarship: the
treaty states that Rome was sovereign in Italy and Carthage in Sicily and that Rome violated the
treaty by their invasion of Sicily under the pretense of aiding a Sicilian city. The analysis of the
Treaty of Philinus has far reaching consequences for understanding that critical period of history,
with regard to Rome’s own self-image as an imperial power and how Rome is viewed today;
accepting the Treaty of Philinus as valid puts their actions in the following wars in a different
light.

Wisconsin Walloon
Madeline Tautges, Bobbi Freagon
Faculty Mentor/Collaborator: Kelly Biers

The purpose of this study was to continue a long term project aimed at the documentation,
analysis, and ultimately preservation of Wisconsin Walloon. Wisconsin Walloon was originally
spoken by Belgian immigrants in the Green Bay area of Wisconsin, but is rapidly losing native
speakers and is considered a minority language. Minority language preservation is an important
part of preserving the culture and heritage of a group of people. Little has been done to prevent
the loss of Wisconsin Walloon culture and language. The current phase of this project includes
conducting interviews with previously established contacts, analyzing the data gathered from the
interviews, gathering ethnographic data on the speaking and nonspeaking Wisconsin Walloon
communities, working with local school districts to create lesson plans and activities to educate
younger generations about Wisconsin Walloon, and working with the community to preserve
their culture and language. The outcome of this phase of the project will be strengthened ties
within the Wisconsin Walloon community, recorded linguistic data about the Wisconsin Walloon
language, a working partnership with the Belgian Historical Society in Brussels, Wisconsin, and
the implementation of lesson plans and activities in the Door Peninsula School District. We will
continue to use this information to establish new ways to serve the community.
The goal of Celebrating our Centennial is to engage the UW-Eau Claire community with 100 years of our history. In preparation, archival collections from McIntyre Library and published texts such as Carter and Jenswold’s *UWEC: A History, 1916-1976* were consulted. Comprised of ten large pull-up banners which makes it highly mobile and modular, this exhibit harnesses a recent trend in public history that embraces mobile design. This structure allows for easy display in locations across campus. The Centennial Exhibit features five panels which explore the establishment of the school to the present, and four feature panels with distinct themes that break up the chronological history panels. This makes the exhibit engaging and informative. Research began in the summer of 2015 supported in part by a grant through ORSP’s Summer Research Experiences for Undergraduates program. Images carefully selected and curated, text and captions written and edited, and consultations with campus marketing professionals and historians all influenced the current draft. The final product will be a mobile display illuminating the major events in campus history and the evolution of the student experience. The final project will be presented in May 2016 and viewed across campus next year.

### Philosophy and Religious Studies

**Music in Irish Church Liturgy from the Medieval to Modern Era**

Lauren Gilstrap  
Faculty Mentors/Collaborators: Charlene Burns, Steven Fink

This research analyzes how music in Irish liturgy changed over time, typically in response to shifts in musical trends dictated by religious identity, developing theology, and political regulations. Early in Irish church history, plainchant and hymnals almost exclusively dominated religious musical expression, and later the use of organs and choirs became commonplace in church settings throughout Ireland. Much of the early music in Catholic and Protestant churches depended on the sect of Christianity, the location of the church, and political regulations. As these characteristics changed, so did the type of music that was performed. As I read through the existing literature on this topic, I realized that there was little written about it. In order to fill this gap, I examined the history of multiple churches/monasteries in Ireland, including Christ Church, St. Patrick’s Cathedral, and Glenstal Abbey. This research method allowed me to compare music both Catholic and Protestant churches/monasteries, and study the ways in which shifts in musical trends were dictated by religious identity, developing theology, and political regulations throughout history. This differs from the existing literature because much of it only addresses a single church or monastery, or the history of Irish liturgical music in a single era.
Math and Computer Science

Computer Science

Database Query Analyzer
Nicholas Pierce
Faculty Mentor/Collaborator: Ryan Hardt
Poster #133

Our project, Database Query Analyzer (“DBQA”), aims to answer the following research question: “Does a data-oriented visualization tool that illustrates SQL query clause execution help students understand how to construct and/or debug database queries?” While SQL has a relatively simple syntax with a small set of commands, it allows for complex query construction that is deceptively challenging. SQL is often the first declarative programming language learned by students, which requires a different analysis approach than that used to understand procedural or object-oriented programming paradigms. While some tools exist to help assess or correct SQL queries, we are unaware of any tools that take the visualized, data-oriented SQL clause evaluation approach used by DBQA. In its current iteration, DBQA handles single table select queries. We are currently adding support for set operations, nested queries, and joins. After these types of queries are supported, we plan to perform an empirical evaluation to assess DBQA’s ability to help students construct and debug SQL queries.

Madeup: The Language of Things
Timothy Roth, Alex Tandberg
Faculty Mentor/Collaborator: Christopher Johnson
Poster #134

Computer Science is something that many people view as intimidating, confusing, and possibly even otherworldly. The way text on a screen seems to be able to interact with a complex machine tends to push many individuals away from the field. Madeup seeks to act as a bridge to connect those who are interested in Computer Science, but are intimidated by what seems to be a steep learning curve. It does this by integrating core programming concepts into a real-time three-dimensional modeling system, allowing the user to see in 3D space what they are creating with code. All this is accomplished while using basic and logical syntax, with the goal of being as user-friendly as possible. In order for Madeup to reach this goal, we have spent the last year debugging, suggesting features, and working in collaboration with its creator, Dr. Chris Johnson, to get Madeup to the status of a highly polished product.

SPOCK - A System for Encouraging Interaction in Small Private Online Courses
Grant Wuerker
Faculty Mentor/Collaborator: Ryan Hardt
Poster #152

Online courses are growing in popularity in the forms of Massive Open Online Courses (MOOCs), Small Private Online Courses (SPOCs), and flipped classrooms. Some MOOC interfaces provided by websites like Coursera, edX, Khan Academy and Udacity allow students to comment on lectures, but they do so using a different component than that used for consuming lecture content. Their comment systems are effectively message boards linked to by lecture pages. This component separation has been shown to create a cognitive overhead for students. Additionally, comments made in these systems typically apply to the lecture as a whole rather than to more finely-grained lecture content. Some SPOC interfaces allow fine-grained, timeline-based comments, but suffer from a “seeding” issue in which students who view the lecture early
lack incentive to participate. Our system, the “Small Private Online Course Keeper” (SPOCK), is an online lecture environment for SPOCs. SPOCK is distinguished by (1) its tight integration between timeline-based lecture content and anonymous student questions, answers, and comments, (2) its use of gamification to encourage student interaction and address the seeding issue, (3) and by its loose coupling with lecture videos, which may be referenced from other websites like YouTube.

**Mathematics**

*Actuarial Fairness of Social Security Benefits*

**Jeremy Nielsen**  
Faculty Mentor/Collaborator: *Harriet Yang*  
Poster #147

In our work, we examined the actuarial fairness of different claiming periods. We re-evaluated the Money’s Worth ratio using the GM law and CIR model, and found that the ratio was greater than one for all delayed claim ages. This indicates that social security retirement benefits in the United States are currently actuarially fair for retirees’. To address the problem of popular present bias phenomenon, we have developed a lump sum and bonus system, which are actuarially equivalent to the current social security distribution system in the United States. The lump sum or bonus system could motivate a delay in claiming social security benefits. This would result in an overall higher net present value of benefits for retirees.

*Algebras Associated with the Hasse Graphs of Polytopes*

**Austin Holmes, Austin Riedl, Mitchell Lemons**  
Faculty Mentor/Collaborator: *Colleen Duffy*  
Poster #210

The primary goal of our project is to determine the structures of the graded algebras that are associated to the Hasse graphs of polytopes. In particular, we are studying the n-dimensional semi-hypercube and the icosahedron, whose symmetry groups are finite Coxeter groups. Our current investigation serves as a natural extension of work done previously on the n-hypercube and n-simplex. For each symmetry of a polytope, we consider the Hasse subgraph consisting of fixed k-faces of the polytope under the action of the symmetry. From each Hasse subgraph we determine the graded dimension of the subalgebra by counting the directed paths between each pair of levels in the graph. For both the n-semi-hypercube and icosahedron we have determined the generating functions which give us the graded dimensions of the subalgebras, which in turn allow us to describe the algebras.

*Analysis of Combining Musical Scale Vectors*

**Emily Gullerud**  
Faculty Mentor/Collaborator: *James Walker*  
Poster #198

This interdisciplinary project uses mathematics to represent musically significant collections of notes (MSCN’s), such as musical scales, chords, intervals, as combinations of other types of MSCN’s. These MSCN's were converted into one-dimensional vectors so that matrices could be used to solve systems of linear equations which create the combinations, a method used in one of Sethares’ papers (“An algebra for periodic rhythms and scales.” Journal of Mathematics and Music, 5(3), 2011, pp. 149-169). The majority of the mathematics used has been coded into MatLab so that ample results can be easily computed. In particular, results have been produced showing the ways in which the octatonic scale is a combination of various MSCN's and combinations of the diatonic scale and the interval of a major third can independently be used to
create other MSCN's. This is an ongoing project, with future work focusing on applying the results to actual musical literature with the help of Gary Don (Professor of Music Theory at UWEC), and creating combinations using more than one MSCN at a time.

**Analysis of Stability Regions of Numeric Methods Using the Time Scale Calculus**  
**Erin Ferrell, Adam Gordon**  
**Faculty Mentor/Collaborator: Chris Ahrendt**  
**Poster #178**

Working with the time scale calculus, a technique created to unify difference equations and differential equations, we establish a connection between the stability region in the complex plane for a given approximation method, and the region in the complex plane where the generalized exponential function converges to 0. We make this connection for explicit and implicit Euler methods, as well for multiple Runge-Kutta methods. Doing this, we find a very natural relationship between the exponential function corresponding to implicit Euler and the exponential function corresponding to explicit Euler. We then investigate this relationship for explicit and implicit Runge-Kutta methods. We conclude with analyzing these regions when the time scale is varied.

**Arithmetic Mirror Symmetry from Reflexive Polytopes**  
**Christopher Magyar**  
**Faculty Mentor/Collaborator: Ursula Whitcher**  
**Poster #138**

Mirror Symmetry is a mathematical phenomenon that arises from the study of string theory in theoretical physics. In string theory, extremely small multi-complex dimensional objects known as Calabi-Yau manifolds are predicted to be joined to every point in our known space-time model. These Calabi-Yau manifolds give rise to specific physical rules (or laws) in the particular space they are joined to; it actually turns out that one of two mirror manifolds can give rise to the same physical rules. In this research, we use concepts from algebraic geometry, number theory, and combinatorics to examine mirror symmetry in smaller dimensional cases through the study of reflexive polytopes. Dual varieties defined explicitly from pairs of polar dual reflexive polytopes in two and three dimensions exhibit some of the same phenomenon observed in string theory. Previously, we have counted points of dual hypersurfaces within these varieties over finite fields to demonstrate an arithmetic mirror symmetric relationship holds for three pairs of elliptic curve families. Most recently we have discovered five new examples of dual reflexive polytopes in three dimensions that exhibit this strong arithmetic mirror symmetry!

**Dissonance Analysis in Piano Works of Debussy**  
**Emily Gullerud, Claire Arneson, Andrea Ranzau**  
**Faculty Mentor/Collaborator: James Walker**  
**Poster #211**

This interdisciplinary project applied mathematics and music theory to analyze several Debussy piano pieces. The students used spectrogram-based acoustical dissonance analysis to the chordal changes shown in the musical scores for the pieces. They compared the dissonance levels in the pieces when they are played in just tuning versus playing in equal-tempered tuning. Their results provided independent, quantitative confirmation of the musical-theoretic dissonance analysis obtained by Gary Don (Professor of Music Theory at UWEC) in one of his papers (“Brilliant Colors Provocatively Mixed: Overtone Structures in the Music of Debussy,” Music Theory Spectrum, 23(1), 2001, pp. 61–73).
**Embedding Properties in Central Products**
Dylan Magnani  
Faculty Mentor/Collaborator: Dandrielle Lewis  
Poster #225

In group theory, the characterization of subgroups is important. My goal was to further characterize the subgroups of central products, which arise from the use of an amalgamated center in a direct product of groups. Edouard Goursat first determined how to identify and describe the subgroups of a direct product, which is very useful in the characterization of the subgroups of central products. My goal over the summer and last semester was to gain a better understanding of the group theoretical embedding properties of normal, subnormal, and abnormal subgroups in central products of finite groups in order to develop a conjecture to provide a characterization of pronormal subgroups in central products.

**An Equivalence Between the Polytabloid Bases and Specht Polynomials for Irreducible Representations of the Symmetric Group**
Michael Vaughan  
Faculty Mentor/Collaborator: R. Michael Howe  
External Student Collaborator: Hengzhou Liu  
Poster #207

Let $n$ be a positive integer and let $\lambda$ be a semi-standard Young tableau whose shape is a partition of $n$. In this poster we demonstrate a map $\phi$ from the vector space of polytabloids obtained from $\lambda$ to the vector space of polynomials in $n$ variables that intertwines the action of the symmetric group $S_n$. We also obtain an equivalence between the bases elements for the irreducible representations of $S_n$ in the polytabloid space and the Specht polynomials as described in Specht, W. (1935), “Die irreduziblen Darstellungen der symmetrischen Gruppe”, Mathematische Zeitschrift 39 (1): 696711.

**Knot and Link Tricolorability**
Danielle Brushaber, McKenzie Hennen, Molly Petersen  
Faculty Mentor/Collaborator: Carolyn Otto  
Poster #208

Our team has been researching the colorability of knots, an invariant used in classification. We focused on the n-Whitehead double and Pure double of knots that have been observed in circular DNA. Representing the knot as a matrix allows us to determine its colorability, and we are interested in knots that are tricolorable. We have found a pattern in the colorabilities of Whitehead doubles of certain knots when twists are added within the link. We have developed conjectures about these, and have proven tricolorability for the Whitehead double of knot 5\_1. We are investigating the relationships of different doubling operators and tricolorability.

**Lattice Point Visibility on Generalized Lines of Sights**
Sara DeBrabander, Michelle Gebert  
Faculty Mentor/Collaborator: aBa Mbirika  
Poster #148

Integer lattice point visibility has been studied since 1971 on straight lines through the origin with rational slopes. Harris, Kubik, and Mbirika generalize this notion of lines of sights to include all curves through the origin given by functions of the form $f(x) = \frac{a}{b} x^n$ for $\frac{a}{b} \in \mathbb{Q}$ and $n \in \mathbb{Z}^+$. Many questions remain open in this new setting of generalized lines of sights. In the classic setting where $n = 1$ a lattice point is visible if there exists no other lattice point between the origin and the point. The visible points are the points $(x, y)$ where $gcd(x, y) = 1$. We
explore the process of identifying the first visible lattice point on a given curve \( f(x) = \frac{a}{b} x^n \) in this new generalized setting. Also we explore the form of any given lattice point on \( f \) in this setting. This allows us to find the number of lattice points on \( f \) between the origin and a given lattice point \((x, y)\). We compare these findings to the classic setting.

**A Lifetime Price Tag on Smoking**

Sara Halfrich  
Faculty Mentor/Collaborator: Herschel Day  
Poster #197

The goal of this project was to develop an expected lifetime cost for smoking cigarettes. By creating a model and putting a lifetime dollar value on the cost of cigarettes, I hope to emphasize the major economic consequences of this decision to young people. To make this model, the state-by-state cigarette ingredient and tax costs of the past 15 years were researched, and future costs were projected using different trends. To find the truest estimate for the total cost, this model contemplates both the time value of money and mortality to find the expected dollar amount that a young smoker will spend throughout their life on cigarettes. After completing this model, it was clear that becoming a life-long smoker will have an extreme financial impact. I recommend all young people think seriously about the decision to begin smoking, for reasons beyond just physical well-being.

**Longevity Risk in Solvency II: A Study on Pricing Longevity Bonds**

Alexander Brown  
Faculty Mentor/Collaborator: Marie-Claire Koissi-Kouassi  
Poster #137

The regulations of the financial market have dramatically raised the costs of financing traditional funded pension’s schemes. Additionally, life expectancy worldwide has improved, leading to what is referred to as longevity risk. Longevity Risk has occasioned reform on the pension systems, one of which requires insures to reserve a certain amount of money to cover for their risks. This is the basic Solvency Capital Requirement. Insurers can comply with the solvency requirement by transferring longevity risk to the financial market via the so-called longevity-linked securities, which unfortunately are somehow difficult to price for several reasons. Among other reasons, the pricing of these longevity derivatives is linked to reliable stochastic modeling of mortality rate and population life expectancy. Additionally, these products must be priced in such a way that they are financially attractive to both individuals and companies (consistent premium and shared risk). In this research, we start by modeling and forecasting mortality rate in the US population, using two stochastic models. We compare the efficiency of these models. Then, we use them as a basis for computing the amount of capital that an insurer should hold to cover their longevity risk according to the Solvency II.

**Modelling Body Mass Index Distribution Using Flexible Skewed Density Functions: An Application to UWEC Health Data**

Thao Tran, Cara Wiskow, Kaolee Yang  
Faculty Mentor/Collaborator: Mohammad Aziz  
Poster #194

The purpose of this project is to find distributions which best model body mass index (BMI) data. BMI has become a standard health indicator and numerous studies have been done to examine the distribution of BMI. Due to the skew and bimodal nature of BMI data, we focused on modeling with flexible skew distributions. We applied the models to UWEC BMI data and to empirical data as well. We used maximum likelihood estimation technique to obtain the models’ parameters. Then we compared flexible models to more conventional distributions, such as
skew-normal, and skew-t distributions using AIC and BIC. Our results indicate that the skew-t and alpha-skew Laplace distributions are able to describe distribution of BMI accurately. We believe the models discussed here will offer a framework for testing features such as – bimodality, asymmetry, and robustness— of the BMI data, thus providing a more detailed and accurate understanding of the distribution of BMI.

**The Moduli Space of 1|3 Dimensional Complex Associative Algebras**  
*Austin Riedl, Lucas Buchanan, Dylan Magnani, Christopher Magyar*  
Faculty Mentor/Collaborator: *Michael Penkava*  
Poster #195

We study all associative algebra structures on a 1|3-dimensional complex vector space, which is a Z/2Z-graded vector space with 1 even and 3 odd dimensions. Such spaces arise both in mathematics and physics. To construct this space, we need to know all Z/2Z-graded simple algebras of lower dimension and all nilpotent algebras of dimension 1|2, 0|3 and 0|2, which have been previously determined. Next, we have to understand how these algebras deform, which means that we change the rules of multiplication slightly and see what new algebra arises. We used software we designed for the Maple computer algebra system as our primary tool for the calculations, which are quite complicated to perform. The deformations determine how the space is glued together.

**Pattern Avoidance in Task-Precedence Posets**  
*Lucy Pepin, Mitchell Paukner, Jarred Wieser*  
Faculty Mentor/Collaborator: *Manda Riehl*  
Poster #168

Classical pattern avoidance was first studied on permutations. We have researched an extension to a new structure: multiple task-precedence posets with three levels, which we will call diamonds. The vertices of each diamond are assigned labels which are compatible with the poset. A corresponding permutation is formed by reading these labels by increasing levels, and then from left to right. We used Sage to form enumerative conjectures for the associated permutations avoiding collections of patterns of length three, which we then proved. We have discovered several interesting bijections between: diamonds avoiding 132 and certain generalized Dyck paths, diamonds avoiding 132 and 213, and diamonds avoiding 231 and 312. We have also found the generating function for descents in these permutations for the majority of collections of patterns of length three. Furthermore, an interesting application of this work can be found when task-precedence posets represent warehouse package fulfillment by robots, in which case avoidance of both 231 and 321 ensures we never stack two heavier packages on top of a lighter package.

**A Statistical Comparison of Methods of Association Mapping with Three-Way Admixture**  
*Jessica Ecker*  
Faculty Mentor/Collaborator: *Abra Brisbin*  
Poster #167

Identifying effective treatments for medical conditions can be difficult, because different people respond in different ways to treatments. However, this can be made easier by using genetic association mapping to identify statistical associations between particular genes and traits or illnesses. Incorporating ancestry into association testing has the potential to improve the ability to detect associations. There is research available regarding association mapping in individuals with ancestry from two populations, such as many African Americans. However, there is not much existing research on populations with ancestry from three populations, such as many
Latinos. In this project, I compared 17 methods across five models of simulated data in which genes and ancestry affect a trait in different combinations. In my comparisons, I use a proportion test to explore which methods are significantly different and more powerful. Through this, I find that the methods that are more powerful vary across the five models of simulated data. I will also present results of a literature review about association mapping of blood pressure.

When Do Links Admit Homeomorphic C-complexes?
Grant Roth
Faculty Mentor/Collaborator: Christopher Davis

A link is an array of circles tangled up in three dimensional space which never cross each other. A knot is a link consisting of a single circle. It is easy to see that any two knots bound identical surfaces which may sit in three dimensional space in different ways. The purpose of this project is to ask the same question of links with many components. The most natural generalization of a surface to this setting is a C-complex which can be thought of as a collection of surfaces that intersect in clasps. Surprisingly, we find that not all links bound homeomorphic C-complexes. We give a complete classification of when two links do bound equivalent C-complexes.

Psychology

Navigating a Virtual Environment Within the Oculus Rift
Nathan Fellom, Nicholas Dopkins, Justin Iverson, Erin Hanson
Faculty Mentor/Collaborator: Jarrod Hines

Although it is generally understood that humans orient themselves spatially within an environment, the precise manner and timescale by which this is accomplished is not entirely understood. In rats, this has been studied using the Morris Water Maze task, which involves training a rat to orient itself in a three-dimensional space using environmental cues (i.e., landmarks) to navigate to a hidden platform after being dropped into a body of water. This approach is not suitable for human research participants, so prior research has used computerized alternatives. These programs provide a non-immersive experience, where participants navigate based on the limited scope of view offered by a typical computer monitor. This study will use the Oculus Rift DK2 and the Unity 5 Personal Edition game engine to design a more realistic environment with full head tracking. This facilitates an immersive virtual reality experience while also recording which environmental cues participants attend to during orientation and navigation. This will paint a more complete picture of not only where participants travel in the environment, but also how they determine where to travel.

Natural and Physical Sciences

Biology
Affects of Crayfish Presence and Substrate Size on Benthic Populations in Little Niagara Creek
Danielle Mares, Troy Wesley, Fatou Kebbeh, Vang Pao Lee
Faculty Mentor/Collaborator: Todd Wellnitz

A current concern for many freshwater bodies is the rising number of invasive Rusty Crayfish, a very aggressive species that can potentially harm the freshwater ecosystems it inhabits. In our
study we aimed to assess whether there is an inverse relationship between crayfish numbers and the abundance of streambed (benthic) organisms in Little Niagara Creek, specifically in relation to substrate size. We predicted that the greater interstitial spacing among large-sized substrate would give crayfish better access to prey, and therefore reduce benthic counts. An experiment was conducted by placing replicated cage groupings in Little Niagara Creek. Each grouping had 6 treatments: 4 cages having each combination of substrate (large/small) and crayfish (present/absent), and 2 tray controls having either large or small substrate. After three weeks, cages were removed and the accumulated detritus with benthic organisms were separated from substrates and preserved in 70% ethyl alcohol. A 200 ml subsample was taken from each sample and organisms were removed, identified, and counted, then dried and weighed. Detritus was also dried and weighed. A two-way Analysis of Variance will be used to test crayfish and substrate effects, and regression analysis will examine correlations between detritus biomass and benthic organism abundances.

**Age Specific Behavioral Variability of Creek Chub Minnows after Exposure to Various Chemicals**

Michael Wold, Mackenzie Flynn, Taren Leitzke, Leah Radeke, Andrew Fisher  
Faculty Mentor/Collaborator: David Lonzarich  
Poster #153

Fish of the superorder Ostariophysi contain alarm substances that elicit fear responses in neighboring conspecifics. Research over the past decade has revealed a strong ontogenetic component to the nature of this response and revealed at least two candidate odorants for the alarm behavior. This project examined the change in response between young and old Creek Chub exposed to skin extract, hypoxanthine 3-N-oxide, and chondroitin. To quantify movement tanks were marked with gridlines; movements were recorded before and after treatments in order to establish baseline activity. The behavioral response of older fish was less pronounced than the response of young fish to skin extract, and only limited evidence of a response to hypoxanthine 3-N-oxide and chondroitin was observed. Future projects detecting activity in the olfactory bulb will indicate which neural pathways are employed during the response in young and old fish to skin extract, hypoxanthine 3-N-oxide, and chondroitin.

**Assessing Restoration along the Escalante River: Does Removal of an Invasive Tree Benefit the Arthropod Community?**

Casey Aumann, Allison Ban-Herr, Jacob Henden  
Faculty Mentor/Collaborator: Todd Wellnitz  
Poster #132

Invasive Russian olives trees (Elaeagnus angustifolia) have altered river ecosystems throughout the American southwest. An on-going restoration project in Utah’s Grand Staircase Escalante National Monument has been removing E. angustifolia from the Escalante River corridor to benefit native trees and other components of the ecosystem. However, the effects of E. angustifolia removal on streamside invertebrates had not been examined. To study this, in March 2015 we set out 72 pitfall traps across 3 sites along the Escalante River to quantify the response of ground-dwelling arthropods to restoration efforts. Two of the sites had undergone E. angustifolia removal in 2010 and 2014, and a third, slated for removal in 2015, served as a control. Pitfall traps were collected after one week and percent ground cover and vegetation data were recorded. Our results showed that arthropod abundance increased within a year of E. angustifolia removal and richness increased after 5 years. As compared to the 2015 control, the 2010 removal site showed the greatest arthropod abundance (P < 0.001) and richness (P = 0.002), while the 2014 removal site had intermediate values for these parameters. Our data
support the hypothesis that Russian olive removal may benefit other components of the Escalante ecosystem.

**Assessment of USDA Conservation Reserve Program State Acres for Wildlife Enhancement (CRP SAFE) in Wisconsin**

Alexandra Johnson  
Faculty Mentor/Collaborator: Paula Kleintjes Neff  
Poster #213

State Acres for Wildlife Enhancement (SAFE) is one of many Conservation Reserve Programs (CRP) administered by the USDA Farm Services Agency (FSA). SAFE emphasizes conservation practices that will improve and manage high-priority wildlife habitat. Landowners enrolled in 10-15 year SAFE contracts receive cost-share benefits and monetary incentives. While there have been several studies analyzing the benefits of Farm Bill conservation programs, our objective is to evaluate the status and effectiveness of SAFE in Wisconsin. We are partnering with the USDA, WI Department of Natural Resources and others to determine the number of contracts, acres (ac.) enrolled, habitat types and monitoring programs for each SAFE area. Currently, there are >1 million ac. enrolled in SAFE nationwide, up to 13,750 ac. in five Wisconsin SAFES across 17 counties. The Shortgrass SAFE (2000 ac.) contains planted wild blue lupine and nectar plants for the federally endangered Karner Blue butterfly. The Southwest Grassland (4,000 ac.), Central Grassland (3,000 ac.) and Glacial (2,250 ac.) SAFES all have grassland birds target species (e.g., Bobolinks, eastern meadowlarks, ring-necked pheasants) and planted native seed mixes to restore habitat. The Western Prairie SAFE (2,500 ac.) provides habitat for grassland birds and waterfowl. Through our findings, we hope to demonstrate and craft a success story that will increase future funding for SAFE.

**Biological Studies with the Charles Darwin Research Station: Fish Maturation Rates for Fisheries Management, Native Plant Restoration, Plankton Ecology for Future MPAs, and Megafauna Community Assessment**

Morgan Freeburg, Casey Aumann, Jesse Hagen  
Faculty Mentors/Collaborators: Wilson Taylor, Deborah Freund  
Poster #191

Various projects were conducted by students regarding marine ecology and native terrestrial plant restoration as part of an internship program with the Charles Darwin Research Station (CDRS) in Galapagos, Ecuador.Projects surrounding the Biomar Laboratory of the CDRS, included the analysis of fertility and maturation rates for Pontinus clemensi, a comparison of phyto- and zoo-plankton populations of seamount versus pelagic systems, and a megafauna community assessment between marine protected and non-protected areas. Nursery maintenance and outplanting of native plants in the islands was a part of the ongoing project Galapagos Verde 2050 hosted by CDRS and the Galapagos National Park. Combined field and lab methods were used in each study. The information obtained from each of these studies can be used to improve the management of marine ecosystems and the restoration of the terrestrial environment in the Galapagos Islands. The concerted effort by the interns and scientists of the CDRS will provide information for more effective fishing laws on P. clemensi, provide a detailed comparison between seamount and pelagic habitat to help further seamount habitat protection, a record of the effectiveness of marine protected areas on mangrove habitats, and the islands with improved techniques for native plant restoration.

54 Undergraduate Poster Presentations
Characterization of Morphogenesis in a SKN7/MBP1 Double Null Mutant Strain of *Candida albicans*

Lydia Shields  
Faculty Mentor/Collaborator: Daniel Herman

*Candida albicans* is a fungal pathogen that can cause opportunistic infections as well as systemic infections in immune-compromised patients. It has been well established that morphogenesis, the transition from yeast to filamentous growth forms, is essential for *C. albicans* to cause systemic infections. Previous work in our lab has shown that the Mbp1 protein is required for morphogenesis under nitrogen-limiting conditions on solid media. In addition, it has been reported that strains of *C. albicans* that lack the Skn7 protein exhibit reduced morphogenesis in response to serum and the lack of a fermentable carbon source. In this study, morphogenesis was assessed in a double null mutant strain of *C. albicans* that lacks both the Mbp1 and Skn7 proteins. The results of this analysis indicate that compared to the wild type strains, SC5314 and CAI4, there was a significant reduction of morphogenesis in response to limiting nitrogen and a non-fermentable carbon source in the MBP1/SKN7 double-null mutant strains. In addition, morphogenesis in response to fetal bovine serum was highly variable in the double-null mutant strains. These results indicate that the Mbp1 and Skn7 proteins are not likely to function in the same signal transduction pathway regulating morphogenesis.

Characterization of *Staphylococcus equorum* and *Staphylococcus succinus* Nasal Swab Isolates  

Savannah Herman, Larissa Furger, Evan Moore  
Faculty Mentor/Collaborator: Daniel Herman

*Staphylococcus equorum* and *Staphylococcus succinus* are bacterial species commonly associated with animals and certain food products. Rarely are incidents of human infection due to these species reported and there are no reports of these species being a component of normal human flora. During the summer of 2010, nasal swabs were taken from 183 staff and patients at a hospital in Loja, Ecuador to determine MRSA (methicillin-resistant *Staphylococcus aureus*) prevalence. MALDI-TOF analysis of isolates from five individuals revealed the presence of either S. succinus or S. equorum. Confirmation of the MALDI-TOF identification for these isolates was performed by analyzing XapI restriction fragment length polymorphisms of the dnaJ gene. The growth of the isolates were characterized to determine pH range and halotolerance. In addition, MICs were performed on each isolate and sugar fermentation patterns were determined for each isolate. The isolates were found to be halotolerant up to 15% (w/v) NaCl and grew within a pH range of 7-10. Antibiotic susceptibility patterns varied by isolate, however all isolates showed resistance to multiple antibiotics. It cannot be concluded from this study whether these isolates are normal flora or are transient. In either case, the possibility for the transfer of antibiotic resistance genes exists.

Creation and Characterization of LRB (Light-Response BTB) /PIF (Phytochrome-Interacting Factor) Mutant Lines in Arabidopsis thaliana  

Zachary Jacobson, Quinn Steiner, Andrew Gearhardt, Allison Welter  
Faculty Mentor/Collaborator: Derek Gingerich

Light-Response BTB 1 and 2 (LRB1 and LRB2) are negative regulators of phytochrome (phy) action in the red light signaling pathway in the plant *Arabidopsis thaliana*. These genes encode proteins that act as target adapters in BTB/Cullin3 E3 ubiquitin-ligase complexes that target the red light receptor phytochromes for degradation. Plants with disruptions of the LRB genes...
exhibit hypersensitivity to red light because the phytochromes are not properly degraded. Phytochrome-Interacting Factor (PIF) genes encode transcriptional regulators that act as negative regulators in the red response pathway. To better understand how these key components of the phytochrome pathway interact and how they work collectively to regulate light responses we are taking a genetic approach, creating Arabidopsis lines with mutations in both LRB and PIF genes. Work this past academic year has focused on finding lrb1 lrb2 pif3, lrb1 lrb2 pif7, and lrb1 lrb2 pif3 pif7 triple and quadruple mutants in populations of individuals generated from parents that had been previously identified as having mutations in LRB or PIF genes. We are also confirming generation of lrb2 pif7 double mutants. Studying the light responses of these mutants may give us clues as to how the genes and their products interact.

**Determining the Age of the Parasitic Invasive Fly*Philornis downsi* Using the Pigment Pterin**

Alyssa Colwitz

Faculty Mentor/Collaborator: Deborah Freund

*Philornis downsi*, an invasive fly in the Galapagos Islands, negatively impacts land bird species. Fly eggs in bird nests hatch into parasitic larvae that feed on the blood and flesh of chicks, decreasing fledgling success. Little is known about the reproductive biology of *Philornis*; learning how they survive eight months of the “dry” season, when known hosts are not breeding, may help determine a control method. If they use other hosts, we will find wild flies younger than eight months old at the beginning of the “rainy” season. The pigment pterin, found in the eyes of *Philornis*, accumulates with age. Lab raised flies of known age were used to establish an average rate of accumulation, serving as a way to age flies, but it was not clear if this same rate applied to wild flies exposed to natural sunlight. Pupae collected from nests were kept in the lab until emergence. Half were raised in outside cages and half in the lab. Flies were decapitated at known ages and pterin was measured. There were no significant differences between pterin levels in outside and lab groups at the same ages, confirming the validity of using our ageing methods for field-caught flies.

**Distribution of Earthworms and Ground-Dwelling Invertebrates on the Upper and Lower Terraces of Putnam Park**

Terrance Shaurette, Jenna Barlow, Cory Dick, Brian Johnson, Wil Raasch, Nathan Sylte

Faculty Mentor/Collaborator: Todd Wellnitz

Invasive earthworms have been identified as important agents of change for modifying forest soils and microbial communities. To assess potential impacts of earthworms in Putnam Park, we designed a study to document the distribution of earthworms and ground-dwelling invertebrates on the park’s upper and the lower terraces. A total of 32 earthworm samples and 48 pitfall traps were randomly distributed across two, 50 square meter quadrats situated on each terrace. Pitfalls were sampled every week for three weeks and earthworms were sampled the first and last week of the study. Percent moisture and ground cover were also measured. We found significantly more worms on the upper terrace (P=0.04) and found a positive correlation with the number of worms and percent moisture (P=0.007) and ground cover (P=0.017). By contrast, invertebrate numbers did not differ between terraces and showed no relationship to earthworm densities, suggesting above and belowground comminutes were loosely linked. Given the profound affects earthworms can have on soil composition, future Putnam Park studies might examine correlates between soil properties and earthworm abundance across the two terraces.
Effects of Depth and Substrate on Lotus (Nelumbo lutea) and Wild Rice (Zizania aquatica) Frequency in Mississippi River Lower Pool 4, 1998-2015  
Valerie Gehn  
Faculty Mentor/Collaborator: Tali Lee  
External Faculty Mentor/Collaborator: Megan Moore, Minnesota Department of Natural Resources

The MN Department of Natural Resources Lake City office, one of six Upper Mississippi River field stations, has documented long-term changes in water quality, fish, invertebrates, and vegetation in the river since 1992 to examine overall river health for restoration purposes. Observable data trends indicate Lake Pepin is gradually filling in, increasing sedimentation in lower pool 4. Locations that were once lotus beds in backwater and side channels of lower pool 4 seem to be shifting toward emergent vegetation, while once-scarce wild rice is making a comeback. This study examined the frequency of lotus, a rooted floating plant, and wild rice, an emergent plant, in lower pool 4 backwater and side channels from 1998-2015. Stratified random sampling was conducted of aquatic vegetation during peak vegetative biomass each year. At each site, substrate type and water depth from six marked points around the boat were recorded. Over time, frequency of lotus has been decreasing and frequency of wild rice has been increasing. Correlations between species presence, water depth, and substrate type may indicate species preference and explain these shifts to provide a better understanding of the process of river composition change over time and the future for these two species.

Effects of Rusty Crayfish on Macroinvertebrates and Benthic Algae in Little Niagara Creek
Valerie Gehn, Kayla Budd, Hailee Grannan, Skylar Huite, Mariel Niehaus, Troy Wesley
Faculty Mentor/Collaborator: Todd Wellnitz

Invasive rusty crayfish (Oroconectes rusticus) can profoundly alter stream habitat and trophic relationships by preying upon macroinvertebrates and consuming benthic algae. Although common in local streams, the distribution of O. rusticus in UW-Eau Claire’s Little Niagara Creek (LNC) is largely unknown. To examine O. rusticus abundance and its possible influences on the LNC streambed community, we sampled crayfish, macroinvertebrates and algae at sites above, below and within the UWEC campus. At each site, crayfish were censused inside an 8-m² area with kick nets over a 10-minute period. Macroinvertebrates were sampled by placing three gravel-filled trays at each site for two weeks to allow colonization. Algae were sampled from clay tiles set in the trays. After sampling, macroinvertebrates were sorted, counted, and weighed, and algal biomass on tiles was determined with a fluorometer. The resulting data showed an inverse relationship between crayfish and macroinvertebrate numbers, whereas crayfish and benthic algae showed a positive correlation under increased stream current. Although preliminary, these data suggest that O. rusticus may play an important role in shaping the LNC stream community. Future studies could better elucidate this role by increasing the number of sites sampled and replicating across time.
Hygroreception in Relation to Aggregation Behavior in *Oniscus asellus*
Ryan Dorschner
Faculty Mentor/Collaborator: Evan Weiher
Poster #193

*Oniscus asellus*, the Common Shiny Woodlouse represent one of the only orders of terrestrial isopods that come from the crustacean family (Isopoda: Oniscidea). Woodlice elicit unique social behaviors in the form of aggregating with other individuals when subjected to changes in environmental conditions such as light intensity, temperature and relative humidity. This behavior is regarded as a method to prevent desiccation to which woodlice are extremely sensitive. Studying these isopods gives insight to the evolutionary mechanisms that allowed for terrestrial life as well as the development of basic social behaviors in response to fluctuations in environmental gradients. This research studied the effects of relative humidity with aggregation behavior of woodlice and hypothesized that humidity and aggregate formation have a causal relationship. 40 specimens of *O. asellus* were used during the experiment and were subjected to variations in humidity ranging from 10 – 90%. The rate at which aggregates formed and the cohesiveness of the aggregates were observed for each 10% difference in humidity. Results indicated that the rate and size of aggregation increased with rising humidity. At 70% humidity, woodlice formed aggregates fastest and remained in groups longest, while more humid conditions elicited less of a response.

Methylparaben Increases Expression of Intracellular Signaling Molecules
Mychaela McMenamin
Faculty Mentor/Collaborator: Winnifred Bryant
Poster #221

Ovarian estrogen regulates the growth and maintenance of reproductive tissues. This is accomplished via interaction with receptors to 1) modulate gene expression or 2) rapidly activate intracellular signaling pathways. Methylparaben (MP) is an environmental estrogen that is used as a preservative in personal care products. Such estrogen mimics could induce atypical signaling in normal cells or exacerbate the abnormal signaling activity observed cancer cells. To determine the effects of MP on estrogen signaling in cancer cells, cultured MCF-7 cells (estrogen dependent cancer cell line) were exposed to MP for five minutes and Western blotting was used to measure ERα, ERβ, and MAPK expression. MP exposure immediately increased ERα, ERβ, and MAPK expression in our in vitro system. These effects were sustained throughout the time course of the experiment (120 minutes). Our results suggest that MP utilizes estrogen signaling pathways to change the activity of cancer cells. Additional studies will determine if MP stimulates MCF-7 cell proliferation. Our work may facilitate better risk assessment of estrogenic compounds.

Ontogenetic and Geographic Variability in Epidermal Club Cell Densities in White Suckers (*Catostomus commersonii*)
Dillan Berg, Steven Miller, Dylan Sturtevant
Faculty Mentor/Collaborator: David Lonzarich
Poster #184

Fish from the superorder Ostariophysi possess specialized epidermal club cells (ECCs) that are associated with an immune function and elicit alarm responses when damaged. Many factors contribute to the development of ECCs in fish such as health condition, predation risk, skin penetrating pathogens and UV radiation. Recent work by other UWEC students and faculty have on several species of minnows have revealed an association between fish age and ECC density. Our goals were to identify the effects of age and ecological setting on ECC densities in White suckers, and to compare findings with those on other species examined by this lab. Collecting
fish of different sizes (i.e., ages) from several lake and river systems in western Wisconsin, we
histologically prepared skin tissue for the enumeration of stained ECCs using light microscopy.
Although results concerning our primary goal (i.e., effects of age and ecological setting) await
further analysis, our findings thus far indicate that ECC densities in White Sucker are much
higher than those in closely related minnows that have been previously studied.

**Plant Biomass and Reproduction Responses to Elevated Atmospheric CO\textsubscript{2} and N in a Large-Scale Grassland Field Study**

Lindsay Backhaus  
Faculty Mentor/Collaborator: Tali Lee

Atmospheric carbon dioxide (CO\textsubscript{2}) and soil nitrogen (N) are vital for plant growth but
anthropogenic emissions and fertilizer use alters cycling of these elements, possibly causing
profound changes in the natural world. Using a pre-existing long-term field experiment, we
chose four common prairie grasses as focal species, growing in monoculture and 16-species
mixtures, to investigate growth and reproductive responses to CO\textsubscript{2} concentrations (ambient, +200
ppm) and soil N (ambient, +4 gN m\textsuperscript{-2} y\textsuperscript{-1}) to reveal potential mechanisms behind species
dynamics. Plant productivity was evaluated as total aboveground biomass and percent cover of
species growing in 2x2 m\textsuperscript{2} plots. Average reproductive dispersule mass was also analyzed.
Elevated N increased aboveground biomass of all species in monocultures but increased percent
cover in the 16-species mixtures for only one species, big bluestem. This likely explains in part
why big bluestem dominates the 16-species mixtures at nearly 50% compared to other grasses at
1-3%. Surprisingly, elevated CO\textsubscript{2} did not impact any measured responses. While dispersule mass
was not significantly impacted by any treatments, potential responses of germination and
seedling traits are still being determined. Our results suggest increased N may be the most
significant factor altering species dynamics, presumably changing future landscapes and
ecosystem functioning.

**Prevalence of Borrelia burgdorferi in Black-Legged Ticks in Eau Claire County**

Hannah Ward, Daniel Schnick, Erin Schneider, Brooke Richart, Emily Martin,
Michaela Leach, Andrew Evenson, Allison Brost, Abigail Bonjour, Leah Radeke
Faculty Mentor/Collaborator: Evan Weiher

It is estimated that 300,000 people contract Lyme disease in the United States yearly. Black-
legged ticks, *Ixodes scapularis*, spread the bacterium *Borrelia burgdorferi*, which causes Lyme
disease. Western Wisconsin ticks are vectors for at least nine infectious diseases and carry a high
prevalence of *B. burgdorferi*. Researchers collaborated with the Eau Claire City-County Health
Department to investigate *B. burgdorferi* prevalence and risk in Eau Claire County. Teams
collected ticks along and standardized tick collection per unit of time. *I. scapularis* nymphs and
adult females (disease carriers) were frozen and tested for presence of *B. burgdorferi* using real-
time PCR. No increase of *B. burgdorferi* prevalence was found in black-legged ticks compared to
2014. Approximately 28% of nymphs and 41% of adult females carry *B. burgdorferi*. Regional
prevalence values determine risk because there was no significant spatial variation. In high-risk
sites, Lowes Creek bike trails, researchers collected 12 ticks per hour carrying *B. burgdorferi*. In
Putnam Park, a low risk site, researchers collected approximately one black-legged tick
carrying *B. burgdorferi* per hour.
Chemistry

3-Benzylidencamphor Derivatives and Their Conversion into Chiral Auxiliaries and Organocatalysts

Michael Kennedy, Phillip Hartfield
Faculty Mentor/Collaborator: David Lewis
Poster #185

Chiral auxiliaries based on camphor have been successfully used in a wide variety of reactions. The rigid camphor ring system leads to derivatives with very defined conformations: For example, the p-nitrobenzoate ester of 3-endo-benzylisoborneol has a crystal conformation in which the two aromatic rings are p-stacked. We are undertaking a systematic exploration of the synthesis and use of 3-benzylisobornylamine derivatives as chiral organocatalysts for Diels-Alder, Friedel-Crafts and Michael additions, and a phosphonate derivative as a chiral auxiliary for aldol additions of lithium enolates. Our progress to date will be discussed.

Atmospheric Particles and Silica Levels near Frac Sand Sites

Julie Zhang, Callie Fischer
Faculty Mentor/Collaborator: Patricia Cleary
Poster #237

Concern has arisen about levels of silica in ambient particles near frac sand mines. In order to assess these levels of silica, we have adopted an XRD analysis to test real air samples. Calibrations were constructed with silica standards containing 10μg - 500μg respirable silica on filter media with detection limits of 10-44 μg. Real air samples were collected at a frac sand site using a personal cascade impactor. Filter substrates were pre-weighed and post-weighed to determine the total dry mass of particles sampled and preliminary XRD results show as much as 10% of the mass can be attributed to crystalline silica in the samples. Problems, interferences and intercomparison with the SEM results will be discussed.

Computational Docking Experiment to Find a Ligand that Will Bind to Xanthine Oxidase

Lysengkeng Her
Faculty Mentor/Collaborator: Thao Yang
Poster #156

Xanthine Oxidase (XOD) is an enzyme that converts purines to uric acid, a metabolic waste product. The objective of the project is to seek a uric acid derivative compound that will be able to bind XOD with high affinity, which could possibly be used as an inhibitor to the XOD activity. We will use computer to design several compounds and employ the program Autodock Vina to perform docking of those compounds to see if they can bind XOD. The uric acid structure contains a six-membered and a five-membered rings fused together with three carbonyl groups on the periphery. We sequentially replaced each peripheral carbonyl group by a sulfur atom (a less polar atom), follow by an aldehyde and a carboxylic acid groups (more polar groups) to obtain different derivatives of uric acid. The values of affinity energies for the three derivatives with all three peripheral carbonyls replaced by either three sulfur atoms, three aldehydes or three carboxylic acids are -5,200 cal/mol, -4,900 cal/mol and -3,600 cal/mol, respectively. The results obtained suggest that in general the carboxylic acid derivatives (most polar group) have higher affinity than the aldehydes and sulfur derivatives.

60 Undergraduate Poster Presentations
Experimental Kinetic Study to Explore the Impact of Macromolecular Crowding on Structure and Function of *Escheria coli* Prolyl–tRNA Synthetase

An Hodac
Faculty Mentor/Collaborator: Sanchita Hati

Aminoacyl-tRNA synthetases (AARSs) are enzymes that catalyze the covalent attachment of amino acids to their cognate tRNA. This reaction is known as aminoacylation of tRNA and is crucial for protein synthesis in all living organisms. These essential enzymes are large proteins, comprised of multiple domains. It has been proposed that the coupled dynamics between various structural elements of these enzymes are responsible for facilitating enzymatic rate enhancement. Unfortunately, previous in vitro studies were limited to dilute solution environments, and were unable to account for the impact of the macromolecular crowding in the cellular environment on these coupled dynamics. We are employing an experimental, non-radioactive enzyme kinetics approach, to probe the impact of macro molecular crowding agents such as sucrose, dextran, and ficoll-70 on the structure, dynamics, and function of *Escherichia coli* prolyl-tRNA synthetase. The preliminary data of our comparative study in the absence and presence of crowding agents will be presented.

Exploring the Interplay of Dynamics and Catalysis in *Escherichia coli* Prolyl-tRNA Synthetase Using Quantum Mechanical/Molecular Mechanical Simulations

Tiffany Huynh, Clorice Reinhardt
Faculty Mentors/Collaborators: Sudeep Bhattacharyay, Sanchita Hati

The intrinsic dynamics that are inherent in proteins are known to be critical for many important biochemical processes. However, there is still limited information regarding how dynamics favor enzymes to achieve their enormous rate enhancement. To better understand the molecular mechanism of the interplay between dynamics and catalysis, we attempted to model an important biochemical reaction known as prolyl-adenylate formation. This reaction is catalyzed by prolyl-tRNA synthetase, a member of the family of aminoacyl-tRNA synthetases. We have used quantum mechanical/molecular mechanical (QM/MM) approaches to model and compute energetics of the adenylate formation reaction in enzyme and enzyme-free (aqueous) system. Herein, we have presented the preliminary results, which include the free-energy of activation of prolyl-adenylate formation for the wild-type and mutant enzymes and analysis of their intrinsic dynamics.

Free Radical Mechanism for the Y-Glutamyl Carboxylase Reaction: A Computational Study

Zoe Lyons
Faculty Mentor/Collaborator: David Lewis

The 1990 mechanism for the γ-glutamyl carboxylase reaction proposed by Dowd requires the formation of an as-yet unidentified strong base that then deprotonates the γ position of the glutamate side chain. The deprotonation of a carboxylate anion to give the dianion in a low-dielectric medium is prohibitively endothermic for a biological reaction. We have developed a free radical alternative to the Dowd mechanism that proceeds through the Dowd dioxetane. Computations reveal that this mechanism, which has a very low energy barrier. This mechanism, which also fits the known chemistry of the vitamin and its substrate analogs, will be discussed.
Investigating Possible Isomeric Forms of Methanobactin-SB2
Kaitlin Toycen, Faith Matheka
Faculty Mentor/Collaborator: Warren Gallagher

Methanobactins are peptide-derived molecules that are produced by methanotrophic bacteria for the purpose of scavenging needed copper ions (Cu+ and Cu2+) from their surroundings. The methanobactins are very strong binders of Cu+ ions and reduce Cu2+ to Cu+. Copper is required by all living organisms, but is also toxic. Methanobactins are the solution that methanotrophic bacteria have evolved to address this problem and show promise as a possible therapeutic agent for curing Wilson’s disease, a copper storage disease in humans. Methanobactins also bind a number of other metal ions and may have uses for bioremediation of toxic waste. The structures of a handful of copper-bound methanobactins have been characterized. We have evidence to suggest that copper-bound and copper-free methanobactin-SB2 (mb-SB2) may exist in multiple, isomeric forms, which involve ring modifications that are responsible for binding copper ions. If this is true, it may provide clues to how the rings are formed from post-translational modifications of the methanobactin precursor peptide. In an effort to elucidate this, we are using methods that we have developed for isolating the intact copper-free form of mb-SB2 and are characterizing the structures of both the copper-bound and copper-free forms using Nuclear Magnetic Resonance Spectroscopy (NMR).

An IR and Computational Study of the Pyridine-HCl Complex and Its Fluorinated Analogs
Camilla Soares
Faculty Mentor/Collaborator: James Phillips

We have been investigating and comparing the properties of the 1:1 H-bonded complexes between hydrogen chloride (HCl) and pyridine and its fluorine-substituted analogs (e.g., fluoropyridine, difluoropyridine, trifluoropyridine). We have been particularly interested in systems for which the H-bonding interaction is enhanced by inert, low-dielectric media (solid neon, argon or nitrogen), which can facilitate proton transfer in the systems. Using quantum-chemical models we obtain equilibrium gas-phase structures, frequencies, binding energies and charge distributions, which vary systematically with fluorine substitution. However, the key to predicting the condensed phase effects is to map an energy profile along the N---Cl coordinates, both in the gas phase and bulk dielectric media. These profiles vary significantly across this range of complexes, which span a range from strong H-bonds to partial H+ transfer systems. We are also collecting infrared spectra on these complexes in solid neon at 6K for pyridine-HCl. Our next experimental goal is to measure this frequency in a neon matrix to find out if the shift is as extreme as in the nitrogen and argon experiments. In the near future, we will extend these experimental studies to complexes of fluoro-substituted pyridines.

Oligoethylene Glycol Substituted Isomeric Pi-Expanded Coumarins with Crankshaft Architectures
Carly Goedhart
Faculty Mentor/Collaborator: Bart Dahl

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 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. More recent work has been directed at the solubility of these lactone switches and trying to improve the solubility with oligoethyleneglycols groups. This particular 4 step reaction begins with 2,4-dihydroxybenzoic acid and undergoes bromination and decarboxylation to create 5-bromoresorcinol. The phenol groups of the compound will be protected to be converted into a pinacol boronate ester and Suzuki coupling will produce the desired crankshaft pi-expanded oligocoumarin.

**Organic-Inorganic Nanoscale Composites: Optical Properties as a Function of Anisotropic Orientation**

Eric Miller, Connor Richards, Nicholas Reitano  
Faculty Mentor/Collaborator: Jennifer Dahl  
Poster #154

We seek to elucidate the effect of orientation on the opto-electronic properties of hydrophobic gold nanorods. Previous studies in our lab demonstrated the fabrication of covalently crosslinked soft networks of hydrophobic gold nanoparticles with the aid of a Langmuir trough. These composite materials exhibited greater mechanical integrity than comparable non-crosslinked networks, and these films can be cast upon planar or textured substrates with no disruption of the array. This methodology can be extended to arrays of complex nanomaterials such as nanorods, whose optical properties are expected to be dependent upon final orientation (either side-by-side or end-to-end) of the finished crosslinked composition. The degree of surface compression will govern orientation of the nanorods, and the configuration can be preserved by covalent crosslinking. Likely applications of these materials include components of photovoltaic devices, optoelectronic circuits, and chemical-sensing membranes.

**Particle Composition and Respirable Crystalline Silica Concentrations in Sand Mining and Processing Facilities**

Joseph Oster, Julie Zhang, Callie Fischer  
Faculty Mentor/Collaborator: Patricia Cleary  
Poster #188

The need for sand for use in hydro fracturing has led to a significant increase in industrial sand mining facilities. With the increase in facilities, it is important to understand the possible hazards involved. The main concern is the inhalation of respirable crystalline silica, which can lead to irreversible lung damage. Crystalline silica, or quartz, is not inherently dangerous until it is ground up into a respirable fine dust that can penetrate deep into the lungs. Our area of study is focused on the composition of respirable particles and the concentration of respirable crystalline silica inside of active industrial sand mining facilities. We have developed a method to collect samples using a personal cascade impactor sampling system with the ability to separate different particle sizes and have collected several sample sets from an active facility in western Wisconsin. A standard operating procedure was developed using scanning electron microscopy (SEM) and energy-dispersive x-ray spectroscopy (EDS) to determine the composition of the samples. We expect to have a better understanding of what respirable particles are present at sand mining facilities and what concentration of those particles is crystalline silica through this study.
Pi-Expanded Coumarins with Switchable Propeller Geometries
Heather Hintz
Faculty Mentor/Collaborator: Bart Dahl

Planar conjugated compounds are becoming a popular topic of research because of their possible application as chemical dyes and possible role in molecular electronics as well as their interesting spectroscopic properties. The focus of this project is on analyzing planar conjugated compounds as molecular switches. Specifically, analyzing the architectures of propeller shaped molecules as pH-driven molecular geometry switches. Previously studied crankshaft shaped compounds are pi-expanded oligocoumarin terphenyl systems with two lactone bridges. Propellers are pi-expanded oligocoumarin systems with biphenyls and terphenyls arranged in a linear fashion with three lactone bridges. The lactone bridges are used to force rigidity in the system and this orientation has demonstrated a strong absorption and emission of UV-light. This property allows us to identify if the molecule has switched to an open conformation after the proper change in pH. With these architectures the rigidity of the aryl system could be reversibly altered by cleavage and re-formation of the lactone bridging of the arenes. Propellers have the potential to be switched from a non-planar conformation with treatment of a base, and switched back to a planar conformation with treatment with an acid. Herein, we report the synthesis and study of several propeller pi-expanded oligocoumarin systems.

Redox Chemistry of 9,10-diacetoxy-1,4-methano-1,4-dihydroanthracene Derivatives
Taylor Kysely, Zoe Lyons, Megan Wilson
Faculty Mentor/Collaborator: David Lewis

The epoxide (2) of the title compound (1) has been found to have unusual oral anticoagulant activity in rats: At day 4 of co-administration with warfarin, it is a potent antagonist of anticoagulation; at day 10 of co-administration, the compound is now a potent agonist of anticoagulation. We have determined that the active principle of the anticoagulation is not a simple conjugate of warfarin with the epoxide. Herein, the hydrolysis of the diacetates 1 and 2 under acid and base conditions, and the redox chemistry of the resulting naphthalenediol derivatives and their analogs in air will be discussed.

Spectroscopic Studies to Explore the Impact of Macromolecular Crowding on the Structure and Function of Escherichia coli of Prolyl-tRNA Synthetase
Lauren Adams, Ryan Andrews
Faculty Mentors/Collaborators: Sanchita Hati, Scott Bailey-Hartsel

Most computational and experimental studies to understand the molecular mechanism of an enzyme-catalyzed reaction are usually performed in dilute solutions. However, enzymatic activities in vivo occur in a crowded environment composed of many macromolecules. We are performing computational, spectroscopic, and kinetic studies to investigate the impact of macromolecular crowding on the structure and enzymatic activity of Escherichia coli prolyl-tRNA synthetase. This enzyme is a member of an important family of enzymes, which are essential for the biosynthesis of proteins in all living organisms. The overall goal is to evaluate if there is a need for consideration of the effect of macromolecular crowding for structure-based drug design to inhibit the function of pathogenic prolyl-tRNA synthetases. Preliminary results of spectroscopic studies will be presented.

64 Undergraduate Poster Presentations
**Structural and Energetic Properties of H3N–GeF3CH3 and Analogous Lewis Acid-Base Complexes (N–MX3-R)**

Benjamin Wahl  
Faculty Mentor/Collaborator: James Phillips  
Poster #217

This project is concerned with molecular complexes that exhibit intermediate bond strength and are prone to condensed-phase structural changes. In general terms a complex is any association of two otherwise stable molecules. In these N–MX3-R complexes, a nitrogen-containing compound (the Lewis base) donates electrons to a group IV metal halide (the Lewis acid). We are surveying a broad range of these complexes to determine which are most apt to change structure in condensed phases. Using quantum chemical modeling, we determined bond energies and equilibrium structures for several of these compounds. For each complex there are 16 possible geometrical isomers (considering conformations and coordination geometry about the metal). For H3N–GeF3CH3 the minimum energy structure features a linear N-Ge-C linkage (axial coordination), with both CH3 and NH3 staggered relative to the GeF3. In this structure the bond energy is -8.0 kcal/mol. This illustrates that CH3GeF3 is a significantly weaker Lewis acid; the predicted binding energy of H3N–GeF4 is -19.7 kcal/mol. Future work will assess the effect of substituting silicon for M, benzene for R, and chlorine for X.

**The Synthesis and Characterization of Model Complexes for the Metalloenzyme Quercetin Dioxygenase**

Elizabeth Brandes, Ashley Lato  
Faculty Mentor/Collaborator: Roslyn Theisen  
Poster #186

The catalytic mechanism of dioxygenase enzymes, such as the metalloenzyme quercetin 2, 3, dioxygenase (QDO), which catalyzes the oxidation of two carbon-carbon bonds of quercetin and releases carbon monoxide and the corresponding depside, is not well understood. This project involves the development, synthesis, and characterization of new biomimetic model systems consisting of a tetra-dentate N3O–containing ligand (BPG) and divalent first-row transition metal ions observed in bacterial and fungal QDO enzymes. The goal of this research is to synthesize a structural model of the unique active site of the biologically important QDO metalloenzyme by creating metal complexes with similar ligand systems with the purpose to further understand how the enzyme cleaves the O-heterocyclic ring of quercetin. Four metal complexes, [Co(BPG)]+1, [Cu(BPG)]+1, [Zn(BPG)]+1, and [Mn(BPG)]+1, have been isolated, as well as three substrate enzyme model complexes, [Cu(BPG)(Maltol)], [Zn(BPG)(Maltol)], and [Co(BPG)(Maltol)] which mimic the QDO active site. Preliminary characterizations of the isolated metal complexes have been performed using FT-IR (diamond), UV-Vis, and 1H NMR spectroscopy methods as well as melting point and magnetic susceptibility measurements.

**Synthesis, Spectral Characterization, and Nucleic Acids Interactions of Nickel (II)-Salen complex**

Olivia Hurst, Dana Warwick  
Faculty Mentors/Collaborators: Sanchita Hati, Roslyn Theisen  
Poster #130

Around the world, cancer is one of the leading causes of death. DNA is the primary target molecule for most anticancer therapy. Transition metal complexes are known to have DNA binding and cleavage properties under physiological conditions. Currently, we are investigating the interactions between a number of nickel (II) complexes and nucleic acids (DNA/RNA) in an attempt to design and develop metal complexes that can have more efficiency in nucleic acids binding and cleavage and therefore, could be used in cancer chemotherapy. We have synthesized
Nickel (II)-Salen complex and the synthesized product was characterized by UV-Vis spectroscopy and FT-IR. We are currently studying the interactions between the Nickel (II)-Salen complex and nucleic acids using UV-Vis spectroscopy and gel electrophoresis. We will present the preliminary results of our study. Our overall goal is to synthesize transition metal complexes that could bind or cleave the target DNA/RNA molecules and effective in the cancer treatment. This study could have major implications on the drug and health industry and potentially cure of cancer.

**Three Oxidation States for Renewable Energy**  
**Abdulghani Mounir**  
**Faculty Mentor/Collaborator: Kurt Wiegel**  
**Poster #158**

In today’s economy, energy based on fossil fuels is finite and destined to end. There is a strong possibility that we will eventually run out of fossil fuels, but with the emergence of renewable energy a promising alternative to fossil fuels is presented. With Redox Flow Batteries (RFBs) we present a way to implement large scale stationary storage of renewable energy. One of the main obstacles preventing the implementation of large scale renewable energy storage is the lack of low cost and efficient energy storage technologies. RFBs are fully rechargeable electrochemical energy storage devices that convert and store electrical energy into chemical energy and release it in a controlled fashion. RFBs have low operation costs and high storage efficiency. However they often suffer from low voltage (~1.2V) and cross contamination. We aim to overcome the limited voltages and cross contamination by designing new first row transition metal complexes as electrolytes (chemical species responsible for energy storage). We have synthesized a family of polypyridyl ligands, which, after metalation, will yield a series of metal complexes. These species can be characterized by spectroelectrochemical techniques and the electrochemical properties of the complexes will be tested by cyclic voltammetry to determine the maximum voltage.

**Using AutoDock Vina to Study the Docking of Quercetin Derivative Compounds to Xanthine Oxidase as Inhibitors**  
**Logan Pankratz**  
**Faculty Mentor/Collaborator: Thao Yang**  
**Poster #157**

Quercetin is an anti-hyperuricemia agent that competitively inhibits the natural ligands for binding at the active site of Xanthine Oxidase (XOD), which catalyzes the oxidation of hypoxanthine to xanthine and then to urate. It is an old treatment for gout, a disease resulting from the buildup of uric acid crystals in the joints of limbs. The long term goal of the project is to find a water soluble quercetin derivative with higher affinity for the XOD active site. The quercetin molecule contains three six-membered rings with peripheral hydroxyl groups that have specific interactions with the side chains of XOD. In the project, computer programs are used to design quercetin derivative compounds by replacing the peripheral hydroxyl groups with aldehyde and carboxylic acid groups. These quercetin derivatives were tested for binding XOD by the AutoDock Vina software. Of the several aldehyde and carboxylic acid derivatives tested for docking, their results showed less affinity for the active site. Once a promising derivative is found, it will be evaluated for suitability and possibility of synthesis, then binding study by NMR spectroscopy.
Utilizing Unmanned Aircraft Systems (UAS) to Analyze and Record Atmospheric Conditions

Alexander Stout
Faculty Mentor/Collaborator: Patricia Cleary

Analyzing atmospheric conditions in situ using manned airplanes has historically been effective yet expensive and limiting. With the growing usage of UAS, this project is aimed at incorporating atmospheric sensors into a UAS as a viable, inexpensive and responsive method for atmospheric monitoring. The sensors will log temperature, humidity, air velocity, and ozone to better understand the mesoscale meteorological phenomenon of the lake breeze front. Currently we are in the stage of integrating the analog and digital sensors with an on-board Arduino microcontroller.

Watching Life and Death at a Cellular Level

Rachel Ross, Claudia Tourville, Gabrielle Rigden
Faculty Mentors/Collaborators: Scott Bailey-Hartsel, David Lewis

Fluorescent probes for visualizing and tracking molecular structures within cells have become an absolute necessity for modern cell and molecular biology and biochemistry. In particular, cell nuclei, lysosomes, mitochondria and certain membrane structures may be labeled nondestructively with the right probe. The main disadvantages of many currently available fluorescent probes are 1) toxicity to cells, 2) susceptibility to degradation and fading by light, (photobleaching) and 3) slow response time. Over the past decade we have designed, synthesized and tested aminonaphthalimide derivatives for rapid and selective fluorescent staining of organelles in live cells. In this study with cutting-edge laser confocal microscopy we have been able to visualize, in real time and 3D, the impact of antibiotics on the mitochondrial membrane potential and integrity in live human fibroblast cells. We show here that the poorly-tolerated antifungal drug Amphotericin B (AmB) causes collateral damage in human cells in part by depolarizing (short-circuiting) mitochondria, the powerhouses of the cell. Our method will allow us to evaluate drug delivery formulas where AmB human toxicity might be reduced while still retaining antifungal activity. The commercial probes we tested faded too quickly to be of use for long term monitoring of these cellular effects.

Geography and Anthropology

Active Channel Loss, Reed Canary Grass expansion, and Nutrient-Enriched Groundwater in the Lower Chippewa River in West-Central Wisconsin

Emily Moothart, Scott Nesbit
Faculty Mentor/Collaborator: Douglas Faulkner

Maps constructed from aerial photographs dating to 1938 along a 50-km section of the Lower Chippewa River (LCR) in western Wisconsin document a decline of active-channel area exceeding 25%. This loss in channel area has occurred despite no detectable change in stream hydrology. Much of the loss instead seems due to the stabilization of lateral bars by reed canary grass (RCG), an invasive wetland species in the Upper Midwest. Why RCG invaded the channel during this time period is unknown, but one hypothesis is that it is coincident with the expansion of center-pivot irrigation on nearby cropland, which led to groundwater discharge into the river enriched in plant-available nutrients. We collected water samples during the summer of 2015 at six different times from six locations along the river where extensive monocultures of RCG
exist. At each location we collected a river sample from mid-channel and a groundwater sample from a hand-excavated pit along the riverbank. Samples were analyzed for nitrate and phosphorus concentrations. Results indicate that groundwater flowing toward the river is generally enriched in nitrates and phosphorus compared to the river, consistent with the hypothesis that groundwater enriched with agricultural nutrients is promoting RCG growth along the LCR.

**A Dense Time Stack Change Detection Analysis of Cropland Phenology Using Images from Unmanned Aerial Systems**

**Michael Bomber**

Faculty Mentor/Collaborator: Cyril Wilson

Unmanned Aerial Vehicles (UAVs) offer an alternative to traditional satellite remote sensing techniques. High temporal resolution of UAV imagery provides an advantage when examining rapidly changing surface features facilitating efficient crop and pesticide management. The study was conducted in a local community garden in the City of Eau Claire, Wisconsin containing multiple crop types. UAV imagery was collected via a quadcopter platform GEMS sensor with visible and near-infrared cameras at .08 meter spatial resolution and 70 meter altitude once a month between May and October. Imagery was mosaicked using ERDAS Imagine 2015. Prior to image classification, several physiological indices were generated at high temporal frequency to gauge the growth rate of crops and assess their moisture, nutrient, and other climatic ingredients including MCARI, RDVI, and ADR. The images were classified using object-based classifiers to effectively characterize 12 crop types. Overall classification accuracy ranged between 88 and 91%. A model was developed to pinpoint vegetation phenology according to crop type. The precision agriculture modeling framework developed in this study is highly invaluable to farmers as it has shown to increase crop growth information flows to farmers at very high temporal frequency.

**Determining Best Data Collection Methods for Merging Oblique and Nadir Imagery**

**Nicholas Berg**

Faculty Mentor/Collaborator: Joseph Hupy

Unmanned Aerial Systems (UAS) are a powerful means to gather data for display and analysis of three dimensional models within a Geographic Information System. This series of maps explores the best methods and practices for creating the most realistic, detailed model using a combination of oblique and nadir imagery. While taking an introductory course regarding the use of UAS, I found myself very intrigued and wanted to dig deeper into discovering how they can be used as very efficient systems for collecting data. This project explores new advances in how images can be processed and used in practical settings. Without the new technology provided to students by the Geography Department, this project would not be possible. This is a topic not heavily explored as the technology and software is relatively new and being improved upon daily. This project highlights the effectiveness of UAS and showcases how they play a major role in the field of photogrammetry.
Development of a Multi-Platform Volunteered Geographic Information Application for Monitoring Invasive Species of Asian Carp in the Upper Mississippi River System
David Leifer
Faculty Mentors/Collaborators: Cyril Wilson, Martin Goettl

Since their introduction into North America, Grass carp, Silver carp, and Bighead carp have significantly damaged aquatic environments by outcompeting native species for resources. Tracking these non-indigenous aquatic species is critical for determining the deployment of control barriers such as alarm pheromones. Volunteered Geographic Information (VGI), a geographic information systems (GIS) framework, is used to gather information on public phenomenon over space and time. VGI for recording sightings of non-indigenous aquatic species has not been fully investigated by the scientific community. This study developed a mobile responsive VGI Web GIS app to facilitate the recording of the presence of Asian carp within the Upper Mississippi River system. To facilitate the collection of this invasive species by the community, a feature template was developed in an enterprise geodatabase and published to ArcGIS for server. In order to prevent volunteers from entering incorrect information, range domains were set to limit numeric fields and coded value domains were applied to string fields. Web development languages manipulating the jQuery mobile API and the ArcGIS API for JavaScript were used to modify a simplified attribute editing module from the Dojo library. This app has the potential to increase location and metadata accuracy by eliminating lag time between transferring field notes to electronic records, a current system of tracking Asian carp. The Web GIS VGI app will alert authorities to pinpoint where barrier techniques are needed to halt the spread of Asian carp to other aquatic environments.

Geospatial Analysis of the Role of Agricultural Practices on Hypoxic Zone Development in the Mississippi River Delta: A Multitemporal Perspective
Syler Behrens
Faculty Mentor/Collaborator: Cyril Wilson

Evaluating dead zones, also known as hypoxic zones or regions of water lacking adequate oxygen content is of extreme importance when monitoring the health of marine ecosystems. Determining the spatiotemporal configuration and quantifying the causes of these oxygen deficient waters is crucial. A geospatial modeling approach to understanding the land-based triggers of dead zones, particularly farm practices has not been given adequate scholarly attention. By enumerating the spatial extent of dead zones and assessing the land-based causes of these regions of hypoxia, it is possible to define more efficient mitigation measures. Using various types of satellite imagery, coupled with geostatistical modeling techniques, this study explores the relationships between agricultural land use practices in the Mississippi River watershed and dead zone development in the Mississippi River delta at three times-steps—2001, 2006 and 2011. To better understand the role of fertilizer runoff from the Mississippi River watershed on hypoxic zone development, a seasonal approach was undertaken. Results of the study demonstrated statistically significant positive relationships between agricultural land use practices and hypoxic zone creation. The outcome of this study is invaluable since it determines major land-based causes of hypoxic zone development and will help environmental planners in developing adequate mitigation measures for dead zone remediation.
**High Frequency GPR Investigation at Kahal Grande, Greece**
Jackelyn Seamans
Faculty Mentor/Collaborator: Harry Jol
External Faculty Mentors/Collaborators: Richard Freund, University of Hartford, Philip Reeder, Duquesne University

The subsurface of the floor of Kahal Grande, located in Old Town Rhodes, was imaged through collection of two grids using a Sensors and Software ground penetrating radar (GPR) system. The data was collected with an antennae frequency of 225MHz and a step size of 5 cm. The first grid was 12 m x 10 m with the starting point (0,0) at the synagogue’s floor southwest corner. A total of 40 transects running south to north was collected every 0.25 m of the grid which covered the entirety of the synagogue floor. The second grid, consisting of 46 lines, was 16 m x 11 m and shot with a starting point (0,0) in the northwest corner and ran from west to east. 3D processing of the data showed several anomalies at approximately 0.25 – 1.0 m beneath the surface. A feature seen on both grids, between what used to be the bemah and the ark, cannot be explained without further investigation. This anomaly is located below a 1.75 m2 tile pattern on the surface. Explanations for this feature include a possible time capsule from the Jewish community prior to the synagogue’s destruction or a temporary storage area for old Torah scrolls.

**Identifying the Great Synagogue of Vilnius, Lithuania with Ground Penetrating Radar**
Thomas Wavrin
Faculty Mentor/Collaborator: Harry Jol
External Faculty Mentors/Collaborators: Richard Freund, University of Hartford, Philip Reeder, Duquesne University

The Great Synagogue of Vilnius, Lithuania was heavily damaged by the Nazi’s during World War II, then following the war, the Soviets destroyed the Synagogue from 1955-57. In 2015, a group of scientists attempted to locate the synagogue’s foundation by using ground penetrating radar (GPR). GPR is a non-invasive survey technology which can be used to explore the subsurface which will result in further investigation on survey sites. GPR sends electromagnetic waves into the subsurface through antennae, where the waves are reflected back from reflectors under the surface. A pulseEKKO 1000 GPR unit with 225 MHz antennae was used to map six GPR grids. The focus of the analysis of the paper are the results from grid #2 which has the length of 44 meters long by 10 meters wide, with a transect collected every 0.25 m and a step size of 0.05 m. From preliminary analysis, remains of the synagogue’s walls have been located in grid #2 and further analysis with EKKO_Project software will be able to determine the feasibility to of future archeological excavations. All analysis made will be available on the official project website for the use and reference of the historical scientific community.

**Knickpoints: Evidence of a Domino Effect on Tributaries to the Lower Chippewa River**
Emily Moothart, Niklas Anderson, Hannah Adams, Anneli Williams, Rory Smuhl, Emily Cottrell, Benjamin Kleist
Faculty Mentor/Collaborator: Douglas Faulkner

Knickpoints, which are abrupt changes in slope on a stream, migrate upstream over time as they incise into the landscape. Previous research using optically stimulated luminescence (OSL) to date terrace alluvium has ascertained that the lower Chippewa River (LCR) incised in an episodic time transgressive pattern in response to Mississippi River incision during the Late

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Wisconsinan glaciation. The purpose of this project is to determine if the tributaries to the LCR reflect this pattern of incision. ArcGIS has been used to create stream profile graphs of relative stream elevation versus downstream distance for many tributaries. After analyzing these profiles, we found that a general time transgressive pattern is apparent, though some anomalies exist largely due to knickpoints on tributaries encountering bedrock highs. This has slowed the upstream migratory process. Knowledge gained from this project can provide insight into how stream networks react to a base level fall, which can, in turn, improve watershed management.

**Patterns of Downstream Fining on the Lower Chippewa River**
Hannah Adams, Allison Vincent
Faculty Mentor/Collaborator: Douglas Faulkner
Poster #85

Bed material of gravel-bed rivers tends to become finer in the downstream direction. Downstream fining operates over a range of spatial scales, which can create complex patterns of bed-material size. This study examines downstream fining of bed armor on the lower Chippewa River at two different scales: at a river scale and at a local scale of individual armored bars. Four sample sites were established on 15 bars over 60 km of river for measuring grain-size using Wolman pebble counts. Data were analyzed using GRADISTAT, an Excel based tool for determining grain-size statistics, such as the D50 and D90 values for each site. We then plotted these values against downstream distance. From these plots, we identified a general downstream fining trend. Downstream fining on bars was more pronounced with the D90 than the D50 values at the river scale. At the scale of individual bars, we found D90 values exhibited fining from upstream to downstream sites on 14 bars. D50 values showed 8 bars to have fining from the upstream to downstream sites. Various sources of sediment added complexity to the characteristic spatial pattern of fining along the studied reach and on individual bars.

**Ski Resort Expansion Modeling: A Descriptive and Suitability Model of Expanding Ski Resorts Based on Vail Resorts**
Peter Sawall, Chad Licht
Faculty Mentor/Collaborator: Christina Hupy
Poster #86

The purpose of this project is to create a model to identify possible sites for the creation of new ski resorts and expansion of existing resorts in the Rocky Mountain region of the United States. The alpine sports industry brings in millions of dollars of revenue for the region, and the creation of a new resort would facilitate the creation of thousands of jobs. The model will be designed using Geographic Information Systems (GIS) in order to analyze the necessary physical, environmental, and economic factors on which a possible resort site will depend. The environmental suitability model will be created using spatial and geostatistical analysis methods to interpolate surfaces from weather station data. After locating several ideal sites, the identified defining physical characteristics of ski run classes will be used to generate trail maps for each of the possible sites. These sites will be further assessed by the variety of generated terrain, as well as their accessibility from populated areas. The results will be a regional-scale suitability map, a trail description table, and several generated trail maps; presented as if presenting possible expansion plans to resort executives.

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Subsurface Investigation of the Wisconsin Point Barrier Spit
Alyssa Krantz
Faculty Mentor/Collaborator: Harry Jol
External Student Collaborators: Alexis Pingle, University of Minnesota-Twin Cities, Todd Kremmin, University of Minnesota-Twin Cities, Brie Jol, Memorial High School- Eau Claire, WI
Poster #113

A barrier spit is a coastal feature formed by laterally moving water which then transports and deposits sediment in the direction of the wave motion. To better understand the processes and conditions that cause the formation of barrier spits, a subsurface investigation was conducted on the Wisconsin Point barrier spit along the west coast of Lake Superior. A geophysical survey was carried out using ground penetrating radar (GPR) to image the interior of the Wisconsin Point barrier spit in Superior, Wisconsin. Four cross-barrier lines were collected using a pulseEKKO 100 GPR system with frequencies of 50, 100, and 200 MHz. Topography was collected using a Topcon RL-H3CL laser leveling system at two meter intervals. The GPR data was geometrically corrected using the processed topography data to reflect the relief of the barrier spit. The GPR data was then processed using pulseEKKO software. By interpreting the imagery, the profiles illustrate sub-horizontal and dipping reflections indicative of a progradational, aggradational barrier. The information collected will be used to understand the processes that formed the barrier spit and to help plan a habitat for the endangered piping plover.

Trend Analysis of Hypoxic Zone Extent in the Green Bay Area of Lake Michigan: An Aquatic Remote Sensing Perspective
Scott Nesbit
Faculty Mentor/Collaborator: Cyril Wilson
Poster #34

Hypoxic zones are regions of water lacking adequate amount of oxygen content which is vital to the health of aquatic ecosystem. Studies have shown that hypoxic zones are spreading in both marine and freshwater ecosystems. It is important to monitor the spatial extent and growth of these oxygen deficient water areas in order to maintain the health of aquatic life. This project analyzed the spatial and temporal characteristics of hypoxic zones in the Green Bay area of Lake Michigan between 1990 and 2000 with the use of remote sensing and geospatial models. Using images from MODIS Aqua and SeaWiFS satellites, biophysical properties of the lake that span Chlorophyll a and daily primary productivity (DPP) were retrieved for 1990 and 2010. The study shows significant spatiotemporal increase in hypoxia over the 20 year period. Results of this study calls for immediate implementation of mitigation strategies that can reverse the alarming trend of hypoxia growth in order to forestall the current destruction of aquatic life.

The Use of LiDAR and Geospatial Modeling for Trail Design Automation
Peter Sawall
Faculty Mentor/Collaborator: Garry Running
Poster #65

The University of Wisconsin–Eau Claire, Priory, located South of the city, plays host to a network of hiking trails that visitors can access to experience the beauty and serenity of hills and forests characteristic of Western Wisconsin. Unfortunately, because the existing trails were created many years ago, some trails are in a state of disrepair, or their primitive design limits travel to only the most intrepid of hikers. The purpose of this project is to locate the existing trails, map their conditions, and plan locations for additional trails. Using a GPS unit, I mapped the trails, locations of downed trees, and where trails will be especially prone to erosion. I then used LiDAR derived elevation and understory vegetation density to produce a path-finding
algorithm to plan routes for future trails. I then created an interactive map featuring two different layers, one showing trail segments in need of repair or improvement for the trail maintenance crews, and one official trail map to be displayed at The Priory. The new sections of trails generated by the path-finding algorithm link existing trails together into a cohesive system, accessible for nearly every level of mobility.

**Visualizing Industrial Organic Waste Located at Rib Lake, Wisconsin: A Geospatial Perspective a Ground Penetrating Radar Test**

**Drake Bortolameolli, Benjamin Degner**  
Faculty Mentor/Collaborator: Harry Jol  
Poster #94

Rib Lake is a north-central Wisconsin village located next to a lake, which once was a holding pond for the Rib Lake Lumber Company. The company processed 1.47 billion board feet of lumber during its 70 years of operation. The sawmill employees dumped all their byproducts into the lake. The practice of dumping into Rib Lake created a thick layer of waste on the lake floor. Logs buried in the waste are of high value due to their rareness and old age. Through the extraction of the logs, the village would be able to sell them in order to fund a cleanup program. Data was gathered from probing into the frozen lake surface. A Microsoft Excel file was created containing coordinates, depth to waste, depth to bottom of the lake and depth to potential logs for each hole. Using ESRI tools, maps were created illustrating the depth to lake bottom, location of logs and a three-dimensional rendition showing waste thickness. Using the probe information and data obtained using ground penetrating radar surveys, the data shows the thickness of waste is between 1.5 and 10 meters and the depth to the lake bottom is between 3 and 10 meters.

**Geology**

**Comparisons of Estimates of Hydraulic Conductivity in the Unsaturated Zone**

**Kinzey Stoll, Justin Dowling**  
Faculty Mentor/Collaborator: Kent Syverson  
Poster #170

The main objectives of this research are to assess the effectiveness of ground penetrating radar (GPR) techniques for estimating hydraulic conductivity at multiple depths at the field scale and to determine the infiltration parameters needed to implement this technique. UWEC researchers have recently shown that GPR techniques can be used to estimate hydraulic conductivity and that hydraulic conductivity estimates from GPR data appear to vary with depth. Additional data acquisition using conventional methods for measuring hydraulic conductivity at different depths is needed to evaluate the variations in hydraulic conductivity indicated by the GPR data. Another important aspect of this research is to determine the infiltration parameters needed to provide the constant rate of infiltration. Additionally, accurate estimation of hydraulic conductivity using GPR techniques requires constant (steady state) infiltration over the depth interval being investigated; this research seeks to determine the duration and intensity of infiltration needed to establish constant infiltration for a range of sampling depths and soil types using numerical simulation and laboratory column experiments. The results of this research can be used to generate practical guidelines for estimation of hydraulic conductivity in the unsaturated zone that would be of great interest to the agricultural and geological communities.
Diagenetic History of Cambrian Sandstone Units in Western Wisconsin: Implications for Resource Extraction

Justin Poirier, Ray Fliflet
Faculty Mentors/Collaborators: J. Brian Mahoney, Kent Syverson
Poster #200

The Wonewoc Jordan Formations in the upper Midwest were deposited as cratonic sheet sandstones during Late Cambrian eustatic sea level changes. These formations, comprised of quartz arenite, are highly valued by the petroleum industry for hydraulic fracturing due to its ultra-pure composition, round, high-strength grains, and weak cementation. The diagenetic history of these formations is poorly understood, and is important for both economic and environmental reasons. Petrographic analysis of the Wonewoc and Jordan formations quantifies the composition of framework detrital grains and interstitial cement. Framework grains are primarily monocrystalline quartz (95%), polycrystalline quartz and microcline. Interstitial spaces are occupied by voids, calcite, sericite, authigenic orthoclase feldspar, and hematite. Variation in the composition and quantity of interstitial material within and between formations suggests a complex multistage diagenetic history of orthoclase feldspar cementation, dissolution, multiple calcite cementation events, hematite cementation, and a final dissolution event. One of the primary environmental concerns with frac sand mining is the potential for the generation of crystalline silica particulate matter. This fine-grained material would most likely be derived from cements during processing. However, silica cement is very rare, is restricted to the upper Jordan contact, which renders the material non-economic because it inhibits disaggregation.

Evaluation of Nanoparticles and Colloids in a Public Water Supply from Well-Head to the Consumer Tap

Sarah Kintner
Faculty Mentor/Collaborator: Robert Hooper
Poster #169

Nanoparticles (NP) are nanometer (1-100nm) sized amorphous to crystalline solid materials that are ubiquitous in low-temperature natural environments, and many NP are being synthesized for use in industry. Manmade NP are appearing in many urban public water supplies. NP’s small size results in large effective surface area; consequently, NP chemical characteristics differ from similar bulk materials characteristics. We evaluated natural NP from three wells, mid-treatment and from two consumer taps to evaluate NP throughout the public water supply distribution system in Eau Claire WI. Samples from the water supply were analyzed using Transmission Electron Microscopy and particle composition was determined by energy dispersive x-ray spectroscopy. Each of the three wells had distinctive NP compositions but the major components were primarily amorphous CaCO3 and Fe-Mn oxides enriched in Silica, Mg, P, Sulfate and Cl. Zinc was a common trace element in almost all NP. Tap water samples rarely contained significant NP concentrations and none of the samples contained NP of real concern for public health. The Eau Claire treatment process appears to effectively remove both natural NP and NP made during water treatment. Unlike Flint MI, the Eau Claire water supply has very low levels of NP of any environmental concern.
Geologic Mapping and Petrologic Modeling of the Green Mountain Shield Volcano, Oregon
Chase Friedemann, Forest Friedrichs
Faculty Mentor/Collaborator: Phillip Ihinger
External Faculty Mentor/Collaborator: Samuel Castonguay, Treasure Valley Community College
Poster #146

The Green Mountain Shield Volcano (GM)—dated at 740,000 ka—is located in Eastern Oregon at the intersection of the Oregon High Lava Plains Province and the northernmost Basin and Range Province. In a preliminary study, Friedemann and Friedrichs (2015) observed minimal variation in geochemistry across the suite of GM lavas. In this study, we refine our petrologic model of the GM Shield Volcano through detailed geologic mapping as well as additional geochemical analysis using XRF spectroscopy on a more complete suite of GM basalts. We compare the GM lavas to an additional, yet much older, volcanic province in western Oregon: the Siletzia terrane. Our geochemical results confirm that the Mg# of the GM suite of lavas remains constant suggesting that all GM magmas experienced a similar degree of crystal fractionation. Our results also show that the GM basalts are geochemically distinct from the Siletzia basalts as well as others. Additionally, we have procured a radiometric age (40Ar/39Ar) for the basal sequence of the GM shield volcano by collecting samples from the ‘lava lakes’ in the center of one of the erupted maars: 891.7 ± 183.5 ka.

Geology of the Precambrian Rocks Hosting the Flambeau Volcanogenic Massive Sulfide Deposit in Rusk County, Wisconsin
Zacharie Zens
Faculty Mentor/Collaborator: Robert Lodge
Poster #206

This investigation examines the geochemical and petrographic characteristics of the volcanic strata hosting the Flambeau Cu-Au volcanogenic massive sulfide (VMS) deposit in Ladysmith, WI. Research on the deposit essentially ceased after the mine closure in 1997 and the site has been successfully reclaimed. This study revisits the volcanic strata hosting the Flambeau VMS deposit through examination of historic drill cores to describe the geology in light of almost 20 years of advances in the fields of geochemistry, economic geology, and the tectonic evolution of the region. Flambeau mine drill cores were re-logged and analyzed using X-ray Fluorescence and Inductively Coupled Plasma Mass Spectrometry. This new geochemical data was compiled with historic mine maps and cross sections to develop a coherent scientific model describing the nature and evolution of the volcanic and hydrothermal system that hosts and formed the deposit. The Flambeau deposit formed as a series of stacked ore lenses in a rifting arc geodynamic setting where a submarine volcanic arc was undergoing extension and likely developing a back-arc rift. Geochemical alteration indices reveal that a pre-metamorphic sericite-chlorite-pyrite mineral assemblage formed along with ore-forming hydrothermal circulation. These results are currently being prepared for publication in peer-reviewed journals.

Geology the Eisenbrey Zn-Cu-Pb Deposit, Rusk County, WI
Nathaniel Jackson, Bruno Henrique De Moura Merss
Faculty Mentor/Collaborator: Robert Lodge
Poster #205

The primary objective of this research is to study the geological characteristics of the poorly understood Eisenbrey Zn-Cu-Pb deposit in Rusk County, Northwestern Wisconsin. Volcanogenic massive sulfide (VMS) deposits are significant sources of metals such as zinc, copper, lead, silver and gold in the form of sulfide minerals. Despite the proximity of the
Eisenbrey deposit to the more infamous, past-producing Flambeau Cu-Au VMS deposit, there has been essentially no research completed on the rocks hosting the Eisenbrey nor has there been any volcanic and tectonic linkages made to the strata hosting the Flambeau. Understanding the tectonic and metallogenic framework of the Eisenbrey and any potential genetic relationship to the Flambeau deposit will significantly improve our understanding of the Precambrian geology of northwestern Wisconsin. Initial phases of research included re-logging and sampling of historic drill core collected during mineral exploration. The samples of the metalliferous ores and their host rocks are currently being analyzed to determine their petrographic and geochemical characteristics and to re-interpret the economic geology of this region.

**Infrared Spectroscopy of Quartz and Feldspar in Alpine Hydrothermal Veins**

**William Fitzpatrick, Eric Brinza, Steven Brost**

*Faculty Mentor/Collaborator: Phillip Ihinger*

With the aim of discerning fluid conditions present during hydrothermal activity associated with Alpine metamorphism, we present new results on the abundance and distribution of hydrous impurities in co-crystallizing hydrothermal feldspar and quartz crystals. The crystals were extracted from a hydrothermal vein in the Lepontine Zone of the Swiss Alps. Gemmy specimens of coexisting albite (Na-feldspar) and quartz are analyzed using infrared spectroscopy at high spatial resolution (100-μm spot sizes). We note the presence of distinctive absorption bands associated with each mineral type. We observe absorption at 3450, 3270, and 3100 cm⁻¹ in all spot analyses of feldspar wafers. The abundances of the three bands range over an order of magnitude (100-1400 Abs/m at 3450 cm⁻¹; 30-600 Abs/m at 3270 cm⁻¹; and 20-200 Abs/m at 3100 cm⁻¹) and co-vary smoothly with one another as our analytical traverses approach and cross structural features, including cleavage fractures and twin planes. Within the quartz crystal, abundances of HOH, LiOH, and AlOH (at 3400 cm⁻¹, 3380 cm⁻¹, and 3480 cm⁻¹, respectively) also covary with one another. We explore the potential that infrared measurements have for discerning variations in fluid conditions present during and subsequent to crystal growth.

**Mapping the Precambrian Bedrock Geology of Rusk County**

**Samuel Helmuth**

*Faculty Mentor/Collaborator: Robert Lodge*

The primary objective of this project is to create a new regional geologic map of Rusk County, Wisconsin, highlighting the characteristics of the Precambrian bedrock hosting the past-producing Flambeau Cu-Au mine and various other metallic mineral deposits in northwestern Wisconsin. An updated geologic map of this region, along with petrographic and geochemical analyses of the volcanic and intrusive rocks will help constrain the volcanic and tectonic setting and will provide an improved framework for exploring for additional metallic mineral deposits in the Penokean orogen. Over the past year, field mapping and sampling of Precambrian bedrock outcrops in the rivers, roadcuts, and quarries throughout Rusk County were completed. In addition, samples of bedrock from drill core were also obtained in regions with no exposed outcrop. Petrographic and geochemical analyses of these samples were completed to fully characterize the rocks and interpret their geologic histories. This new data was integrated with compilations of historic maps and USGS aeromagnetic surveys in ESRI® ArcGIS software in order to produce a modern, re-interpreted geological map. This new map contains additional information such as geochemical plots and photographs of samples. The project is currently being prepared for publication with the Wisconsin Geological and Natural History Survey.
New Zircon U-Pb Ages for the Choiyoi Silicic Large Igneous Province of Argentina that Define a Strong Episodic History of Magmatism and Mass Extinction in the Permo-Triassic Time
Carly Mueller, Samantha Bartnik, Adam Wiest
Faculty Mentor/Collaborator: J. Brian Mahoney
External Faculty Mentor/Collaborator: David Kimbrough, San Diego State University

Poster #175

The Choiyoi magmatic silicic large igneous province (SLIP) of central and southern Argentina and Chile (23°S–42°S) was emplaced along the eastern edge of Gondwana in Permo-Triassic time. This magmatic province qualifies as a SLIP due to: 1) aerial extent of ~500,000 km2 and variable thickness of at least two kilometers, 2) dominate rhyolite-ignimbrite composition, 3) the correlation of Choiyoi magmatism to widespread Permian ash falls, and 4) strong episodic magmatic record over ~30 m.y. The 26 new laser ablation ICP-MS zircon ages for Choiyoi rocks from two key transects in Mendoza (32°S) and San Juan (33°S) define strong bimodal age distribution with peaks at ~246 Ma and 266 Ma. The older peak dominates the distribution encompassing 20 of 26 ages that are statistically indistinguishable and which yield a weighted mean age of 265.9 ± 1.0 Ma (95% conf.). This ‘flare-up’ is documented strongly in a compilation of all available zircon U-Pb ages over the extent of the province (25°S–40°S) and the Neogene foreland basins. The ~266 Ma peak represents a short duration (1-6 m.y) of silicic volcanic activity that overlaps with several end-Permian events and extinctions, including Olson’s extinction event marking the transition from basal synapsids to terapsids.

Petrographic Analysis of the Flambeau Sulfide Ore Body
Maile Olson
Faculty Mentor/Collaborator: Robert Lodge

Poster #229

The Flambeau volcanogenic massive sulfide (VMS) deposit was the only one of several potentially economic deposits to be extracted in Wisconsin. Despite being a source of essential base and precious metals such as copper, zinc, and gold, a limited amount of research has been published on this deposit and company reports focused on the secondary enriched ore that was the only part of the ore body to have been extracted. This project is designed to examine the mineralogy, texture, and composition of the ore body and to determine the base and precious metal phases that are present in the primary ore zone. Petrographic and geochemical analyses of ore-forming minerals have helped constrain the nature and evolution of economic mineralization. The current phase of this research project has involved mineral analyses of polished thin sections of Flambeau ore samples. Using the SEM in the Materials Science Center at UW – Eau Claire, the habit of gold alloy grains have been documented. Research utilizing reflected light petrography and the SEM has improved the identification of ore minerals, their chemistry, and characterization of the precious metal mineral-hosts. The data gathered here is contributing to a larger study that is seeking a complete a geochemical and petrographic understanding of Wisconsin’s VMS deposits.

Quantifying Grain Shape Characteristics and Fragmentation in Raw and Processed Frac Sand from Western Wisconsin
Kaelyn Blotz
Faculty Mentors/Collaborators: Geoffrey Pignotta, J. Brian Mahoney

Poster #228

Different sand formations, including the Wonewoc and Jordan, are mined in western Wisconsin in part for frac sand, which is used in hydraulic fracturing for hydrocarbon extraction. Health...
Concerns regarding frac sand mining exist in part due to the possible presence of fine grained respirable silica, which if inhaled by human lungs in high volumes over extended periods of time could cause a respiratory condition known as silicosis. One possible source for this respirable silica could be fracturing and fragmentation of sand grains during processing. To determine the extent of fracturing and fragmentation of sand grains, representative samples of raw and processed samples were analyzed manually and digitally. Samples were manually point-counted from different sand formations to determine a baseline for raw, unprocessed sand. Representative raw sand yield < 3.2% fractured grains while representative processed sand yield < 3.7% fractured grains. To further quantify characteristics of raw and processed sand including degree and size of fragmentation, digital image analysis techniques were utilized to examine grain shape characteristics, such as roundness, sphericity, circularity, and roughness. Comparing digital and manual results shows statistical similarity between the two methods. Digital image analysis allows for a rapid and more statistically robust of grain shape.

**Schematic Illustration of Evolving Tholeiitic and Calc-Alkaline Magmatic Systems: New Models**

Eric Brinza

Faculty Mentor/Collaborator: Phillip Ihinger

Poster #120

The dramatic contrast in the geochemical evolution of tholeiitic and calc-alkaline magmatic systems has remained an enigma since their original characterization nearly a century ago. Recently, two new models that describe the evolution of each magma type have been developed that explain the enigmatic features observed in the classic intrusions of each magma type (Ihinger, 2015). The long-standing paradoxical observations within the tholeiitic Skaergaard (Greenland) and the calc-alkaline Shonkin Sag (Montana) intrusions are now understood to represent magma chambers wherein evolved felsic liquids have buoyantly segregated from a host residual crystal mush. Here, we present our efforts using Adobe Illustrator to schematically illustrate the processes that lead to the geochemical and textural variations observed in the crystallized intrusions. We support these illustrations with actual thin-section photomicrographs taken from the intrusions. Our images document the evolving geochemistry of both residual liquid and complementary crystal phases throughout the duration of crystallization. Our representations capture the details of the chemical evolution and show the roles that the processes of crystallization, liquid immiscibility, and compaction play in the development of each magma intrusion.

**Severe Weather Siren Protocol in Eau Claire: Does It Produce Intended Responses?**

Jacob Larson, Lucy Horst, Kyle Tollefson

Faculty Mentor/Collaborator: Scott Clark

Poster #145

This study was conducted to investigate UWEC students’ knowledge, perceptions, and behaviors (KAB) of outdoor siren alerts in the City of Eau Claire. The city activates outdoor warning sirens whenever the National Weather Service issues a severe thunderstorm warning or a tornado warning for the city. The same sound is used for both severe thunderstorm and tornado warnings. Our hypothesis is that this practice may lead individuals to dismiss the potential risks associated with an approaching storm if they have repeatedly heard the sirens for storms that did not produce any strong winds or damaging hail. A Qualtrics survey was sent to students enrolled in six introductory geology courses. The survey asked students about their KAB related to the city’s outdoor sirens. Coding of responses revealed that many students are confused or do not know
why the sirens are activated. The use of the same warning sound for severe thunderstorms and for tornado warnings causes students to take all siren alerts less seriously. If the city used different sounds for each, students state they would respond appropriately for tornado warnings, but not for severe thunderstorm warnings. Warnings of severe thunderstorms need to be taken as seriously as tornadoes. We recommend that the City of Eau Claire invest efforts into improving the public’s awareness of the warning siren protocol and into explaining why severe thunderstorms need to be taken as seriously as tornadoes.


Samantha Bartnik, Adam Wiest, Carly Mueller

Faculty Mentor/Collaborator: J. Brian Mahoney

Integrated stratigraphic, sedimentologic, geochronologic and thermochronologic analyses of Neogene sedimentary successions yield a high fidelity record of organic exhumation and basin inversion within the retroarc foreland basin of the south central Andes. Neogene synorogenic strata of the Cacheuta basin record episodic sediment flux produced during eastward thrust belt propagation. Initial basin subsidence is constrained as Early Miocene (19.20 ±0.26Ma) by U/Pb geochronology on a tuffaceous sandstone near the base of the succession. Provenance analysis identifies detrital contributions, in decreasing order of abundance, from syndepositional Miocene volcanism, Cordillera Frontal (PermoTriassic clasts and detrital zircon), Precordillera, Cordillera Principal and Cordillera Costal (JuraCretaceous zircon). Sediment influx and depositional rate vary systematically upsection, with the highest sedimentation rates reflecting elevated volcanism and rapid accumulation of tuffaceous sediment, and lower sedimentation rates corresponding to progradation of conglomeratic units dominated by Cordillera Frontal rhyolite, Precordillera metasedimentary clasts, and, Cordillera Principal carbonate and conglomerate clasts. Detrital apatite (U-Th)/He thermochronology records the initiation of rapid basin inversion at ~4-5 Ma. Detrital apatite (U-Th)/He ages in strata younger than ~9.7 Ma match syndepositional zircon U/Pb ages, and apatite ages in strata older than ~9.7 M progressively decrease downward, and are consistently younger than volcanic tuff U/Pb ages.

**Geology and Materials Science Center**

**Surface Water and Groundwater Chemistry of Western Wisconsin: Establishing an Environmental Baseline**

Samantha Bartnik, Adam Wiest, Carly Mueller

Faculty Mentors/Collaborators: J. Brian Mahoney, Stephen Sellwood, Laurel Mc Ellistrem

The primary objective of this investigation is to conduct the first comprehensive analysis of surface water and groundwater chemistry throughout western Wisconsin. This analysis will establish an important environmental baseline that documents background variations in dissolved metal content in surface water and groundwater throughout the region. This environmental baseline is essential for accurate assessment of potential public health risks and identifying the source of these metals. These data are vital to the development of reasonable and responsible environmental safeguards that will facilitate economic growth and sustainable development of the silica sand industry while protecting water resources in western Wisconsin. This investigation focuses specifically on concentrations and mobility of metals that are naturally occurring in
geologic units in western Wisconsin. The study area encompasses surface water sampling sites between Barron and Tomah, Wisconsin, northeast of the Mississippi River and southwest of Medford, Wisconsin, in the northeastern upper Mississippi River watershed. The baseline established by this investigation is critical for the development of regulations on Nonmetallic Mining Operations in Wisconsin, and the results of this investigation will be of considerable interest to regulatory agencies (i.e. WDNR), scientific organizations (i.e. WGNHS and USGS), environmental groups, the silica sand industry, and the general public.

Materials Science Center

Characterization of Mechanical Properties of $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ Superconductor through Scanning Electron Microscopy
Alexandra Putney, Sarah Sortedahl, Christopher Hopp, Gavriel DePrenger-Gottfried, Tanner Olson, Grant Hawkins
Faculty Mentor/Collaborator: Matthew Jewell

$\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ (Bi-2212) is an emerging superconducting material that can be used to create superconducting magnets. In Bi-2212 wire, brittle superconducting filaments are embedded in a soft silver matrix and despite its outstanding electrical properties, it has weak mechanical behaviors. To make large magnets, a more mechanically durable Bi-2212 wire with preserved electrical properties is needed. Here, Bi-2212 filaments were analyzed with a scanning electron microscope in order to understand how these delicate filaments degrade under mechanical testing. The wires used in this study were tested under compressive, tensile, and cyclic strains. It was found that under compression, Bi-2212 filaments buckle and crack as soon as the strain is applied which degrades electrical properties in the wire. This degradation scales with over pressure processing condition and void content. In tension, the wire survives until ~0.4% strain and then degrades rapidly. This new knowledge about the mechanical properties of Bi-2212 will allow for the creation of a more robustly engineered Bi-2212 wire. Acknowledgments: This work was financially supported by the U.S. Department of Energy (DoE), Office of High Energy Physics (OHEP), award DE-FG02-13ER42036, and benefited from the support of the Materials Science & Engineering Center at UW-Eau Claire.

Impact of PDMAEMA Molecular Weight on Smart Properties of mPEG43-block-PDMAEMA
Brianna Shoulak, Elizabeth Stubbs, Phillip Conor
Faculty Mentor/Collaborator: Elizabeth Glogowski

“Smart” polymers have the potential to be used in a variety of applications ranging from enhanced oil recovery to drug delivery. Smart polymers are polymers that change properties in response to an external stimulus such as pH and temperature. By changing polymer structure, “smart” polymer properties can be tuned. A set of smart diblock copolymers of poly(ethylene glycol)-block-poly(2-dimethylaminoethyl methacrylate) was synthesized with a controlled ratio between the two blocks. Smart properties were tested using ultraviolet-visible spectroscopy and dynamic light scattering. The cloud point, the temperature at which PEG-PDMAEMA goes from being water soluble to insoluble, was determined as a function of polymer concentration, pH, polymer molecular weight, and buffer concentration. The results to date of the thermoresponsive testing will be explained as well as how polymer structure relates to the smart properties of PEG-PDMAEMA. With fine-tuned control over the structure and smart properties
of PEG-PDMAEMA, this smart polymer has potential for uses in applications such as enhanced oil recovery and drug delivery.

**Investigating Metallographic Sample Preparation Techniques for Bi$_2$Sr$_2$CaCu$_2$O$_{8+x}$ Superconductor Wire**  
Sarah Sortedahl, Alexandra Putney, Christopher Hopp, Tanner Olson, Gavriel DePrenger-Gottfried  
Faculty Mentor/Collaborator: Matthew Jewell  

Ongoing advances in high energy physics depend on developing superconducting magnets capable of producing magnetic fields in excess of 20 Tesla. Superconducting Bi$_2$Sr$_2$CaCu$_2$O$_{8+x}$ (Bi-2212) is a strong candidate material and available as a round wire containing brittle superconducting filaments embedded in a soft silver matrix. However, the wire performance can degrade during operation due to filament fracture. In this study, a series of sample preparation techniques were developed to study the microstructure of Bi-2212 wire in order to understand how Bi-2212 responds to mechanical loading. It was found that deep etching the silver is a gentle method to observe Bi-2212 filaments both internally and externally. Additionally, our improved vibratory polishing techniques remove material from the wire gently, while a new attack polish is a quick and effective method that etches the silver and polishes the filaments concurrently. Each of these methods allows for a different view of the B-2212 filaments. This systematic study provides confidence for the subsequent analysis of these brittle Bi-2212 wires.

**Acknowledgments:** This work was financially supported by the U.S. Department of Energy, Office and High Energy Physics, award DE-FG02-13ER42036, and benefited from the support of the Materials Science & Engineering Center at UW-Eau Claire.

**Smart Polymer-Grafted Silica: Synthesis and Characterization**  
Maria Brandel, Erik Engness  
Faculty Mentor/Collaborator: Elizabeth Glogowski  

Colloidal particles have properties based on size and have the potential to better explain molecular systems. Smart polymers are chains of repeating subunits that have the unique ability to change properties based on an external stimulus such as temperature or pH. Our goal is to synthesize and characterize smart polymer-grafted colloidal silica particles in order to observe a combination of properties from both systems. Silica particles were synthesized using the Stӧber growth process, which allowed for controlled particle growth around a fluorescent dye. Atom transfer radical polymerization (ATRP) was used to graft the smart polymer, poly(2-(dimethylamino)ethyl methacrylate) (PDMAEMA), from functionalized silica particles. PDMAEMA is a known smart polymer that changes its polarity based on temperature, pH, and molecular weight. To confirm polymer synthesis, infrared spectroscopy and gel permeation chromatography were completed. The use of confocal laser scanning microscopy allowed imaging of the polymer-grafted particles through both time-scans and z-scans. These scans enabled observation of particle movement in 3D as the temperature and pH were changed. Observations concerning the synthesis and behavior of smart polymer-grafted silica can be can used for applications ranging from 3D printing to enhanced oil recovery.
**Strength Distribution of Individual Nb3Sn Filaments with Partially Unreacted Cores**

Sam Schultz  
Faculty Mentor/Collaborator: Matthew Jewell  
External Student Collaborator: Max Dylla, Northwestern University  
Poster #144

Nb3Sn cable-in-conduit superconducting wires are being used in magnet systems for experimental fusion reactors. The Nb3Sn brittle filaments inside these wires can crack due to the high Lorentz forces generated during magnet operation; these cracks degrade the superconducting properties of the wires. Filaments are also more prone to premature fracture when they contain unreacted cores, which are present due to variability in the heat treatment of the wire. Here, individual Nb3Sn filaments with unreacted cores were tested under tensile stress to generate a fracture strength distribution. Filaments broke at an average of 1.24 grams of force (315 MPa stress) with a standard deviation of ±1.02 grams. After fracture, SEM analysis and an elliptical model were used to determine the cross sectional area of each broken filament. In addition, filament heads were analyzed and unreacted core cross sections were calculated based upon total filament area. Stress values were then calculated for individual filaments. Compared to filaments without unreacted cores, these filaments broke at around 0.8 grams for force (200 MPa) less than their counterparts. These results demonstrate that the unreacted cores are detrimental to the mechanical behavior of the wires, and the fracture toughness of the wires can be improved by more aggressive heat treatment.

**Synthesis and Characterization of a Reversible and Tunable Smart Polymer**

Charles Lindberg, Elizabeth Laskowski, Elizabeth Stubbs  
Faculty Mentor/Collaborator: Elizabeth Glogowski  
Poster #143

From smart phones to shoes, polymers have been integrated into a large number of consumer products due to the vast array of applications that polymers have. A subset of polymers, called smart polymers, can modify their properties in response to their surroundings. The diblock copolymer poly(ethylene glycol)-block-poly(2-(dimethylamino)ethyl methacrylate) (PEG-PDMAEMA) is of particular interest due to its ability to reversibly change the polarity of its PDMAEMA half. This smart polymer is synthesized using Atom Transfer Radical Polymerization (ATRP) where a number of variables in the synthesis were systematically altered to test the effects they had. Some of these variables included the ratio of PEG to PDMAEMA, the ligand used, and the length of time allowed for synthesis. Various characterization methods including Dynamic Light Scattering, UV-Visible Spectroscopy, and Fluorescence Spectroscopy were used to test the smart properties of the polymer and their relationships to temperature, pH, and ionic strength. The primary smart property observed was the cloud point and how it could be adjusted by modifying the molecular weight of the PDMAEMA half or the pH and ionic strength of the surroundings. Some applications of PEG-PDMAEMA that take advantage of these tunable properties include enhanced oil recovery and drug delivery.

Poster #235 withdrawn

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Physics and Astronomy

A Finite Element Model of Kubrick Mons, Charon
Jason Grubish
Faculty Mentor/Collaborator: Paul Thomas

With the recent mission involving NASA’s New Horizons spacecraft to Pluto, many high definition photos have been making their way back to Earth. Such photos include the vast landscapes of not only Pluto, but also its moon Charon. One of Charon’s unique features, Kubrick Mons, is a large mountain sitting in a moat. This new finding has brought about questions concerning the formation of this geological feature. We present the results of a finite element model for the formation of the moat feature of Kubrick Mons using NairnFEAMPM software provided by John A. Nairn of Oregon State University. The size and extent of the moat constrain material properties for the shallow subsurface of Charon.

General Ideas of Organic Light Emitting Diodes and Relevant Designs of Laboratorial Equipment
Luogen Xu
Faculty Mentor/Collaborator: James Rybicki

General Ideas of Organic Light Emitting Diodes and Relevant Designs of Laboratorial Equipment Organic electronics are a promising new option for optical technology. Organic light emitting diodes (OLEDs) can be fabricated at low cost and printed on flexible displays. They can be chemically tuned to produce any desired wavelength of light and their viewing angle is greater than that of their inorganic counterparts. They also have been shown to have interesting magnetic field effects which open up the possibly for new applications. To study our OLEDs optical, electrical, and magnetic properties a specialized mount had to be designed. This was done using a cloud-based computer-aided draft (CAD) program, OnShape. By using OnShape, we were able to address the technical requirements for measurement, study the mechanical feasibility of our proposed design, and consider its integration with equipment already in place in our laboratory all prior to construction. In addition, we also took into account design materials which would not alter measurements of magnetic field properties.
**How Does the Presence of Extrasolar Planets Affect the X-Ray Output of Hot Stars?**

**Dylan Easterla**  
Faculty Mentor/Collaborator: **Nathan Miller**  
Poster #151

Our perception of the universe has changed drastically within the past decade due to new advancements in astronomical telescopes and exoplanet search methods. The recent surge in exoplanet discoveries has given rise to many new questions regarding the properties of our universe and stellar activity. In this project, we investigated exoplanets orbiting OB-type stars because most research so far has focused on the exoplanets orbiting sun-type stars. Using the NASA Exoplanet Archive containing all confirmed exoplanet discoveries to date, our goal was to investigate the possible effect of exoplanets on the X-ray output of OB-type stars. Spectral types were not always available in the Archive, so we applied de-reddening techniques to determine if any of the exoplanets have OB-type host stars. However, our search did not reveal any clear OB star candidates in the exoplanet archive. It is currently unclear whether OB stars truly lack planets or whether some may be detected as a larger number of stars are studied in detail. As a way of exploring the ramifications of any future discoveries of these planets, we modeled the effects of planets on the winds of O and B stars having a variety of stellar, planetary, and wind parameters.

**Magnetoresistance in Single Carrier Organic Light-Emitting Diodes**

**Austin Riedl**  
Faculty Mentor/Collaborator: **James Rybicki**  
Poster #180

Organic electronics are a promising emerging technology. They are of particular interest to the scientific community and industry because organic devices can be produced with flexible screens which have better picture quality and are more energy efficient than traditional devices. In addition to these desirable properties, these devices exhibit organic magnetoresistance (OMAR). This means that the electrical resistance of the organic device changes when a magnetic field is applied. The underlying mechanism of OMAR is not yet fully understood, but there are two leading models attempting to explain OMAR, the electron-hole model, which requires two charge carriers, and the bipolaron model, which requires only a single charge carrier. We hypothesize that the OMAR we observe is a combination of both effects. The goal of this project was to isolate the effects predicted by the bipolaron model by creating single charge OLED devices, whose OMAR could then be compared to that of regular devices, which contain two charge carriers. We find that the single carrier devices exclusively display a positive OMAR effect, while regular devices exhibit both positive and negative effects. This is consistent with the bipolaron model, which predicts positive magnetoresistance due to spin blocking.

**Rayleigh-Bénard Convection: Simulation vs. Experimental Results**

**Aaron Kaufman, Sarah Kintner**  
Faculty Mentor/Collaborator: **Paul Thomas**  
Poster #165

This project uses infrared camera technology to explore the Rayleigh-Bénard convection model through experimental and computer modeling. The Rayleigh-Bénard convection model describes convection currents that organize in fluid that is heated from below; a regular pattern of convection cells, known as Benard cells, are characteristic of this model. Warm water is less dense than cool water and consequently rises; as the warm water cools, it loses density and begins to sink. The system self-organizes into multiple Benard cells, each driven by density currents of warm water rising and cool water falling. This project is based on a 2-D model of...
Rayleigh-Benard convection. Use of an Infrared camera (λ=7.5-13μm) allows researchers to compare computer models with experimental data. Infrared radiation, part of the electromagnetic spectrum, is emitted from objects as a function of temperature. The experiment will be conducted in a thin fish tank, to emulate 2-D and to permit transmission of infrared radiation. The back, sides, and top of the tank are constructed of infrared resistant objects, while the front viewing window is constructed of infrared transparent material. Both the simulation and experimental setup consider a fluid heated from below. This project presents a comparison of simulation and experimental result.

**Self-Navigation Robot Using 360 Sensor Array**

Marissa Zaleski, Nicolas Tremain, Alexander Kukay, Dylan Easterla, Jason Grubish

Faculty Mentor/Collaborator: Kim Pierson

Poster #164

The goal of this project was to develop a robot that can navigate through an environment with many obstacles using a sensor array that provides a 360 degree view of its surroundings. The sensor array consists of infrared and ultrasonic distance sensors. Four sensor arrays are swept in an angular pattern to provide a complete view of the robot's surroundings. Each type of distance sensor has its own unique attributes. The data from the two sensors must be combined using a mathematical calibration algorithm to take advantage of each sensor's specific characteristics. The unique aspects of this project are the navigation program and the sensor calibration algorithm.

**Watershed Institute**

**Optimizing the Sensitivity of Particulate Silica Quantification by Molybdenum Blue Absorbance Spectrometry**

John Tum, Ethan Fuhrman, Emily Wagner

Faculty Mentor/Collaborator: James Boulter

Poster #204

This project entails the development of a novel analytical method for quantifying respirable, airborne silicon containing particles. Many previous studies utilized the reduction of heteropoly acids to molybdenum blue as a highly sensitive spectrometric absorbance technique to quantify a variety of environmental analytes including, phosphorus, arsenic, and silicon. We are optimizing this molybdenum blue method for silicon by varying key factors influencing its sensitivity including pH and fluoride ion. Optimized values will simplify our analytical method and provide increasingly sensitive and accurate results for all sample types. The optimized approach to heteropoly acid formation will subsequently be modified to exploit chemiluminescence detection for still greater sensitivity. NIOSH estimates a limit of detection (LOD) of 10 μg SiO2 for the molybdenum blue analysis of silica. We estimate our proposed chemiluminescence instrument to have an LOD on the order of 0.5 μg SiO2, enabling sampling times of less than an hour to reach the proposed OSHA personal exposure limit of 50 μg/m3. Potential applications of such measurements include air monitoring in environmental and industrial settings from shipbuilding to petroleum extraction.
The purpose of this research project is to develop a new quantitative investment approach suitable for the student-managed investment fund (SMIF), a pool of real money which business students invest as a learning experience. We examine relative returns, transaction costs, and volatilities of an array of investment strategies such as value, size, momentum, and quality using the Bloomberg Terminal. We then propose a new composite strategy that would have outperformed the S&P 500 Index during both market upturns and downturns. By implementing the new approach, the student participants in the SMIF program can gain some exposure to quantitative approaches commonly used by mutual fund and hedge fund managers. In addition, they should be able to build the portfolio more quickly at the beginning of the academic year. Last but not least, while the primary goal of SMIF is to provide practical training, the new approach also offers the possibility of superior returns comparable to professional fund managers.

Throughout college, it is critical to be involved in organizations to define oneself, develop relationships, and build resumes (Holzweiss, Rahn, & Wickline, 2007). To influence students' involvement, organizational leaders need to maximize a sense of community and minimize the factors that cause people to leave organizations (Nepstad, 2004). Studies show that the stronger the organizational identification of coworkers, the more likely they are to stay (Apker, Propp, & Zabava, 2009). Based on Social Identity Theory (Hogg, 1988) and linguistic studies, leadership language impacts members' feelings of organizational identification (Horney, Blackwood, & O'Brien, 2005; Mayfield, 2009). This study aims to discover whether the use of inclusive language within one career-focused and one faith-based organization is associated with members' organizational identification, and whether or not the nature of an organization determines the relationship between inclusive language and organizational identification. In addition, the study will analyze the rhetoric used in these organizations' meetings and on their websites to determine the use of inclusive language. It is expected that high levels of inclusive language by the leadership of an organization will be associated with stronger levels of members' organizational identification.
Analyzing Employee-Centric and Culturally Indicative Messages In Corporate Rhetoric
Matthew Wickert, Molli Bichrt, Carissa Vinck, Mary Christensen, Amy Greene
Faculty Mentor/Collaborator: Martha Fay
Poster #103

Mission statements have been utilized to provide an organization with strategic direction, balance demands of an assortment of stakeholders, and provide motivation to members (Desmidt & Heene, 2007). Research has shown that customers are the most frequently cited stakeholder group, emphasizing the external orientation of mission statements (van Nimwegen, Bollen, Hassink & Thijssens, 2008). However, little research has been conducted to explore the inclusion of employees within company mission statements. According to the stakeholder dependency theory, stakeholders on which an organization is most dependent should be recognized within that organization’s mission statement. Using this theory, the present study examines the public literature of five Fortune 500 organizations for the purpose of quantifying and analyzing employee-centric messages and programs. This study also examines the public rhetoric of these organizations that determines cultural type and its relationship to employee-centric messages.

Effects of Hidden Voice on Perceptions of Leader Communication Competency and Credibility in a Politically Charged Environment
Nicholas Ferch, James Ebben, Jacob Wrasse
Faculty Mentor/Collaborator: Martha Fay
Poster #77

Communication Accommodation Theory (CAT) posits that when people interact with different populations they change their vocal patterns and behaviors to match the group with which they’re communicating. Gasoriek (2015) applied CAT to interactions between stakeholders and the powerful, finding an association between the speaker’s credibility, communication style, and perceived level of accommodation. This may be extended to the analysis of political negotiations, where observers can often detect ‘hidden voice’, or communication lapses that indicate a previous private conversation is affecting the conversation at hand (Shenhav, 2007). The politically charged environment that has surrounded the UW System’s budget issues has created an urgent need for competent leaders and credible communication, particularly between members of the legislature and leadership representing the UW System, but the confidential nature of much of the utilized rhetoric may have resulted in the employment of hidden voice. This study examines messages of leaders on two levels, state and campus, for the existence of hidden voice and its subsequent impact on the perceptions of the speakers’ credibility and communication competency.

Is Intercultural Competency Associated With College Students’ Global Awareness and Environmental Efficacy?
Claire Malchow, Katherine Allee, Brooke Meyer, Elizabeth Vouk, Carolyn Wolff
Faculty Mentor/Collaborator: Martha Fay
Poster #78

Human use of environmental resources cannot continue at the current pace without being irreversibly damaging, and sustainability is more paramount than ever (Burton et al., 2012). One factor that may impact greater awareness of this issue by future generations is exposure to knowledge and ideas which may be gained through study abroad. Because studying abroad has been linked with greater intercultural communication (IC) skills (Williams, 2005) and greater awareness and understanding in general, it is plausible to think greater intercultural competency might be associated with both greater awareness of global and local environmental issues and with behavioral intentions toward environmental issues. However, no studies have linked all of
these together. This study examines whether study abroad and intercultural competency are associated with awareness of global and local environmental issues and related behavioral intentions. Based on research that has shown a link between efficacy and environmental action, this study also tests for efficacy as a potential moderator of this relationship. Results of this study may allow environmentalists to identify individuals who will be more likely to have greater knowledge about, and positive attitudes and behaviors toward, the environment (Malkus and Meinhold, 2005), while illuminating another benefit of broader intercultural experiences.

**The Link Between Recruitment Messages and Applicant Transformational Leadership Qualities**

Cory Long, Benjamin Thompson Isaac, Shannon Carlson  
Faculty Mentor/Collaborator: Martha Fay  
Poster #129

Firms are moving toward flattened leadership structures (Wulf, 2012), allowing broader subordinate responsibilities and leadership opportunities (Powell, 2002). This creates a need for organizations to recruit individuals capable of leading at all levels of the organization (Trosten-Bloom, 2014). While these business models are important, scholarship still focuses on vertical structures, and it is possible that organizations are also lagging behind. Person-Organization fit research suggests that job seekers who desire leadership opportunities will look for evidence that leadership is valued within firms’ rhetoric. Considering 70% of organizations use websites for recruitment (Rowh, 2005; Berry 2005), it is likely that applicants will look to websites for information about what the company values in employees. Because transformational leadership (TL) has been linked with employee productivity through motivation (Middleton, 2015), alignment with company values (Piccolo, 2006), goals (Jiang & Men, 2015), and desire to excel (Shamir et al., 1993), TL should be highly valued. However, most TL studies focus on managers, ignoring non-managerial employees with leadership qualities (Wang et al., 2011). This study analyzes how five flattened firms communicate TL elements through job descriptions on their websites, to understand how firms can best attract transformational applicants through strategic messages.

**Mediation of Professors’ Sex in Relation to Students’ Ratings of Their Transformational Leadership, Charisma and Emotional Intelligence: A Comprehensive Survey**

Katie Buntrock, Zachary Gurholt, James Halverson, Paige Kuepers, Anna Lehman, Mariah Wild  
Faculty Mentor/Collaborator: Martha Fay  
Poster #76

Prior research shows a positive correlation between emotional intelligence (EI) and transformational leadership (TL) (Duckett & Macfarlane, 2003) and TL and charisma (Prati, Douglas, Ferris, Ammeter & Buckley, 2003). TL has also been positively correlated with women (Stempel, Rigotti & Mohr, 2015). However, studies have shown that these associations vary based on sex of the rater. Student perceptions of professors of the same sex have been shown to be more favorable, and past research shows same sex alignment between professors and students result in higher student ratings than cross sex relationships (Levine, Muenchen, & Brooks, 2010). Social learning theory (Bandura, 1971) would suggest that people might identify more strongly with leaders of the same sex, however this preference may not hold for people who are perceived higher in TL, EI, and charisma. This study tests previous findings on perceptions based on sex,
and examines the role that TL, EI and charisma may play in modifying these perceptions. Results of this study should increase understanding of the role that sex of raters and leaders plays in perceptions of leaders' TL, EI, and charisma.


*Jenna Jandrt*

Faculty Mentors/Collaborator: *Nicole Schultz*

Poster #234

As a campus with a current Strategic Guidepost Goal of working toward a student body that includes 20 percent enrollment of students of color, UWEC recognizes potential implicit biases inherent within institutional practices at UWEC that need to be addressed (Schmidt, 2015). This research explores student experiences with the Selma-Eau Claire Exchange Alternative Spring Break (ASB) trip, a university-supported Domestic Intercultural Immersion (DII) experience. The primary purpose of this high-impact experience is to expose Blugolds to history, activism, and nation-wide community partnerships to intentionally work to support Equity, Diversity, and Inclusivity (EDI) initiatives on campus. To explore the effectiveness of these efforts, this scholarship employs a mix-method data collection approach, including surveys of participants, field notes of research student ethnographers, and interviews with students and community partners. Results yield conclusions surrounding inherent biases, white privilege, attitudes towards race, and cultural competence. Conclusions and implications exemplify the significance of DII ASB trips in supporting the development, implementation, and embracing of EDI initiatives to impact organizational culture on campus, assessed and contextualized utilizing tenets of Social Judgement Theory (Griffin, 2006).

**Communication and Journalism and Geology**

**Finding Ways to Provide a Lifeline to SOS: Student Knowledge and Behaviors Surrounding the Student Office of Sustainability**

*Brandon Hoege, Olivia Edwards, Angela Knauf, Ella Koch, Brianna Truitt*

Faculty Mentors/Collaborators: *Evan Perrault, Scott Clark*  

Poster #75

The UW-Eau Claire Student Office of Sustainability (SOS) has a yearly budget of $200,000, and is funded completely by student segregated fees. The purposes of this research were 1) to determine if students are aware of SOS and knowledgeable about its activities; and, 2) to investigate how SOS can more effectively utilize its funding to provide the greatest return on investment for students. A survey of 779 students found about one-third were unaware that SOS exists. More than 80% did not know they (the students) completely fund this office, and about half thought its annual budget was ≤ $10,000. Most worrisome, about 57% of students said they have never seen any on-campus messaging about SOS or its activities. Of 11 key SOS-related activities (e.g., bike lease program, free water bottle distribution, e-waste recycling), the average number students were aware of was less than 3 (M=2.68). With the size of their budget and their university-wide support, SOS has an opportunity and a responsibility to more effectively educate students about sustainability. SOS will need to improve its communication efforts to make significant impacts on student awareness of how to live a sustainable life. Recommendations, based on students’ message preferences, are provided.

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**Sustainability Knowledge, Barriers, and Motivations of UW-Eau Claire Students**

**Brandon Hoege, Olivia Edwards, Angela Knauf, Ella Koch, Olivia Spiegel, Brianna Truitt**

Faculty Mentors/Collaborators: *Evan Perrault, Scott Clark*

*Poster #74*

The purpose of this study was to examine UW-Eau Claire students’ knowledge, barriers, and motivations toward sustainability. An online survey was distributed to 779 students asking four open-ended questions: First, they were asked to define sustainability, followed by why they perform sustainable behaviors, why they don’t, and what would make them perform more sustainable activities. Formal coding of responses revealed that students are primarily motivated to perform sustainable behaviors because of environmental concerns. Students indicated they fail to practice more sustainable behaviors because they perceived them to be inconvenient, don’t have the knowledge, or the time to do them. They indicated that if more information was provided to them about the efficacy of their efforts, or if sustainable activities were made more affordable to perform, that would increase their behavioral prevalence. Students most commonly defined sustainability as a means to “maintain.” Many definitions also related to “the environment,” while disregarding both social and economic factors. These results indicate that further refinement of campus sustainability messaging needs to take place. Definitions of sustainability on collateral material need greater explication, and barriers to students performing sustainable behaviors need to be removed.

**Communication Sciences & Disorders**

**Immersion Learning at Aphasia Camp: Analyzing Student Video Reflections**

**Terah Homolka, Seemah Gunasagaran**

Faculty Mentors/Collaborators: *Jerry Hoepner, Thomas Sather*

External Faculty Mentors/Collaborators: *Mary Beth Clark, Mayo Clinic Health Systems, Michele Knutson, Mayo Clinic Health Systems*

*Poster #233*

There is an increasing emphasis on the importance and value of immersion experiences at the collegiate level. The Chippewa Valley Aphasia Camp is a multi-day immersive experience during which students participate in meaningful conversations with individuals with aphasia and their partners. As a partnership between Mayo Clinic Health System – Eau Claire and the University of Wisconsin – Eau Claire, the camp provides reciprocal benefits to students and individuals affected by aphasia. Student volunteers participated in the camp weekend by supporting adults with aphasia, and by helping to facilitate communication, participation, and relationships. Each evening of the camp, students reflected on the day's experiences by recording themselves via iPad. Reflections on immersion experiences can facilitate application to coursework as well as to future careers. Additionally, video self-reflections are effective assessments of growth and learning. A total of 306 utterances from twenty students across three days were transcribed and coded according to nine a priori categories established by previous aphasia camp immersion research (Hoepner, Clark, Sather & Knutson, 2012). Results of this qualitative analysis support the aphasia camp as an environment that promotes student learning, growth, and application of current and future course content. Additionally, benefits of video self-reflection are discussed.
This qualitative study examines the Story Trove experience at a weekend aphasia camp. Story Troves is an interactive activity in which participants work collaboratively to create a story using artifacts in thematic troves. This study was conducted during the Chippewa Valley Aphasia Camp 2015, a participation-based weekend camp for adults with aphasia and their families in the north woods of Wisconsin. An ethnographic approach was used to document observations through field notes during story trove activities. Additional sources included camper and staff surveys, student volunteer focus group transcripts, and camp photographs. Investigators used qualitative content analyses to identify categories and themes from all sources within the Story Trove experience. This iterative process revealed a number of positive outcomes along with barriers to optimal participation. The Story Trove experience fostered genuine communication opportunities, problem solving, and interest. Factors such as time, complexity, aphasia-friendliness, caregiver role, and frustration negatively impacted the Story Trove experience. Interpreted broadly, this study provides further information to design and scaffold activities to foster success, interaction, and communication for those with aphasia in the context of aphasia camp and beyond. Future applications of experiences similar to Story Troves should take these variables into consideration.

Economics

**Eau Claire Wage and Labor Market Analysis**
Rachel Pratt, Sam Gullerud
Faculty Mentor/Collaborator: Wayne Carroll

Analyze economic conditions of Eau Claire’s labor market, and wages, in relation to other metropolitan areas in Wisconsin. From the years of 1999-2014 Eau Claire has experienced median, and mean, wages lower than metropolitan areas of similar composition in Wisconsin. We studied historical data on wages, employment, and cost of living for six metropolitan statistical areas in Wisconsin. Across the 22 employment sectors, categorized by NAICS codes, we compared the effects of labor market composition on annual mean wages, holding everything else constant, by incorporating a location quotient into the wage formula. Further, we used cost of living data from across the MSA’s to determine the magnitude of average wages by comparing standard of living. We eliminated the possibility that there were a larger number of low wage jobs in Eau Claire relative to other metropolitan areas in Wisconsin. We reject the original hypothesis that the low wages in Eau Claire were a result of the composition of the labor market.

**The Effect of an Occupation’s Detailed Characteristics on the Gender Wage Gap in the U.S.**
Joe Westenberg
Faculty Mentor/Collaborator: David Schaffer

In recent research, some economists have suggested that most of the remaining gap in wages between men and women can be explained by the fact that women choose more time-flexible, and therefore lower paid jobs than men. These jobs pay less because workers are less productive in jobs with greater time flexibility. Therefore, women are voluntarily sorting in to these jobs and
their overall lower pay is not caused by any type of gender discrimination. In fact then, there is no further need for equal pay and affirmative action public policies in regards to gender. We combine data sets from the Current Population Survey and the Occupational Information Network to analyze this. This combined data set includes more than 600,000 individuals with extensive information on their wages and work characteristics along with more than 400 characteristics of their occupations. We address one major question: does the data support this new contention? We analyze the data using a variety of modern statistical techniques, including a combination of quantile regression and principal components analysis. We find only weak support for this theory.

**Trends in Female Entrepreneurship in Vietnam**  
**Thao Tran, Beth Jacobson**  
Faculty Mentor/Collaborator: *Rose-Marie Avin*  
Poster #126

The World Bank’s Vietnam Gender Assessment of 2011 quotes research asserting “…that female owned enterprises are of special significance in transition and developing countries because they tend to employ other women more frequently, help reduce gender discrimination in the wage labor market and possibly reduce trafficking by expanding economic opportunities for women” (World Bank 2011, 60). This suggests that female-owned enterprises can play a significant role during the process of economic development by promoting economic growth, creating jobs and alleviating poverty. However, the review of the literature on female entrepreneurship in Vietnam reveals that there is little easily-accessible data available with which to measure the extent of female entrepreneurship, their contributions to the economy and the challenges that they face. In summer 2015, our research team, led by Dr. Rose-Marie Avin, conducted surveys and interviews with 46 female entrepreneurs in Hanoi, Vietnam. Through hard work and extensive collaboration, we were able to analyze the challenges and current trends of Vietnamese female entrepreneur. With the findings of our research, we hope to deepen the state of knowledge about the role of female entrepreneurs in Vietnam and contribute to policy formulation that will enhance the lives of female entrepreneurs.

**Woodman’s Food Market Altoona, WI — Economics Impacts**  
**Beth Jacobson**  
Faculty Mentor/Collaborator: *Thomas Kemp*  
Poster #128

The purpose of this research is to quantify the direct and pass-through economic impacts of the construction and operations of the Woodman’s Food Market in the River Prairie Development Project of Altoona, Wisconsin. In order to do so, land assessments, Tax Increment Financing (TIF), the Metropolitan Statistical Area (MSA), annual operational revenue, and employment numbers are acquired and taken into consideration. This research uses the IMPLAN model to estimate the economic impacts of the project considering these variables. We estimate the total economic impact, both direct and pass-through, to be $18 million during its construction phase and $35 million annually in the years following. Significant local pass-through economic impacts are expected in the retail and medical sections as a result of the Woodman’s project. Total state and local tax impact is projected to be $3.8 million annually with the majority of additional revenue being general through property and sales taxes. The researchers recommend future study on the reduced demand of the pre-existing businesses that this project will affect. Additionally, the Wisconsin Tax Increment District (TID) law contains some limitations that could be investigated.
Economics and Management and Marketing

Does Access, Repeated Exposure, Encouragement and Praise Increase Children's Consumption of Vegetables for School Snack?

Joseph Hunt, Anna Hamer, Kjirstin Martell, Matthew Pergolski

Faculty Mentors/Collaborators: Eric Jamelske, Sydney Chinchanachokchai

Poster #106

Fruit and vegetable consumption has been shown to improve health and reduce the risk of a variety of costly chronic diseases. However, poor nutrition among children, including low fruit and especially low vegetable intake persist. As a result, increasing children’s fruit and vegetable consumption has become an important focus among practitioners, policymakers and researchers. This research uses data from students in twelve classrooms in two Seattle, WA elementary schools (N=300) from their implementation of the USDA Fruit and Vegetable Program. We measure consumption of five vegetables; cucumber slices, celery sticks, pepper slices, salad greens and assorted roasted vegetables for school snack. Consumption of these five items is recorded by teachers/parent volunteers across six servings over several months for each child. This presentation compares consumption in classrooms using different delivery snack delivery methods. Specifically, intake in classrooms where the vegetable snacks were simply made accessible in repeated servings are compared to intake in classrooms where the vegetable snacks were made accessible in repeated servings and snack time was also part of an intentional experience/intervention including encouragement/praise from the teacher. Our work addresses an important issue with meaningful public health and public policy implications and thus should be of broad interest. We are just beginning our data analysis and thus do not have any results to include at this time.

Tracking the Use of Free Fruit and Vegetable Coupons Given to Families and Assessing the Impact on Children’s Consumption

Lorena Garceau, Joshua Bodnar, Ryan Mikula, Levi Soborowicz

Faculty Mentors/Collaborators: Eric Jamelske, Sydney Chinchanachokchai

Poster #107

Fruit and vegetable consumption has been shown to improve health and reduce the risk of a variety of costly chronic diseases. However, poor nutrition among children, including low fruit and vegetable intake have contributed to rising rates of obesity among U.S. children which have been shown to persist into adulthood. As a result, increasing children’s fruit and vegetable consumption has become an important focus among practitioners, policymakers and researchers. There is a variety of evidence from research showing that school-based interventions can increase children’s fruit and vegetable consumption. However, most studies reveal only modest gains in the short term. This project was designed to influence children to eat more fruits and vegetables at home by providing free fruit and vegetable coupons to parents. We examine the coupon redemption rate and whether students whose families redeemed the coupons showed an increase in fruit and vegetable intake. Participants in this study included 121 students in fourth grade classrooms in two Western Wisconsin elementary schools. Out of more than 7,000 $1 coupons, less than 2,000 (27.1%) were redeemed by families. Using self-report surveys timed to match coupon availability we find only modest increases in fruit and vegetable intake for children whose families redeemed the coupons. We also explore reasons and implications for these results. Our research may also have policy implications for the Supplemental Nutrition Assistance Program and the Women, Infants and Children Program.

Undergraduate Poster Presentations 93
Economics and Watershed Institute and Communication and Journalism

**Climate Change Denial and Skepticism in China and the United States: Evidence from a Topic Prevalence Analysis of Open-Ended Survey Question Responses**

**Paul Cooper, David Hahn, Tung Nguyen**

Faculty Mentors/Collaborators: *Eric Jamelske, James Boulter, Won Jang*  Poster #109

The importance of global climate change in society cannot be overstated. Specifically, China and the United States share prominent roles in the development of international climate change mitigation strategies. Citizen opinions are crucial for policy action to mitigate climate change to occur. However, due to the complexity of the issue, public views are diverse and can be uninformed or misinformed. There is evidence that American opinions on climate change are influenced by sources advocating denial/skepticism. To better understand public views on climate change, we analyze responses to the open survey question “what comes to mind when you hear the words ‘climate change’?” Surveys were conducted of Chinese and American citizens from May – October 2015 (N=7,556). We investigate the frequency that words/topics associated with climate change denial and/or skepticism appear in American and Chinese responses respectively. We also examine what respondents’ views, beliefs, and characteristics other than nationality are related to comments associated with denial/skepticism and analyze common themes found in these comments. Preliminary results indicate a greater frequency of statements indicating denial/skepticism from American respondents which is consistent with their significantly lower acceptance of climate science in other survey results compared to Chinese respondents. These results also both correlate with American respondents’ political affiliation. Our work addresses a timely and important issue with meaningful public policy implications and thus should be of broad interest.

**A Continuing Analysis of Chinese and American Public Support for an International Climate Change Mitigation Treaty**

**Ryan Hammer, Hunter Hermes, Emily Koehn**

Faculty Mentors/Collaborators: *Eric Jamelske, James Boulter, Won Jang*  Poster #108

The importance of global climate change in society cannot be overstated. Specifically, China and the United States share prominent roles in the development of international climate change mitigation strategies. Surveys were conducted of Chinese and American citizens from May – October 2015 (N=7,556). We investigate support for signing an international climate treaty and what factors influence support for a treaty in each country. We use two questions randomized across respondents specifically referring to the 2015 United Nations Framework Convention on Climate Change meeting in Paris, France. One question is unconditional with no mention of the other country, while the other is conditional on knowing the other country will not sign the treaty. Our results show greater support for an international climate treaty among Chinese respondents. Support diminishes in both countries when it is known the other country will not participate. Almost two-thirds of Americans support signing a climate treaty with no mention of China, while just over 50% support a treaty without China’s participation. Additionally, a variety of variables reflecting climate change perceptions are positively correlated with support for a climate treaty in both countries, while political affiliation influences support among Americans. Our work addresses a timely and important issue with meaningful public policy implications and thus should be of broad interest.

94 Undergraduate Poster Presentations
A Continuing Analysis of Chinese and American Public Willingness to Pay for Climate Change Mitigation Policy Action
Helue Vazquez Valverde, Gregory Sikowski
Faculty Mentors/Collaborators: Eric Jamelske, James Boulter, Won Jang  Poster #125

The importance of global climate change in society cannot be overstated. Specifically, China and the United States share prominent roles in the development of international climate change mitigation strategies. Surveys were conducted of Chinese and American citizens from May – October 2015 (N=7,556). We investigate willingness to pay for an increased cost of living arising from policies putting a price on greenhouse gas emissions to mitigate climate change. We also examine what factors influence willingness to pay in each country. We employ a double-bounded dichotomous choice contingent valuation framework with five randomized initial bid values, followed up by specific second bid values based on the initial bid value response. All monetary values are considered in both home country currencies and international dollars converted using purchasing power parity. Our results show a higher willingness to pay for climate change mitigation policy action among Americans compared to the Chinese. However, adjusting for purchasing power parity reveals a significantly higher willingness to pay among the Chinese. Additionally, a variety of variables reflecting climate change perceptions are positively correlated with willingness to pay for climate change mitigation in both countries, while political affiliation influences willingness to pay among Americans. Our work addresses a relevant issue with meaningful public policy implications and thus should be of broad interest.

Management and Marketing

Analyzing the Relationship between Hospital Readmissions and Patient Satisfaction Using the Hospital Consumer Assessment of Healthcare Providers (HCAHPS) and Hospital Compare Data
Justin Teal
Faculty Mentors/Collaborators: Kevin Hansen, Jennifer Johns-Artensi
External Faculty Mentor/Collaborator: Melissa Castora-Binkley, University of South Florida  Poster #116

Research currently analyzes quality in hospitals with indicators directly related to patient care. Newer studies have argued for more quality measures, including readmission rates and patient satisfaction. To date, no study analyzes whether a relationship exists between readmission rates and rates of patient satisfaction. The current analyzes whether patient satisfaction, measured using the Hospital Consumer Assessment of Healthcare Providers (HCAHPS) data, is correlated with readmission for cause-specific readmissions rates (e.g., heart attack, heart failure, pneumonia, chronic obstructive pulmonary disease, stroke, hip/knee surgeries), measured in the Hospital Compare dataset available from the Centers for Medicare and Medicaid Services (CMS). The current study evaluates Midwest hospitals, based on 2011 – 2014 HCAHPS and CMS Hospital Compare data to determine if specific patient satisfaction survey scores appear to impact cause-specific readmission rates greater than other survey scores. Analyses will determine if hospital characteristics (e.g., profit status, provision of emergency services) correlate with patient satisfaction and readmission. Public policy implications will be discussed in the study, incorporating these results, with the goal of informing measures related to cause-specific readmissions and efforts to ensure and improve patient satisfaction with care in acute settings.
With the availability of mobile devices, consumers have a tendency to perform more than one task at a time. The purpose of this study is to examine different types of tasks in multitasking and how it affects consumer’s ability to generate ideas. Participants (N = 164) were assigned to one of four conditions (Control, Stress Ball, Doodling, Coloring). In the control condition, participants completed an idea generation task in which they listed as many creative ideas as possible for the use of a newspaper. In the Stress Ball condition, participants completed the same task while squeezing a stress ball. In the Doodling condition, participants completed the task and were also given a blank piece of paper on which they could draw freely. In the Coloring condition, participants completed the idea generation task while coloring two provided images with crayons. In the two-task conditions, they had ten minutes to complete both tasks simultaneously. The results showed that participants who squeezed a stress ball while trying to generate ideas for uses of a newspaper had the greatest number of ideas generated. While the participants in the Coloring condition reported they enjoyed the tasks the most, they had the lowest number of ideas generated.

Exploring Consumer’s Reaction in the Bad Gift Situation Across Cultures
Gracia Clark, Yooik Jo
Faculty Mentor/Collaborator: Sydney Chinchanachokchai
Poster #91

Gift exchange promotes consumptions of products. It grows into huge part of profit businesses. The current study looks at the impacts of bad gift giving across cultures, especially how Western (American) vs Eastern (Asian) consumers react when they receive bad gifts and how it would affect their relationship with the giver. It extends the understandings of gift exchange in different cultures, which international businesses can use to sell gifts in different settings that have different cultural backgrounds. Moreover, it helps to design the marketing plan and can help to promote businesses to be more precise to the needs of the customer. Students (N = 257) from a university in Thailand (Eastern culture) and a university in the US (Western culture) participated in the online study in exchange for extra credit. The results show the culture differences in gift giving behavior between collectivist and individualistic cultures, especially when they receive undesirable gifts. Although individualist culture felt that the gift was more appropriate, they seemed to put an emphasis on reciprocating the bad gift. On the other hand, collectivist culture still wanted to give something good to the giver even though they did not like what they received from them.

An Investigation of Pre-Game Entertainment: A Professional Football Context
Tomas Benzo, Jacob Pederson, Haley Rockweiler
Faculty Mentor/Collaborator: Scott Swanson
Poster #140

Sport is a major component of the American culture and a growing sector of the entertainment industry and the global economy, thus competing for the discretionary income of consumers world-wide. In business terminology, customer satisfaction measures how products and services offered by a company meet or exceed customer expectations. Customer satisfaction is crucial in the sport industry, where sport organizations focus on understanding the needs and wants of customers while working to achieve organizational goals. This project was designed to understand the perceptions of spectators towards pre-game entertainment. A structured, self-
completion questionnaire was utilized to collect primary data from spectators attending a National Football League home game. The survey instrument was constructed to solicit information in three areas: the spectator's perception of game day factors, attendance information, and demographics. Through statistical analysis we were able to determine perceptions of a variety of ancillary game day offerings and gain a better understanding of spectator behaviors and future intentions across different demographic and psychographic variables. The findings helped to decipher which pre-game events were most useful in terms of gaining fan attention and increasing customer satisfaction.

Neglect Citations in Nursing Homes: Analyzing Related F-Tags in Florida Facilities
Nathaniel Sproat
Faculty Mentor/Collaborator: Kevin Hansen
External Faculty Mentor/Collaborator: Kathryn Hyer, University of South Florida
Poster #115

This study examines neglect in nursing homes, indicated by receiving a citation for neglect (F-Tag 224), and the pattern of citations associated with its issuance. Related deficiencies include restraints, receiving necessary care, accidents and supervision, and medication errors. Using Online Survey Certification and Reporting (OSCAR) data, a nursing home dataset was created to analyze neglect and related deficiencies. To observe facilities over time, we employed generalized estimating equations to estimate the probability of mutually exclusive events (e.g., citation or no citation). Facility-level control variables included profit status, chain membership, and total number of beds. Preliminary results indicate that all eight of the selected deficiencies were associated with the issuance of a neglect citation. To further analyze citations to determine whether deficient care is systemic within a particular nursing home or directly related to a specific incident, the 2567 forms for Florida facilities cited for neglect, which are issued by the Centers for Medicare and Medicaid Services whenever a deficiency is cited to a nursing home, will be analyzed to determine residents involved with each issued citation. Given the data, a more comprehensive approach to analyzing neglect in nursing homes can be developed, including guidance provided to surveyors and facilities.

Professional Football Spectator Perceptions: A Comparison of (Non)Tailgaters
Tomas Benzo, Jeff Skaer
Faculty Mentor/Collaborator: Scott Swanson
Poster #142

A great sporting event atmosphere is often directly correlated with the level of spectator engagement. However, it is clear that there are a number of different spectator segments. The focus of this study was to identify similarities and potentially significant differences between tailgating and non-tailgating spectators at a professional football game. Primary research was collected using an intercept approach. Information provided by the client and verified by field observation suggested that different areas around the football stadium were likely to contain certain homogeneous groups. As such, potential subjects were approached at four different stadium locations in order to obtain a more representative sample. The focus of this study was to identify similarities and potentially significant differences between tailgating and non-tailgating spectators of professional football games. Our analysis investigates differences between tailgaters and non-tailgaters on demographics, attendance patterns, game day perceptions, and
attitudes and behaviors. It further reveals differences between the groups on key marketing outcomes such as future purchase intentions. Conclusions are drawn and recommendations are reported. The research findings will enable the client to better understand and serve their diverse fan base, and in turn increase customer satisfaction with the game day experience.

**Sportscape Perceptions and Impacts**  
Tomas Benzo, Connor Adams, Sydney Livingston  
Faculty Mentor/Collaborator: Scott Swanson

Due to the heightened competition for the consumer in the sport industry, sport executives must be concerned with the satisfaction of spectators and clearly understand the factors that influence spectators to attend and return to a sporting event. Sportscape factors have a direct impact on the level of satisfaction of spectators and their desire to return to the venue. This study investigated sportscape factors (e.g., quality of the seating, concessions, restrooms) and the associated satisfaction of spectators who attended a professional football game. An important purpose of this study was to get a better understanding of what amenities need to be improved to enhance the spectator experience. A structured, self-completion questionnaire was utilized to collect primary data. The survey instrument was constructed to solicit information in three areas: the spectator's perception of sportscape factors, attendance information, and demographics. Through statistical analysis we were able to identify the most important sportscape factors that fans find the most important to ensuring customer satisfaction. Our findings provide the Philadelphia Eagles with strategic insights to allow them to better serve their fans.

**UW-Eau Claire Marketing Department Brand Audit: Student Perspectives**  
Mitchell Schwonke, Samuel Nechkash  
Faculty Mentor/Collaborator: Scott Swanson

This research is part of a brand audit study of the UW-Eau Claire marketing department. Every organization can derive important benefits from taking a holistic look at the health and strength of their brand. While conventional branding research focuses on consumers, a complete brand audit assesses relationships with all of the important stakeholders of a brand, which includes both internal and external audiences. The data for this research was obtained by administering questionnaires to current marketing majors at UW-Eau Claire. The statistical data was analyzed using statistical package for social sciences (SPSS) utilizing a variety of statistical tests (e.g., content analysis, descriptive analysis, t-tests, ANOVA, chi-square), as appropriate. Findings capture student satisfaction ratings on a number of important program variables and identifies respondent perceptions of how well they are being prepared for the marketplace. The results also identify strengths, weaknesses, external threats, and potential growth opportunities for the marketing program. The research is designed to help revitalize the UW-Eau Claire marketing curriculum and reposition its brand.

**UWEC Marketing Department Brand Audit Study: Alumni**  
Dylan Thomas, Jacob Pederson  
Faculty Mentor/Collaborator: Scott Swanson

A brand lives and evolves in the minds and hearts of current and potential stakeholders as a sum total of experiences and perceptions. Every organization can derive important benefits from taking a holistic look at the health and strength of their brand. The research being presented is part of a brand audit of the UW-Eau Claire Marketing unit. The study involved collecting both qualitative and quantitative data from UWEC marketing alumni (n=349) using an on-line
questionnaire. Findings capture alumni satisfaction ratings on a number of important program variables and identifies respondent perceptions of how well they were prepared for the marketplace. The results also identify strengths, weaknesses, external threats, and potential growth opportunities for the marketing program. Data analysis focuses specifically on marketing alumni that have graduated in the past ten years. Utilizing SPSS we conducted a variety of statistical tests (e.g., content analysis, descriptive analysis, t-tests, ANOVA, chi-square). The findings provide useful insights for the UW-Eau Claire Marketing unit to help guide future strategic decision making.

Political Science

*Behaviors of Priests Accused of Child Sexual Abuse: An Analysis of Joliet*

Louisa Strange
Faculty Mentor/Collaborator: Jason Spraitz

The sexual abuse of minors by Catholic priests has been an issue silenced for so long, and only recently has it come to light. The goal of this research collaboration was to study different patterns of behavior used by priests from the Roman Catholic Diocese of Joliet who have been accused of sexually abusing children. Through a retrospective content analysis of 16 priest files that were released in 2014, various behavioral patterns became evident, including the use of techniques of neutralization in order to justify criminal activity and grooming of victims and their families. The high level of grooming - when a perpetrator attempts to create a friendly and trusting environment with the victim in order to lower inhibitions and eventually engage in abusive conduct - used by the priests from this diocese was unexpected based on findings from similar research on priests from other dioceses. This poster highlights prior literature on priest sexual abuse and grooming patterns used by all abusers, the research methods that we used to conduct the analysis, our findings and the implications of the findings, and directions for future research on this topic.

*Digital Teen Dating Violence: A Literature Review*

Shelby Maruszczak
Faculty Mentor/Collaborator: Justin Patchin

Traditional forms of dating violence, such as physical, psychological, and sexual, have been a focus of study for quite some time. With the widespread use of modern technology, new techniques of dating violence are being used, including harassment and monitoring through the use of text messaging, emailing, and social media. In order to examine the extent of published research on this topic, a search was conducted to find such articles and a literature review was written. The search found that digital teen dating violence has been the focus of very few studies. What has been published on digital dating violence has supplied varied rates of prevalence, ranging from 26% to 92%, depending on the definitions and measurements used by researchers. Never-the-less, digital teen dating violence is a significant source of violence among dating adolescents and continued research is necessary.
The Empirical Status of Cyberbullying Research: A Comparative Analysis
Madison Bacon, Shelby Maruszczak
Faculty Mentor/Collaborator: Justin Patchin

Empirical investigation into the topic of cyberbullying among adolescents has exploded in the last few years. Despite this expanded attention, inconsistencies in definitions, methodologies, and samples obfuscate any meaningful conclusions that could be drawn. The current project seeks to build on two earlier efforts in 2010 and 2013 to collect, review, and synthesize all of the empirical research that has been published regarding cyberbullying, with a particular focus on comparing and contrasting research that has been done outside of the United States. Scholarly inquiry into the issue of cyberbullying in the United States has generally outpaced other countries, though it is clear that important work is being done abroad. This study seeks to evaluate the attributes of quantitative studies conducted abroad to determine relevant differences that might be useful for researchers studying this problem in the U.S.

Europe’s Immigration/Migration Crisis: Social Democracy, Values and Identity, Challenges, and Reaction
Audrey Mulliner
Faculty Mentor/Collaborator: Steven Majstorovic

The ongoing crisis of Muslim migrants flooding into Europe from the Middle East has created unprecedented challenges for the capacity of European States and the European Union to address the complex array of problems generated by the sudden and large influx of people. The challenges are essentially cultural as the secular democratic culture of Europe addresses the interaction with a culture that is non-secular with values that do not always comport with those of Europe, especially with regards to religion and gender. The reaction in Europe has been a rise in right-wing parties who articulate and recommend intolerant and Islamophobic solutions to the crisis. This paper highlights the flash-points of recent events and argues that, despite the probability of drastic short term measures, many of the problems for European states and the European Union will be successfully addressed over time but that a process of expulsion and deportation of a small percentage of the Muslim immigrants will be an inevitable outcome of Europe’s adjustment to the changes in the political and cultural landscape.

Psychology
Assessing the Reliability of Abbreviated Delay Discounting Procedures in Rats
Allyson Salzer, Margaret Murphy, Alexandra Tredway
Faculty Mentor/Collaborator: Carla Lagorio

Delay discounting is the ability to choose a larger reward delivered at a later time while resisting a smaller reward delivered sooner. How rapidly reinforcers are discounted differs across species as well as individuals, and this phenomenon has been widely studied over the past 30 years in a variety of procedural assays. Despite methodological differences, many methods of assessing discounting have impressive internal reliability and external validity. The current study assesses this further by comparing two of the most commonly utilized procedures, along with a novel discounting method. One procedures includes an adjusting delay procedure, in which subjects make choices between receiving one food pellet immediately and a larger number of food pellets after some delay. The other procedure includes several increasing delays in which the delay to the larger food amount increased across days or within trial blocks in a session. Post-hoc
analyses examined the consistency across measures and also whether reliable outcomes could be attained in time spans as short as one week. Ideally, such results can lend confidence in using abbreviated discounting assays when examining potential correlates with other time-sensitive variables in behavioral, pharmacological, or aging research.

**Attitudes Towards Police Use of Force**

**Brady Palecek, Aaron Tryhus**

Faculty Mentor/Collaborator: Jeffrey Goodman

Poster #11

In 2015, Americans’ confidence in the police hit a 22-year low, with Democrats and People of Color showing the sharpest declines in confidence (Gallup, 2015). This changing perception is believed to be the result of recent highly publicized instances of deadly use of force against unarmed African Americans, and the belief that US police forces have become increasingly militarized. Surprisingly, there is a paucity of research on American’s attitudes toward police officer’s use of force. The current study aimed to shed light on this important social issue. We conducted an experiment in which participants were asked to read a vignette describing a traffic stop. The amount of force used by the police officer was manipulated in a realistic manner (low, medium, or high force), as was the race/ethnicity (black vs. white) and sex (female vs. male) of the driver. Participants reported their perceptions of the appropriateness of the officer’s actions, as well as their attitudes regarding police legitimacy, police funding, and personal safety. We predict that participants’ perceptions of police use of force will vary as a function of the driver’s race/ethnicity and sex. Our findings will be discussed in light of their theoretical and practical relevance.

**Characteristics Associated with Suicide Prevention Education**

**Sophia Thoen, Spencer Morgan**

Faculty Mentor/Collaborator: Jennifer Muehlenkamp

Poster #81

Knowing the characteristics of students who are more inclined to enroll in suicide prevention curriculum may help to engage a broader range of students in suicide prevention efforts on campus. The current study examined characteristics of students enrolling in either an Honors course titled “Understanding Suicide” or “Cognitive Bases of Religious Beliefs.” We hypothesized that students enrolled in the Understanding Suicide course would show less stigmatizing attitudes towards suicidal individuals, have had previous experiences related to suicide education, and be more willing to advocate for suicide prevention when compared to their peers in the other course. Students were invited to complete an online survey assessing knowledge, attitudes, and advocacy for suicide prevention. There were no significant differences between groups on stigmatizing attitudes about suicidal individuals, willingness to give time to advocate for suicide prevention, x(4) = 3.67, n.s., or on basic knowledge of suicide, t (28) = 1.16, n.s. Participants in the Understanding Suicide class had significantly more experience with previous suicide prevention training than control students, x(1) = 4.22, p < .05. One implication of these results could be that earlier exposure to suicide prevention messages may increase student likeliness to become involved in prevention efforts.

**Comparing Preferences of Different Classes of Reinforcement on Skill Acquisition with a Child Diagnosed with Autism**

**Alexandra Tredway**

Faculty Mentor/Collaborator: Kevin Klatt

Poster #82

Positive reinforcement successfully maintains or increase the occurrence of behavior by
presenting preferred items or activities as a consequence. Different types of positive reinforcement exist such as food, toys, and social praise or physical contact. In order to execute positive reinforcement effectively, preference assessments are necessary. Preference assessments establish a hierarchy of highly preferred items and activities to the least preferred. Research examining the preference of different classes of reinforcement is scant. The current study examined the preference of four different classes of reinforcement (edible, social, tangible, and sensory) and how fast a child learned sight words. Results of a preference assessment determined the rank of items and activities. A second preference assessment used the top three preferred items or activities from each class to determine preference of reinforcement class. In order to assess how fast the participant learned a word, items from the highest or least preferred class were delivered when the participant provided the correct response. Results show edible as the most preferred reinforcement class with the least amount of trials required to learn the sight words.

Conflations of Correlation with Causation in Researchers' Descriptions of Their Work
Carly Murray, Stephanie Darling, Michaela Gunseor, Mark Priebe
Faculty Mentor/Collaborator: April Bleske-Rechek
Poster #19

People often conflate correlation with causation. This bias has been described as a mindware gap (Stanovich, 2009) that “leads us astray practically every day” (Dobelli, 2013, p. 110). Indeed, research suggests that people incorrectly infer causality from descriptions of non-experimental research as often as they correctly infer causality from descriptions of experimental research (Bleske-Rechek, Morrison, & Heidtke, 2015). In this study we investigated the frequency with which social scientists use cause and effect language in descriptions of their work and the frequency with which it is appropriate given their research design and findings. We reviewed poster submissions accepted for the 2015 Association for Psychological Science convention. We recorded use of causal language in the title, in the short abstract, and in the supporting summary. Our analysis of the content of the posters revealed that across poster sessions, over half of researchers used causal language. On average, less than half of those also described a research design or findings that clearly justified the causal language. Our findings imply that the confusion between correlation and causation extends to those training future scientists.

Discriminative Stimulus Effects of Naltrexone in Rats with Limited Access to Sucrose
Faculty Mentor/Collaborator: David Jewett
External Student Collaborators: Jody Herrmann, Calvin Thai
Poster #99

Daily, but limited, access to sucrose results in “binging” in rats. The excessive sugar intake has been reported to increase dopamine and endorphin function in the brain. Naltrexone, an opioid antagonist, is not discriminable at typical doses in standard operant paradigms in opioid-naïve subjects. We attempted to establish naltrexone as a discriminative stimulus in rats given 12-hour access to sucrose solutions. After establishing the sucrose baseline, rats were given daily injections of either saline or naltrexone (0.1 or 3.2 mg/kg, 15 min PT). During the training session, correct lever presses (left following naltrexone, right following saline) were reinforced with a food pellet. Training continued until subjects exhibited 80% or more condition-
appropriate responses for eight out of 10 consecutive sessions. Naltrexone (3.2 mg/kg) was established as a discriminative stimulus in all subjects, while (0.1 mg/kg) was discriminated only by a few subjects. Interestingly, acute water substitution did not alter the discriminative stimulus effects, suggesting that sucrose consumption produced a long-term change in endorphin function. Chronic (two week) water substitution eliminated the discriminative stimulus effects of naltrexone. Rats with constant water or limited saccharin access were unable to discriminate naltrexone, suggesting that the change in endorphin function is dependent upon sucrose consumption.

**An Exploratory Study of College Students’ Self-Compassion**

Casey Hoffman, Abigail Johnson, Nicholas Peterson, Samuel Schwiebert

Faculty Mentor/Collaborator: Mary Beth Leibham

Previously, people believed that adolescents with high self-esteem would be less susceptible to mental health issues (e.g., anxiety, depression) than those with low self-esteem (Pyszczynski et al., 2004). However, the link between self-esteem and psychological well-being has been questioned, as some people engage in dysfunctional behaviors such as comparing themselves to others and putting others down to pursue higher self-esteem. Recently, researchers have started to examine self-compassion, with the belief that this construct may be a more adaptive predictor of psychological well-being (Barnard & Curry, 2011; Neff, 2003a, 2003b). Self-compassion encourages one to extend kindness to oneself without blame or judgement and does not involve evaluations of self-worth (Neff, 2011). The purpose of this study is to examine college students’ levels of self-compassion and whether or not self-compassion relates to their self-reported anxiety, achievement goals, perfectionism, and busyness. Approximately 200 UWEC students will complete online surveys to assess levels of self-compassion, anxiety, achievement goals, perfectionism, and busyness. We will also examine potential differences across sex, age, major, and GPA. This study has the potential to inform the higher education community of the importance of self-compassion and will allow us to refine our research questions for subsequent research.

**Hindsight Bias in Judgments of Dating Couples**

Michaela Gunseor, Megan Ross, Jenna Maly

Faculty Mentor/Collaborator: April Bleske-Rechek

Research on Hindsight bias began in 1975, when Fischhoff published his seminal article describing the effects of hindsight bias on judgments of important evidence and perceived likelihood of possible outcomes. In this study, we investigate hindsight bias in people’s perceptions of the outcomes of specific events in dating relationships. All participants in this study will read a hypothetical scenario about a couple and the development of their dating relationship. Participants in the control condition will assign a 0-100% likelihood rating to two possible relationship outcomes for the couple: broken up six months later or still together six months later. In two different experimental conditions, however, the scenario will be followed by information on which of the two outcomes actually occurred; and then participants will be instructed to ignore that outcome knowledge and assign a 0-100% likelihood rating to the two possible outcomes. Regardless of condition, participants will also be asked to evaluate the relationship (e.g., its stability, the relationship partners’ compatibility). We predict that participants who receive outcome knowledge will be unable to ignore it when evaluating the couple and forecasting outcomes; thus, judgments of those in the experimental conditions will differ systematically from each other and from those of the control group.
How Does Stimulus Difficulty Impact Study Time Allocation in Younger Adults?
Emilie Zamarrripa, Joseph Latimer
Faculty Mentor/Collaborator: Jarrod Hines

There are many contexts in which individuals are given multiple opportunities to learn new information. It is important to understand the factors that guide restudy efforts to enhance efficiency. In the current study, participants will study a set of word pairs (e.g., DOG-SPOON), take a memory test, and have an opportunity to study the same pairs again. Whereas prior research used homogeneous sets of word pairs (of similar difficulty), the current research will use a mixture of easy-to-remember (e.g., REASON-THINK) and difficult-to-remember (e.g., CLEMENCY-IDIOM) pairs to determine the degree to which the below-listed cues for memory confidence are reactive to different types of stimuli. Prior research supports a relationship between item-specific restudy time and (1) a person’s memory of their past test performance (a recollection of getting an answer correct or incorrect during a previous test); (2) participants’ impressions of item difficulty following an initial study attempt; (3) objective memory accuracy during an initial test (prior to restudy); (4) subjective memory test confidence; (5) objective response times to test stimuli; and (6) subjective response time estimates (i.e., how fast they think they responded to test questions). We expect the relative weight of cues to change with the stimulus type.

Implicit Effects of Religious Priming on Prejudice and Prosocial Behavior
Chance Boley, Marina Eggen
Faculty Mentor/Collaborator: Jeffrey Goodman
External Student Collaborators: Cody Butcher, University of Minnesota-Mankato, Bannu Jeevanba, University of Missouri-Kansas City, Jody Herrmann

Previous research from our lab and others’ has provided evidence that Christian believers express higher levels of prejudice than nonbelievers toward various groups (i.e., Blacks, Muslims, lesbian and gay individuals and women who have had an abortion). However, believers and nonbelievers in our samples have not differed in self-reported 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 while minimizing self-presentational concerns. We subliminally primed believers and nonbelievers with religious or neutral concepts through the use of a lexical decision task. Subsequently, participants were given measures to assess their likelihood to volunteer and advocate for certain minority groups. Finally, they completed measures of possible mediators (e.g., mood and empathy). We anticipate that priming religious concepts will decrease rates of volunteering and advocating among believers, but expect to observe a different pattern among nonbelievers. Our findings will be discussed in light of their contributions to the understanding of the relationships between religious beliefs, prejudice and prosocial behavior.

Incubation & Divergent Solutions
Jenna Lee, Krista Falk
Faculty Mentor/Collaborator: Catya von Karolyi

Conditions that promote creativity include positive mood (i.e., Bass, DeDreu, & Nijstad, 2008; Davis, 2009), and providing incubation periods during problem solving (Sio & Ormerod, 2009). Listening to music (in major keys) can promote positive mood (Lingham & Theorell, 2009). Building on these ideas, we asked participants to read the Divergent Solutions Task (DST) items, provided incubation activates, then asked them to seek solutions to the DST items. Participants
engaged in one of three incubation activities between reading and solving the DST items: Two groups watched a video clip of fractal images (Wolfe, 2010) accompanied either by (a) music in a major key, or (b) silence. A third group saw no clips, but continued responding to some survey items (of no relevance to the present study). We measured mood twice--either pre/post clip, or for the control group, pre/post DST responses. We predicted that music-listeners’ moods would improve; and that their DST responses would be the most creative; controls’ would be least creative; and silence-listeners’ would fall between the two. Our results could, potentially, inform education, business, and individuals about how to effectively promote creative problem solving.

**Influence of Gender Performance Stereotype on the Error-Related Negativity and Error Positivity**

Kelsey Rolefson, Rachelle Belott, Gretchen Bye, Sara Badour, Calvin Verdegan, Stephen Hlavka, Summer Underwood, Ronald Lockington

Faculty Mentor/Collaborator: David Leland

External Student Collaborator: Claire Brennan, University of WI-Eau Claire graduate

Poster #51

Gender stereotype threat refers to a situation in which one may be at risk of confirming negative stereotypes for their gender. We investigated whether women’s brain response to errors on a flanker task would be influenced when told (falsely) that women generally perform worse on that task. In the flanker task, participants make responses indicating the direction of a central curly brace in a series of five curly braces. Two components detected in the electroencephalogram (EEG)—the error-related negativity (ERN) and the error positivity (Pe)—reflect brain responses to errors. Our preliminary results replicate classic findings for both components in that they were larger following incorrect behavioral responses than correct responses. For the Pe but not the ERN, however, this effect was reduced in women exposed to stereotype threat as compared with women given no suggestion that task performance relates to gender in any way. Gender stereotype threat may lower performance expectations in women, reducing the impact of errors and perhaps the motivation to learn from and improve upon making mistakes.

**Intent of Video Chat Room Users among Different Ages and Genders**

Kailee Culver, Melanie Bauer

Faculty Mentor/Collaborator: Blaine Peden

Poster #13

Previous research has found a connection between age and gender throughout online communications. Children using the internet and chat rooms to communicate are being exposed to sexual predators and sexual content that they do not consent to (Atwood, 2006). Our goal was to research whether adolescents were exploiting themselves online voluntarily or if they are exposed to harmful material from the adults using the website. We also wanted to research whether males or females were more likely to use video chat room websites for sexual purposes. Our hypothesis was that more male adults will use the websites for sexual purposes than any other demographic. The results of this naturalistic observation study were not statistically significant, but did show slight trends in sexual behavior. It was found that a slightly larger amount of women showed sexual intent, and that participants of the young adult group showed the most sexual intent. We conclude that while there may not be statistically significant demographic differences in sexual behavior, video chat rooms overall show a large amount of sexual tendencies. For adolescents using the websites, this could be extremely harmful.
Mama’s Baby, Papa’s Maybe: Links Between Child-Father Resemblance and Child-Reported Paternal Investment
Rachel Griffiths, Casey Bloechl, Carly Murray, Rebecca Nelton, Cassandra Abel
Faculty Mentor/Collaborator: April Bleske-Rechek
Poster #42

Because conception occurs internally to the human female, ancestral males would never have 100% certainty of their paternity. Evolutionary theorists have proposed that males are sensitive to an offspring’s resemblance to them as a cue of paternity (Daly & Wilson, 1988), and calibrate their investment accordingly. In support of this proposal, research has shown that young adults who perceive themselves as resembling their father also report higher quality relationships with their father (Gallup et al., 2015). The current research was designed to replicate that association and to extend it by showing that the link between resemblance and investment is stronger for fathers than for mothers. We brought 248 young adults into the lab, where they reported on their family history, primary mother and father figures’ investment, and perceived physical resemblance to each parent. Each young adult also supplied a photo of themselves as a child, a current photo of themselves, and a current photo of their primary mother figure and father figure. As expected, young adults’ perceptions of their resemblance to their father were positively correlated with perceptions of their father’s investment, whereas perceptions of their resemblance to their mother were not correlated with perceptions of their mother’s investment.

Musical and Verbal Creativity: Is There an Association?
Krista Falk, Jenna Lee
Faculty Mentor/Collaborator: Catya von Karolyi
Poster #71

Whether creativity is domain specific or domain general is a ubiquitous debate—perhaps built upon a false dilemma (Plucker & Beghetto, 2004). Comparisons of nonmusicians with musicians, and of levels of music training, reveal music expertise associated with creativity (Hallam, 2010). Using a verbal measure of creative problem solving, the Divergent Solutions Task (DST), we compared nonmusicians to musicians, and music training levels. Participants reported their music training, then responded to a Personally Expressive Activities Questionnaire (PEAQ) variant. On the PEAQ, they indicated the one activity they considered to be most self-defining; rating activity-related experiences of overall flow; self-realization of values; personal expressiveness; and skill. Musicians indicated and rated a second, music-related, self-defining PEAQ activity. Flow is strongly associated with creativity (Csikszentmihalyi, Rathunde, & Whalen, 1997) and logical suggests personal expressiveness should be associated with music. Therefore, we predicted that in relation to their level of musical training, musicians would report higher levels of overall flow and personal expressiveness for their PEAQ activities and that their DST responses would be more creative than those of nonmusicians. The latter result would undermine a domain-specific view of creativity, thereby contributing to the field.

The Naked Truth: Perceptions of Pornography Towards Intimacy
Connor Murray, Sonja Ruotsinoja
Faculty Mentor/Collaborator: Blaine Peden
Poster #12

This study used a 2 x 2 between subjects design to analyze perceived relationship quality of a pornography based relationship and willingness to participate in porn influenced sexual acts as a function of gender and the type of scenario given. Previous research found that men viewed more porn more than women and tend to apply what they see to their sexual relationships. This survey was distributed online using a Qualtrics survey. One hundred and seventy participants completed the survey in which they were randomly assigned to one of two scenarios. One scenario
portrayed a couple using porn that benefited their relationship whereas the second scenario depicted the same couple having negative experiences with porn. Participants rated questions of relationship quality of individuals in the scenarios as well as willingness. The results found that those given a scenario promoting porn in a relationship perceived a higher relationship quality. Gender did not have a significant effect on this variable. Also, males had a stronger willingness to participate in porn influenced acts when compared to women. The type of scenario did not have an effect on the participants’ willingness to participate in porn influenced acts.

**Personality as a Predictor of Interpersonal Conflict Avoidance**  
Savanha Drew, Brooke Benson  
Faculty Mentor/Collaborator: Jeffrey Goodman  
Poster #41

The purpose of this study was to determine if individuals raised in specific regions of the United States differ in their propensity to avoid interpersonal conflict. Regions of the United States are known to differ in Big Five Personality Inventory scores such that Friendly and Conventional; Relaxed and Creative; and Temperamental and Uninhibited regions have been identified. Participants took a Qualtrics survey that included the Big Five Personality Inventory, the Conflict Communication Scale, the Harmony Scale, a Political Ideology Questionnaire, and demographic background questions. Participants were placed into a US geographical region on the basis of where they grew up and a personality profile on the basis of their Big Five scores. Subsequently, geographic region and personality profile were treated as quasi-independent variables. We hypothesized that individuals born and raised in the Midwest, or the Friendly and Conventional region of the United States, avoid interpersonal conflict to a greater degree than those born and raised in the Temperamental and Uninhibited Region of the United States. Our findings will contribute to research on connections between personality and behavior and to our understanding of US regional cultural differences.

**Reducing Student Food Waste on Campus**  
Allyson Salzer, Anna Hamer  
Faculty Mentor/Collaborator: Carla Lagorio  
Poster #40

Environmental and social justice movements have emphasized the importance of reducing food waste. In the United States, food is the number one landfill material, producing harmful atmospheric pollutants. Restaurants generate excessive consumer waste from unfinished meals but also serve thousands daily and therefore hold potential for addressing this large-scale issue. This study targeted UWEC’s primary buffet-style cafeteria, in which students experience no adverse contingencies for taking more than they consume. Researchers weighed compost bins twice daily to assess weight of leftover food from 7am-9pm. Upon stability, several interventions were parametrically assessed. First, infographics were displayed, providing facts about environmental impacts of food waste and encouraging students to only take food they can consume. This produced a fairly immediate waste reduction, with an ultimate return to baseline levels. A second manipulation introduced a competition, challenging students to “beat” their prior week’s food waste number. This intervention was subsequently replicated and both times food waste was reduced, equating to a projected annual reduction in waste of 30,236 and 17,252 lbs. Given the promise of this manipulation, future research could examine how to implement similar interventions in other locations with ease.

Undergraduate Poster Presentations 107
**Relationship Between Sport Participation, Gender Norm Conformity, and Athlete Satisfaction**

Allison Hable  
Faculty Mentor/Collaborator: Lori Bica  
Poster #69

Sports emphasize masculine norms such as power, aggression, and competitiveness; however, feminine norms such as focusing on relationships and being kind foster important team components of athletics. The purpose of this study is to examine the relationship between gender norm conformity and satisfaction with collegiate athletics for members of different types of sports teams. Although other researchers have investigated gender norms and satisfaction among college athletes, they have not considered differing expectations based on type of sport (Steinfeldt, Carter, Zakrjasek, & Steinfeldt, 2011). We will survey student-athletes participating in three categories of sport to measure beliefs about gender norms using Parent and Moradi’s (2010) Conformity to Masculine Norms and Conformity to Feminine Norms Inventories and their satisfaction using Riemer and Chelladurai’s (1998) Athlete Satisfaction Questionnaire. We hypothesize that athletes participating in appearance-centered, highly objectified sports will report the greatest conformity to feminine norms, athletes participating in contact sports will report the greatest conformity to masculine norms, and endurance-centered sport participants will report comparable levels of conformity to feminine and masculine norms. Additionally, we hypothesize that participants who experience the greatest athletics satisfaction will report the highest levels of conformity to feminine and masculine norms associated with relationships, risk-taking, and winning.

**Sex Differences in Young Adults’ Physical Attraction to their Opposite-Sex Friends: Natural Sampling versus Mental Concepts**

Whitney Joseph  
Faculty Mentor/Collaborator: April Bleske-Rechek  
Poster #18

Studies in which men and women are asked to think about and report on their opposite-sex friendships have found that men report more attraction to their friends than women do. Expecting to replicate the sex difference, we approached male-female dyads at a university student center (40 of whom were friends) and surveyed each partner. We failed to document a sex difference in attraction. We conducted a replication. Again, male friends did not differ reliably from their female friends in reported attraction. We reasoned that men’s and women’s mating adaptations, which differ particularly in proclivity towards short-term sex, are reflected in how men and women conceptualize opposite-sex friends; hence, previous studies may have documented a sex difference in attraction because men and women in those samples had different types of people in mind when they thought about opposite-sex friends. To test that possibility, we asked young adults to “think of an opposite-sex friend” and then choose descriptors for that person. Men less often than women characterized the person as “a friend” and more often than women characterized the person as someone they were “attracted to.” We conclude that men’s and women’s everyday experiences with their opposite-sex friends differ somewhat from their mental definitions of opposite-sex friends.

**Training Efforts to Increase Adoptability Potential of Canines at the Eau Claire County Humane Association**

Allyson Salzer, Krista Falk, Eric Markham, Shelby Lokken, Kylie LeGate  
Faculty Mentor/Collaborator: Carla Lagorio  
Poster #21

Behavioral Applications Regarding Canines (BARC) is a competitive internship program run...
through UWEC’s Psychology Department. Students in the BARC Program implement behavioral training techniques with canines at the local Eau Claire County Humane Association to increase obedience skills and decrease problematic behaviors, with the ultimate goal of improving the dogs’ adoptability potential and long-term adoption placement. The student trainers frequently use positive reinforcement procedures, along with systematic desensitization, counter-conditioning, differential reinforcement, and prompting procedures. As a part of the interventions, trainers collect data on the treatments to track the dogs’ progress and to assess efficiency of programs. Based on these data, trainers monitor, refine, and create new training programs to best address specific behavioral issues that arise. In addition, efforts have been focused on identifying behavioral markers for placing dogs in different behavior modification programs best suited to their current motivators and performance (for example, there are several choices of programs for teaching a dog to walk on a leash without pulling). The current poster will present some of these efforts and will illustrate several different behavior modification programs we have refined and commonly utilize.

**Using Intel’s Realsense Camera to Detect Emotion in Facial Expressions: A Validity Study**

*Louis Losbanos, Emilie Zamarripa*

Faculty Mentor/Collaborator: *Jarrod Hines*  
Poster #73

Understanding the relationship between emotional experiences and behavior can provide a clearer understanding of the mechanisms that underlie both phenomena. Recent developments in emotion recognition technology have opened numerous opportunities in cognitive, developmental and neurological research. The current study will investigate one such piece of technology, Intel’s Realsense F200 camera, with respect to its purported ability to recognize six primary emotions: anger, disgust, fear, joy, sadness, and surprise. We will use the camera along with software provided with Intel’s Realsense software developer kit (version 5.0) to assess its ability to recognize facial expressions. Our stimuli will be derived from various pre-existing databases of facial expressions made by humans of diverse origin (in terms of physiological sex, ethnic background, and age), and we will essentially scan each image and compare the database label with the reading supplied by the RealSense. This exploratory study will potentially set the stage for the integration of this technology in future studies that would otherwise involve ratings performed by human researchers. For example, we would be able to examine the emotional experience of participants as they complete a cognitive task, which could give us insight into the relative difficulty of each task component.

**Sociology**

*Abstinence Only Sex Education: Are There Effects Beyond the Realm of Knowledge, STIs and Pregnancy?*

*Sylvie White*

Faculty Mentor/Collaborator: *Jeff Erger*  
Poster #39

Research has shown that Abstinence Emphasized sex education (AE) often produces lower levels of knowledge, higher rates of sexually transmitted infections, and higher unintended pregnancy rates than Comprehensive Sex Education curricula. This exploratory research takes a Feminist theoretical perspective and investigates if the often patriarchal, essentialist, and objectivizing curriculum in AE reflects effects of state level cultural forces on gender inequality in a broader
context. Longitudinal data from 1990-2010 from Bureau of Justice Statistics and the Department of Labor on rape prevalence and wage inequality at the state level was analyzed. We found no relationship between AE in a state and the change in the gender pay gap in that state over time, but we do find that AE is significantly associated with a decrease in rapes reported to police of over 11 per 100,000 beyond the general declining trend of such reports nationally. We suggest this might show a decrease in reporting in AE states rather than a decrease in sexual assaults. Future research is needed to expand on this finding, and potential sources of data for such a task are discussed given weaknesses in existing data for fine grained analysis of this social process.

**Commitment to College**

**Allison Hable, Kelly Binning**

Faculty Mentor/Collaborator: Kathleen Nybroten

The purpose of this study is to examine what influences students when deciding to go to college and stay in college. Using a survey of first year students, we investigate what factors students consider when deciding to attend UWEC and what role parents play in students’ decisions about their education. Further, we analyze the significance of social background characteristics and the connection to campus made while at UWEC on student satisfaction with college and continued commitment toward degree completion. Our study contributes to the research about emerging young adulthood, parental involvement in education, and higher education persistence.

**Fitness Fundraisers: Running for You or “the Cause”?**

**Hannah Barringe Kenny, John Junker**

Faculty Mentor/Collaborator: Peter Hart-Brinson

There is currently a debate among social scientists about the status of civic engagement in our society. One argument is that citizens are becoming more individualistic and less engaged in their communities; others argue civic engagement is simply changing and that people are finding new ways to build social capital. The researchers enter into this debate by examining fitness fundraisers - one example of community engagement that offer an athletic activity for participants to raise money for a charitable cause. Using ethnographic research methods (participant observation field notes and qualitative interviewing), the researchers investigate participant’s motivations for participation and thoughts on the nature and benefit of fitness fundraiser events. The researchers report that while altruistic motivations play a large role in the decision to participate, people are more generally motivated by individualistic factors. Data from field notes and interviews provides information about the benefits fitness fundraisers provide participants other than the opportunity to support a valued cause. The researchers conclude that fitness fundraisers reflect the individualistic nature of our society, however these events have the potential to provide communities and organizations with many concrete benefits.

**Gender Segregation in Dentistry: Patterns of Declining and Persistent Inequality**

**Alexander Padalino**

Faculty Mentor/Collaborator: Peter Hart-Brinson

This project is an exploration of gender inequalities in the dental profession and how occupational segregation, socialization, and culture affect the occupational environment. Historically, dentistry has been a patriarchal profession, in that dentists were primarily men and subordinate hygienists and assistants were almost exclusively women. After exploring the literature, analyzing quantitative data on admissions to dental schools, and conducting interviews with practicing dentists, hygienists, and assistants, a mixed pattern emerged. Women’s status in
dentistry has improved in recent decades, both in dental practice and in admissions to dental school. However, stereotypes persist: Women are still seen as primary caregivers and thus less suited to be dentists because of the time needed away from work; some think other career paths, such as hygiene, assisting, and dental therapy, are more favorable for women. Dental hygiene and assisting remain almost exclusively female occupations. Qualitative interviews suggest that men do not see these fields as long-term career options but rather as stepping stones to higher positions. It is possible that men simply being in the field could serve as role models for future generations, but further advocacy and persistence is needed to prevent the gender revolution in dentistry from stalling.

**Watershed Institute**

*Direct Trade: A More Equitable Cup of Coffee?*

**Cammy Rathsack, Alison Olmstead, Hannah Apold, Mackenzie Dewaard, Brianna Dahl**

Faculty Mentor/Collaborator: *Karen Mumford*  
Poster #202

Growing numbers of consumers are paying higher prices for products that support the livelihoods of producers and the environment. According to FairTrade Labeling Organization International, annual FairTrade and ethical products sales exceed $3.7 billion. FairTrade certification is well established in the global coffee industry. FairTrade certified products promise higher prices and increased incomes for coffee farmers. However, FairTrade has fallen short of expectations due to high participation costs and lower than anticipated income to farmers. To address these shortcomings, DirectTrade has emerged as a new strategy. DirectTrade connects coffee farmers to coffee roasters to ensure higher prices for farmers and higher quality coffee to consumers. Few studies have described and analyzed the efficacy of DirectTrade. We employ case study methods to assess De le Gente, a DirectTrade coffee cooperative located in Guatemala. Data for this study were collected from De la Gente farmers and coordinators during the UW Eau Claire January 2016 immersion experience to Guatemala and follow-up interviews with De la Gente coordinators. This research compares the structure and outcomes of De la Gente DirectTrade with the FairTrade industry. We examine De la Gente to assess whether or not DirectTrade serves the interests of coffee farmers, roasters, and consumers.
Growing numbers of consumers are paying higher prices for products that support the livelihoods of producers and the environment. According to FairTrade Labeling Organization International, annual FairTrade and ethical products sales exceed $3.7 billion. FairTrade certification is well established in the global coffee industry. FairTrade certified products promise higher prices and increased incomes for coffee farmers. However, FairTrade has fallen short of expectations due to high participation costs and lower than anticipated income to farmers. To address these shortcomings, DirectTrade has emerged as a new strategy. DirectTrade connects coffee farmers to coffee roasters to ensure higher prices for farmers and higher quality coffee to consumers. Few studies have described and analyzed the efficacy of DirectTrade. We employ case study methods to assess De le Gente, a DirectTrade coffee cooperative located in Guatemala. Data for this study were collected from De la Gente farmers and coordinators during the UW Eau Claire January 2016 immersion experience to Guatemala and follow-up interviews with De la Gente coordinators. This research compares the structure and outcomes of De la Gente DirectTrade with the FairTrade industry. We examine De la Gente to assess whether or not DirectTrade serves the interests of coffee farmers, roasters, and consumers.
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