UW-EAU CLAIRE

CERCA

Celebration of Excellence in Research and Creative Activity

2015

2015 APRIL 29-30TH
23RD ANNUAL STUDENT RESEARCH DAYS

Center of Excellence for Faculty and Undergraduate Student Research Collaboration
Office of Research and Sponsored Programs
https://www.uwec.edu/orsp/cerca
Celebration of Excellence in Research and Creative Activity
(23rd Annual Student Research Days)

Abstracts of Student Presentations

University of Wisconsin-Eau Claire
April 29 and 30, 2015
Presentations in W.R. Davies Center
**Poster Sessions and Exhibits:**
Ojibwe Ballroom and Hallways, 3rd Floor

**Poster Student Presentation Times:**
Wednesday, Apr. 29  4:00 - 6:00  
Thursday, Apr. 30  2:00 - 4:00

**Oral Sessions and Films**
Wednesday, Apr. 29  9:00 - 4:00  
Thursday, Apr. 30  9:30 - 2:00

**Reception**
Dakota Ballroom  
Thursday, Apr. 30  4:00

---

**Map of Davies Center with CERCA rooms labeled:**

---

**Windows**

---

**Ojibwe Ballroom**

---

**Map of Davies Center with CERCA rooms labeled:**

---

**Level 3**
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday, April 28, 2015</td>
<td>Students set up posters</td>
<td>Ojibwe Ballroom, 3rd Floor Hall</td>
</tr>
<tr>
<td>4:30 pm - 6:00 pm</td>
<td>Students set up posters</td>
<td>Ojibwe Ballroom, 3rd Floor Hall</td>
</tr>
<tr>
<td>Wednesday, April 29, 2015</td>
<td>Students set up posters</td>
<td>Ojibwe Ballroom, 3rd Floor Hall</td>
</tr>
<tr>
<td>7:00 am - 8:00 am</td>
<td>Students set up posters</td>
<td>Ojibwe Ballroom, 3rd Floor Hall</td>
</tr>
<tr>
<td>8:00 am - 6:00 pm</td>
<td>CERCA poster session open, with student presenters at posters from 4:00-6:00 pm</td>
<td>Ojibwe Ballroom, 3rd Floor Hall</td>
</tr>
<tr>
<td>9:00 am - 3:30 pm</td>
<td>CERCA oral presentations</td>
<td>Ho-Chunk, Menominee</td>
</tr>
<tr>
<td>10:00 am - 11:50 am</td>
<td>CERCA Music performances and presentations</td>
<td>Dakota Ballroom</td>
</tr>
<tr>
<td>10:50 am - 12:50 pm</td>
<td>Philosophy Capstone presentations</td>
<td>Menominee</td>
</tr>
<tr>
<td>1:00 pm - 1:50 pm</td>
<td>Women’s Studies Award Winner Film</td>
<td>Woodland Theatre</td>
</tr>
<tr>
<td>1:30 pm - 1:50 pm</td>
<td>Women’s Studies Award Winner presentations</td>
<td>Ho-Chunk</td>
</tr>
<tr>
<td>Thursday, April 30, 2015</td>
<td>CERCA poster session open, with student presenters at posters from 2:00-4:00 pm</td>
<td>Ojibwe Ballroom, 3rd Floor Hall</td>
</tr>
<tr>
<td>8:00 am - 4:00 pm</td>
<td>CERCA poster session open, with student presenters at posters from 2:00-4:00 pm</td>
<td>Ojibwe Ballroom, 3rd Floor Hall</td>
</tr>
<tr>
<td>9:30 am - 1:45 pm</td>
<td>CERCA oral presentations</td>
<td>Ho-Chunk, Menominee</td>
</tr>
<tr>
<td>11:00 am - 12:15 pm</td>
<td>Philosophy Capstone presentations</td>
<td>Menominee</td>
</tr>
<tr>
<td>1:00 pm - 3:30 pm</td>
<td>Women’s Studies Capstone presentations</td>
<td>Centennial</td>
</tr>
<tr>
<td>4:00 pm</td>
<td>CERCA Reception. A buffet with speakers Chancellor Schmidt and UW-Eau Claire alumni researcher Peter Fernholz, Fellow Researcher at EcoLab, Inc. in St. Paul, MN, and student and faculty awards.</td>
<td>Dakota Ballroom</td>
</tr>
</tbody>
</table>
Many people helped to make this Celebration of Excellence in Research and Creative Activity (23rd Student Research Days) possible, and we thank them for contributing their part cheerfully and efficiently:

Christine Henricks, A.J. Moen, Nick Mompier, Karen Stuber, and the Event Production crew - for attending to a million details of preparing to hold this event in Davies Center.

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

Randy Wampole - 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, Jordan Jenkins, and Josh Gallagher - for performing at the CERCA Event reception.

Lora Statz, 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, Brad Patton, Beth Krantz, Sydney Flottum and 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; Sally Julson, 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.

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

Megan Bauer, Amy Chhunn, Caitlyn Duley, Dee Evans, Heidi Feyereisen, Elijah Freeman, Tennisha Sonsalla, Nicholas Stamm, Jake Stendahl, Sydney Tupy, Ashley St. Aubin-Clark, Lillian Cook, Leah Wagner, Audrey Steinman, Lindsey Merchlewitz, CERCA Moderators, for seeing that the oral sessions run smoothly. Mackenzie Drengler, Madelyn Fellingler, Mychaela McMenamin, Spencer Morgan, Kaitlin Shea, Sean Szydel, Emily Torbenson, Rachel Treadway, Ryan Miklua, Sean Porten, Serena Schultz, Amanda Nell Brooke Sjoquist, Kelsey Dery, CERCA Assistants, for helping out with the event.

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

Lastly, we thank student participants and their faculty mentors for all the hard work that led up to the polished presentations we see and hear in the W.R. Davies Student Center.
# TABLE OF CONTENTS

## Oral Sessions, Performances, and Films
- Philosophy Capstone Presentations 1
- Women's Studies Award Winners 3
- Women's Studies Capstone Presentations 5
- CERCA Film Presentation 6
- Music Performances and Presentations 6

## CERCA Oral Sessions
- UW-Eau Claire and Eau Claire Community 8
- Feminism and Identity 9
- LGBTQ Studies 10
- UW-Eau Claire and Local Gender and Race Issues 11
- Studies Abroad 12
- Hmong Studies 14
- Literary Criticism 14
- Writing Center Studies 16
- Identity and the Body Politic 17
- Computer Science 19

## Graduate Poster Presentations
- Human Development Center 19
- Psychology 20

## Undergraduate Poster Presentations
- Education and Scholarship of Teaching and Learning
  - Chemistry 21
  - Communication and Journalism 21
  - Communication Sciences & Disorders 22
  - Education Studies 22
  - English 23
  - History 24
  - Languages 24
  - Music and Theatre Arts 25
  - Nursing and Health Sciences 25
  - Psychology 25

## Fine and Performing Arts
- Art and Design 26
- Music and Theatre Arts 27

## Health Sciences
- Communication Sciences & Disorders 27
- Kinesiology 28
- Nursing 30

## Watershed Institute
- 33

## Humanities
- American Indian Studies 34
- English 34
- History, English, and Women's Studies 35
- History 35
- Languages 36
- Philosophy and Religious Studies 36

## Math and Computer Science
- Computer Science 37
- Computer Science, Chemistry, and Geography 38
- Mathematics 38

## Natural and Physical Sciences
- Biology 43
- Chemistry 52
- Geography and Anthropology 59
- Geography and Anthropology and Materials Science 66
- Geology 67
- Materials Science Center 71
- Materials Science and Geography and Anthropology 74
- Physics and Astronomy 74
- Psychology 76
- Watershed Institute 77

## Social Sciences
- Communication and Journalism 77
- Communication Sciences & Disorders 80
- Economics 80
- Economics and Management & Marketing 82
- Economics, Watershed Institute, and Communication and Journalism 83
- Geography and Anthropology 84
- Geography and Anthropology and Languages 86
- Geography and Anthropology and Materials Science 86
- Kinesiology 87
- Management and Marketing 87
- Political Science 89
- Psychology 89
- Social Work 97
- Sociology 98
- Watershed Institute 99
Menominee Room  
Wednesday, April 29  
10:50 am – 11:50 am

Theists and Atheists: Permission to Disagree  
Matthew Mantl

Disagreement is relevant to every day life. For example, we encounter disagreement between theists and atheists on a regular basis. Can both sides be rational? I argue that if beliefs in the existence or non-existence of God are both rational, then instead of defeating another's argument in order to promote one's own, both parties to a disagreement can promote goodwill and respect. My position is informed by Miriam Schoenfield and Jennifer Lackey. As such I take a permissivist stance on disagreement which takes a person's level of justified confidence into consideration.

The Justification of Tolerance  
Jacob Weaver

Rational disagreement is the notion that two people can hold opposing opinions and both be considered rational. The philosophical community is divided on whether or not rational disagreement is possible. To those opposed, it seems obvious that only one person can be right: One person must have the correct belief while the other is incorrect and therefore irrational. This line of reasoning stems from the notion that, in each instance of disagreement, there is a correct answer readily available to those disagreeing. However, I assert that the correct answer is much more elusive than some might think. Humanity is imperfect and, because of this, we are often mistaken. Given this, reaching the correct answer within peer disagreement may be less important than reaching an understanding between peers. When Joe and Bob disagree about the existence of God, a decisive answer is not readily at hand. Rather than seek this answer, Joe and Bob should attempt to respect and tolerate one another's viewpoint. I will describe in further detail why I believe rational disagreement is possible, how and when rational disagreement occurs within religious debates, and the tolerant attitude these disagreements warrant.

Religious Belief and Rational Inquiry  
Michael Doering

This project analyzes the current debate in the epistemology of disagreement literature and applies it to the problem of religious disagreements. In this essay, I critically analyze several theoretical notions central to the debate. I then argue that a more helpful way to decide whether a given disagreement is rational would be to discern whether the parties involved in the disagreement are engaged in rational inquiry. I show that if parties involved in religious disagreements are truly engaged in rational inquiry, they are on a mutual quest for religious truth through sincere dialogue with one another. I suggest that religious exclusivism and absolutism are barriers to interreligious dialogue and rational inquiry. I conclude by positing religious pluralism as a possible way for religious believers both to remain committed to their faith and be open to the kind of belief revision often required by rational inquiry.

Menominee Room  
Wednesday, April 29  
11:50 am – 12:50 pm

Rational Disagreement in Complex Situations  
Glen Olson

My presentation focuses on disagreement, specifically the question of whether one can disagree about answers to significant philosophical and social questions and still be rational. In an increasingly polarized political and social environment, the question of how to act in the face of disagreement is becoming more and more relevant. I suggest that because the truth of most philosophical, social and political disagreements cannot be reached as a matter of fact, disagreement is a catalyst that brings people to a better understanding through trial and error. I argue that disagreements are generally caused not by disputes about facts themselves, but by disputes about which facts to
emphasize and in what is thought to be important. This is illustrated by Igor Douven’s Flash of Insight example, wherein one can be spurred to look at the same information as before in a different way, leading to different emphases and a new conclusion. To apply this, I look at the abortion debate. Philosophical essays arguing for and against abortion show that two parties with the same information can still disagree rationally.

**On the Possibility of Rational Disagreement**  
**Nathaniel Taylor**

People commonly disagree with their peers. Equally well-educated, informed, and perceptive peers find ways to disagree about nearly everything. But the question that this study considers is whether or not two peers—with similar educations, knowledge, and information—can look at the same evidence and come to two different yet justified conclusions. I argue that it is not possible for the peers to disagree and be fully rational: while there might be many ways of interpreting data, there is only one interpretation that is the most rational of the options. Hence, a body of evidence supports at most one rational position. In defending my view, I argue that theories of rationality ought to incorporate more than just the internal consistency of an agent’s beliefs: they should account for the accuracy of the agent’s beliefs as well. This would mean that, along with having consistency, a crucial part of being rational is having accurate beliefs.

**Rational Standards and Rational Disagreement**  
**Hailey Huizenga**

A recent philosophical debate over the possibility of rational disagreement aims to determine whether the “agree to disagree” approach to disagreement has epistemological merit. In everyday disagreements, especially on complicated topics like politics, ethics, and religion, people approach disagreement believing it’s possible for the other party to be rational in their conclusions, even if the disagreement remains. I argue that rational disagreement is not only possible, but epistemically justified. Building on insights from Miriam Schoenfield I advocate for the thesis that different epistemic standards of rationality and subjective factors allow for difference in rational belief. In line with Igor Douven, I assert that proponents of the impossibility of rational disagreement need an objective confirmation theory as well as a definitive definition of rationality, and that such a definition must address our every-day intuitions. To provide insight into the application of my position I weigh in on the political philosophy debate between Ideal and Non-Ideal Theory.

**Menominee Room**  
**Thursday, April 30**  
**11:00 am – 12:15 pm**

**Drawing the Line on Rational Disagreement**  
**Natalie Fiedler**

When two parties hold opposing beliefs in topics such as religion, ethics, or politics, we might wonder whether both sides are being rational. In this project I aim to answer this question by examining a multitude of positions taken by scholars and separating disagreements into two categories: simple and complex. I use these categories as a basis from which to differentiate between rational and irrational disagreement. While I conclude that disagreement is irrational in simple cases, I suggest that disagreement can be rational in complex cases provided certain conditions are met. I illustrate this by analyzing arguments for and against the existence of God.

**Disagreement and the Case Against Ethical Relativism**  
**Samantha Meurett**

Is it possible to rationally disagree? My paper addresses the above question by rejecting the view that rational disagreement is possible and applying this to ethical dilemmas. I believe in many situations we have access to the correct answer (e.g facts, accepted theories). Even in more ambiguous cases, carefully examining the evidence and using critical and logical thinking allows us to identify the better answer. I argue that some actions are intrinsically better than others. For example, although there are respected philosophers on each side of the relativism debate in ethics, I think the arguments against ethical relativism are much stronger than those in favor. I analyze arguments provided by these philosophers and use the examples of abortion, female genital mutilation, and human rights to show that non-relativism is a much more compelling position and is thus more rational.
The Concept of Beauty Through the Lens of Rational Disagreement

Joseph Melheim

How beauty is perceived? Is my perception of beauty independent of my prior experience or contingent upon it? Though art and beauty are often treated as irrational subjects, I examine whether conflicting perceptions of beauty could be rational. This inquiry is part of a larger debate concerning whether disagreement between people with incongruent views about a subject can be rational. I propose, due mostly to the intrinsic differences between people, that those with opposing views on a subject can be rationally justified in holding those views. I apply this conclusion to the debate in aesthetics and show that, though I myself find perceptions of beauty to be constructed through a person’s previous experience, those who believe otherwise can be rationally justified in their belief.

Rational Disagreement and Intuition

Michael Dupont

People experience disagreement frequently in daily life. Are there ever cases where multiple individuals can be rational in maintaining their respective beliefs? This question forces us to consider when it is appropriate to maintain our beliefs in the face of disagreement. Building on arguments provided by various philosophers, I suggest that individuals who disagree often have good reasons for coming to different conclusions. Intuition, or the insights we individually possess, factor into why we hold certain beliefs. Intuitions may explain why individuals who have received equal training in a particular field might still have unique perspectives and insights. I conclude that intuition is a real phenomena and use this as a basis from which to question whether individuals can share all forms of knowledge with one another. This result suggests that rational disagreement is very possible.

Women’s Studies Award Winners

Woodland Theater

Wednesday, April 29
1:30 – 1:55 pm

The Spirit of Sisterhood (Film)

Jessica Amaris

Mickey Crothers Award

In a society that pressures women to be physically perfect, it can be hard for a woman to find her self-worth, love and confidence, when she is constantly comparing herself to media’s ideal images of beauty and her peers. Among those pressures and comparisons, is a group of women finding self-love, empowerment and spiritual peace through the ancient art form of belly dance. As a student, I made it my goal to learn more about the art and how it changes lives, which eventually turned into a full-fledged multi-media project. The interactions with the Lasa ANahaTa Tribe provided such a deep insight into the connections, trust and self-discovery that comes with belly dance that it is now difficult to think of the dance as simply, a dance. Instead, it is a communication and energy that radiates love, empowerment and support, with every move, look and song. My goal was to find what fed their confidence and self-worth, and I have discovered it’s a journey that is different for each dancer, but they all have one thing in common: the love and support provided by their dance sisters, allows them to take the first steps into discovering a much deeper, powerful and beautiful part of themselves.

Ho-Chunk Room

Wednesday, April 29
2:00 – 3:50 pm

“Worse than death!”: The Limits of Disabling Illness as Metaphor in Sarah Grand’s The Heavenly Twins

Quinn Forss

Helen X. Sampson Undergraduate Research Paper

This essay posits the importance of analyzing the uses of ableist metaphors and figurative language of the New Woman novel and its impact on our understanding of Victorian (dis)ability today. In doing so, I hope to illustrate
the need for not only a language of responsibility today that does not equate disability as lacking, ignorant, or repulsive, but also a critical literary framework that does not read ableist metaphors as such. Rather, I encourage resistance by reclaiming ableist metaphors of disease and madness through a disabilities studies lens. To demonstrate, I examine a reading of Sarah Grand’s The Heavenly Twins (1893) that use the characters’ interactions with syphilis as metaphors for women’s oppression and lack of subjectivity. Rejecting these one-dimensional representations of disability/disease, I focus on a rereading of the character Edith and her interactions with syphilis in an attempt to find the metaphor of her disease as empowering to those living with disabling illness.

An Examination of Mothers, Motherhood, and Mothering
Emilee Grunow
Helen X. Sampson Undergraduate Project Award

A short series of three poems seeks to explore and understand the highly complex relationships that stem from the mother. My poetry attempts to understand how a mother’s presence influences the growth of her children, and the complicated interplay between mothers and motherhood. Free verse form is relied upon to shape the natural progression of the poems as they evolve from reflecting on vivid imagery, aurally pleasing elements, and visual structure. I intend to use poetry as a way to examine relationships and chart the impressions that they leave on everyone. The importance of connection remains the central message, and is expressed through poetic forms to mimic real world experiences.

Recollection of India: Dynamics of an Intercultural Immersion
Elaine Lor
Donna C. Turell Award

Elaine Lor will be presenting Recollection of India: Dynamics of an Intercultural Immersion at the Provosts Honors Symposium on Friday, May 1st.

Collection of Five Poems
Huyen Pham
Virgiline and Joseph See Award

A collection of poetry that contains the best pre-study abroad memories of me, a girl from Hanoi, Vietnam. I am an international student at UWEC and these memory poems actually make me feel less homesick. The collection includes five poems: “My Name Is”, “Firefox”, “To My Grandma’s Cat”, “Angel in the Dark”, and “The Giant Rock”. Except for the first poem, each tells a story of a particular thing or event that happened during the years in Vietnam that still stay in my mind. “My Name Is” shows the interpretation of my Vietnamese name and how a name is treasured as a parents’ second gift to their child after the child’s life. “Firefox” links to the first house I lived in, which burnt down after a short time with the very first toys I had. “To My Grandma’s Cat” connects to a sad event of my life when I realized how important a small creature like a cat could comfort us after a loss of our loved ones. “Angel in the Dark” captures a scene of my daily after school routine in kindergarten playing at my uncle’s when he took lots of pictures of me dancing that I still keep today. “The Giant Rock” describes the experience I had during my first big trip, thus shows the love and support my family always have for me.

If Real Men Don’t Eat Quiche, What Do They Eat?
Tim Allison
Helen X. Sampson Graduate Paper/Project Award

I investigate how the concept of masculinity has been instilled in me from youth to today. By reflecting on my often conflicting experiences of being raised by a single mother, having two brothers, and being immersed in the American culture of the 1970s to the present, I have come to understand how I have internalized what it means to me to be a man. I examine my growing understanding of gender as a binary to today’s more nuanced, flexible, and growing concept of gender. My work mirrors society’s evolving view of gender that has especially been evident recently. I conducted this project by examining the “texts” that have influenced me most including family, literature, television, music, and, most predominantly, a very strong-willed woman, my mother. It was this presence of a strong woman that has allowed a wider understanding of gender including the idea that masculinity can include feminism.
Women’s Studies Capstone Presentations

Centennial Room
Thursday, April 30
1:00 – 3:30 pm

Women’s Studies Theory as Creative Expression
Quinn Forss

For their Women’s Studies Capstone, Quinn Forss takes some of their favorite theoretical pieces encountered throughout their studies and translates them into Science Fiction short stories. This project is an attempt to breakdown the academic jargon of theory and present it in a more accessible form for those in and outside of academia. Quinn will describe the process they went through to create these stories, including selection of theory, transforming theoretical ideas into metaphor, symbolism, and other literary features, as well as the editing process. Selections of the stories, with an over view of the theory that inspired them, will be read and discussed.

Reflections on White Privilege and Anti Racist Activism
Erin Bernardy

My attendance at the 2015 annual White Privilege Conference in Louisville Kentucky inspired me to interrogate my white privilege, engage in compassionate conversations about race and join racial justice movements. It also made me interrogate the intersections between anti-sexist and anti-racist theoretical, political, and intimate engagements. Upon returning from the conference I have crafted this capstone to operate as two fold; I am working with the Office of Multicultural Affairs to help bring awareness to the academic and social implications of institutional racism on our campus as well as theoretically situating myself within transnational feminist and critical race theories in order to challenge the contradictions present within the academic field of “whiteness studies.”

Reflecting on Our AIDS Resource Center of Wisconsin Externship
Danielle Decock, Kendall Mager, Caitlin Opatik, Der Dang

In working with the AIDS Resource Center of Wisconsin, our capstone group has broadened our understanding of HIV, AIDS, and Hepatitis C prevention efforts. We specifically worked with prevention specialists at the AIDS Resource Center to coordinate outreach activities to high-risk communities in the Chippewa Valley in the hopes of increasing the number of high-risk individuals who get tested for HIV and Hepatitis C in the following months. Drawing on research that indicates that injection drug users and members of the LGBT community are at high risk for the contraction of these diseases, our group has focused on outreach to these specific communities. As feminist students, we work with the AIDS Resource Center of Wisconsin to embody a harm-reduction approach to the prevention of HIV, AIDS, and Hepatitis C. This approach allows individuals who get tested for these diseases to become active participants in the shaping of their own care.

My Externship with the Boys and Girls Club
Lauren Saxhaug

My Externship with the Family Support Services Centre
Sydney Washcovick
CERCA Film Presentation

Woodland Theater
Wednesday, April 29
1:00 – 1:25 pm

Civil Conversations
Breane Lyga, Raina Beutel, Nicholas Erickson, Courtney Kueppers
Faculty Mentor/Collaborator: Jan Larson

Using interviews intermixed with historic news footage, audio records and still images Civil Conversations examines how ordinary people shape extraordinary events. The project seeks to capture the living history of participants at several points of the civil rights movement. We have multimedia journalism content that focuses on Freedom Riders of 1964, foot soldiers of the Selma to Montgomery march in support of voting rights and the arrest of Rosa Parks and the Montgomery bus boycott. Civil Conversations facilitated a meeting between a former Freedom Rider and a member of the Montgomery Police Department. The end product of the project is a series of print, audio, video and still images taken over the past year during the Civil Rights Pilgrimage and when the research team traveled to Selma, Alabama to report on the 50th anniversary of Bloody Sunday from March 3 – 10, 2015. We plan to share the stories of civil rights participants and discuss how their past actions continue to shape events today.

Music Performances and Presentations

Dakota Room
Wednesday, April 29
10:00 – 10:50 am

New Music for Piano Inspired by Literature
Stephen Rawson, Miles Plant, Timothy Igel, Jordan Jenkins
Faculty Mentors/Collaborators: Nicholas Phillips, Chia-Yu Hsu

The goal of this project was for students to gain professional experience as composers by working hands-on with faculty members of UWEC. Students met to conceive of a central theme that would unify the works composed: “Music Inspired by Literature.” The project was proposed by Dr. Nicholas Phillips as a call-for-scores written for solo piano. The project began by each student choosing an individual text with which they would work. After the first sketches of their new works, students met with their composition professor Dr. Chia-yu Hsu who advised the students in their progress. The results of this project yielded this program of works for solo piano centered on a unifying theme:

8 Bitz
Miles Plant

8 Bitz is based on a poem written by Kevin Hodgson about the existential crisis one gets in when technology malfunctions. The poem is written in 8 bit binary code, in order to read the binary code you must translate it through a digital processor. This piece explores the timbral sonorities of the piano through mimicking the binary process (pedals/keys either on [1] or off [0]) and conveys the emotional turmoil of a human being having to cope with technology’s flaws.

Summer of GAD
Timothy Igel

This piece was inspired by a text called the Human Test Vol. 3 by Ze Frank. It talks about a wide range of emotions and situations that if you identify with, would prove you are human. This piece specifically focuses on complex relations people have while communicating via text messaging, social media, and other
modes of non-face to face communication. The resultant emotions that are felt by either person comprise the emotional content of the piece, but the primary focus is on the anxiety that one might feel without the reassurance that in-person connection and contact provides. The GAD in the title refers to General Anxiety Disorder.

A Completed Portrait of J. Alfred Prufrock
Stephen Rawson

A Completed Portrait of J. Alfred Prufrock is a work for speaking pianist, which utilizes the text of T.S. Eliot's Love Song for J. Alfred Prufrock. Many critics have speculated that the character of Prufrock is most likely a pessimistic self-portrait of the young Eliot. Therefore my ambition was to emulate the “character” of Eliot through this piece. A primary characteristic of much of Eliot's writing is the use of allusion, or making reference to existing works of the same medium to advance or contrast his own language. Likewise, I make musical allusion to several works spanning from Beethoven to Barber, Nono, Wagner, Cowell, Liszt and others. The mood of the piece is one of great introspection, self-doubt, aggression and perversion. This piece was done in collaboration with Faith Rawson, and is accompanied by the portrait of Prufrock himself.

Five Aphorisms of Franz Kafka
Jordan Jenkins

This piece was written for Dr. Nicholas Phillips as part of a Faculty-Student Collaborative Research Grant at the University of Wisconsin-Eau Claire. The piece is based on five different aphorisms of Franz Kafka, taken from Reflections on Sin, Pain, Hope, and the True Way. Each movement grabs on to a particular image or idea of the text and tries to capture it in a musical medium. As a result, the music becomes picturesque, almost a sound painting, transferring words to images through a middleman: the piano. The particular Aphorisms with their numberings appear below in the order of the movements:

#1: The true way goes over a rope, which is not stretched at any great height but just above the ground. It seems more designed to make people stumble than to be walked upon.
#12: Like a road in autumn: Hardly is it swept clean before it is covered again with dead leaves.
#13: A cage went in search of a bird.
#66: Theoretically there exists a perfect possibility of happiness: to believe in the indestructible element in oneself and not strive after it.
#73: Intercourse with human beings seduces one to self-contemplation.

Throughout the course of the summer, students met with Dr. Nicholas Phillips who was able to offer advice for idiomatic piano writing and performance considerations. This project demonstrated the professional environment in which a composer and performer must work to negotiate a new composition. Student composers gained important real-life perspectives such as deadlines, revisions and proper, professional score formatting. Students were able to complete a professional composition, gaining valuable experience and advice that will carry with them into their future professional lives.
A Study of the Solos de Concours of Charles Colin, Professor at the Conservatoire National Superieur de Musique de Paris: With a Brief History of the Conservatoire, Oboe Professors and the Concours Competition in the Nineteenth-Century

Jonathan Conjurske
Faculty Mentor/Collaborator: Christa Garvey

Our research project examines the Solo de Concours of Charles Colin, a prominent oboe professor at the Paris Conservatoire in the nineteenth century. Colin’s concours solos have largely been unexplored in terms of structure and melodic development among scholars. The purpose of this study was to examine each of Colin’s Solos de Concours, looking for expansion of stylistic elements, technical challenges presented to the oboist, moods and characters to be expressed, and changing nuance of the structural layout that Colin employs over time. The project began with background research on the history of the nineteenth century oboe studio at the Paris Conservatoire, the oboe professors, the tradition of the jury competition, and the history of concours solos. Each solo was analyzed first on a structural level and then focused in on detailed phrase and melodic development. Colin’s works were found to be operatic and grandiose, display a large range of musical character, and show clear development of complexity in terms of melody, pacing, and increasing technical challenge.

Analysis of Top U.S. Orchestra Excerpts & Auditions for Violoncello

Kaitlyn Witherspoon
Faculty Mentor/Collaborator: Tulio Rondon

Auditioning into an orchestra is demanding for a musician. To succeed, a performer needs the technical ability and training to play the requested music better than thousands of other applicants. Standing out is challenging, but becomes possible with a clear focus. My research helps illuminate necessary knowledge and specific goals. My goal is to educate and guide cellists who aspire to enter professional orchestras. I determined the top ten orchestras in the United States and the ten most common excerpts. I looked at the difficulties of each excerpt by studying the scores plus the overall context for each piece by researching the history of the orchestra, the time period of the piece, and each composer. To understand the judges, I found studies of musicians rating other musicians’ performances. I found that each excerpt must be approached with a different style and a different focus. My research helps one focus on the most important aspects of the excerpts, while not overlooking other possible elements, such as why one should play with a certain style based on the history of the orchestra or the composer preferences.
and mapping with in-person interviews to identify community issues, invent possible solutions, and take productive action. We recruited a mixture of college students, families, and young professionals from the target community to document the role alcohol plays in their neighborhood and its impact, both good and bad, on their quality of life, by taking up to 10 pictures each over a four week period to be shared at group sessions. Problems that were agreed to be urgent and most troublesome by participants included environmental concerns (litter), alcohol-related vandalism and crime, advertisements and bar specials promoting binge drinking, and noise complaints. The positive, social side of responsible drinking also surfaced in group discussions. Here we review project findings including photos, maps, and stories, and offer a critique of the efficacy of implementing PPM to bring diverse groups together to discuss public health concerns and provide viable suggestions for how to take collective action.

The Effects of On- Versus Off-Campus Living on Academic and Social Outcomes of College Students


Faculty Mentor/Collaborator: Jerry Hoepner

Being a traditional first year student at college can be challenging for anyone, but where a student lives impacts their college experience. The purpose of this study was to examine the experiences of first year students who lived either on or off campus. We looked at the evolution of relationships with high school friends/parents, the involvement on campus and how on- versus off- campus students’ relationships differ between peers and professors. Existing research suggests living at home and commuting to campus tends to lead students to be less engaged then those who live on campus. Twenty-six college freshmen at the University of Wisconsin – Eau Claire were be recruited; participants went through semi-structured interviews. Our data will be analyzed using qualitative coding method devised by Graneheim and Lundman (2004). We are currently analyzing our data.

Geometric Analysis of Musical Modes

Jordan Jenkins

Faculty Mentors/Collaborators: James Walker, Gary Don

Since the beginning of the 20th century, composers of classical art music tended to stray away from writing music using functional tonality like the music of Mozart and Beethoven, instead choosing many different and eclectic ways to construct their music. Music theorists and mathematicians have searched for many different ways to analyze classical music written during this period to the present. The purpose of this project was to examine a particular method of mathematical analysis, investigating the geometric properties of musical modes, and apply it in addition to a music theory analysis of a piece of 20th century classical music, the “Romanza” movement of Symphony No. 5 by the British composer Ralph Vaughan-Williams. The project examined two different methods of mathematical analysis, one using a hexagonal network of chord relationships called the Tonnetz, and a newer method known as the Table of Diatonic Relations developed by theorist Ian Bates. The project reveals interesting insights into how composers writing outside a tonal idiom conceive and structure their music, and how geometric analysis can provide another layer of understanding of music in general.

Feminism and Identity

Ho-Chunk Room

Wednesday, April 29
10:00 – 10:50 am

Hawthorne’s Masculine Materialities: American Indian Artifacts, Thoreauvian Excursion, and Antebellum Manhood(s)

Ryan Furlong
Nathaniel Hawthorne's relationship to American Indians has more recently (and surprisingly) been explored in critical discourse, especially considering scholars’ initial hesitancy to seriously research the topic. Consequently, Hawthorne’s attraction to the American Indian has been explained as a result of a guilty historical conscience, an emerging literary nationalism, and even anxieties over racial miscegenation. But amongst these important studies, I instead engage with Hawthorne’s persistent infatuation with Henry David Thoreau’s persona of “playing Indian,” in which non-Indian Americans enacted fantasies of adopting Indian material and non-material culture in pursuit of identity formation. In particular, Hawthorne envisioned Thoreau as a “wild” American Indian free from Anglo-American domesticity and economic failure, two problems that plagued Hawthorne throughout his literary career and biography. Hence, I argue Hawthorne enacted, personally and fictively, what I call “moderate excursions,” temporary journeys into the placiality, spatiality, and materiality of the imagined American Indian, to experience both a “primitive” masculinity and a release from the domestic-economic restraints imposed by the “self-reliant” masculinity of his own culture. In doing so, Hawthorne’s “moderate excursions” materialize Native Americans’ beneficial significance for antebellum manhood and reveal Hawthorne’s writing on the subject as an endeavor to ensure literary and financial security.

Written by a Woman: The Body, the Text, and the Female Author
Kaitlyn Johnson
Faculty Mentor/Collaborator: Carey Applegate

The purpose of this project was to investigate how the relationship between author and text is altered when the author is a woman. Through Constance Fennimore Woolson’s short story “Miss Grief,” I was able to explore the importance of the connection between the female author and the text she creates. I began by complicating Roland Barthes’ “Death of the Author” with the idea of a woman’s mind and body being situated in her cultural context, and also with the idea of a woman being fundamentally linked with the text she creates. By complicating these ideas, I bring into question whether a text has a single source, multiple sources, or no source at all. By doing so, I seek to show how writing as a woman has a profound influence on the text, and the text cannot be separated from the conditions in which it was created.

LGBTQ Studies
Ho-Chunk Room
Wednesday, April 29
11:00 – 11:50 am

Predictors of Frequency and Intensity of “Worst-Point” Suicidal Thoughts in LGBTQ Young Adults
Emily Burish
Faculty Mentor/Collaborator: Jennifer Muehlenkamp

LGBTQ individuals are at increased risk for suicide compared to heterosexuals, and it may be negative experiences associated with being a sexual minority elevating the risk. The current study examines the influence of minority stress, internalized homophobia, etc. on the intensity and frequency of suicidal thoughts among individuals identifying as LGBTQ. The current 143 LGBTQ (M age = 20.28, SD = 1.75; 95% White) participants completed questionnaires assessing suicidal ideation, depressive symptoms, and multiple minority stressors. Approximately 40% of participants reported serious suicidality in their lifetime and 5.6% reported having attempted suicide in the past year. A hierarchical linear regression revealed the intensity of “worst point” suicidal ideation, controlling for age, gender, and depressive and anxiety symptoms. The full model was significant, f(5,137) = 12.23, p<.001, accounting for 28.3% of the variance. Depression, internalized homo-negativity, and expectancy of rejection were significant factors. A similar approach was used to evaluate predictors of the frequency of “worst point” suicidal ideation. Significant predictors included depression and internalized homo-negativity. Both intensity and frequency of suicidal thoughts are linked to internalized homo-negativity and depressive symptoms. These findings provide insight into unique factors that contribute to increased suicidal thinking among LGBTQ students.
Mapping Contentions within Communities of Difference: Using Oral Testimonies to Examine Distinctions Between Trans* and Drag Identities

Michael Federspiel
Faculty Mentors/Collaborators: Pamela Forman, Ellen Mahaffy
Non-UWEC Faculty Advisor: Michael J. Faris, Texas Tech University

While transgender and drag identities are often conflated in public imaginations and by some theorists, this project explores the specificity of these different identities. Feminist and queer theorists like Judith Butler often cite drag as potentially subversive—an assumption this project challenges. During summer 2014, I collected eight oral histories from transgender individuals and drag performers who live in western Wisconsin. In disarticulating transgender from drag, I illuminate the heterogeneity that is not often addressed within dominant, liberal notions of LGBTQ politics. I suggest that while drag has the potential to create spaces for political commentary and satire, it also depends upon public personae that can, and often do, implicitly mock transgender persons because drag hyperbolically depicts the presumed gender binary. These drag performances place transgender lives at risk by depicting womanhood, manhood, and/or personhood as contingent on “looking real.” Drag performers frequently risk framing transgender lives in deceit, thievery and jest. Framing trans* identities in this light furthers cisgender privilege and elides possibilities for challenging gender binaries.

UW-Eau Claire and Local Gender and Race Issues

Ho-Chunk Room
Wednesday, April 29
12:00 – 12:50 pm
Next steps for Q2: A Community Building Approach to Serving the Needs of Sexual Minority Youth in the Chippewa Valley

Caitlin Opatik, Erin Bernardy
Faculty Mentor/Collaborator: Theresa Kemp

The purpose of our project is to identify the needs of the AIDS Resource Center of Wisconsin’s LGBTQA youth group, Q2, in order to reach a greater number of marginalized youth in the Chippewa Valley. National and state government agencies such as the Centers for Disease Control and Wisconsin Department of Health have shown that the absence of protective factors among this demographic are correlated with an increased risk of contracting sexually transmitted diseases, engaging in self-harm activities, and suffering from social isolation. By increasing attendance of Q2 through outreach, we hope to assist in the creation of a healthier, visible, community oriented LGBTQA population in the Chippewa Valley. We strive to utilize feminist methodologies, which nurture a collective, process oriented research experience. Through the employment of these methodologies, we are examining the roles of community members and organizations in fostering a safe, inclusive, environment for LGBTQA youth. We are working to identify community allies and business leaders who will participate in a community oriented Safe Space training and networking opportunity in May. We hope that participation in this event will inspire a compassionate, ongoing relationship between LGBTQA youth and the community organizations that serve them.

Studies Abroad

Menominee Room
Wednesday, April 29
1:00 – 1:50 pm

Analysis on the Psychological Wellbeing of the Urban Chinese Elderly
William Michel
Faculty Mentor/Collaborator: Jianjun Ji

Using the 2006 China National Rural and Urban Elderly Survey data, this study examines the variations of the socioeconomic-demographic characteristics, the psychological wellbeing of the Chinese elderly, and the associations between them. The study hypothesizes that the demographic characteristics of age, gender, fertility, and marital status of the Chinese elderly have an impact on their psychological wellbeing of memory, health, loneliness, family harmony, and life satisfaction. It is also hypothesized that the socioeconomic statuses of education and income have an impact on psychological wellbeing. By using statistical methods of cross-tabulation, correlation and the significance test of Chi-Square, the results show to be supportive to the hypotheses. Perceived psychological wellbeing of the Chinese elderly varies among the respondents. Among the demographic and socioeconomic variables, marital status and economic status show to have consistent and significant impact on perceived psychological wellbeing. This project is important due to the lack of scholarly knowledge on the aging Chinese population. Because of this, it becomes all the more important in studies on gerontology and cultural differences. With this work, we can now help make policy recommendations that could shape China for decades to come. This may not be seen in other projects at CERCA.
Back to Basics: The National Awakening Party in the 2014 Indonesian Legislative Election
Hailey Kiefer
Faculty Mentor/Collaborator: Eunsook Jung

Prior to the 2014 Indonesian legislative election, many scholars predicted that Islamic parties would not fare well. Survey results indicated that support for Islamic parties compared to secular parties was relatively low. Despite these expectations, Islamic parties did slightly better than in the previous election. In particular, the National Awakening Party (PKB), which represents traditionalist Muslims, gained 19 more seats in the parliament than in the 2009 legislative election. Why was PKB successful in this election? One explanation would be that PKB has mended its relationships with Nahdlatul Ulama (NU), the mass-based traditionalist Muslim organization, and has appealed to cultural-religious ties with traditionalist Muslims. However, this explanation overlooks an institutional perspective. We argue that PKB has made conscious efforts to strengthen party cohesiveness by setting up a clear internal system, and by recruiting new and young members to regenerate its party. Such efforts were accompanied by election campaign strategies that went beyond an appeal to traditionalist Muslims. In doing so, PKB has moved away from a personalistic party under Abdurrahman Wahid, lacking democratic principles and practices within the party to a vibrant and cohesive party. This paper is based on in-depth and open-ended interviews with PKB party officials, legislators, and NU board members in both Jakarta and Surabaya during fieldwork conducted in 2014.

Machu Pikachu: Ethnolinguistic Vitality within Japanese and Peruvian Cross-Cultures
Robin Jungwirth, Anna Myers
Faculty Mentor/Collaborator: Manuel Fernandez

The purpose of this project is to explore relations between Japanese who have immigrated to Peru and vice versa since the late 1800s in search of employment, and furthermore how these immigrant communities have integrated themselves to varying degrees at linguistic, social, and cultural levels. Through this study we hope to understand how this particular community’s ethnolinguistic identity has been maintained at the same time it adapts to that of its host country. Both Nikkeijin (Peruvian descendent Japanese) as well as Japanese living in Peru have access to a variety of resources and social events in both Spanish and Japanese – such as financial consulting, legal aid, childhood education, traditional festivals, night clubs, and language classes. Access to these and other societal institutions of each community’s respective host societies are what may strengthen or weaken the group’s ethnolinguistic vitality, affecting chances of assimilation while inversely affecting the preservation of their ethnolinguistic identities. By examining historical accounts, academic literature, modern-day magazines catered to non-native populations, and conducting interviews online we hope to understand what institutions are in place and how they affect assimilation versus preservation of culture. Our ability to speak Spanish and Japanese can help us in this and future fieldwork.

Global Feminisms in India
Heather Spray, Sara Hansen
Faculty Mentors/Collaborators: Asha Sen, Theresa Kemp

Women’s issues have been receiving more global attention in recent years, and few places more than India. A country that only in the last few decades has gained its independence, India has been the site of numerous highly publicized movements, organizations, and protests regarding women, their rights, and especially their relationship with the government. To investigate these topics, a group of twelve students and two professors traveled to New Delhi in January of 2015. The purpose of our project was to gain an awareness of feminism and become activists for women’s rights in a cross-cultural context. By going abroad for three weeks, we hoped to open a dialogue between Indian and American women in pursuit of facilitating an exchange of fresh ideas, approaching advocacy for women’s rights, and sharing our unique perspectives with each other. We hoped to inspire the motivation to become or continue to pursue an active role in garnering rights for women. On our trip we collected narratives from Indian women, worked directly with different NGOs, and participated in lectures from Miranda House faculty and visiting
lecturers. Through this we gained insights into the barriers to change, and how they compare to those in the United States.

**Hmong Studies**

**Menominee Room**  
**Wednesday, April 29**  
**2:00 – 3:30 pm**

*The Path of our Fathers: A History of Hmong Refugee Men*  
Khong Meng Her  
Faculty Mentor/Collaborator: Joseph Orser

Since the arrival of the first Hmong refugees in 1975, scholars who have written about the Hmong experience mainly focused on these refugee men’s involvement with the American CIA in Laos during the Vietnam War. Therefore the Hmong are given a soldier’s story and their story as an individual are not included in scholarly works. Interviewing these Hmong men and using their stories to tell the history of the Hmong, not as soldiers, but as a human being with a unique experience. Their stories open up a distinct individual whose life was outside of fighting a war and what it means to be a Hmong man in the Hmong community from Laos to the resettlement in the United States. Findings show that being a Hmong man in the United States is not easy trying to hold onto tradition while the newer generation is adapting western views and challenging their cultural identity. Further research with the newer Hmong generation is needed to explore the topics of masculinity, gender role, and balance between two different cultures in detail.

*An Exploration of Hmong Culture and Experiences in Thailand*  
Pada Xiong, Pang Xiong, See Xiong, Ja Yang, Andrew Vue  
Faculty Mentors/Collaborators: Charles Vue, Ka Vang

This research project allowed the Hmong students to learn the cultural practices and experiences of the Hmong in Thailand, and how they differ from the Hmong in Wisconsin. We captured the narrative stories of Hmong families in Northern Thailand, both in English as well as in Hmong, to reach a broader audience. Topics we explored were Hmong funerals, Hmong and Thai names, Hmong women’s maternal health, family structures in gender roles and education, and New Year practices and celebrations. We used phenomenological research methods to gather the natural experiences and perceptions of the Hmong in Northern Thailand. We applied a variety of open-ended questions to gather information, stories, and participants’ accounts through individual and/or group interviews, discussions, and observations in their natural settings—which gave insights into their motivations, meaning, and actions. The data was analyzed and the results showed that some experiences of Hmong American and Hmong Thai were similar and different due to the cultural and geographic/environmental factors. We also learned that from our western perspectives of a Hmong primitive society, Hmong Thai people are becoming more “civilized” as time is progressing. This research project will add to the critical but limited body of literature on the Hmong.

**Literary Criticism**

**Ho-Chunk Room**  
**Thursday, April 30**  
**9:30 – 10:45 am**

*Steve Rogers/Captain America in the Marvel Cinematic Universe*  
Winnie Khaw  
Faculty Mentor/Collaborator: Audrey Fessler

In this abstract on the Marvel Cinematic Universe’s (hereafter referred to as the MCU) Steve Rogers/Captain America, I analyze how, after the Super Soldier serum injection, by choosing to be “a good man,” Steve Rogers—“just a
kid from Brooklyn”--transforms himself into the American superhero ideal; I demonstrate how the methodical expansion of the MCU is achieved through such means as the insertion of the character Nick Fury, the looming presence of S.H.I.E.L.D, the continual mention of the Avengers Initiative, the transfer of the Tesseract from one villain to another, and the glaring failure of attempts to replicate Project Rebirth. I then explore war motifs as shown by public fears of total annihilation, HYDRA’s monstrous supremacist ideology bent on world domination/destruction, propaganda devices (particularly focusing on Captain America’s role as “The Star Spangled Man with a Plan”) and Captain America’s weapon of choice, a vibranium shield painted in patriotic colors, emphasizes the defensive, protective nature of the causes he champions--much akin to what the United States would like to think of its own global conflicts--asserting that all of the above retain nuanced and contemporary relevance.

**Austen’s Fans and Their Fiction: Janeites Recreating Jane**

Alexandrea Krause

Faculty Mentor/Collaborator: Carey Applegate

The purpose of this project was to determine why Jane Austen continues to be prominent within contemporary literary studies, and more specifically, why there has been an influx of Jane Austen spin-offs and related fiction in popular culture. In particular, I looked at *Pride and Prejudice and Zombies*, *Sense and Sensibility and Sea Monsters*, *Longbourn*, and *Jane Bites Back*. Through examining current Jane Austen trends, I will explore the following question: Why are so many writers using “Jane” as a launching point for new, yet clearly related, fiction? By examining both the culture of “Janeites” and their desire to further Austen’s influence over the literary world, I will illustrate the complexities of Jane Austen’s influences within popular culture and texts today. Using connections to social issues in her original texts, I will trace common threads between current and classic texts in order to show their continued relevance to readers today. I will demonstrate how Austen’s prominence has expanded, and far exceeded beyond, the literary world through contemporary fiction. This project was presented in collaboration with students from two other universities as part of a panel discussion at the 2015 Sigma Tau Delta International Convention in Albuquerque, NM.

**The Composer is Dead: The Postmodern Relationship Between Pseudonym and Author in A Series of Unfortunate Events**

Jonathan Pumper

Faculty Mentor/Collaborator: Blake Westerlund

Lemony Snicket’s *A Series of Unfortunate Events* has been a staple in the literary diet of adolescents since its release in 1999. The dour, comical, and philosophically ambivalent series is written by Daniel Hadler under the guise of Lemony Snicket. What complicates this particular author-pseudonym relationship is the fact that Snicket acts as a dynamic narrator and character within the actual text. As authorial voice drifts out of the extratextual world Hadler inhabits, Hadler’s own stake in the series enters into question: what role, what agency does Hadler have in his own creation? If much of the controversy associated with the series (i.e., it is too bleak, too violent, too dependent upon the misery of children) is explained away by authorial intention, what happens to its existence if we reject the notion Hadler has any stake in his own work? What happens if we accept—as critic Roland Barthes does—that the author (in terms of interpretation) is dead to the text? Through application of postmodern discourse and the critical conversation surrounding *A Series of Unfortunate Events*, I explore the complex relationship Hadler has with his pseudonym Snicket and his distanced audience, and how this affects our interpretation of his series.

**The Three Sisters**

Barry Inman

Faculty Mentor/Collaborator: Amanda Profaizer

The purpose of this project is to tell the story of The Three Sisters through costume design. The story is traditionally placed in turn of the century Russia, as this is its original setting. The director had decided to take another route and change the whole concept of the show. He placed the story in 2005 Detroit, which alters how the design team will work to tell the story of the characters in this new setting. However, Professor Profaizer and I were challenged with how to communicate, through costuming, to the audience that the characters are deconstructing emotionally. The scenic design team went with a physical destruction of the set but Professor Profaizer and I decided on using color, one of the many elements of design, to show how these characters are deconstructing. We began with bright colors in the beginning of the show and eventually made our way to blacks and greys. Through primary and secondary research, my mentor and I collected images of fashion of the time period to get the correct silhouette of the
times. Hopefully we were able to tell the story of deconstruction of the characters using the element of color rather than another element.

Writing Center Studies

Ho-Chunk Room
Thursday, April 30
11:00 – 12:15 am

Supporting ESL Students in the Writing Center: Concerns and Solutions
Mark Priebe
Faculty Mentor/Collaborator: Alan Benson

The University of Wisconsin–Eau Claire has seen an increasing number of students who are non-native speakers of English. To ensure that all UWEC students have the chance to excel academically, the Center for Writing Excellence must evolve its tutoring practices to address the different needs and rhetorical traditions of our international and ESL students. This project focused on improving the practices of writing assistants by investigating two principle ideas: how to handle the many lower-order concerns (grammatical and sentence-level issues) found in ESL writing, and how to integrate ideas from contrastive rhetoric into the center’s pedagogy. Through an interview with an ESL instructor and a filmed tutoring session with an ESL student, this research identified productive strategies for improving the grammatical proficiency of ESL students while retaining the focus on higher-order concerns like argument and organization. This project also explored cross-cultural rhetorical strategies that can assist writing assistants during their sessions with ESL students. Findings from this project will be valuable not only as a roadmap for better support for English language learners in the CWE, but also as a set of strategies for addressing language barriers campus-wide.

This [AND] That: Disabling Binary Gender in the Writing Center
Melanie Daas
Faculty Mentor/Collaborator: Alan Benson

Despite the growing visibility of people identifying as LGBTQIA* in media, queer theory has not always been acknowledged in writing center studies—especially when referring to those that identify outside the gender binary. My research project aims to create a no-pressure dialogue by identifying situations in which people marginalize non-binary students in the classroom environment, giving suggestions on how to better serve these students, and—most importantly—highlighting the necessity of discussing non-binary issues. The research itself draws up articles and blog posts written by non-binary individuals, as well as the very few scholarly articles connecting queer theory, non-binary gender, and writing center work. This lack of writing center engagement actually served as my main reason to begin researching, and I feel that it only substantiates the need for this conversation among scholars, educators, and students alike. Although my project is tailored to the specific practices of the Center for Writing Excellence, its findings are pertinent to all areas of academia, social interaction, and life itself. By providing information on queer theory, defining terminology, and encouraging conversation, my project makes the topic both visible and accessible to any audience.

Space and the Center for Writing Excellence
Kiah Sexton
Faculty Mentor/Collaborator: Alan Benson

A major element of academic lore is that writing centers should be “homey” or “cozy.” This affects not only the work taking place inside writing centers, but also the shape of the spaces they occupy. The purpose of this project is to integrate scholarship from writing center theory and Space/Place research to determine how to best promote learning by both students and tutors. This research project attempted to discover and alter how tutors and students perceive the Center for Writing Excellence as a pedagogical space. During the project, I made changes to the physical space of the CWE in an attempt to explore how changes to the material environments of a writing center affected the human interactions inside. My research on these changes—diverting foot traffic, enhancing visibility,
and adding visual aids—validates claims that the primary audience influenced by a “cozy”/“homey” environment is the tutors who spend the most time in the center; students who come in to work are largely indifferent to the space around them. This has implications for center design and planning of learning spaces both on the UWEC campus and, more broadly, on campuses everywhere.

**Personalizing the Classroom: An Inquiry into Students’ Needs in Tutor Training for the Center for Writing Excellence**

**David Kocik**
Faculty Mentor/Collaborator: Alan Benson

As a student in English 397: Writing Center Theory and Practice, a required class for all future UWEC Center for Writing Excellence tutors, I was intrigued by the immense variety of the texts we read and assignments we completed. I was also curious about which types of readings and activities— theoretical or practical—most effectively prepared tutors for a position at the CWE. The purpose of my research was to investigate the various approaches to writing center tutor training in writing center pedagogy, while also researching English 397 students’ various needs in tutor training. Through secondary research into writing center scholarship, I found both theory and practice must be integrated in order to effectively train tutors. However, through two surveys I gave to students in the English 397 course, I found students’ definitions of effective tutor training are extremely diverse, meaning the classroom and practice experience should be as individualized as possible to allow every student to become the best tutor possible. My findings reveal the need for individualization not only in training CWE tutors, but in all forms of teaching.

**Building Writer Confidence: Specific Praise and the Writing Center**

**Katelyn Sabelko**
Faculty Mentor/Collaborator: Alan Benson

This project explored the ways that writing tutors engage with students through feedback in the form of specific praise—comments that highlight specific things students have done well versus general praise such as “Good work.” Through research into writing center scholarship and the scholarship of English educators, I discovered a gap between the feedback given by writing teachers and the development of writer confidence, a gap created by the significant lack of specific praise given by teachers to students. My research, conducted through surveys of students at the Center for Writing Excellence and a community of writers not affiliated with the university, reveals that writing center tutors are in a unique position to fill this gap by offering specific praise during tutorials. My work also reveals the great impact praise has on students both mentally and physically. I explore areas such as the impact of specific versus unspecific praise on writers, the connection between praise and body language, and the correlation between praise and writer motivation. My research reveals the importance of praise not only to writing center tutorials, but also for tutors and students of all disciplines.

**Identity and the Body Politic**

**Ho-Chunk Room**
**Thursday, April 30**
**12:30 – 1:45 pm**

**“Ethnological” Indian Villages at the Minnesota State Fair, 1906-1945**

**Sean Szydel**
Faculty Mentor/Collaborator: Oscar Chamberlain

State Fairs and World Fairs in the 19th and early 20th Centuries were social gatherings and included exhibits varying from agriculture to technology. World Fairs reinforced how the white dominant culture viewed Native Americans during the time period. I analyzed the Sioux and Ojibwe “Indian Villages Exhibits” at the Minnesota State Fair as an example of the white dominant culture, who believed Native Americans were a vanishing race in the early twentieth century. I will begin with World Fairs because they influenced the content of state fairs and celebrated the same assumptions concerning race and civilization. Despite the regular inclusion of such villages in state fairs we have little
information about them. This should be a subject for further research.

Language and Identity among Somalis in Barron, Wisconsin
Benjamin Carpenter
Faculty Mentor/Collaborator: Joshua Brown

This study provides an initial look at an immigrant community in rural Wisconsin that is not only linguistically, but culturally, racially and religiously very different from its Wisconsin surroundings: Somali refugees in Barron, Wisconsin. The Somali refugees are part of the second largest immigrant community in the United States, and the refugee status attached to the Somali community provides a unique opportunity to examine potential shifts in the linguistic landscape as it is happening. Through a series of ethnographic interviews with community members in Barron, participant observation in the community, and sociohistorical information about the community, we assess the role of language(s) in the identities of the Somali refugees and how their immigrant identity affects language use and maintenance. Primarily, we are interested in the transmission of the Somali language to American-born Somalis and the changing role of the Somali language for American-born Somali identities.

The Paradox of Intelligence in U.S. Foreign Policy
Christopher Dictus
Faculty Mentor/Collaborator: Stephen Hill

The use of strategic intelligence in US foreign policy occupies a tenuous position for diplomats and statesmen. While the gathering and analysis of information can work to prevent large and devastating terrorist attacks, there are constant concerns over the invasion of privacy. This debate rose to the forefront of policy analysts in the wake of the leaks of Edward Snowden in 2013. He revealed the National Security Agency’s wide-scale collection of data against US citizens and allied states. This sparked a firestorm in the international community, particularly with the revelation that the US tapped the cellular phone of Angela Merkel, the Chancellor of Germany. Intelligence occupies a unique, albeit underdeveloped, place in academia as it lies at the intersection of international relations and domestic policy. This project seeks to outline a cost-benefit analysis for the use of intelligence as a part of a foreign policy approach, particularly against allied states. The evidence for the repercussions of espionage will largely be found in public statements/interviews, and economic factors. This analysis is expected to provide a pragmatic approach for the use of espionage as a tool for states.
Dynamic User Interactions with Evolving Artificial Intelligence and Environment
Aaron Emmert
Faculty Mentors/Collaborators: Michael McMann, Robert Greene

The goal of this project was to design a game environment where intelligent non-player characters (NPCs) have the capability to communicate to the player via dynamically generated text, as well as the ability for both the player and the NPCs to manipulate their environments. This allows for the tasks, or “quests”, in the game to be given to the player at run time, rather than being predefined. The ramifications of progress toward, or completion of, a quest affects the environment at large, since the environment itself is also dynamically generated. NPCs can also be empowered to build and destroy space stations and other objects, adding complexity to the gameplay. The game is built in 3-D using HTML, CSS, JavaScript, and WebGL, and the setting is in outer space to focus on the AI development. The biggest challenge in creating dynamic communication between NPCs and the player is the process of generating sentences in a systematic fashion. In the game, every possible action that can be performed is paired with a verb, so that the language within the game will only be as complicated as what actions can be done.

An Integrated Methodology for Digital Signal Processing Education
Ryan Prior
Faculty Mentors/Collaborators: Jack Tan, James Walker

Digital signal processing is tragically underutilized in the sciences. Industry routinely builds valuable software that people will choose not to use because they do not expect to become effective quickly enough to make their effort worthwhile. This problem limits access to science, technology, engineering, and mathematics, disproportionately harming people who receive less institutional support due to subtle effects of bias and discrimination. The solution presented here combines methodology from interaction design, education, graphic design, and software engineering to create a dramatically different learning experience. While the resulting prototype is practical for teaching digital signal processing in mathematics and engineering, it also illustrates that a mindful presentation of technical systems is more useful for people of all skill levels and suggests effective means for promoting access to software and technical skills.

Using BEA to Modify Packaged Reading Interventions for English Learners
Christopher Moua, Mallory Dernbach
Faculty Mentors/Collaborators: Michael Axelrod, Melissa Chaffin

The purpose of this study was twofold. First, the study tested if Brief Experimental Analysis (BEA) could be used to empirically-select a reading fluency intervention for four English Learners (ELs). Second, the study investigated if the selected interventions would yield positive reading fluency outcomes when modified into a prepackaged reading intervention program for ELs. The study employed a multielement design with three conditions and an extended analysis to examine the effectiveness of the empirically selected intervention when implemented within the Read Naturally intervention program. Results indicated that the BEA was able to differentiate performance between the three interventions. However, three of the four participants did not exhibit gains in oral reading fluency when exposed to the empirically-selected intervention across three weeks. These results contribute to the existing literature on using BEA to support EL students and how it can be used within a packaged reading intervention.
Do Labels Affect Teachers’ Acceptability of Intervention for Children with ADHD?

Sara Rinka
Faculty Mentor/Collaborator: Michael Axelrod
Poster #246

Research on Attention-Deficit Hyperactivity Disorder (ADHD) continues to be an area of interest in education and psychology partly due to the increase of children diagnosed with ADHD each year (CDC, 2013). The focus of the present study was to examine how acceptable an evidence-based intervention is for children with ADHD versus children who possess similar behavior patterns but lack a diagnostic label. Specifically, this study looked at the impact the label of ADHD had on teacher’s acceptability of an evidence-based intervention called Daily Report Card. The prediction was that the label of “ADHD” would impact the acceptability of an evidence-based behavioral intervention. Participants were 45 pre-service general education college students from the University of Wisconsin-Eau Claire who were in their last four semesters of their education studies degree. Results indicated there was no significant difference in the acceptability of the evidence-based intervention called “Daily Report Card (DRC)” between conditions.

The Effects of Teacher-Directed and Computer-Assisted Interventions on Math Fact Fluency

Emma Johnson
Faculty Mentor/Collaborator: Michael Axelrod
Poster #248

Math skills are an important aspect of children’s education. Effective instructional strategies need to be in place in order to increase students’ ability to succeed in math. The use of technology within education is on the rise and many schools are having their students use computers as an educational aid. In a 2009 survey, teachers reported that their students use computers during 40 percent of the instructional class time (National Center for Education Statistics, 2010). The purpose of this study was to evaluate the effectiveness of computer-assisted versus teacher-directed interventions on subtraction math fact fluency. Math fact fluency is the ability to answer math facts automatically without hesitation. The teacher-directed intervention used was an incremental rehearsal strategy. The computer-assisted intervention consisted of the participant individually answering flashcards using Microsoft PowerPoint. The effects of the interventions were evaluated using single case alternating treatment design methodology over the course of a five-week summer program. Digits correct per minutes was used to assess the effects of the two interventions. The results extend the literature on the effectiveness of teacher-directed and computer-assisted interventions on math fact fluency.

Psychology

School-Wide Early Literacy Screening: Comparing PALS and AIMSweb TEL

Danielle Meyer, Reese Butterfuss
Faculty Mentors/Collaborators: Mary Tusing
Poster #167

Effective early literacy screeners are necessary to provide students at risk of reading difficulties the early intervention needed. Although mandated in many schools, the predictive accuracy of PALS (Phonological Awareness Literacy Screening) assessment of reading performance is lacking. Using archival data collected from a Midwestern school district, prediction for first-grade reading performance was explored. Our findings indicate that for both AIMSweb and PALS-K demonstrated adequate sensitivity; students identified as at-risk in kindergarten remained below benchmark in reading in first grade. This research was presented at the National Association for School Psychologists 2015 Annual Convention

A Review of Aggressive Behavior Intervention Research

John Zillmer
Faculty Mentor/Collaborator: Melissa Chaffin
Poster #198

Overt, physically aggressive behavior is a significant problem in elementary schools. Many school-based interventions targeting aggressive behavior have been evaluated in the literature. However, there have been fewer attempts to systematically evaluate the overall findings from this area of research (e.g., meta-analysis). This study will synthesize research on the general effectiveness of school-based behavior interventions targeting aggressive behavior using meta-analysis. An overall effect size will be calculated to estimate the relative change in overt, physically aggressive behavior from pretest to posttest or between an intervention and control group. The results will indicate the char-
acteristics of effective behavior interventions as well as the possible differences between interventions represented in research and those more typical of school practice. The implications for selecting interventions as well as adjusting or adapting ongoing interventions in schools will also be discussed.

**Undergraduate Poster Presentations:**

**Education and Scholarship of Teaching and Learning**

**Chemistry**

*Investigation of Student Attitudes and Understanding in General Chemistry*

Hannah Zidon, Rachel Egdorf

Faculty Mentor/Collaborator: Roslyn Theisen  
Poster #75

This on-going research project aims to optimize the laboratory experience for introductory-level chemistry students by examining the cognitive and attitudinal effects of inquiry-based labs in UWEC’s Chemistry 103 course. The project is motivated by a desire to enrich students’ learning with hands-on activities that require innovative thought. To test students’ attitude toward chemistry, a validated and reliable attitude survey was administered at the beginning of the semester, immediately after the inquiry/traditional lab, and at the end of the semester. Results from these surveys were studied for any significant changes using statistical analysis. To test students’ learning, scores from questions on the mid-term and final exams were collected and analyzed. While testing and analysis is ongoing, we predict that students who underwent the inquiry-based lab will show improved attitude toward chemistry as well as greater understanding of the content, both short- and long-term. These results will be used to improve the Chemistry 103 lab curriculum and provide a meaningful, enjoyable learning experience to chemistry students.

**Mindful Mentoring: Student Perspectives**

Amanda Krueger

Faculty Mentor/Collaborator: Robert Eierman  
Poster #105

The Mindful Mentoring project is part of a larger effort to understand and evaluate mentors and mentoring practices. A previous study conducted by the researchers focused on the priorities and challenges of mentors, including categories such as project design, student recruitment, initial stages, continuing stages, final stages, and scholarly environment. The current study contributes the perspective of the student in undergraduate research. The results of this study will be used to evaluate student perspectives on mentoring and will be applied to further improve mentoring practices. UW-Eau Claire research students were surveyed about their perspectives on mentoring during collaborative scholarly activity with faculty/staff. Students were asked about how mentoring impacts their growth as a student and a researcher. Evidence was gathered through an online survey distributed to students who have participated in ORSP funded research in the past two years. Students answered free response questions regarding skills they acquired as a result of their research/scholarly experience, their attitudes towards research/scholarly activity, how their mentor impacted their experience, and important qualities of a mentor. Students reported both positive and negative experiences with their mentors. The results are analyzed to indicate where mentoring practices at UW-Eau Claire could be improved. Education and Scholarship of Teaching and Learning

**Communication and Journalism**

*Integrative Learning Experiences: Benchmark Achievements and Preferences Among Three Academic Populations*

Alexis Benjamin, Erin Hanson

Faculty Mentor/Collaborator: Nicole Schultz  
Poster #204

Studies illustrate that commitment to providing students with higher educational Integrative Learning (IL) opportunities should be practiced intentionally to maximize student connections to course material and across disciplines (Werdner, 2013; Miller, 2005). Bruner’s theoretical model of Discovery Learning analyzes and interprets students’ successful involvement in their learning through connecting personal experiences, existing knowledge, and interac-
The current study examines students’ engagement in IL and their awareness of such using thematic analysis and the IL Liberal Education Assessment Rubric (University of Wisconsin – Eau Claire, 2013) to analyze focus group interviews and written artifacts from students in three populations (first-year only, open enrollment, and social justice living learning community) of the same cross-listed (Communication Studies and Women’s Studies) course. Results reveal that the majority of students meet or exceed the IL benchmarks of connecting academic knowledge to personal experiences, making connections across disciplines, and applying academic knowledge from one context to another, but to varying degrees depending on the population. Results also show students’ engagement in IL within classrooms designated to their specified populations and provide conclusions surrounding the prescribed, intentional curricula structured to enhance IL success within these populations.

Communication Sciences & Disorders

**The Effects of GEN 100 (Freshman Transition) Classes on Social and Academic Outcomes**

Patricia Rupnow-Tabb

Faculty Mentor/Collaborator: Jerry Hoepner

Poster #139

The purpose of this project is to study the perceived effects of freshman, GEN 100 transition classes, from a student perspective. There are many studies reflecting the influences of transition courses for freshmen on social and academic outcomes (e.g., grades and persistence in college). However, the present study is unique because the student-researchers themselves are first year students. Also, this study is very specific to the experiences of University of Wisconsin - Eau Claire students and can thus provide insights into what GEN 100 students value. This study, led by first year students, will utilize focus groups of students who had previously taken the GEN 100 transition classes in fall 2014. The expected results should generally include that transition courses impact on academic achievements, social well-being, along with campus and community involvement. The student-investigators will employ a focus group design to foster collaborative discussions about student experiences in various GEN 100 courses. Qualitative outcomes will be analyzed using categorical coding scheme.

Education Studies

**Sharing the Classroom: Collaborative Teaching for the 21st Century**

Alexandria Herrera, Amanda Chase, Molly Bissen, Amanda Hicklin, Katherine Flanagan

Faculty Mentors/Collaborators: Janine Fisk, Barbara Meier, Deborah Pattee

Poster #200

With the demands of edTPA, teacher effectiveness and standardized tests looming, it is essential for educators to embrace new methods that affect the greatest gains in student achievement. Educators must be prepared to adapt their pedagogical choices in response to what students in their classroom need to succeed. Co-teaching strategies are one way to accomplish that mission. This research study emphasizes the increased quality of student learning when two teachers in one classroom collaborate in planning, teaching, and assessing. Data collection through workshops and pre/post tests show the knowledge, attitude, and ability to implement this strategy into classrooms. Our research found co-teaching to be much more effective than the current method Wisconsin uses, benefiting everyone involved. Pre-service teachers are able to become more involved more quickly, their cooperating teachers can welcome them with fewer risks, and the students they teach learn more. Additionally, based on the findings we plan to expand and continue this research with greater numbers next fall.

**Embracing the Somali Immigrant Experience in Midwestern Public Schools**

Mai Lee Kha

Faculty Mentors/Collaborators: Aram deKoven, Dandrielle Lewis

Poster #205

This project studied participants’ pre- and post-immersion understandings of the challenges faced by urban immigrants in the United States today. Specifically, this study sought to measure participants’ understandings of the Somali culture, religious practices, life styles, school lives, and broad comprehensions about racism and race-based oppression in the United States today. To measure changes in participants’ comprehensions about these issues, two surveys were administered prior to the immersion experience and post immersion, the MAKKS-T and the Somali Culture and History Assessment. In addition, written focus group interviews were conducted. The participants were
involved in a combination of twenty-five hours of classroom instruction, five full days of field placement in one of two public schools, daily extra-curricular enrichment programs, and reflection sessions. The quantitative and qualitative findings of the study indicated that through these involvements, participants were able to increase their knowledge and comprehensions about Somali culture, traditions, religion, and about their awareness surrounding systemic race-based oppression in the United States. Implications, in particular for educators, and limitations to the study are discussed.

**Engaging Middle School Students in Digital Literacy**

Kayla Servais, Sierra Snapp, Teresa Schmeling, Nicole Brown  
Faculty Mentor/Collaborator: Janine Fisk  
Poster #206

This research project examined the attitude and engagement of middle school students when a digital media project was implemented as an authentic assessment for independent reading of novels. The goal was to determine if there was a change in attitude and engagement towards literacy when digital projects were implemented. The significance of this study was to gain further knowledge in addressing 21st Century learning with the use of digital media and effectively connecting these new literacies to reading/writing pedagogy and curriculum. A mixed method methodology was utilized to assess the students’ attitude and engagement. Data was gathered through motivation surveys, time on task observations and rubric analysis of the completed project. Additional qualitative data was gathered from the classroom teacher’s perceptions of student behaviors and final project assessments. Initial findings of the study demonstrate a positive response to incorporating digital media. Time on task surveys indicated a significant increase in engagements. Qualitative statements additionally reported a favorable response in terms of attitude.

**English**

**Barriers to the Completion of the Free Application for Federal Student Aid: An Investigation into FAFSA Completion Perceptions and Behaviors of First-Year Students.**

Jenna Rosquist  
Faculty Mentor/Collaborator: David Jones  
Poster #170

The Free Application for Federal Student Aid (FAFSA) is currently used by post-secondary institutions nationwide to determine student eligibility for financial assistance. Students who fail to complete the FAFSA may be unable to receive financial assistance, and as a result may face financial challenges while enrolled in post-secondary education that could otherwise be avoided. The current project seeks to investigate what barriers to FAFSA completion could exist in the perceptions and behaviors of first-year UWEC students. A thirteen-item questionnaire was administered to participants in Introductory Writing courses in Fall 2014. Key findings suggest that students felt underinformed about (1) the potential benefits of completing the FAFSA, and (2) the process of form completion (e.g., information needed and timeline); in addition students reported the FAFSA to be tedious and complex, and felt as though they may lack proper resources (e.g., available guidance counselors, explicit written instruction) needed for accurate and timely completion of the form. Results can be used to develop targeted assistance, be it by disseminating more information about the FAFSA or offering professional help in completing the form, to ensure that students reap maximum financial benefit from completing the FASFA.

**English Education Transitions in Pedagogy**

Alexandria Herrera  
Faculty Mentor/Collaborator: Carey Applegate  
Poster #199

This year-long English Education project focuses on the developmental process of moving from the role of pre-service English Education student to professional English/language arts (E/LA) educator. Through researching, I hope to better understand which methods are most practical and beneficial for those who work and teach in the E/LA field. The study looks at three different areas of progressive pedagogy that teachers (of any level of experience) look to incorporate into their own classrooms and teaching experiences: raising student engagement, including adolescent literacy as legitimate texts, as well as the study of multi-media as a form of literacy. Through an examination of past research and publications, alongside interviews of current pre-service or novice educators, I am trying to examine which methods are most practical and beneficial as an educator for our current educational climate. Our educational system is under increasing scrutiny these days, and it is imperative that we seek the most beneficial
teaching solutions for all of our students and those involved.

History

What do we Remember?
John Lanska
Faculty Mentor/Collaborator: Teresa Sanislo

The goal of this SoTL project was to transform HIST 325 “History and Memory in Central Europe”, a three-week online course, into a full-semester honors course that aligned with the newly adopted global and integrated learning outcomes and rubrics. We planned to develop a bibliography of resources to expand the interdisciplinary perspectives offered in the course and add a transnational unit on Central European immigration history. The additional material would compare biological and individual memory with collective memory. It would examine how nationalism and cultural memory were influenced by music. It would also help students connect the material to their own lives by demonstrating how memories of the Central European past and immigration have shaped the cultural landscape of Wisconsin. This summer, we conducted bibliographic and on-line research to locate a range of books, journal articles, videos on memory studies and web resources on ethnic associations and memory sites in Wisconsin. Follow up work this spring produced video-taped interviews (to be streamed for the course) of a range of faculty discussing how their discipline approaches memory studies. Teresa Sanislo has used materials from this project this spring in HIST 325 with success. She plans to teach the new honors course and assess student work using the new R2 and IL rubrics when staffing permits her to.

Languages

Collaborative Translation in the English/Spanish College Classroom
Dana Rich
Faculty Mentor/Collaborator: Carlos Garcia

The goal of this project was to identify an effective method to teach and evaluate a college course for English/Spanish translation. Research shows that the semantic differences between two languages makes teaching translation a difficult task. We hypothesized that collaborative teaching methods can be used to improve the learning results and student satisfaction in the advanced Spanish translation class offered at the University of Wisconsin Eau Claire. In order to answer this question we investigated a number of different teaching methods, and organized the data to discover a common trend. Our main source of information included scholarly research articles. We concluded that translation courses should include preparation before class, collaborative translation during class and reflective journaling after class. A new lesson plan has been implemented in the course for spring, 2015. After comparing previous class results, the students in our new course have seen a ten percent improvement in test scores and a 5.5% increase in project scores. The results of this study are important in assuring that the students here at the University of Wisconsin Eau Claire are receiving the best academic experience possible, striving to maintain excellence.

Measuring Student Attention in the Second Language Classroom
Krista Neyers
Faculty Mentor/Collaborator: Anne Hlas

This research project investigates the frequency and duration of student attention lapses in the second language classroom at the university level. The motivation behind this study includes the importance of attention in second language acquisition. Throughout a 7 week period, 274 participants reported their attention lapses from 17 Spanish classes taught by 9 different faulty, ranging from the 100 to the 400 level. Of these 17 classes, 3 were 75-minute classes and 14 were 50-minute classes. To collect the data, participants were given iClickers which they used to self-report attention lapses lasting 1 minute or less, 2 to 4 minutes, and 5 or more minutes. Immediately after data collection, participants completed a written survey and willing participants were interviewed to further investigate the reasons behind the attention lapses. In addition, each class was observed and the pedagogical happenings were recorded during each 30 second increment of class. From the observation, student attention lapses were paired with what was happening at that moment in the classroom. Findings show trends in reasons behind attention lapses, attentional rich times during class, and effective teaching practices. Preliminary findings suggest concrete ways to
maintain, direct, and redirect student attention in the second language classroom.

Music and Theatre Arts

Theatre Education Right Now
Leah Beckman, Julia Jaskulske
Faculty Mentor/Collaborator: Jennifer Chapman  
Poster #163

In Summer 2014, ORSP funded a research project about “best practices in U.S. theatre education.” The principal investigator of the project was Associate Professor Jennifer Chapman. Theatre education students Leah Beckman and Julia Jaskulske collaborated in conducting research that was subsequently presented at the annual conference of the American Alliance for Theatre and Education. The project’s research questions were: 1) What are best practices; 2) How can theatre education uniquely achieve best practices in middle and high school education; 3) What are the challenges of achieving best practices in theatre education; and 4) What are the roles of state and national standards in best practices in theatre education. All three collaborators used recent publications in the field about best practices in theatre education and state and national standards to prepare questions. The conference presentation featured 4 award-winning educators who responded to a series of questions about “best practices” in theatre education which were based on the summer research project. The proposed poster session for CERCA will summarize the research, identify key issues from panelists, and make recommendations about the value of conference attendance for undergraduate students.

Nursing and Health Sciences

The Needs of Students and Faculty Participating in Intercultural Clinical Immersion Experiences
Karen Nakano, Leah Mott, Megan Houle
Faculty Mentors/Collaborators: Debra Jansen, Rosemary Jadack  
Poster #131

Nursing programs are expected to prepare students to work with increasingly diverse populations in need of culturally responsive, high quality health care. An assumption of the Purnell Model for Cultural Competence is that learning a culture occurs through cultural encounters. At our university, undergraduate nursing students are able to take part in 7-10 day immersive nursing clinical experiences at an Indian Reservation in South Dakota, a perinatal clinic in Texas, and/or a palliative care hospital and orphanage in El Salvador. Little is known about the needs of students/faculty preparing for and returning from these experiences. Therefore, the purpose of this research study is to identify the unique needs of students and faculty before, during, and after participation in nursing clinical immersion experiences. Semi-structured interviews are being conducted with undergraduate nursing students/instructors at our university who participated in intercultural clinical immersions. The interview includes questions about their clinical experiences, preparation needed prior to immersion, perceived needs before, during, and after the immersion, and recommendations for future students and faculty. Content analysis will be used to identify interview themes; inter-rater reliability in categorizing the themes will be calculated. Findings will be useful when preparing for, designing, and advancing intercultural immersion clinical experiences.

Psychology

Evaluating the Outcomes of Brief Experimental Analyses at Two Points in Time
Reese Butterfuss
Faculty Mentor/Collaborator: Melissa Chaffin  
Poster #177

Reading is a fundamental skill children must learn to succeed in academics. Therefore, providing effective intervention to children underperforming under standard teaching circumstances is critical. Our study explores differences in the outcomes of Brief Experimental Analyses (BEAs) administered at two different times during the school year. BEA is a way to “test drive” different interventions in succession to match each student with an intervention that works best for them. Thus, our study can provide important information regarding how we can use BEA to meet children’s changing instructional needs as their skills develop. We tested four different reading interventions using BEA and collected data from each child’s performance to select the most promising intervention for each child.
Then, we implemented each child’s selected reading intervention during one-on-one sessions over several weeks and collected data. We used visual analysis procedures to evaluate differences in the BEA outcomes. Data analysis is ongoing, but we expect that BEA outcomes may differ for some children, but not others, when administered at two different times as a function of changes in students’ academic skills.

**Using BEA to Modify Packaged Reading Interventions During the Summer**

Reese Butterfuss, Jessa Quick, Mallory Dernbach
Faculty Mentor/Collaborator: Melissa Chaffin

Poster #178

Summer months can be a time of skill loss for students who are already struggling academically, especially when compared to their peers (Schacter, 2003). Researchers studying this phenomenon have called for an expansion of high-quality summer programming (Alexander et al., 2001). Despite many potentially effective programs, school professionals need more information about how to modify or augment these programs for students who still fail to make progress using a standard treatment approach. Brief experimental analysis (BEA) applies single case design logic to evaluate the effectiveness of interventions over a short time period for individual participants. These interventions can then be applied over a longer time period and results can be measured (Burns & Wagner, 2008). This study examined how BEA procedures can be used to modify a commercially available reading intervention program implemented in the summer. Results indicated that BEA procedures examining three types of modeling interventions produced differentiated results for participants. For all participants, the BEA indicated intervention produced increases in WRCM on intervention materials. Three of the participants also made gains on unread material.

**Fine and Performing Arts**

**Art and Design**

An Exploration in Digital 2-D Animation

Jamay Richgels
Faculty Mentor/Collaborator: Li-Ying Bao

Poster #250

Over the course of Fall 2014 and Spring 2015, I learned the fundamental processes for creating 2-D animation and produced a short 2-D animation movie combining the expression of character emotions, movement, and a unique story line. The story centers on a character finding his true love, but then we discover the plot shown was in a book the character was reading and was not real. This story was born of my own experiences with life and love, and my dismay that life doesn’t always end up perfectly as it does in movies and romance novels. This work expresses the emotions of extreme happiness and love, which are transformed into sadness and disappointment, and lastly into hope. The pace and movements conveyed match the emotions that are displayed: faster more upbeat movement for happiness, and slower movements for sadness. One of the most important things I learned from creating this project is that animation is incredibly time consuming. The medium of 2-D animation helped me accomplish my story-telling and artistic goals for this project by helping me successfully convey character emotion. This animation is similar to other 2-D animations because it uses characters and plot to advance a meaningful storyline.

Dine Right: A Study in Educational Interface Design and App Development

Derek Hestekin, Steven Scherz, Andrew Hagen
Faculty Mentor/Collaborator: Sooyun Im

Poster #251

The purpose of this research was to develop an educational iPad application to teach life skills to students with developmental disabilities. It was a collaborative project between the University of Wisconsin- Eau Claire Special Education Department and the Art & Design Department. In today’s society, it is crucial for students with special needs to acquire knowledge such as shopping, purchasing, and dining skills that promote independent living. However, majority of the existing tools for teaching these skills are not very effective or relatable to individuals with developmental disabilities. After researching existing interface designs and technologies, the group’s goal was to develop the iPad application *Dine Right*, which is visual, easy to use, portable, and presents dining skills in ways that is fun and easy to learn. In using *Dine Right*, students are taught different aspects of dining in sit down and fast food restaurants through movie segments and photo sequencing. Lessons include greeting, ordering, and paying. *Dine Right* is currently in the development stage, with the technical programmer and graphic designer working together to create a technologically functional app that is educational and easy to use for students.
**Music and Theatre Arts**

The Blackface Tradition in Western Wisconsin: Documenting Minstrelsy Performance & Reception History in Eau Claire  
Henry Bergmann  
Faculty Mentor/Collaborator: Ryan Jones  
Poster #162

Begun in the 1840s, minstrelsy was the first original form of popular entertainment to emerge in the United States and be recognized as a specifically American genre by European audiences. For these eighty-plus years, numerous traveling minstrel troupes performed variety shows composed of singing, dancing, and assorted skits in large city centers as well as smaller communities throughout the country. Prior to the Civil War, minstrel shows were staged exclusively by white performers who applied blackface—burnt cork or greasepaint—in an effort to mimic caricatures of African Americans that quickly established and perpetuated certain stereotypes including Jim Crow, Zip Coon, the Sambo, and the Jezebel. This project concerns the research and systematic review of local Eau Claire media sources that documented the performance of minstrel productions, specifically during the 1920s and 1930s. The chief primary source was the former Eau Claire Leader (begun in 1894)—a forerunner to the present-day Leader Telegram (est. 1970), housed in the microfilm collections of McIntyre Library. Research conclusions will concern the minstrel shows’ documented role in publicizing, patronizing, and proliferating stereotypes of marginalized cultures that pervaded western Wisconsin at large, and Eau Claire in particular.

**Health Sciences**

Communication Sciences & Disorders

The Experience Sampling Method in Speech-Language Pathology and Audiology Research  
Haley Franson, Abigail Nehls-Lowe  
Faculty Mentor/Collaborator: Thomas Sather  
Poster #138

This poster will outline the framework for designing and using the experience sampling method (ESM), including use of sampling schedules, data gathering tools, statistical analyses and data displays. Development of ESM has been credited to the positive psychologist Mihaly Csikszentmihalyi, and has been used in many different disciplines, including psychology, sociology and education studies. This methodology allows for multiple sampling points while increasing ecological validity. However, it is an underutilized research method in the discipline of speech-language pathology and audiology. This poster will include a review of the past, current, and future uses of ESM as well as applicability of this methodology to speech-language pathologists and audiologists.

How Language Elicitation Partners Affect a Language Sample in Children ages 2-5  
Leah Carpenter, Jillian Utz, Jacqueline Oakes  
Faculty Mentor/Collaborator: Deborah Elledge  
Poster #140

Language samples are used as measures of preschool language development during communication evaluations. Currently, there is a paucity of research regarding the effect of the familiarity of the communication partner (i.e., parent versus speech-language pathologist) on the quality of the child’s language. As the language sample is an integral component of the diagnostic process, it is critical that it accurately represents the child’s language skills. This study compares the syntactic complexity and lexical diversity of language samples of preschool children during interactions with a parent to language samples elicited during interactions with an unfamiliar partner. Children were recruited from the Eau Claire area. Language skills were initially evaluated with a standardized communication assessment (Test of Early Language Development-3). Children then engaged in separate free play sessions with a parent and with a student researcher during which time the child’s language was recorded for analysis. Language samples were transcribed and analyzed for Mean Length of Utterance (measure of syntactic complexity) and Number of Different Words (measure of lexical diversity). Data collection will be completed March 9, 2015 with results analyzed by mid-April, 2015.
**Differences in Vocal Quality among Mennonite and Standard American English Teenage Females**

*Megan Burfield, Emily Desilet*

Faculty Mentor/Collaborator: Abby Hemmerich  
Poster #145

The human voice is used to convey a plethora of information beyond the words we say. The use of one’s voice is often influenced by the environment. The purpose of this research study is to compare lifestyle, culture, and social influences on vocal qualities in females in the Mennonite and standard American English cultures. Two females from each culture were recruited to participate in a 30-minute speech sample with the researchers. Within this sample, the participant was recorded using a digital voice recorder and asked to produce a sustained “ah”, read a short paragraph, and complete an interview in order to obtain conversational voice samples. The interview asked each participant to describe various aspects of their daily lives related to lifestyle, culture, and social interactions. Comparisons between groups on voice quality will be shared, as well as the relationships between voice quality and environmental influences. Results may inform clinicians and healthcare providers working with individuals with voice disorders about potential positive and negative influences on the voice.

**Vocal Fry and Media Use in College Females**

*Rachel Wojcik, Ashley Rolf*

Faculty Mentor/Collaborator: Abby Hemmerich  
Poster #146

Recent research has suggested that the use of vocal fry, a potentially damaging voice behavior, has increased among female college-aged students. Possible explanations for this trend have included media influences, conversational style among peers, and females reflecting positions of authority, although no studies have examined those relationships systematically. The purpose of this study was to explore the relationship between media usage, conversational partners, and the use of vocal fry in adult female speakers. Participants included 18 female college students between the ages of 18-22. Two conversational speech samples were collected from each participant: one with a peer who used vocal fry, and one with a peer who did not. Participants were also asked to complete a survey which addressed their vocal behaviors and media usage. Using a selected 50-syllable speech segment, data was analyzed by calculating the percentage of vocal fry present. Percentages were compared between the two speaking contexts as well as to the findings from the media usage surveys. Vocal fry percentages were higher when speaking with the peer using fry. Individuals with more frequent social media consumption used vocal fry more often. These results confirm speculations in previous research about the influence of environment on speaking style.

**Kinesiology**

**Effect of Deep Heating and Foam Rolling vs. Static Stretching of the Gastrocnemius and Soleus Complex in Improving Active Ankle Dorsiflexion Range of Motion**

*Amy Kennedy, Melissa Ericson, Karlee Rosentreter*

Faculty Mentor/Collaborator: Tadd Turnquist  
Poster #116

There are many means of intervention when it comes to improving range of motion (ROM) of a joint. The purpose of this study was to determine which treatment protocol involving static stretching (SS), deep heating (US), and/or foam rolling (FR) would provide greater improvements in ankle dorsiflexion ROM. The deep squat Functional Movement Screening (FMS) was used as a screening tool for eligibility. Eighteen Division III Track and Field athletes were eligible to participate and randomly assigned to three treatment groups (SS, FR+SS, US+FR+SS). The study measured bilateral dorsiflexion with the knee extended and flexed. Measurements were taken at baseline, prior to and immediately after treatment sessions, and at a final assessment after 3 weeks. The two-way repeated measures analysis of variance (ANOVA), with an alpha of .05, revealed there was no group or interaction effect, but a significant time effect on all dependent variables. Paired samples t tests revealed bilateral ankle dorsiflexion with the knee extended and flexed at final was significantly greater than baseline. All participants improved bilateral dorsiflexion ROM from baseline to final.
Effects of Kettlebells versus Battle Ropes on Upper Body and Lower Body Anaerobic Power in Recreationally Active College Students

Brianna Kruchten, Stephen Hodgson, Kevin Kramer, Chelsea Hahn
Faculty Mentors/Collaborators: Jeffrey Janot, Steven Fleck

Poster #117

Kettlebells and battle ropes have become popular modalities used to improve health and fitness. The purpose of this study is to determine whether a kettlebell and a battle ropes protocol may have positive effects on anaerobic power. A second aim of the study is to investigate the differences between kettlebell and battle ropes training in terms of upper and lower body anaerobic power improvements. Thirty-four recreationally active college-age (18-26) males and females will be recruited from a local university. Participants will be randomized into one of three groups: kettlebell, battle ropes, or control. Height and weight will be recorded to determine the resistance criteria for pre- and post-anaerobic testing, and for the initial kettlebell weight used for the training portion. All participants will perform a lower body Wingate anaerobic power test (WAnT), using the Monark model 894E cycle, as well as an upper body WAnT, using a modified model. Testing will be completed by all groups prior to and following the 4 weeks of training. Relative peak power, mean power, and rate of fatigue will be collected. Results may provide insight regarding the effectiveness of battle ropes and kettlebells in enhancing athletic performance relating to anaerobic power.

Lasting Effects of HIIT Training on Physiological Variables

Faculty Mentors/Collaborators: Jeffrey Janot, Saori Braun

Poster #118

High-intensity interval training (HIIT) has become influential in both athletic and clinical populations. The time-efficient physiological benefits of HIIT training are outlined by a plethora of research. No studies to our knowledge have examined the lasting effects of HIIT training on physiological adaptations. A total of 27 college-aged recreationally active participants are randomly assigned to either an experimental HIIT group (EXP) or steady-state aerobic training control group (CON). For three weeks of training, both EXP and CON group will attend two sessions/week. Each participant in the EXP will participate in 20 minutes of training/session; completing bouts of 1-minute maximal effort running (90-95% HR_{max}) with 1-minute recovery (60% HR_{max}), while CON runs at 60% HR_{max} for 20 consecutive minutes. Visceral fat, ventilatory threshold, and VO_{2max} will be measured at baseline, immediately following training, and after two weeks of detraining. Two-way repeated measure analysis of variance will be employed to examine the group and time effects of the intervention. The results of this study will demonstrate the lasting effects of this specific dose of HIIT training when compared to steady-state aerobic training. Findings may also constitute a larger dose of HIIT training as it relates to increasing and long-withstanding physiological adaptations.

Effects of Tissue Manipulation of Bilateral Quadriceps on Force Production Vertical Jump Performance in Male Collegiate Athletes

Nathan Schermerhorn
Faculty Mentor/Collaborator: Mary La Rue

Poster #141

The purpose of this study is to compare the power output and force production of football, basketball, and hockey male athletes through three different soft tissue manipulation techniques. We will accomplish this through the use of a Kistler Quattro Jump force plate. This study will help to further understand how these modalities affect athletes prior to sport activities. This study is unique because limited research has been conducted comparing the three manipulation techniques with power output and force production variables. Performing a study on the acute effects of these techniques through the use of a force plate will register force production, power output, and vertical jump. There will be 10 participants randomly assigned to each group: Graston, Dynamic Stretching, and a Foam Rolling group. Each participant will perform testing without soft tissue manipulation and then within 48-72 hours will test after treatment has been conducted. Knowing what technique works best for increasing power output and force production will benefit athletes’ performances in the future.

Atrophy of Fast-twitch Muscle Fibers and Decreased Leg Strength in Older Males

Alexis Schneider, Jacqueline Cleereman, Mallory Donegan, Katie Sladek, Samantha Daul
Faculty Mentor/Collaborator: Steven Fleck

Poster #143

Atrophy of fast twitch muscle fibers occurs with aging and is correlated directly with strength decline. Significant loss of strength is associated with increased risk for morbidity and mortality. In this descriptive study, knowledge will be gained of whether a compression in the range of repetitions occurs at varying intensities by comparing older...
adult males and college-aged males. A total of 40 participants including 20 college age and 20 older males, who resistance train two to four days a week, were recruited from around campus and the community. Height and weight of each subject will be measured along with body composition the Inbody™ machine. One repetition maximum (1RM) of the lower extremity and 70%, 80% and 90% of subject’s 1RM to repetition failure on the leg press were tools utilized to assess subjects. Independent T tests analyzing the dependent variables of the change in repetition from 90-70% of the 1RM will be employed ($p < .05$) to see if there is a significant difference between college age versus older males. Data will be collected and analyzed during the spring of 2015. This study may help individualize training programs for older adults.

**An Investigation of the SWAY Balance System as an Injury Prediction Tool in Intercollegiate Athletics**  
Taylor Tassoul, Matthew Elsing, Sarah Montee, Erin Reichow  
Faculty Mentor/Collaborator: Robert Stow  
Poster #144

The method for assessing one’s risk of injury is to look at their physical training, body composition, blood markers, age, gender, etc. Recent methods have emphasized the use of a physical screen (e.g., Functional Movement Screen, Balance Error Scoring System). Most physical screens are subjective; thus we are quantitatively examining whether a decrease in overall balance scores as measured with the SWAY Balance System correlate with an athlete's predisposition to injury and the effect of a single sports season on overall balance. The SWAY Balance application (app) uses the accelerometer in a smartphone/tablet to measure a patient's postural sway. The target population were student-athletes that participated in an NCAA Division III winter sport (N=101). All participants were surveyed (demographic and medical history) and baseline was collected prior to the sport season. Participants were retested after sustaining any injuries that resulted in missed activity session(s) and then weekly until they returned to activity and at the conclusion of the season. Data collection has recently been completed and will be analyzed for dissemination by April 2015. We hypothesize that we will find a relationship between lower body injuries, balance, and improved balance from athletic participation.

**Nursing**

**Reducing OA Symptoms with Practitioner and Self-Delivered Healing Touch**  
Allison Arvey, Savannah Shortess, Nicole Lauffer  
Faculty Mentor/Collaborator: Der-Fa Lu  
Poster #130

The aim of this study is to test the effect of biofield intervention, specifically Healing Touch (HT), on older adults with Osteoarthritis (OA) knee pain and knee function. HT is a low-cost, non-invasive modality with no side effects for symptom management. The study will test the hypothesis that OA participants who receive HT 3 times a week for 6 weeks will demonstrate reduced pain and improved feelings of wellbeing compared to the control group. The second aim is to explore the feasibility, adherence and efficacy of self-delivered HT in a 6 week intervention program. Although few studies have been conducted on the modality, the results showed significance in symptom management. The findings will come from six weeks of practitioner-delivered HT sessions and 6 weeks of self-delivered HT with a 6 week follow-up period. Outcomes will be measured using a variety of pain scales to assess knee pain, the Goniometer to determine joint function, and the Short Form 12v2 to identify the wellbeing of community dwelling older adults over the age of 65. The results will be used to expand the literature on biofield intervention and provide a basis for further research on HT in nursing practice.

**Accelerated Second-Degree Bachelor of Science in Nursing Graduates: Experience of the Transition to Professional Practice**  
Kaitlyn Wilberding  
Faculty Mentors/Collaborators: Cheryl Brandt, Melissa Boellaard  
Poster #154

Accelerated second baccalaureate degree nursing (ASBSN) programs enable non-nurse college graduates to streamline their nursing education and begin professional practice. However, few studies have investigated their transition to practice. The research question for this study was: how do ASBSN graduates describe the experience of transition to practice? ASBSN graduate participants (N = 7) were interviewed within 12 to 15 months following their May 2011 graduation using a semi-structured interview guide. All interviews were audiotaped and transcribed. Data were analyzed using methods consistent with Interpretive Description to identify themes in interviewees’ responses.
Eleven themes were identified, including (a) Intense situations evoked strong emotions, (b) The progression of orientation fit my needs, (c) Patient safety was paramount as I built confidence, (d) Being on my own was frightening, and (e) the ASBSN program mirrored the intensity of real-life nursing and helped me transition to practice. There were many similarities in the ASBSN graduates’ transition to practice when compared to their traditional baccalaureate nursing program graduate counterparts. New ASBSN graduates experienced stress, needed support, and increasingly contributed to the healthcare team as they gained confidence. They credited the intensity of their ASBSN program experience with helping prepare them for real-life nursing practice.

**Effects of Guided Imagery on Post-Operative Pain**

**Elin Zimmerman**

Faculty Mentor/Collaborator: Debra Hofmann

Pain management in the post-operative period is an ongoing concern due to multiple barriers; such as adverse effects, and provider and patient preferences, both cultural and individual. Therefore, pain may not be adequately managed. This ongoing problem of unresolved post-operative pain calls for alternative approaches to be considered as adjunct to conventional allopathic approaches. An estimated 40% of Americans utilize some form of complementary and alternative medicine (CAM) or integrative therapy. The purpose of this project is to research the effects of guided imagery on post-operative pain. A database search was conducted to find evidence-based, published articles. These research articles were analyzed and appraised. Through the compilation of evidence, there is indication that guided imagery may be an effective complementary approach to reducing pain in the post-operative period.

**Mother/Baby Outcomes after Water Birth from a Group Practice of Certified Nurse Midwives in a Hospital Setting**

**Nicole Peters, Caitlin Gardner, Emily Hulke, Lindsey Kuhn, Emily Werven**

Faculty Mentor/Collaborator: Rita Sperstad

For several decades women have had the choice of using water immersion during labor and birth. Evidence supports water immersion during labor and birth such as decreased stress, decreased pain, less use of analgesia/ anesthesia, and greater satisfaction with the birth experience. Despite these advantages, there is also documentation of potential risks. Currently, there is debate in support with the practice of water immersion and birth (the American College of Obstetricians and Gynecologists & American Academy of Pediatrics (2014); American Association of Birth Centers (2014). Further research is needed from prospective data collected with anticipatory, skilled providers under safe water birth practices. The purpose of this faculty/student research project was to collaborate with a group of certified nurse midwives (CNM) to provide descriptive results from a population of low-risk women who participated in water birth within a local hospital setting. Quantitative and qualitative data were collected from the mother/baby medical records and through short open-ended questions from the mother. Data will be analyzed and results described. Dissemination of the research findings and implications will be presented in a scholarly format. This research demonstrates the final product of the students nursing honors work.

**Qualitative Experiential Outcomes of an Undergraduate Nursing Immersion Clinical Experience in El Salvador**

**Clare Sievert, Melissa Finley, Lauren Fix, Courtney Gehringer, Elizabeth Husnick, Amanda Marvin, Valerie Parrish, Heidi Solchenberger**

Faculty Mentor/Collaborator: Jill Hecker Fernandes

This presentation will describe the qualitative experiential outcomes of an immersion clinical experience among UW-Eau Claire undergraduate nursing students who traveled to El Salvador. International clinical immersion experiences have been shown to promote cultural competencies in undergraduate nursing students (Caffrey, Neander, Markle, & Stewart, 2005). The immersion process began weeks prior to leaving the United States with readings, discussions, and films to develop knowledge of Salvadorian culture and history. Students worked to develop and prepare projects in Spanish based on community health promotion and education. These projects are a part of an evolving five year initiative to provide knowledge and skills to community health care workers where access to care is extremely limited. The outcomes of clinical immersion abroad are successful in not that of “fixing” another culture, but rather gaining insight and experience in attempt to become more culturally competent. This includes sustainability of the experience to transcend to future clinical groups and the people of El Salvador. The student advantage to cultural immersion goes beyond meeting the requirements for clinical practice through engaging and
sharing transcultural perspective to ultimately develop and diversify professionalism through the art of nursing.

**Exploring Nurse Educator Attitudes Regarding Integrative Therapies**

*Emily Hulke*

Faculty Mentor/Collaborator: Arin VanWormer

Poster #184

There is an increased demand for Integrative Therapies (IT), evidence-based complementary/alternative therapies, as Americans embrace a more holistic approach to improving their health. However, the degree to which IT is incorporated within acute care settings remains unclear. Limited studies have investigated the attitudes of medical professionals toward IT and very few of the previous studies have included nurses. No studies to date have examined attitudes of Nurse Educators toward IT in acute care settings. The purpose of this exploratory study was to identify common thematic perspectives of Nurse Educators on their knowledge, barriers, and intent to use IT in acute care settings. This study utilized qualitative, semi-structured interviews with 14 Nurse Educators from three acute care facilities located in Western-Central Wisconsin. Although the study participants felt that IT are effective, few were able to share specific examples of how IT are incorporated into clinical care. Common barriers identified included limited access to evidence, lack of knowledge, lack of resources, provider attitude, and a need for buy-in. Despite these challenges, there is an increased interest in further investigating the use of IT in acute care settings and a need for further education about specific IT techniques.

**Registered Nurse Attitudes Towards Integrative Therapies in Acute Care Settings**

*Emily Hulke*

Faculty Mentor/Collaborator: Arin VanWormer

Poster #185

Traditional medical care is changing in the U.S. and there is an increasing demand from health care consumers for more Integrative Therapies (IT). These therapies focus on health and healing versus disease and treatment and use a holistic approach to integrate complementary and alternative therapies into conventional medicine. Although there is a general willingness to learn more about IT, there have been few studies within U.S. clinical settings that focus on nurses and no studies examining Registered Nurse attitudes towards IT in Wisconsin. The purpose of this quantitative research study was to identify knowledge, barriers, and intent to use IT among nurses in clinical settings. A cross-sectional survey was developed through modification of an existing survey and by using results from a qualitative research study that identified common themes of Nurse Educators on their knowledge, barriers, and intent to use IT in West-Central Wisconsin. The findings from this study will provide a more comprehensive understanding of the perceptions and ability to implement IT into clinical settings in which UW-Eau Claire nursing students routinely complete their clinical hours. A greater appreciation of changes in these clinical environments is essential for students to have the skills necessary to function optimally as graduate nurses.

**Developing Leadership Skills for the Future Nurses and New Nurses**

*Katie Daley, Lauren Gehl, Danielle Fotsch, Brooke Farrell*

Faculty Mentor/Collaborator: Charlotte Sortedahl

Poster #190

The aim of our research is to survey hospital nurse leaders throughout the United States to determine what essential professional behaviors nursing students should acquire. The data collected will help nursing schools and nursing educators to advance curriculum that emphasizes professional behaviors nursing leaders find most essential. Our research was developed from the urgent need to educate nurses to be leaders at all levels (Institute of Medicine, 2010). The survey is a multiphase project currently working at the national phase. The first step of the project was created from a pilot survey of hospital nurse leaders in the Midwest. Phase two of this research project is using a stratified sampling technique to recruit 10-25 hospitals from each of the 50 states. In this phase, registered nurses who are administrators, managers, executives, and educators will help further develop an understanding of professional behaviors on a national level. The data from the survey will help gain more information about what hospital nurse leaders across the nation believe are the most essential professional behaviors nursing students should be acquiring through nursing education.
**Exploring What Is a “Nursing Expert”**

**Danielle Hibbard**

Faculty Mentor/Collaborator: Shelley-Rae Pehler

Poster #191

When developing or validating a nursing diagnosis, current nursing research methods include the use of nursing experts. The goal of this project was to determine how “nurse expert” is defined in the area of nursing standardized languages. Our aim was to discover common criteria for a nursing expert. A survey of the current literature on nursing experts, nursing diagnoses and content validation models was conducted. The criteria for nursing experts was compared and analyzed for common themes. Through this project a more clear understanding of the title “nursing expert” was identified. This definition also guided the synthesis of this author's nursing honors area of study. The author was able to refine literature review analysis skills and increase knowledge about the development, validation, and acceptance of nursing diagnoses. It has provided a deeper understanding of the use and validity of nursing diagnoses in future nursing practice.

**Pediatric Celiac Disease Management and Perceived Quality of Life**

**Kelsey Lynn**

Faculty Mentor/Collaborator: Rachel Merkel

Poster #214

Studies indicate Celiac disease (CD) is a common childhood chronic diseases, affecting approximately 1% of the U.S. population. Strict, lifelong adherence to a gluten-free diet (GFD) is the only known treatment for CD, requiring exclusion of all foods and beverages containing gluten. Adherence to the GFD requires ongoing effort and attention from the family unit, which may contribute to a less than favorable perceived quality of life (QOL). Review of literature revealed that until recently little research was available on QOL of children diagnosed with CD in the U.S. This study utilized a recently developed and validated QOL instrument specific to children in North America to create parent and child surveys as a means to examine and compare children’s and parents’ perception of the child’s QOL in relation to management of CD. Participants recruited via convenience sample included parents and children ages 8-18 seen in a pediatric GI clinic. Surveys were completed using a CD-specific pediatric Health Related Quality of Life Instrument for 8-12 year olds and 13-18 year olds. Study results will provide pediatric healthcare professionals with a better understanding of the management of CD and its influence on the child’s and parent’s perception of the child’s QOL.

**Evaluating an Academic-Service Partnership on Evidence-based Practice in Public Health**

**Nicole Jerdee, Alaina Guussert, Nicole Jerdee, Kaitlyn Conway, Madeline Hynek, Courtney Nase, Pang Houa Xiong Yang**

Faculty Mentor/Collaborator: Susan Moch, Rachel Stein

Poster #215

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 an 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. These processes have shown qualitative benefits for both public health agencies and students. A more quantitative evaluation approach for both students and academic partners is planned for the future.

**Watershed Institute**

**Particulate Matter Levels Near Frac Sand Processing Facilities**

**Ian Wetzel, Ruijian Liang, Jennifer Schmitz**

Faculty Mentor/Collaborator: Crispin Pierce

Poster #5

The process of hydraulic fracturing to extract oil and gas from deep underground shale formations will require 30 million tons of Wisconsin sand this year. Frac sand is used as during extraction to hold open fractured shale during removal of natural gas. Around the state there are 150 frac sand mines, processing facilities, and trans-load (truck-to-train) stations. Particulate matter in the air near these processing facilities is of concern to us because of proven
Anthropogenic Input of Pharmaceuticals and Personal Care Products in Swimming Pools
Kyle Brockman
Faculty Mentor/Collaborator: Laura Suppes

Pharmaceuticals and personal care products (PPCPs) capable of causing long-term health effects have been found in swimming pool water and are hypothesized to originate from anthropogenic pollution like urine and sweat. This research attempts to identify risk factors of PPCPs presence and origins of contamination. Associations between PPCP presence and risk factors such as frequency of dumping and refilling pool water, bather load, bathroom accessibility, filtration and disinfection methods will be explored. PPCP concentrations in fill water will be quantified and compared to concentrations in pool water for identifying origins of contamination, like bathers or tap water. Thirty swimming pools in Minnesota and Wisconsin will be surveyed for the presence of 32 PPCPs suspected in pool water based on pharmaceuticals, lotions, detergents, and other products commonly used by the public, and previous studies that surveyed tap water for PPCPs. Sample collection began in December, 2014 and is expected to be complete in fall, 2015. Results from this research can be used to assess risk among exposed populations and develop interventions that prevent PPCP contamination of pool water.

Humanities

American Indian Studies

Public Sacred Spaces: Recognizing the Council Oak at the University of Wisconsin- Eau Claire
Olivia McCarthy
Faculty Mentor/Collaborator: Heather Moody

The purpose of this research is to discover the campus community’s relationship with the Council Oak, a public sacred place. My hypothesis is that a minority of the campus community has any knowledge about the Council Oak or even about the topic of sacred places. With this study, I will delve into the issues of education and cultural awareness in a Eurocentric society. Ignorance and destruction of sacred spaces on public and private lands is a very real issue in Indian Country, therefore it is important for us to maintain knowledge of the Council Oak. Using the Explanatory Sequential Mixed Methods approach to interpret my data, I will gain insights into the perception of the campus community about this issue. I will begin by obtaining quantitative data through a survey, move to collecting qualitative data through a focus group and then analyze the data collectively. The results of this research will help us understand the relationship between the university and the Council Oak. Understanding this relationship will help in the development of programs to increase awareness of public sacred spaces and the Council Oak. This research has the potential to be generalized for application to other public sacred spaces.

English

Feigning Formality: A Corpus Linguistic Pilot Study of Novice Academic Writers in the Blugold Writing Seminar
Robin Jungwirth, Nathaniel Woznicki
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. We examined 200 papers by students in the Blugold Seminar (WRIT 114 and WRIT 116), converted them into plain text documents, and used the Natural Language Toolkit (NLTK) to assign each word with a part-of-speech tag. We tagged seven student papers by hand and compared them to the tagger program’s results to assess its accuracy, which averaged 93%. Using NLTK, we ran several preliminary searches to acquire data about our novice academic writers. This revealed differences between classes: students in 114 used more 1st- and 2nd-person pronouns and wrote papers of more varying length. This data suggests a higher level of writing confidence or knowledge of expected constraints in 116 as compared to 114. Both courses...
showed a low frequency of hedges (almost, maybe) and downtoners (barely, slightly)—contrasting with studies on professional academic writing. This may demonstrate transfer of prescriptive writing rules from secondary education. This project can inform writing instructors and provide a tool for future empirical linguistic studies about the effect of secondary education on students’ writing strategies.

>Be a Strange Form of Oral Narrative: Analyzing 4Chan’s “greentext”
Benjamin Carpenter
Faculty Mentor/Collaborator: Jon Bakos

Conversational storytelling is something that occurs regularly in daily life, and Labov’s work on the subject outlines its components and structure, specifically the “credibility” and “reportability” of events. Nevertheless, in a world with more access to language than ever before, the structure of oral narrative also exists in forms outside of casual conversation, especially on the internet. This study examines one such example, 4chan.org’s “greentext.” Most commonly used to quote or reference posts by other users, greentext also acts as a form of storytelling similar to oral narrative. By taking specific examples from 4chan and assessing their structures, I show that greentext is capable of adhering to the framework of oral narrative, mainly through its use of Labovian clausal structure and connecting statements through the “>” symbol, which acts as a quasi-conjunction. I also show that while greentext fulfills the structure of oral narrative, it also plays with Labov’s narrative framework, particularly in regard to credibility and evaluation. This research shows that, despite its name, oral narrative exists outside of speech.

History, English, and Women’s Studies

Interior Architecture and Gendered Space of the Apostle Islands Light Stations
Emma Felty
Faculty Mentors/Collaborators: John Mann (History), Barbara Kernan (English/Women’s Studies)

The Apostle Islands are a chain of 22 islands that make up an archipelago in Lake Superior, off the Bayfield Peninsula in northern Wisconsin. These islands are unique for many reasons. They are exceptional examples of geological formations, have an abundance of wildlife and mining resources, and a long, detailed history. The Apostle Islands are home to the United States’ highest concentration of lighthouses in one geographic area. Five islands are home to these light stations, which were established in the mid-19th century with the flourishing trade in iron, timber, and other resources, which made shipping aids along Superior’s shores necessary. Lighthouses function as a family dwelling and government property simultaneously, which is an important intersection during the rise of domesticity in America. While women could control their domestic spheres on the mainland, lighthouse wives were under the influence of the lighthouse inspectors and had to shape their family lives to the US Light Service’s regulations. The families only lived together on the Apostles for three months, yet the houses are exceptionally decorative and sturdy to withstand harsh conditions. The light stations were built to promote and protect Lake Superior commerce, though they are in the unique position of being on the blurred edge between government property and private family dwelling. While they are inherently economic property, they simultaneously function as Victorian domestic spaces for the lighthouse keepers and their families. A room-by-room analysis will demonstrate how keeper’s wives and the families interacted within the space, which includes the kitchen, dining room, parlor, bedroom, and of course, the light tower.

History

Soldier and Scholar: Exploring the Educational Experience of Veterans through the UWEC Alumni Centennial Oral History Project
Jessie Beckett, Stephen Petrie
Faculty Mentor/Collaborator: Erin Devlin

The aim of the Soldier and Scholar project is to explore how one group of students, veterans, experienced life on campus at the University of Wisconsin-Eau Claire during the World War II and Vietnam Eras. This research was conducted in cooperation with the UWEC Alumni Centennial Oral History Project, which strives to incorporate the perspective of former students into the University’s public memory. As we approach our centennial year, we
risk losing the memories of those who graduated from UWEC fifty years ago. The purpose of this project was to harvest those memories and preserve them for future generations. Student researchers were paired with narrators to conduct an interview between 30 and 120 minutes long. Ninety interviews were donated, transcribed, and are currently available to researchers and scholars at McIntyre Library Special Collections and Archives. The Soldier and Scholar project identified representative examples of student veterans through these transcripts and created podcasts with clips from the interviews. This poster highlights the experiences of student veterans from two wars, WWII and Vietnam, and illuminates how these global conflicts influenced UWEC’s campus and impacted individuals in different ways.

Languages

Wisconsin Walloon - A Language and Culture in Sharp Decline
Elizabeth Ehrenberg, Kristina Hoyt, Madeline Tautges
Faculty Mentor/Collaborator: Kelly Biers
Poster #173

The purpose of this study was to set in motion 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. This phase of the project includes reaching out and establishing contacts with speakers of Wisconsin Walloon, collecting ethnographic data on the speaking and nonspeaking Wisconsin Walloon communities, conducting interviews, and organizing recorded conversations in Walloon for later analysis. The results of this phase of the project will inform us as to the state of the spoken language as it exists today and the extent of its decline. We will use this information to determine how to best serve the community under study (i.e., whether language revitalization efforts might be useful, or whether we will concentrate subsequent phases of the project on language documentation).

Philosophy and Religious Studies

The Phenomenology of Commuting
Brian Macke
Faculty Mentor/Collaborator: Matthew Meyer
External Collaborator: Reed Stelle, University of Minnesota
Poster #148

This project focuses on how our form of commuting might frame our environment, our sense of space and time, and our perception of those around us. The research examined three styles of commuters in the Minneapolis-St. Paul metropolitan area; automobile, bicycle, and public transit. Our data was gathered by conducting long-form interviews and analyzing the results for shared themes. The initial findings point towards themes of certainty, security, simplicity, transparency, and the connections to others playing a positive role in a commuter’s experience. There are negative experiences as well, such as “othering” of those of different classes and abilities; even “othering” of other types of commuters. Indications are that while these themes might affect the daily lives of these commuters, they do not lead to drastic changes in commuting preferences. In short, once a commuter chooses their method they seem to embrace all of its positive attributes and endure its negatives, once that particular type is established as a habit. That said, we hope that even identifying these themes can lead to fruitful future research about the experience of being a commuter.
Math and Computer Science

Computer Science

SnakeWrangler
Haley Muotka, Trey Zahradka
Faculty Mentor/Collaborator: Peter Bui
Poster #252

The goal of this project is to alleviate the burden of running, monitoring, and maintaining IPython notebooks by providing a straightforward software platform called SnakeWrangler that automates the configuration and deployment of the IPython notebook web servers for the instructor. As there is considerable effort required to set up and maintain IPython notebooks this project will save the instructor time allowing them to focus on other tasks; the project allows the instructor to do a one-time setup for students and not have to ensure that each individual IPython notebook is active and online. This project joins two common methodologies: Decentralized where the instructor supplies all students with a script that the students run and automatically configure and run the IPython notebook, and Centralized where the instructor configures and maintains all of the notebooks in one location. This combination allows one central location that is configured by the instructor while also allowing the students to stop and start their own notebook as needed. The project has promising results, alleviating students from configuration and ensuring the instructor does not need to be maintaining the system at all hours.

Creating Anamorphic Illusions with Microsoft Kinect
Nathan Fellom, David Spiegel, Nicholas Kryzer
Faculty Mentor/Collaborator: Daniel Stevenson
Poster #253

The purpose of our project is to dynamically integrate sensor data from a Microsoft Kinect with a projector display in order to produce an interactive environment for the user. We drew inspiration for this project from various technology demos, ranging from big-time corporations like Microsoft (IllumiRoom) to small-time developers. To accomplish our goals, we utilized Cinder, an open source C++ library that contains efficient graphic libraries. Cinder also permitted us to make use of the Microsoft Kinect V2, which allowed for higher resolution images and more accurate skeletal tracking. A major objective of this project was calibrating the projector and Kinect using OpenCV’s “Find Chessboard” algorithm. Once this was accomplished, we could overlay Kinect data onto the environment. Ultimately, our final goal was to use this calibration data to create an anamorphic projection of an object to produce an illusion of depth on a two-dimensional image. The Kinect data is used to adjust the perspective of the projected image to align with the user’s viewpoint. Through the process of working on this project, we implemented many different techniques for calibration, and researched methods for improved 3-D visualization.

WIDLE: A Web Based Linux Interface
Lucas Novoa, Charles Volzka
Faculty Mentor/Collaborator: Peter Bui
Poster #254

For new systems students coming from graphically based operating systems navigating remote Unix style shells can be as difficult as learning a new language. The purpose of this research project is to create a user friendly web interface for students interested in learning the UNIX environment, and programming, but do not have the experience to do so in a terminal. WIDLE is a RESTful web server that supports remote file system browsing, interaction, and editing through a standard web browser. WIDLE also provides an interface to view multimedia files from remote systems and an easy method to transfer files making it useful for advanced users. By using WIDLE, it is expected that users ease into the UNIX environment faster and manage media files easily. To evaluate our system, we have given students a chance to test WIDLE, and collected their feedback on the following questions: how could WIDLE be improved, what are the advantages of using WIDLE, and how can WIDLE make the life of a new or experienced programmer better.
Monitoring, Analyzing, and Visualizing Distributed Computing Clusters
Jonathan Stupka
Faculty Mentor/Collaborator: Peter Bui
Poster #255

With the explosive growth of distributed systems, it is imperative that system administrators and users have the ability to monitor the resources and properties of their computing infrastructure. By periodically aggregating data from different machines and organizing the system metrics and statistics in a database, it is possible to provide rich and compelling visualizations of the status of the distributed systems. In our project, we have constructed a system which collects and manages data from multiple machines and makes this information available via a web server for visualization and display. Accessing this system are a pair of Raspberry Pi embedded computers which are used to present the aggregated information in an automated sideshow. To manage the overall system, we provide a web-based administrative console for modifying and configuring the information displays.

Obelisk: Summoning Minions on a HPC Cluster
Grant Wuerker
Faculty Mentor/Collaborator: Peter Bui
Poster #256

In scientific research, having the ability to perform rigorous calculations in a bearable amount of time is an invaluable asset. Fortunately, the growing popularity of distributed systems at universities makes this a widely accessible resource. However, in order to use such computing resources, one must understand Linux, parallel computing, and distributed systems. Unfortunately, most people do not have the time or patience to learn these skills, indicating that the high performance computing (HPC) cluster has not been abstracted far enough. The purpose of Obelisk is to facilitate the submission of jobs via an intuitive web interface, making HPC clusters accessible to all. With the Obelisk web portal, users select a scientific application, configure parameters, and submit their task to the Obelisk manager. This will in turn translate the request to a batch job on the HPC cluster and provide the user with progress information via a status page. Using Obelisk, novice users no longer need to know the arcane incantations necessary to harness the power of HPC minions and instead can utilize a straightforward wizard interface.

Computer Science, Chemistry, and Geography
Integration of Atmospheric Sensors into Unmanned Aerial Vehicle Platforms
Matthew Kennedy
Faculty Mentors/Collaborators: Patricia Cleary (Chemistry), Peter Bui (Computer Science), Joseph Hupy (Geography)
Poster #48

There is an increasing use today in sensor data as well as a boom in how to gather data. The practice of putting sensors on Unmanned Aerial Vehicles has become a more common practice but information about how to replicate experiments and gather one's own data is still quite fragmented. This need led the team to develop an embedded sensor solution on a fixed wing UAV in order to gather atmospheric data in areas of high pollution. This poster will describe programming and hardware strategies for the integration of air sensors into a UAV using Arduino IDE, SPI and Pixhawk flight controller.

Mathematics
Mirror Symmetry in Reflexive Polytopes
Christopher Magyar
Faculty Mentor/Collaborator: Ursula Whitcher
Poster #156

Mirror Symmetry, with its origins in theoretical physics, describes a relationship between geometric objects in multiple complex dimensions called Calabi-Yau manifolds. We examine mirror symmetry in smaller dimensional cases through the study of reflexive polytopes. The polar duality transformation takes a polytope with integer lattice points to its polar dual. If the polar dual is also a lattice polytope, then we refer to the polytopes as reflexive polytopes. Dual varieties defined from pairs of reflexive polytopes exhibit the phenomenon of mirror symmetry predicted by string theorists. We use concepts from algebraic geometry, number theory, and combinatorics to examine one-parameter families of elliptic curves obtained from reflexive polygons. Previously, we have counted points of
dual hypersurfaces within these elliptic curves over finite fields to demonstrate an arithmetic mirror symmetric relationship holds for three pairs of elliptic curve families. Currently, we seek to link these results to the Picard-Fuchs equations, which can be used to describe how these families change as their parameter is changed.

**New Methods of Constructing 4-dimensional Tops**  
**Adam Schwartz, Alexa Syryczuk**  
Faculty Mentor/Collaborator: Ursula Whitcher  
Poster #157

String theory predicts that the universe has many extra dimensions. These have the structure of Calabi-Yau manifolds. Physicists hypothesize that these manifolds should occur in mirrored families, and the mathematical field of mirror symmetry seeks to understand the geometric correspondences between paired Calabi-Yau manifolds. The polar duality transformation takes a polytope with integer lattice points to its polar dual. A lattice polytope is reflexive if its polar polytope is also a lattice polytope. Reflexive polytopes can be used to describe Calabi-Yau hypersurfaces, and thereby better understand how they relate to string theory and extend to higher dimensions. Reflexive polytopes have been classified in 3D and 4D, with 4,319 and 473,800,776 classes of equivalent polytopes respectively. A top generalizes the idea of slicing a reflexive polytope. The points of a top with the last coordinate of 0 are a reflexive polytope that is one dimension less than the top. Beginning with a 3-dimensional reflexive polytope, we investigate new methods of constructing 4-dimensional tops.

**Application of Calculated Off-beat-ness to Real World Situations**  
**Adam Schneider**  
Faculty Mentor/Collaborator: James Walker  
Poster #158

Upon finishing last semester’s research on a numeric system that calculates how “off-beat” a rhythm is, some questions arose: 1) Does this system mathematically explain which rhythms are perceived as difficult? 2) What would happen if we applied this research towards a musical piece? We explored these questions with two different measures of rhythmic off-beatness, weighted and unweighted, applied to several musical examples. These examples include: 1) rhythmic sequences from world music; 2) rhythmic sequences used by Povel and Essens to gauge performance difficulty; 3) rhythmic difficulty of various measures of Stravinsky’s “Suite from l’Histoire du Soldat,” which historically is a very rhythmically challenging piece. The weighted measure is better able to distinguish various world music sequences and correlates well with the difficulty ranking for the Povel and Essens sequences, thus proving there is a mathematical correlation between the weighted off-beatness and difficulty. Applying the weighted measure to a movement of the Stravinsky yields a quantitative description of the changing levels of off-beatness through the course of the piece. This description provides a guide for rebarring the movement to lower the difficulty, while maintaining rhythmic integrity.

**Perception of Loudness in Dissonance and Harmonic Tones**  
**Ashly Kastenschmidt, Sarah Luman**  
Faculty Mentor/Collaborator: James Walker  
Poster #159

Two different models for measuring auditory roughness were created to see how humans perceive loudness in dissonance and harmonic tones. Estimated Fletcher-Munson curves that show the relation between frequency of pitches and their loudness was incorporated into a MATLAB code. This MATLAB code used roughness measures by Sethares. Then dissonance graphs were produced from the MATLAB code that also compared Sethares original dissonance curve with the new dissonance curve that incorporated the Fletcher-Munson curves. Then two different models were created with constant amplitude harmonics and exponential decreasing harmonics. The constant amplitude harmonics curve showed that there was significance in perception of loudness in dissonance curves compared to Sethares dissonance curve. However, the exponential decreasing harmonics curve was very similar to the Sethares dissonance curve.
**Associating Blood Pressure with SNPs Through Statistical Mapping**  
*Pedro Henrique Gomes Machado*  
Faculty Mentor/Collaborator: Abra Brisbin  
Poster #186  

Genes carry important information about diseases and other traits. In this poster, we apply statistical tests including linear regression to identify SNPs, a type of genetic variant, which are associated with blood pressure in a data set of individuals from Brazil. A baseline analysis of 97223 SNPs on all 22 autosomes using age and sex as covariates finds 2252 associations that are nominally significant at the .01 significance level. To incorporate ancestry as a covariate, we phased the data using SHAPEIT and estimated genome-wide proportions of Native American, European, and African ancestry using Principal Components Analysis. The ancestry-based analysis helps to refine the association results and better identify genes which may influence blood pressure.

**Using Linear Discriminant Analysis to Determine Ancestral Proportions of Admixed Individuals**  
*Jordan Thill, Ji Hyun Kim*  
Faculty Mentor/Collaborator: Abra Brisbin  
Poster #187  

Diseases affect individuals of various ancestral backgrounds differently. Thus, discovering the percentage of different ancestral backgrounds in individuals with multiple ancestries is useful for understanding and predicting disease susceptibility. In this poster, we will present an application of Linear Discriminant Analysis and Hidden Markov Models on genetic data to estimate the percentage of ancestral heritage for a given individual. This method will be verified and tested on simulated individuals with known ancestry proportions.

**Fitting Alpha-Skew-Normal Distribution to Insurance Data**  
*Aaron Leinwander*  
Faculty Mentor/Collaborator: Mohammad Aziz  
Poster #188  

The purpose of this project was to explore the use of the alpha-skew-normal distribution to other commonly used distributions in modeling insurance data. General properties of the distribution are looked at and initial tests are conducted to determine the validity of applying the more flexible alpha-skew-normal distribution compared to more orthodox distributions such as the normal and skew-normal distributions. In the initial findings, the alpha-skew-normal distribution appears to be comparable in effectiveness to the skew-normal distribution and better in cases of bimodal data.

**An Investigation of the Relationship between Health Care Costs and Premiums by State**  
*Shawny Gabriel*  
Faculty Mentor/Collaborator: Herschel Day  
Poster #189  

The focus of this project is to determine how closely related health insurance costs and premiums are across the 50 states. At the outset, we hypothesized that costs and premiums would have a strong, positive correlation. After analyzing premiums both prior to the enactment of the major impacts of the Affordable Care Act (ACA) and following it, there was clear evidence suggesting otherwise. For example, the state of Minnesota had the second lowest exchange premiums while having per capita health care costs that ranked in the highest 30% of states. Using regression analysis and age/gender normalization, we examined different cost drivers and multiple years of premium data to better understand the relationship of health care costs and premiums. In doing so, we hoped that our discoveries might provide insights on creating more affordable insurance exchange premiums.

**Modeling and Forecasting Mortality Rates with the Lee-Carter Model: A Comparative Study**  
*Andrew Smeed*  
Faculty Mentor/Collaborator: Marie-Claire Koissi-Kouassi  
Poster #216  

In most of the industrialized nations, people now live on average longer than expected. This is referred to as longevity, which describes long life span. Although longevity is a great achievement for humanity, it puts a burden on the solvency of pension systems. Death rates are used to measure and model mortality rates. Actuaries need to well anticipate longevity in order to avoid future financial losses. This justifies the need for improved models for mortality projection, which has led to a growing interest in stochastic mortality models. In 1992, Lee and Carter presented a stochastic model to fit and predict mortality rates. Since then, the Lee-Carter model has been widely used for demographic and actuarial applications in many countries including Japan, the G7, Belgium, and the Nordic countries.
This project first examines the performance of the Lee-Carter model on the data from the United States. We used the Singular Value Decomposition and the Maximum Likelihood methods. We then make a comparative study with death rates from several other countries. We expect to observe differences by countries and approaches.

Computation and Simulation Study of Least Absolute Deviation Methods
Lyle Paukner
Faculty Mentor/Collaborator: Jessica Kraker
Poster #217

In the context of finding the “best” predictive model, this research project focuses on assessing and fitting models with least-absolute-deviation techniques. Such techniques are more robust to outliers, though there are computing considerations with the mechanics of fitting such models. Linear multiple regression explores the relationship of a response variable to predictor variables through a linear combination of the terms, plus error (“noise”). Using predictors explored in a previous study, we simulated responses with a variety of types of errors. We assess the fits of a variety of models to the data via both least-squares and least-absolute-deviation measures. Additional measures of skewness and outliers were used in quantifying the impact of the types of errors on the assessment values. Predictions were performed by fitting the model via ordinary and “penalized” regression methods. One of these methods, the L1-norm loss penalized regression, aims to minimize the least absolute deviation of the errors. While this model has been introduced in the literature, its preferential use has not been examined. Assessments for the various penalized methods will be computed and cross-compared over the different types of simulated errors, with the goal of better describing data situations in which this L1-norm loss penalized regression results in better predictions than with other regression-fitting methods.

Solution Behavior of Dynamic Riccati Equations over Time Scales
Maxwell Dylla, Christopher Hopp
Faculty Mentor/Collaborator: Chris Ahrendt
Poster #218

The classic Riccati differential equation is well developed in the literature and has many applications in the field of physics. In this work, we examine the behavior of solutions of generalized dynamic Riccati equations over time scales. The time scale calculus generalizes and unifies discrete difference equations and continuous differential equations into a single theory. In the time scale calculus, the derivative can be defined in two ways: a forward derivative Delta and a backwards derivative Nabla. These two derivatives lead to two types of Riccati equations. We focus on asymptotic solution behavior of both dynamic Riccati equations on the time scale muZ, where mu is a positive real number. Using the time scale calculus, we develop a general solution to the Delta Riccati equation using generalized sines and cosines, and the generalized exponential function for time scales. We compare the solutions of the Delta Riccati equation that have almost perfect periodic solutions to those with perfect periodicity. The periodicity of these solutions is governed by the choice of mu for the time scale. Almost periodic solutions exhibit different “layers” of almost periodicity.

Minimal Complexity C-complexes for Colored Links
Grant Roth
Faculty Mentor/Collaborator: Christopher Davis
Poster #219

A link is a collection of strings tangled together with their ends fused together. Given any link there is a two-dimensional surface it bounds. The genus of this surface gives a measure of the complexity of the link. In this project, we study the analogous measure of complexity given by a generalization of a surface called a C-complex. In order to show that this measure captures some information, we present an infinite family of links for which this new measure of complexity is arbitrarily high. It is an interesting question how the measures of complexity coming from classical surfaces and C-complexes compare.

Determining Colorability of Knots
Danielle Brushaber, McKenzie Hennen
Faculty Mentor/Collaborator: Carolyn Otto
Poster #220

Our team researched the colorability of knots, an invariant used in classification. We specifically looked at the n-Whitehead double of knots (a doubling operator). Using linear algebra, the minor determinant of the matrix representing the intersections of the knot state its colorability. We are looking to find a pattern correlating the determinant of the original knot and the determinant of the Whitehead double with the most basic link. We have
developed conjectures involving the determinant of n-Whitehead double of specific knots, which we will present.

**Pattern Avoidance in Forests**  
Derek Levin, ML Tlachac  
Faculty Mentor/Collaborator: Manda Riehl  
External Faculty Mentor: Lara Pudwell, Valparaiso University  

Pattern avoidance in permutations is a growing research specialty in mathematics, and we widen its application to forests. An increasing forest is a collection of t trees where each of the trees has v labels, and every path from root to leaf is an increasing sequence of labels. These forests contain associated permutations which are found by conducting a depth first search on each tree from left to right, starting at the root and moving left to right by level. We enumerate pattern avoidance classes within the permutations associated to these forests and create bijections to other combinatorial objects. We have a bijection from forests avoiding the pattern 123 to the set of paths loosely under the line \( y = vx \) from \((0,0)\) to \((t, tv-t)\) using vertical steps \((0,1)\) and horizontal steps \((0,1)\). Additionally, the number of forests of n increasing 2-node trees avoiding 321 is the same as the number of 321-avoiding ordered set partitions of \(\{1,\ldots,2n\}\) where all blocks are of size 2. We also found that the number of 321 avoiding binary forests with 2 trees is given by \(\binom{2n}{n}\). Lastly, in unary forests where each tree has 2 nodes, there is a bijection between forests avoiding each of the patterns 132, 213, 312, and 231.

**Evaluation of Risk Based Premium of Pension Benefit Guaranty Corporation with Regime Switching**  
Guoxi Lei  
Faculty Mentor/Collaborator: Harriet Yang  

This work studies the defined benefit [DB] pension plan supported by pension benefit guaranty corporation (PBGC). PBGC provides insurance against loss in retirement funds for 42 million American workers. In recent years, reports have shown that PBGC itself has been suffering losses. Our research project generalizes Chen's work of premium calculation for the risk based model by taking the market regime switching into consideration. We analyze two scenarios. First, pension funds are forced to close if a certain threshold value is hit. Second, distress termination happens when the performance of the sponsor's asset is not sufficient good enough to cover its debt. Finally, we introduce closed-form solutions for the risk-based premiums under both of these two conditions.

**Deformations of 5 Dimensional Complex Non-nilpotent Associative Algebras**  
Thao Tran, Zachary Forster, Austin Riedl, Hengzhou Liu  
Faculty Mentor/Collaborator: Michael Penkava  

We have been studying the deformation theory of non-nilpotent complex 5-dimensional associative algebras. Using the computer algebra system Maple, we computed the versal deformations of the algebras to determine precisely which other algebras it deforms to. With this information, we will be able to understand how the moduli space of these algebras is naturally glued together. In this poster, we will explain some of the methods we have used to carry out the computations. According to our findings, there are 285 isomorphism classes of algebras, including 16 one-parameter families. Each of these families is parametrized by a 1-dimensional projective orbifold. We have computed versal deformations for nearly all of these algebras, so are close to completing our analysis of the moduli space. We will present some highlights of our results.

**N-Dimensional Semi-Hypercubes and the Algebras Associated with Their Hasse Graphs**  
Austin Riedl, Mitchell Lemons  
Faculty Mentor/Collaborator: Colleen Duffy  

The primary goal of our project is to determine the structure of the graded algebra that is associated to the Hasse graph of an n-dimensional semi-hypercube. Our current investigation serves as a natural extension of the work done by our predecessors on the hypercube. We consider a unit n-cube with one vertex at the origin, remove those vertices with an odd number of 1’s in its coordinate positions, and form new simplex and semi-hypercube facets. Each symmetry of the n-dimensional semi-hypercube can be thought of as acting on the coordinates of the vertices. For each symmetry, we consider the Hasse subgraph consisting of fixed k-faces of the semi-hypercube under the action. From each Hasse subgraph, we count the directed paths between each pair of levels in the graph. We have determined the generating functions that describe this algebra. This defines the complete structure of this algebra.
Natural and Physical Sciences

Biology

The Effect of Substrate Size on Macroinvertebrate Distribution in Little Niagara Creek
Alexandra Hillstrom, Morgan Freeburg, Katlynn Kralewski, Allison Ban-Herr
Faculty Mentor/Collaborator: Todd Wellnitz
Poster #7

During the reconstruction of the UW-Eau Claire campus in 2012, a restoration project added rock substrate to Little Niagara Creek to enhance the stream habitat. The purpose of this study was to determine the effect of different substrate sizes on benthic macroinvertebrate richness, diversity and abundance in the stream. Wire mesh trays containing either small, medium, or large size rocks (4 trays per substrate size) were placed in Little Niagara Creek for three weeks. Macroinvertebrates were then collected and identified to the lowest taxonomic level feasible, and the species abundance, richness and diversity was determined for each. Differences in taxonomic parameters among the substrate size classes were tested using analysis of variance (ANOVA). We found no differences in richness or taxonomic diversity; however, specific taxa were more abundant or only present on certain substrate sizes. Hydropsychidae caddiflies preferred large substrate size over small, and snails and flatworms were found only on large substrates. If the university were to continue stream restoration of Little Niagara Creek, our data suggest that larger substrate sizes would increase the numbers of these taxa.

Bird and Mammal Species of the Monk’s Community Forest
Alexandra Hillstrom, Syler Behrens, Morgan Euteneuer, Jonathan Schenk, Peter Tha
Faculty Mentor/Collaborator: Deborah Freund
Poster #8

The Monk’s Community Forest in the Oddar Meanchey Province of Cambodia is a fundamental resource for surrounding villages and the global ecosystem. However, the forest is continually threatened by unsustainable practices such as illegal logging and poaching. In order to convey the negative implications of these practices, conservation efforts focus on how the wildlife are affected. The purpose of this project was to compile a species list of birds and mammals present within the Monk’s Community Forest during January, 2015. Over a period of three weeks, image and audio data were collected daily. Typically, bird surveys were conducted twice per day; once in the early morning and again in the late afternoon. Additionally, trail cameras were used to record wildlife activity at various locations throughout the forest. The photographs and audio recordings were analyzed to identify species and combined with previous survey data to generate the species list. Our motivation for the project was to raise awareness of the ecological importance of the forest and promote its conservation. We anticipate our findings will encourage the funding of protection efforts for the Monk’s Community Forest.

An Approach to Analyzing Changes in Gene Expression of Non-model Plant Species Grown Under Elevated CO2 and Soil N Levels
Leah Radeke, Patrick Moran
Faculty Mentors/Collaborators: Tali Lee, Julie Anderson
Poster #9

The use of genetic techniques is a contemporary approach used to answer ecological questions. A long-term, large-scale field study in Minnesota, USA, called BioCON, manipulates CO2 and soil nitrogen availability. The physiological responses of several non-model plant species grown in BioCON have been previously observed; however, the gene expression responses of these species have not been studied and may reveal mechanisms that drive these physiological responses. Leaves were sampled from three native species grown in factorial combinations of atmospheric CO2 (ambient, ambient +200ppm) and soil nitrogen (ambient (low), ambient +4gm^-2y^-1). RNA from these leaves is currently being extracted and analyzed and will ultimately be used to assess gene expression patterns using microarrays from closely related model plant species. We are specifically interested in the interactive effects of elevated CO2 and elevated nitrogen levels on the expression of genes involved in nitrogen metabolism and photorespiration, as photorespiration is directly affected by CO2 and is also linked with nitrogen assimilation and metabolism. These efforts will provide a better understanding of the natural vegetation responses to changing resource availability associated with future global change.
The Use of Portable Gas Exchange Systems to Measure Plant Leaf Photosynthesis: Comparing Different Methods to Control Humidity  
Bailey Kramer  
Faculty Mentor/Collaborator: Tali Lee  
Poster #10

Today most leaf-level measurements of photosynthesis presented in journals come from commercially available portable infrared gas analyzers. These instruments control the environment surrounding a leaf in terms of CO₂ concentration, humidity, and temperature and subsequently measure changes in these parameters caused by leaf processes. The instrument can control for the water within the chamber through airflow across the leaf (FLOW), the relative humidity (RH), or the amount of moisture in the chamber (H₂OS). It is not known if the environmental fluctuations that result from these different techniques differentially affect leaf responses, which could impact the speed and accuracy of measurements. In this study, I tested if photosynthesis was affected by the method used to control for water. I hypothesized that there would be no significant difference in photosynthesis between the methods of measurement and that rates would stabilize faster under constant RH than the other two methods. The method of measurement did not significantly affect photosynthesis. However, the method did affect the time to stabilization in one of the two species tested. This should be considered when planning and interpreting experiments done using these portable gas exchange systems.

Trends in Invertebrate Feeding Strategies Due to Light Intensity Changes in Little Niagara Creek  
Bailey Kramer  
Faculty Mentor/Collaborator: Todd Wellnitz  
Poster #11

Light levels can affect primary production and resource availability in streams. The availability of food resources could impact streambed macroinvertebrate communities by altering the proportion of species belonging to different functional feeding guilds (FFGs), or groups of organisms that utilize different food resources. We hypothesized that “grazers,” the FFG that feeds on algae, would predominate under full sunlight because algae are light-dependent, and that “shredders,” the FFG that feeds on coarse particulate organic matter that falls into the stream, would be more abundant under shaded conditions where algae should be less abundant. To test this, we manipulated light at three levels (high shade, low shade, no shade) by suspending screens over Little Niagara Creek. Three substrate baskets were placed within each treatment at the beginning of the experiment to serve as colonization surfaces. After 17 days, macroinvertebrates were collected, identified and sorted into FFGs. Algal abundance was determined using a fluorometer. Our hypothesis was partially supported; collector abundance was positively correlated with shade as predicted. However, grazer numbers did not respond to increased light despite an increase in algal abundance. Nevertheless, these results indicate that light is an important environmental factor structuring the benthic macroinvertebrate community in this stream.

Characterization of the Innate Fear Response in Ostariophysian Fish  
Claudia Seravalli, Cynthia Koenigsberg, Leah Radeke  
Faculty Mentors/Collaborators: David Lonzarich, Winnifred Bryant  
Poster #20

Fish within the superorder Ostariophysi (e.g. minnows, catfish, suckers) exhibit a response of innate fear upon exposure to skin extracts of other fish, or Schreckstoff’s substance. The study of innate fear has applications in medical research as a model of mammalian stress, but the nature of this response has not been fully characterized. The three neural tracts in the olfactory system of zebrafish have been shown to correspond to different behavioral activities: fear, foraging, and copulation. It has also been shown that activity in regions of the bulb relative to a given tract correspond to the behavior associated with that tract. We have established an immuno-labelling protocol to track creek chub neural activity in the olfactory bulb using c-Fos, a transcription factor that is expressed in active regions of neural tissue. Utilizing this protocol has revealed that juvenile creek chub exposed to skin extract show a difference in neural activity compared to a control. These findings show that our protocol can be used to further investigate neurobiological components of the alarm response.
Behavioral Responses of Zebrafish to Different Chemical Constituents of the Skin
Philip Schadegg, Cynthia Koenigsberg, Claudia Seravalli
Faculty Mentor/Collaborator: David Lonzarich
External Collaborator: Holly Embke

The Zebrafish (*Danio rerio*) belongs to a family of fishes whose members produce a chemical in the skin that elicits a defense response in neighboring fish. This “alarm response” has drawn the attention of the biomedical research community for its potential value in understanding the neural pathways associated with fear and anxiety in humans. Our study aims were to develop a behavioral assay to characterize the alarm response in Zebrafish and to describe their behavior following exposure to chondroitin, a chemical of the skin, and chemical components of cultured skin cells. In developing a behavioral assay our objective was to establish the foundation for subsequent work exploring the neural pathways of the alarm response and to evaluate behavioral responses to different skin odorants. Our evaluation of chondroitin is based on evidence, thus far unreplicated by others, that it is the alarm response stimulus source. We also have examined chemical odorants derived from skin cells grown in culture for the purpose of isolating the cellular source of the alarm chemical. We have made significant progress towards achieving our first objective. Experiments on chondroitin and cell culture odorants have yielded positive results, but at this time these findings are not well resolved.

Does Elevation Change the Way Current Velocity and Rock Surface Area Affect Benthic Community Composition in an Andean Mountain Stream?
Hunter Promer, Morgan Freeburg
Faculty Mentor/Collaborator: Todd Wellnitz

Streambed macroinvertebrate communities are profoundly influenced by current velocity. Current mediates key processes such as oxygen exchange, downstream transport, and colonization rates on substrates. Where macroinvertebrates congregate on the streambed is influenced by current and available surface area. However, the role these factors play in structuring benthic communities along stream elevation gradients is not well described. To address this gap, we examined macroinvertebrate assemblages on different-sized rocks across a range of stream current at two elevations (2100 and 3000 m) in an Andean Mountain stream in Argentina. We measured current velocity, rock surface area and collected macroinvertebrates from 16 different-sized rocks at each elevation. Macroinvertebrates were identified and counted and the influence of current, rock area, and elevation on taxonomic richness and abundance was examined using multiple linear regression. We found that the importance of current and rock size for shaping communities varied with elevation. At the lower site, rock surface area showed a positive relationship to macroinvertebrate richness and abundance and current had no effect. At the high elevation site, rock size had no effect, but current velocity correlated with macroinvertebrate abundance. These results suggest that the influence of current and surface area on macroinvertebrate community structure is elevation-dependent.

Human Traffic and Fire Effects on Invasive Earthworm Abundance in the Boundary Waters Canoe Area Wilderness of Northern Minnesota
Todd Wellnitz, Matthew Rothaus, Andrew Evenson, Christopher Stolp, Katelyn McKay, Kayla Weihing, Megan Padrutt
Faculty Mentor/Collaborator: Todd Wellnitz

Exotic earthworm invasion of temperate North American forests may be an important driver of ecosystem change. Earthworms can cause changes in soil structure, nutrient cycles, and the diversity and abundance of plants. However, the extent of earthworm invasion and their impact on northern forests is not completely understood. We examined the distribution and abundance of earthworms in the Boundary Waters Canoe Area (BWCA) Wilderness and hypothesized that worms would be more abundant near campsites and less abundant in areas burned by the Pagami Creek Fire of 2011. We assessed earthworm abundance in four land categories: campsites, non-campsites, burned forest, and unburned forest. Earthworm impacts were assessed by measuring soil nitrogen and pH and leaf litter accumulation. Campsites had higher worm abundance and less litter accumulation than non-campsite areas. Burned areas had lower worm densities and higher soil nitrogen and pH. More significantly, worm abundance in burned areas decreased as distance as the access entry point increased, indicating human traffic correlates with their spread. These data suggest that earthworm effects on the ecosystem are not yet pronounced, but that human activities in the BWCA are an ongoing driver of the earthworm invasion, and forest fires may temporarily reduce their numbers.
Does Stream Current Influence Crayfish Effects on Macroinvertebrate Communities?

Drew Frase, Andrew Dixon, Hayley Emerson, Margaret Gapinski
Faculty Mentor/Collaborator: Todd Wellnitz

Crayfish are freshwater invertebrates that may greatly influence stream communities, particularly assemblages of benthic macroinvertebrates. However, the degree to which crayfish (Ouromectes rusticus) impact the macroinvertebrates inhabiting the streambed will likely vary with stream conditions. Current velocity is a particularly important condition that can modify both crayfish and macroinvertebrate behavior, thus, we hypothesized that current would influence their interaction. A cage experiment was conducted in Lowes Creek across a gradient of current with 3 treatments: open cage controls, closed cages containing one crayfish, and closed cages without crayfish. Each set of three cages was replicated eight times (24 cages total) and current velocity was measured at each cage. After three weeks, macroinvertebrates from cages were collected, identified, and counted. Total macroinvertebrate abundance increased with current velocity, but was 34% lower in the cages with crayfish than in those without. The most commonly occurring macroinvertebrate, the net-spinning caddisflies (Hydropsycheidae), showed a 42% reduction in the presence of crayfish, but only in fast current (>50 cm/s). These data support the hypothesis that crayfish effects on macroinvertebrate communities are modified by current, and show that certain species are more susceptible to crayfish effects than others.

How Does Student Activity Impact Little Niagara Creek? – Examining the Relationship between Streambed Disturbance and Species Diversity in a Campus Teaching Resource

Casey Aumann, Philip Schadegg, Raul Tapia, Jesse Hagen
Faculty Mentor/Collaborator: Todd Wellnitz

Our research goal was to determine the effect that streambed disturbance has on benthic invertebrate diversity in the Little Niagara Creek. Little Niagara is a valuable educational tool used for classes and student projects at the University of Wisconsin – Eau Claire, but the response of its benthic community to disturbance resulting student activities such as stream sampling and collecting are unknown. We hypothesized that the relationship between disturbance frequency and invertebrate diversity would follow the Intermediate Disturbance Hypothesis (IDH), which predicts that an “intermediate” amount of disturbance will maximize diversity and any amount of disturbance deviating from this will decrease diversity. Eight gravel-filled trays were placed on the streambed and disturbed 1, 2, 3, 4, or 6 times over 24 days. Invertebrates were then sampled, identified, and counted to calculate diversity. We found that as disturbance frequency increased, species diversity decreased. Although the IDH was not supported, we may have observed only the far end of the curve where diversity decreases at higher disturbance frequencies beyond the intermediate level. More samples over a wider range of low disturbance frequencies are needed to gauge how potential disturbance events, like class activities, might affect streambed diversity in Little Niagara Creek.

Benthic Invertebrate Distribution in Relation to Current Velocity in Little Niagara Creek

Alyssa Colwitz, Olivia Ludke, Delaney McCullough
Faculty Mentor/Collaborator: Todd Wellnitz

To understand how current velocity affected the distribution of benthic macroinvertebrates in Little Niagara Creek, we examined two sites in the stream that had fast (0.64 m/s) and slow (0.06 m/s) mean current velocity. We hypothesized the current would influence benthic species composition by favoring certain species at the different velocities. At each site, five plastic mesh cages (16 x 6 x 6 in) were filled with gravel substrate and placed on the streambed. After two weeks, the containers were removed and macroinvertebrates were identified and counted. An analysis of variance found no difference in overall abundance and richness between current treatments; however, there were differences in species composition. Isopoda (pillbugs) were more abundant in the slow current whereas Hydropsychidae (net-spinning caddisflies) were more abundant in the fast current. The differing distributions of these two species across current supported our hypothesis and reinforce the idea that current constitutes an important niche axis for certain benthic stream organisms. It also suggests that current is an important variable to be considered when predicting how species will respond to aquatic habitat alteration and change.
Using Benthic Macrinvetebrate Populations to Assess Campus Impacts on Little Niagara Creek
Danielle Mares, Brian Johnson
Faculty Mentor/Collaborator: Todd Wellnitz
Poster #39

We sampled benthic macroinvertebrates in Little Niagara Creek to assess the impact that the UWEC campus had on the stream. Macroinvertebrate communities serve as ecosystem indicators, and their composition and richness can be used to measure the ecological “health” of a stream. Macroinvertebrates were sampled with D-nets at the three different locations along a 0.6 km reach of the stream that included areas upstream, within, and downstream of the UWEC campus. Three samples were collected at each location and macroinvertebrates from each sample were identified, sorted to species, and counted. Species richness was highest at locations upstream (15 species) and within campus (12 species), and was significantly lower downstream (5 species). Different species dominated (in terms of % abundance) each location: for the upstream location, broadwinged damselflies (48%); for within campus, sow bugs (38%); and for the downstream location, snails (63%). Total macroinvertebrate abundance mirrored the richness pattern. These data indicate that the downstream location is the either more impacted or a less favorable habitat for benthic macroinvertebrates than upstream and campus locations. Our results also suggest that the UWEC campus has little impact on benthic community of Little Niagara Creek.

Direct and Indirect Effects of Water Velocity on Foraging Success in Stream-Dwelling Fish Species
Les Warren, Morgan Freeburg
Faculty Mentor/Collaborator: David Lonzarich
Poster #40

Understanding the specific effects of water current on fish performance is an important research goal in stream ecology. In this study, we set out to develop a mechanistic understanding of a well-established link between fish feeding success and water velocity. Building on previous work, we identified three predictors of feeding success—the size of an individual’s foraging field, its ability to detect food in that field, and its ability to capture that detected food. Our experimental subject was adult Creek Chub (*Semotilus atromaculatus*), a common species in Wisconsin streams. Performing feeding trials in a 70-liter flow chamber, we collected feeding data on ten chub across five different water velocities. Our principal hypothesis was that the dependence of feeding success on water velocity could be explained by the effects of water velocity on each predictor variable. Testing this hypothesis was the primary goal of this study, but a more ambitious goal was to develop a model that would identify both the direct and indirect effects of water current on these variables and ultimately on feeding success. While the feeding trials have been completed, we continue to analyze video from several hundred individual feeding events.

Establishment of a Stable Culture of Fish Alarm Cells
Heather Hintz
Faculty Mentor/Collaborator: Winnifred Bryant
Poster #41

The goal of this project was to establish a primary epithelial cell culture from the skin of Creek Chub (*Semotilus atromaculatus*). The epithelial cells (specifically alarm cells) are the source of alarm substance. This compound is released when tissue damage occurs and mediates fear response in fathead minnows. Alarm substance has not been isolated and commercial preparations are not available. Therefore a sustainable primary culture, despite containing a mixed population of cells, would prove to be an abundant source of alarm substance (bioassays have demonstrated that media removed from these cultures successfully induce fear responses in Creek Chub). To generate a viable culture of cells, we developed protocols for tissue collection and processing, and determined optimum nutrient medium formulations and culture conditions. We have successfully developed a protocol for establishing a primary culture of Creek Chub epithelial cells. The culture is finite—cells proliferate for a period of 3-4 weeks before entering a period of senescence. We are currently determining how to isolate the alarm cells for subculture. A pure population of alarm cells would allow isolation and in-depth chemical analysis of alarm substance.

Local Prevalence of *Borrelia burgdorferi* in Adult Female *Ixodes scapularis*, Spring 2014
Emily Holman
Faculty Mentor/Collaborator: Lloyd Turtinen
Poster #50

The purpose of this study was to conduct a local survey of the female deer tick population harboring *Borrelia burgdorferi* in Wisconsin during the spring of 2014. This is a continuation of a larger study begun in 2010. *Borrelia burgdorferi*, which is spread through tick bites, is the bacteria responsible for causing Lyme disease. UWEC students collected ticks using sweeping or visual detection methods in local areas. DNA was extracted from individual ticks.
Undergraduate Poster Presentations: Biology

Enhanced DNA Replication of Human Cytomegalovirus US29/30 Deletion Mutants
Emily Holman
Faculty Mentor/Collaborator: Lloyd Turtinen
Poster #51

The purpose of this study was to determine if the US29/30 genes in human cytomegalovirus (HCMV) influence viral DNA replication. A galK/Kan' cassette was inserted into the US29/30 gene loci inactivating both genes. Mutant virus formed plaques (killed foreskin fibroblast cells) beginning at 5 days post-inoculation (dpi) versus 7 dpi for parental wild-type virus. Because DNA replication is an important early step in virus formation, we quantified the amount of viral DNA present after 2 dpi and 5 dpi using a real-time polymerase chain reaction (qPCR) approach. Both the SYBR green dye method and the more sensitive TaqMan probe method amplified the HCMV UL123 gene DNA as an indicator of viral DNA amount. Normalization of samples was done using the cellular actinB DNA. No increase in viral DNA was seen at 2 dpi, but by 5 dpi the mutant virus infection had on average greater than 10 times more viral DNA than the non-mutated wild-type virus. Lack of the US29/30 genes directly or indirectly increases HCMV DNA replication and accelerates plaque formation. The molecular details remain to be determined.

Surgery on a Galapagos Giant Tortoise
Raul Tapia
Faculty Mentor/Collaborator: Deborah Freund
External Mentor: Gustavo Jimenez-Uzcategui, Charles Darwin Research Station
Poster #52

Galapagos giant tortoises are the largest reptiles to inhabit the Galapagos Archipelago. However, the tortoises' large size and slow movement put them at a disadvantage when humans began to migrate to the islands. The Ecuadorian government protects them, but climate change and urbanization on the islands are factors that affect the well-being of these creatures. During this case study, I was assigned to assist a wildlife veterinarian at the Charles Darwin Research Station with a carapace reconstruction surgery on a giant tortoise that was hit by an automobile. The surgery was performed to put a broken carapace back into place so the wounds could heal. During the surgery, we used dental acrylic to cover bone fractures. Dental acrylic has been used to keep bone close together while it grows back. I was assigned to keep the tortoise stable by administering a tranquilizer and aiding in the repositioning of the carapace. After the surgery, the animal received intensive care and was given medications. The giant tortoise recovered from surgery and was released back into the wild. This case study required me to be resourceful due to the lack of supplies on the islands as well as to make quick decisions in the field.

Prevalence and Characterization of MRSA in a Regional Hospital in Cuenca, Ecuador
Erin Leisen, Annie Szmanda
Faculty Mentor/Collaborator: Daniel Herman
Poster #53

Methicillin-resistant Staphylococcus aureus (MRSA) is an antibiotic-resistant strain of the bacterium Staphylococcus aureus that is responsible for many hospital-acquired infections worldwide. Very little information is currently available on the prevalence of MRSA colonization among patients and staff in Ecuadorian hospitals. During the summer of 2012, nasal swabs were collected from 494 volunteers in a regional public hospital in Cuenca, Ecuador to determine the prevalence of MRSA colonization within the hospital. MRSA isolates from volunteer samples were presumptively identified through culture-based methods. Confirmation of presumptive MRSA isolates was performed using a multiplex PCR protocol that amplified regions of the 16S rRNA, femB, and mecA genes. Confirmed MRSA isolates were genetically typed in specific Staphylococcus cassette chromosome (SCCmec) groups utilizing another multiplex PCR protocol. The overall prevalence of MRSA colonization within the regional hospital was determined to be 1.8% (9 positives). All nine MRSA isolates were genetically classified as belonging to SCCmec Type IV. In addition, other species of methicillin-resistant Staphylococcus (MRS) were observed with a 6.1% MRS prevalence when including MRSA. These results indicate that MRSA and other species of methicillin-resistant Staphylococcus are present within the Ecuadorian hospital examined, and the potential for hospital-acquired infections exists.
Prevalence and Characterization of MRSA in a Regional Hospital in Rio Bamba, Ecuador

Erinn Larsen Van Alstine, Savannah Herman
Faculty Mentor/Collaborator: Daniel Herman

Poster #54

Methicillin-resistant Staphylococcus aureus (MRSA) is an antibiotic-resistant strain of the bacterium Staphylococcus aureus that is responsible for many hospital-acquired infections worldwide. Very little information is currently available on the prevalence of MRSA colonization of patients and staff in Ecuadorian hospitals. During the summer of 2013, nasal swabs were collected from 561 volunteers in a regional public hospital in Rio Bamba, Ecuador to determine the prevalence of MRSA colonization within the hospital. MRSA isolates from volunteer samples were presumptively identified through culture-based methods. Confirmation of presumptive MRSA isolates was performed using a multiplex PCR protocol that amplified regions of the 16S rRNA, FmB, and mecA genes. Confirmed MRSA isolates were genetically typed in specific Staphylococcus cassette chromosome (SCCmec) groups utilizing another multiplex PCR protocol. The overall prevalence of MRSA colonization within the regional hospital was determined to be 0.18%, consisting of one positive sample from hospital staff participants. The MRSA isolate was genetically classified as belonging to SCCmec Type IV. It was also found that 94 participants had methicillin-resistant Staphylococcus (MRS), with an overall MRS prevalence of 16.7%. These results indicate that MRSA is present within the Ecuadorian hospital examined, and the potential for hospital-acquired infections exists.

Distribution of USDA SAFE CRP Farms in Relation to Historically Documented Populations of the Federally Endangered Karner Blue Butterfly, Eau Claire County, WI.

Jacob Henden
Faculty Mentor/Collaborator: Paula Kleintjes Neff

Poster #67

We used ArcMap10.2 to analyze the spatial relationship between private land enrolled in the USDA State Acres for Wildlife Enhancement (SAFE) Conservation Reserve Program and documented Karner Blue butterfly (Lycaeides melissa samuelis) populations in Eau Claire County. Between 2009-2014, 2000 acres of highly erodible cropland were planted with a dry sand prairie seed mix to create habitat for Karners and other wildlife and to reduce soil erosion and enhance water quality. As part of our efforts to gauge the success of the program we determined and mapped the proximity of SAFE sites to known KBB occupied sites in the event that KBB dispersal and colonization were possible. We obtained farm locations from the USDA NRCS and KBB sites from the WDNR Natural Heritage Inventory. Results indicate that 16 of 73 separate SAFE land contracts (22%) are located within the KBB High Potential Zone. Ten of these are within 3 km of known KBB sites but none are <2 km. KBB typically disperse between 1.0-2.5 km and must have their larval host plant Lupinus perennis and adult nectar plants available. Although the likelihood of colonization of SAFE by KBB is low, the conservation benefits of reconstructed grasslands cannot be underestimated.

Variability in Use of Dasiphora fruticosa (L.) Rydb. as a Nectar Plant by Butterflies: Latitudinal Differences in the Rocky Mountains

Aaron Irber
Faculty Mentor/Collaborator: Paula Kleintjes Neff

Poster #68

We hypothesize that the flowering woody shrub Dasiphora fruticosa (L.) Rydb. (Family Rosaceae), is an important nectar resource for insects in montane habitats, particularly where wildflowers are a limited nectar resource due to warmer and drier conditions as a result of climate change. In 2004, our lab confirmed that D. fruticosa is a preferred nectar resource for adult butterflies in the southern Rockies (New Mexico). In 2014, we conducted a comparable study on butterflies and other pollinators in a more northern latitude (Idaho). We observed that butterflies spent more of their total observed nectaring time [54% in NM (10 species) & 56% in ID (7 species)] on D. fruticosa than on any other available blooming species. D. fruticosa also received a greater proportion of total butterfly visits (48% in NM & 45% in ID). In New Mexico, butterflies spent significantly more time nectaring than basking or flying. In Idaho, activity times were similar. In both regions, six butterfly species were found nectaring on D. fruticosa more than any others. Although butterflies visited D. fruticosa in the northern Rockies, we found that flies, bees, and beetles visited the plant significantly more often, which suggests it is a floral resource for multiple pollinators.
Eighty Years after E.R. Hall’s Survey: Marmots Persist at Low-Elevation Sites in the Great Basin
Alison Schulte, Morgan Freeburg
Faculty Mentor/Collaborator: Chris Floyd
Poster #69

The effects of climatic warming are expected to be particularly severe for cold-adapted, mountain-dwelling (montane) species. With continued warming, the zone of relatively cool, wet conditions to which montane species are adapted is predicted to shift upslope, thus imperiling populations of these species living at the lower-elevation margins of their distributions. We studied the yellow-bellied marmot (*Marmota flaviventris*), a large burrowing rodent that lives in montane meadows of mountain ranges in the Great Basin. We focused on the lowest-elevation sites where E. R. Hall documented marmots in the 1930s. Our goal was to document whether marmots still lived at these sites and to learn more about how marmots survive there. We hypothesized that marmots at low elevations depend on anomalously cool microhabitats such as deep rock crevices that preserve winter ice. During May–June 2014 we searched for and found marmots at three low-elevation sites in Nevada where Hall had reported the species. At one site we found that marmots showed no preference for burrowing near a talus-like rock pile that vented astoundingly cold air. This observation and others suggest that marmots in the Great Basin may be physiologically or ecological flexible enough to survive future climatic warming.

Creation and Characterization of LRB (Light-Response BTB) /PIF (Phytochrome-Interacting Factor) Mutant Lines in Arabidopsis thaliana
Luke Helminiak, Kari Carothers
Faculty Mentor/Collaborator: Derek Gingerich
Poster #70

*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 BTB (Bric-a-Brac, Tramtrack, Broad Complex) domain-containing proteins that act as target adapters in BTB/Cullin3 E3 ubiquitin-ligase complexes that target phytochromes for degradation. *Phytochrome-Interacting Factor* (*PIF*) genes encode transcriptional regulators that also act as negative regulators in the red response pathway. They directly interact with phytochromes and are degraded in a light and phytochrome-dependent fashion. Recent evidence shows that LRB1 and 2 can bind to a PIF3-phyB complex and induce degradation of both PIF3 and phyB, demonstrating a close link between LRB and PIF action. To better understand how these key components of the phytochrome pathway work collectively to regulate light responses we are taking a genetic approach; creating Arabidopsis lines with mutations in both *LRB* and *PIF* genes. Currently, we are attempting to generate *lrb1 lrb2 pif3*, *lrb1 lrb2 pif4*, *lrb1 lrb2 pif7*, *lrb1 lrb2 pif3 pif4*, *lrb1 lrb2 pif3 pif7*, and *lrb1 lrb2 pif4 pif7* lines from populations segregating mutations in these genes. Data on our progress creating and analyzing the phenotypes of these lines will be presented.

Characterization of Arabidopsis thaliana Light Mutants Identified in an Lrb1 Lrb2 Genetic Suppressor Screen
Kevin Mayer, Weston Orendorff
Faculty Mentor/Collaborator: Derek Gingerich
Poster #71

The ability to respond to the amount and quality of light is vital for plant growth and development. Red and far-red light are detected by the phytochrome (*phy*) photoreceptors which mediate plant behavior. We previously identified two genes in *Arabidopsis thaliana*, *LRB1* and *LRB2* (*Light-Response BTB1* and 2) as potent negative regulators of phy-mediated red light responses. *LRB1* and *LRB2* encode functionally redundant E3 ubiquitin-ligase target adapters that recent evidence has shown mediate ubiquitylation and degradation of phy. To investigate LRB gene function and isolate other components of the red pathway, we conducted genetic screens in *Arabidopsis* to identify mutations which suppress the red light hypersensitive phenotype produced by disrupted *LRB1* and 2 genes. More than 100 putative suppressor mutants were identified in a screen of >30,000 M2 individuals. We are working to confirm and characterize these lines. Three of the lines have mutations in the *phyB* gene, based on results from mapping and/or complementation analyses. In one the *phyB* mutation disrupts proper splicing of the first exon of the gene and subsequent production of the phyB protein. We are currently sequencing the *phyB* gene in the other two lines. These mutations may provide insight into phyB structure and function.
Plant Diseases and Pests in Wisconsin
Katelyn McKay
Faculty Mentor/Collaborator: Jamie Lyman Gingerich

Within my work with the Wisconsin Department of Natural Resources (DNR), I studied two prevalent tree diseases commonly found throughout the state. These diseases mainly included Oak Wilt (Ceratocystis fagacearum), which affects all Oak species, Annoosum Root Rot (Heterobasidion spp.), which affects multiple conifer species, and destruction of Ash trees by the Emerald Ash Borer (EAB). These diseases/pests, if not contained, threaten to wipe out large populations of trees across the entire state. In order to keep track of where the diseases are occurring, and where they are most likely to spread, the Wisconsin DNR implements surveys. Data is collected from the field, and then analyzed in the lab to test for various pest and disease problems. When the disease or pest is confirmed, certain measures are taken to contain or eradicate said disease. I was trained to notice signs of the diseases, to confirm them in the lab, and to then implement the “next steps” for landowners and state properties. Within this presentation of information the symptoms, effects, and eradication methods will be discussed.

Using Ciliary Protein PKD-2 Localization in Caenorhabditis elegans to Study Primary Cilia Form and Function
Samuel Grund, Tairen Linder, Shelby Hamlin
Faculty Mentor/Collaborator: Jamie Lyman Gingerich

Primary cilia are cellular projections that sense the surrounding environment. In humans, non-functional cilia can cause a range of health issues including heart defects, syndromic obesity and polycystic kidney disease (PKD). Defects in the gene, Pkd-2, cause PKD. The protein encoded by Pkd-2, PKD-2, is found in primary cilia in both humans and the nematode Caenorhabditis elegans. The specific targeting of the PKD-2 protein to the ciliary membrane is required for proper cilia function in both humans and nematodes. Thus, C. elegans are a great model for studying primary cilia form and function. The mechanisms by which PKD-2 is transported and inserted into the ciliary membrane remain incompletely understood. In order to understand how cilia structure and PKD-2 localization contribute to cilia function, we are investigating which genes in the C. elegans genome affect PKD-2 localization by using RNA interference (RNAi), a technique used to make specific genes non-functional. We identified 18 additional genes that contribute to PKD-2 localization. We are currently investigating the specific functions and effects of two of these: one that is widely expressed in human brains and may be linked to bipolar disorder and one that may be involved in asymmetry generation in neurons.

Identification of Brain Regions Activated with Arousal-Induced Clock Resetting in Mice
Jonathan Schenk, Robert Olson, Andrew Schultz
Faculty Mentor/Collaborator: Daniel Janik

The circadian clock in the suprachiasmatic nucleus (SCN) of the brain is involved with many important biological functions. Desynchronization of this clock can cause negative health effects. Therefore, studying clock resetting is important to forwarding the understanding of biological health. Previously, it has been shown that transitioning mice into complete darkness in the middle of the day arouses them and causes a 2.5 hour circadian phase advance. The purpose of this experiment was to identify brain regions involved with transmitting arousal information to the circadian clock in the SCN. After transitioning the mice into complete darkness, we extracted and sectioned their brains. We then processed the sections to Fos protein, a marker of neuronal activation. We quantified the staining comparing the brains of aroused animals with those of controls and focusing on brain regions known to be involved with stress and arousal, such as the thalamic paraventricular nucleus and the bed nucleus of the stria terminalis. We expect to see differing levels of activation in these areas between the experimental and control groups. The results of this experiment will contribute to the understanding of arousal in circadian clock function and to the understanding of circadian clocks overall.
Screening the University of Eau Claire Campus for Methicillin-Resistant Staphylococcus spp. Isolates Capable of Transferring Methicillin-Resistance

Courtney Schauer, Alexandra Bunda, Christina Vlahos, Stephanie Gilsdorf
Faculty Mentor/Collaborator: Sasha Showsh

Poster #101

Methicillin-resistant *Staphylococcus aureus* (MRSA) is an antibiotic-resistant strain of the bacterium *Staphylococcus aureus* that is responsible for many community and hospital-acquired infections world-wide. A survey of the UW-Eau Claire campus was conducted to indicate the relative presence of Methicillin-Resistant *Staphylococcus* spp. (donor strains). We collected 282 oxacillin resistant samples. Of these, 38 samples displayed characteristics of MRSA and were designated as potential donors. Further testing determined none of these donors to be MRSA. The donors were used to determine their ability to transfer the resistance gene (*mecA*) to *Staphylococcus aureus* recipients (SAS 850 and SAS 810). To determine the ability of isolates to transfer the *mecA* gene, a series of conjugation experiments were conducted with potential donors and recipients. The resulting transconjugants (products of the donor and recipient matings) were plated on CBA plates containing streptomycin, spectinomycin (donor sensitive), and oxacillin (recipient sensitive). Colonies capable of growth on all three antibiotics were screened against the donors, recipients, and a positive MRSA control using polymerase chain reaction (PCR) and the coagulase test to genotypically distinguish the presence of *mecA*. To date, 28 of the 38 donor strains have been tested and none successfully transferred methicillin resistance to the recipient.

Analyses of the E3 Ubiquitin-Ligase Target Adapter-Encoding BTB Gene Families in Algal and Lower Plant Species

Katie Plamann
Faculty Mentor/Collaborator: Derek Gingerich

Poster #212

Ubiquitylation, the attachment of ubiquitin to proteins to mark for degradation, is crucial for proper organism function. One family of complexes involved in ubiquitylation is the BTB/Cullin 3/RBX E3 ubiquitin-protein ligases, which catalyze attachment of ubiquitin to target proteins. The BTB domain-containing proteins are target-adapter, binding to target proteins via motifs appended to the BTB domain. BTB gene families in eukaryotic organisms show variability in size, complexity, and composition. In land plants, BTB gene families are large (~75-150 members) and complicated (with multiple subtypes). We are interested in when the BTB family composition seen in higher plants arose in evolution. To answer this, we are characterizing this family in lower plants *Physcomitrella patens* and *Selaginella moellendorffii* and in green algal species *Ostreococcus lucimarinus*, *Chlamydomonas reinhardtii*, and *Volvox carteri*. Our analyses show the family in *Physcomitrella* is large (65 members), with many of the same BTB types found in higher plants. In contrast, while the family in *Chlamydomonas* is larger (>65 members), most BTB types in this alga are not seen in land plants. The genome of *Ostreococcus* contains only two BTB protein-encoding genes. Collectively these data show there have been dramatic changes in this E3 ubiquitin-ligase gene family during evolution.

Chemistry

**Exploring the Impact of Macromolecular Crowding on the Function of Escherichia Coli Prolyl-tRNA Synthetase.**

Lauren Adams, An Hodac, Heidi Schmit
Faculty Mentor/Collaborator: Sanchita Hati

Poster #12

Aminoacyl-tRNA synthetases (AARSs) are enzymes that catalyze the covalent attachment of amino acids to their cognate transfer-RNA (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 is yet to be fully understood why these enzymes are so considerably large, when only a small number of residues of an AARS are integral for its enzymatic function. It has been hypothesized that coupled dynamics between multiple components of the enzyme 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 currently studying the impact of the presence of macromolecular crowding agents such as sucrose, dextran and ficoll-70 on substrate binding affinity and catalytic rate of *Escherichia coli* prolyl-tRNA synthetase (ProRS). We will present the preliminary data of our comparative study of enzymatic reaction in dilute (in absence of macromolecular crowding agents) and concen-
Comparison of the Intrinsic Dynamics of Proteins involved in Metabolic Pathways using Coarse-grained Normal Mode Analysis  

Sarah Bretl, Ryan McMunn  
Faculty Mentor/Collaborator: Sanchita Hati  
Poster #13

Protein dynamics play an important role in molecular recognition and catalysis. Each protein structure has unique dynamics encoded by its primary sequence. It has been proposed that the connection between protein structure and function actually lies in dynamics. Therefore, functional classification of proteins can be accomplished through comparison of their intrinsic dynamics. We will investigate the intrinsic dynamics of enzymes involved in primary metabolic pathways using coarse-grained normal mode analysis. We will analyze dynamics of fifteen different families of enzymes, and explore if each enzyme family exhibits unique patterns of motion that are conserved across multiple species. Completion of this study is expected to produce a catalog of characteristic dynamics that could be used for functional classification of proteins.

A Low-Temperature IR Spectroscopy and Computational Study of Frequency Shifts in CH3CN–HCl  

Nicole Weiss  
Faculty Mentor/Collaborator: James Phillips  
Poster #14

This project is concerned with environmental effects on the hydrogen bond interaction between acetonitrile (CH\textsubscript{3}CN) and hydrogen chloride (HCl). Experimental insight has been obtained by measuring infrared spectra of CH\textsubscript{3}CN–HCl in gases near absolute zero. The spectrum observed in solid neon differed from those previously seen in solid argon and nitrogen, implying that the subtle change in environment affects the strength of the hydrogen bond. The HCl frequency of CH\textsubscript{3}CN–HCl in neon was observed at 2677 cm\textsuperscript{-1}, which differed from those previously measured in argon (2662 cm\textsuperscript{-1}) and nitrogen (2566 cm\textsuperscript{-1}). The decrease in HCl frequency indicates a stronger hydrogen bond interaction. Computational techniques were used to model these effects and better understand their physical basis. Specifically, the N-H and H-Cl potential energy curves were mapped. This was accomplished by calculating the energy of the complex at a series of fixed N-H and H-Cl distances. Solvation models were also used to account for the effects of the solid noble gas environments. In addition, a similar analysis of the H\textsubscript{2}N–HCl complex is being undertaken. These computational results facilitate a comparison between CH\textsubscript{3}CN–HCl, for which the environmental effects are subtle, and H\textsubscript{2}N–HCl, for which they are extreme.

Structural and Energetic Properties of Nitrile—SiF\textsubscript{4} Complexes  

Nicholas Hora  
Faculty Mentor/Collaborator: James Phillips  
Poster #16

We are interested in the effects of bulk, condensed-phase media on the structural properties of molecular complexes, with an eye toward systems that change structure when the chemical environment is altered, e.g., gas phase to solution. In the present case, we are dealing with two specific complexes: CH\textsubscript{3}CH\textsubscript{2}CN–SiF\textsubscript{4} and C\textsubscript{6}H\textsubscript{5}CN–SiF\textsubscript{4}. This project stems from a previous study on CH\textsubscript{3}CN–SiF\textsubscript{4}, in which condensed-phase structural changes were predicted but not observed. We expect the larger carbon groups to enhance the bonding interaction and lead to more significant structural change in the condensed phase. Using quantum chemical computations, we obtained key structural and energetic properties of C\textsubscript{6}H\textsubscript{5}CH\textsubscript{2}CN—SiF\textsubscript{4} and CH\textsubscript{3}CH\textsubscript{2}CN—SiF\textsubscript{4}, including: Structures, binding energies, frequencies, and N-Si potential energy curves. These curves are “flatter” relative to CH\textsubscript{3}CN—SiF\textsubscript{4}. Thus, there is a greater likelihood that we will observe condensed phase structural changes. Thin film infrared spectra will be collected, and differences between the measured frequencies and those calculated for the gas phase complex will reveal the extent of structural change.

Structural and Energetic Properties of Haloacetonitrile-Germanium Tetrafluoride Complexes: FCH\textsubscript{2}CN-GeF\textsubscript{4} and ClCH\textsubscript{2}CN-GeF\textsubscript{4}  

Anna Waller  
Faculty Mentor/Collaborator: James Phillips  
Poster #17

We are interested in condensed phase effects on the structural and energetic properties of Lewis acid-base complexes. Specifically, our study is focused on the solvent or other bulk medium effects on FCH\textsubscript{2}CN-GeF\textsubscript{4} and ClCH\textsubscript{2}CN-GeF\textsubscript{4} complexes, such as enhanced bonding. We use computations using the M06, MP2, and ωB97X-D methods.
and the aug-cc-pVTZ basis set to compute equilibrium structures, binding energies, gas-phase frequencies, and potential energy curves, which provide mechanistic insight. We also use experimental evidence by analyzing and performing experimental infrared spectroscopy to see the shifts between bulk samples and calculated gas frequencies. Thus far, we have concluded that the most stable structure of these complexes is in the axial eclipsed conformation with Ge-N distances for the fluorine and chlorine substituted complex 2.32 and 2.29 Å, respectively. These distances are about 0.1 Å longer than CH₂CN-GeF₄. The calculated binding energies are -8.0 and -8.5 kcal/mol, which is about 3.0 kcal/mol higher than CH₂CN-GeF₄. The potential energy curves are flatter than CH₂CN-GeF₄. These results confirm that the halogenation effects on CH₂CN-GeF₄ cause a weaker and less stable complex, more prone to condensed phase effects. Recent findings in IR spectroscopy and the effects of solvent in curves will be discussed.

**Modeling of the Gamma-Glutamyl Carboxylase Reaction**

**Zoe Lyons, Clorice Reinhardt**

Faculty Mentors/Collaborators: David Lewis, Sudeep Bhattacharyay

Poster #18

The gamma-glutamyl carboxylase is the first enzyme in the blood clotting cascade, and is responsible for the formation of mature clotting factors in the blood. The structure of this enzyme is unknown, but a mechanism for its action was proposed in 1990. A major component of this proposed mechanism was the presence of a very strong base. In the following quarter century, this base has never been identified. We have proposed a new mechanism for the reaction, in which free radicals are the key intermediates. This removes the necessity for a strong base, and is therefore much more compatible with a living cell. We have modeled the reaction pathway using the 6-311G**G**(2df,p) and aug-cc-pvtz basis sets. The results of this computational study will be discussed.

**Adventures in Organophosphorus Chemistry**

**James Dulaney**

Faculty Mentor/Collaborator: David Lewis

Poster #19

Organophosphorus compounds have been an increasingly important part of organic synthesis since the discovery of the Arbuzov rearrangement in 1905. In the century that followed this discovery, the applications of phosphorus-based reagents in synthesis have grown to incorporate the Wittig and Horner-Wadsworth-Emmons reactions for alkene formation, as well as the Mitsunobu inversion reaction, which is used to convert alcohols to a wide range of products with inversion of configuration. In an attempt to replace the highly toxic, explosive, and highly regulated azodicarboxylates used in the Mitsunobu reaction with an environmentally benign compound, we attempted the Mitsunobu reaction using triphenylphosphine and indigo as the reagent. The reaction failed, but P-31 NMR spectroscopy revealed an unexpected clean conversion of triethyl phosphite to diethyl phosphonate. We have found that this reaction is promoted by weak acids. Our results will be presented, and a mechanism for these reactions will be proposed.

**Please Don’t Fade Away: Rebooting a Robust Series of Organelle-Specific Fluorescence Probes for New Purposes**

**Danielle Smith, Rachel Ross, Nay Myo Win**

Faculty Mentor/Collaborator: Scott Bailey-Hartsel

Poster #42

Fluorescence microscopy is a vital tool in modern cell and molecular biology research. However a major problem with confocal and epifluorescence microscopy is the rapid photochemical bleaching of many organelle-specific probes which precludes long term monitoring or quantitative measurements in cells. Anti-fading agents may be used, but they are often toxic and not usable with live cells. To combat this problem, we have synthesized and patented a robust, fade-resistant series of organelle-specific fluorescence probes based on the naphthalimide fluorophore. With the acquisition of a state of the art confocal microscope at UW-Eau Claire we are extending the use of these probes for more challenging problems and purposes. Yeast cells (*Saccharomyces cerevisiae*) are very small and thus present a very challenging target for microscopic studies. We have found that our lysosomal probes can be used to efficiently and specifically visualize organelles such as the central vacuole at least as well as expensive commercial dyes but with greater resistance to fading. Our ultimate goal is to develop and license or market a specific set of probes which can be used to quantitatively and qualitatively monitor organelles, membrane domains, pH gradients and membrane potentials in live cells.
Kinetics of Naphthalimide Aminolysis
Stanford Mitchell, Samantha Anderson
Faculty Mentor/Collaborator: David Lewis
Poster #43

Our research group reported in 2013 that, contrary to over half a century of conventional wisdom, N-aryl-4-chloro-1,8-naphthalimides react with amines at the heterocyclic ring rather than at the halogenated position. The aminolysis reaction exhibits pseudo-first order kinetics in butylamine, and the Hammett plot of the kinetic data show that substantial negative charge accumulates at the heterocyclic nitrogen during the slow step of the reaction. We have subsequently carried out kinetic studies in alcohol solvents, and these studies demonstrate that the reaction is subject to general acid catalysis. We have subsequently carried out kinetic studies using triethylamine as the base solvent in order to determine the kinetic order of the reaction with respect to the butylamine, and to test the hypothesis that the reaction may be subject to general base catalysis. The results of these kinetic studies will be reported, and their consequences in terms of the transition state of the reaction will be discussed.

A Computational Study of Complexes Relevant to the Mechanism of the Friedel-Crafts Reaction
John Lanska
Faculty Mentor/Collaborator: James Phillips
Poster #44

We are performing a computational study of structural and energetic properties of RX-MX₃ complexes, where R is an organic group (e.g., CH₃), X is a halogen (F, Cl), and M is a group III element (B, Al, Ga). These complexes are intermediates in Friedel-Crafts reactions, a broad class of widely useful reactions in organic synthesis. These structural properties, especially the extent of the positive charge on the R group, will provide insight into the mechanism of Friedel-Crafts reactions. The central question is how changes in R, X, and M affect the structural and energetic properties of these systems. So far, equilibrium structures and binding energies have been calculated for CH₃F–BF₃, CH₃F–BCl₃, CH₃Cl–BF₃, CH₃Cl–BCl₃, CH₃F–AlF₃, CH₃F–AlCl₃, CH₃Cl–AlF₃, and CH₃Cl–AlCl₃. Analyses of the charge distributions are in progress. These computations were performed using Gaussian 09 with the MP2, ω-B97X-D, and X3LYP methods and the aug-cc-pVTZ basis set. In the future, IR spectra of a few representative complexes from this family will be taken, starting with the R-F–BF₃ systems.

Exploring the Role of Distant Domain Dynamics in Substrate Binding of Escherichia Coli Prolyl-tRNA Synthetase
Matthew Mocol
Faculty Mentors/Collaborators: Sudeep Bhattacharyay, Sanchita Hati
Poster #46

The *Escherichia coli* prolyl-tRNA synthetase is a multi-domain enzyme that catalyzes the covalent attachment of proline to tRNA<sup>Pro</sup>. X-ray crystallographic results suggest that the catalytically important proline-binding loop (PBL), located in the central catalytic core, undergoes a large-scale conformational transition upon prolyl-adenylate binding. Computational and biochemical studies have suggested that the global dynamics of an insertion domain (INS) is coupled with the local dynamics of the PBL and that the complete deletion of the INS has a significant impact on substrate binding and catalysis. To understand how the energetics of substrate binding is influenced by INS domain dynamics, the substrate binding process is simulated using steered molecular dynamics simulations. Herein, the preliminary results of this study will be presented. Our results demonstrate that the presence of the INS domain is critical to providing the required energy barrier for the substrate to remain bound to the catalytic core, instead of getting spontaneously hydrolyzed. In addition, the point mutation of several key residues in the wild-type ProRS have also been shown to have a significant effect on the energy barrier. The effect that these various mutations have on the free energy of binding to bacterial ProRS has enormous implications in drug design.

Exploring the Interplay of Dynamics and Catalysis in Escherichia Coli Prolyl-tRNA Synthetases
Tiffany Huynh, Clorice Reinhardt
Faculty Mentors/Collaborators: Sudeep Bhattacharyay, Sanchita Hati
Poster #47

Proteins are intrinsically dynamic and those intrinsic dynamics 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 are currently involved in modeling a very important biochemical reaction, known as aminoacyl adenylate formation. This reaction is catalyzed by aminoacyl-tRNA synthetases, a family of enzymes that play a crucial role in protein synthesis in all living organisms. We are using a quantum mechanical/ molecular mechanical
approach to model and compute energetics of adenylate formation reaction in aqueous and enzyme-bound systems. Herein, we present the preliminary results of our study, which includes the free-energy of activation of aminoacyl adenylate formation and the associated changes in the protein active site during the catalytic process.

**Sand Mine Particulate Analysis**  
**Callie Fischer**  
Faculty Mentor/Collaborator: Patricia Cleary

This project aims to measure the quantity of respirable silica particles in area sand mines. Research has shown a correlation between the presence of silicon dioxide air particulates and both silicosis and lung cancer, so high levels could be hazardous to public health. Sandstone in the mines contains silicon dioxide in the form of quartz, and large quantities of respirable silica in the air could impact the health of both the miners and people living in the near vicinity. Working with geologists, we will obtain air samples from these mines and analyze them through x-ray diffraction and scanning electron microscopy. This research will be conducted following a modified version of NIOSH Method 7500. So far procedures have been tested with crushed sandstone samples, and a full calibration curve relating the quantity of respirable silica on a filter as a function of peak area, from the x-ray diffraction peaks, will be shown. From the results of this research, it can be determined whether the levels of silicon dioxide present in the air meet safety regulations established by OSHA.

**Synthesis and Comparison of Various 6-aryldibenzo[b,d]pyrylium Salts.**  
**Jonathan Kitzrow**  
Faculty Mentor/Collaborator: Bart Dahl

Our mission is to explore the synthesis and physical characteristics of different 6-aryldibenzo[b,d]pyrylium salts capable of dihedral angle modification through reversible hybridization state switching of a central carbon molecule. These molecules show promise as synthetic dyes, chemical environment sensors, and have applications in the field of molecular electronics. These salts can exist in two states, either planar or nonplanar. In the planar form, π-orbital overlap extends throughout the structure of the molecule. The π-orbital overlap facilitates intramolecular charge transfer, enhancing the conductance and fluorescence of these molecules. When in the nonplanar state, the π-orbital overlap is disrupted, destroying the charge transfer and eliminating any fluorescent properties present. We are able to change the molecular state by altering the pH environment. Here we examine the effects of electron path length and various electron donors on the spectroscopic properties of these pyrylium salts. We specifically examine the pyrylium salts’ fluorescent properties in each geometric state and the pH sensitivity of each switch. To do this, we characterize the molecules through NMR spectroscopy, UV-Vis spectroscopy, and spectrofluorescent analysis.

**Ozone and Air Quality Around and Over Lake Michigan**  
**Joseph Oster**  
Faculty Mentor/Collaborator: Patricia Cleary

It has been widely proven that poor air quality can lead to many diseases and in extreme cases death. Ozone and air quality levels are measured and recorded in many cities around the United States, but the models of air quality over Lake Michigan are not validated by measurement. The purpose of this study is to find out what the air quality is like over the lake and to determine how air pollutants travel in the transition environment between the coast and the lake. To further understand this, we looked for a way to evaluate shoreline measurements with the Community Multi-scale Air Quality Model (CMAQ). We compared the CMAQ model to hourly ozone measurements at five shoreline sites to evaluate the model and then calculated the bias between the model and measurements. Calculations were done to find the average ozone mixing ratios at the shoreline sites to determine north-south gradients. We are currently developing an experiment to continue studying ozone in the transition environment at the shoreline with a UAV. The UAV will allow us to better measure the transition by collecting data both on and off shore and at varying altitudes.
Undergraduate Poster Presentations: Chemistry

**Synthesis, Characterization and Applicability of Reactive Biomimetic Complexes Towards Important Biological Reactions**

**Kristin Meise, Elizabeth Brandes**

Faculty Mentor/Collaborator: Roslyn Theisen

Poster #74

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 correspondingdepside, is not well understood. This project involves the development, synthesis, and characterization of new biomimetic model systems consisting of a tetra-dentate N,O–containing ligand (BPG) and divalent first-row transition metal ions observed in bacterial and fungal QDO enzymes. The goal of this research is to understand how the unique active site of this enzyme cleaves the O-heterocyclic ring of quercetin by evaluating the functionality of a series of metal complexes with ligand systems similar in structure to the active site of QDO. Four metal complexes, \([\text{Co}(\text{BPG})]^2+\), \([\text{Cu}(\text{BPG})]^2+\), \([\text{Zn}(\text{BPG})]^2+\), and \([\text{Mn}(\text{BPG})]^2+\), have been isolated, as well as two substrate enzyme model complexes which mimic the QDO active site, \([\text{Cu}(\text{BPG})(\text{Maltol})]\) and \([\text{Co}(\text{BPG})(\text{Maltol})]\). This poster will also report preliminary reactivity experiments with O- and N-heterocyclic compounds.

**Analysis of Antibody Binding to a Reverse Sequence Mucin Peptide Using STD-NMR**

**Megan Schumaker**

Faculty Mentor/Collaborator: Thao Yang

Poster #76

This research involves analyzing the binding properties of a reverse sequence MUC1 peptide (DPASTVG) to a monoclonal antibody (mAb, 6A4). The reverse sequence is derived from the native epitope GVTSAPD found on the transmembrane mucin protein, which contains multiple 20-amino acid sequence tandem repeats. Of the 20-amino acid tandem repeat segment, only seven residues were used to synthesize the short reverse sequence peptide (DPASTVG). In cancerous cells MUC1 becomes under-glycosylated, which as a result presents new peptide epitopes that causes an immune response. Due to the ability of the peptide epitopes to bind MUC1 antibodies, this suggests a possible target for future cancer therapy. Through the use of two-dimensional NMR, and peptide-antibody binding properties, we designed different peptide epitopes that may enhance their affinity to the antibody. We present here the \(^1\text{H}\) NMR assignments and STD NMR results on the binding properties of the reverse sequence peptide to the mAb. The STD NMR results suggest that the amino acid residues on this peptide have few interactions with the mAb.

**Analysis of the Antibody Binding of Derivative MUC1 Peptides via STD NMR**

**Andrew Lynch**

Faculty Mentor/Collaborator: Thao Yang

Poster #77

The binding epitope PDTRP, found within the VNTR domain of MUC1 glycoprotein, is recognized by the immune system and binds mucin monoclonal antibody SM3. This study analyzes the binding ability of the peptide GVT-SAPD, an upstream sequence preceding PDTRP, as well as six derivative peptides against specific mouse MUC1 mucin monoclonal antibody (IgG1, 6A4) by Saturation Transfer Difference NMR (STD NMR). This is to determine the specific residue critical for antibody binding and whether analogous side chain characteristics in the derivative sequences would enhance binding. The STD NMR results indicated that Pro\(_6\) is a critical residue for binding as it displayed greater saturation transfer effects for its side chain protons than did any other residue. Substituting the Pro\(_6\) residue with single hydrophilic or hydrophobic aliphatic residues eliminated all STD effects while substitution of Pro\(_6\) with single hydrophobic aromatic residues produced STD effects at the aromatic protons. Substitution at Ser\(_4\) position for Asn produced STD effects that were similar in pattern and intensity to those of the native sequence. The results indicate that the Pro\(_6\) residue is critical for antibody binding and substitution at this position for aromatic residues conserves binding ability. This suggests that these substituted peptides may possess biological activity.

**Three Oxidation States for Renewable Energy**

**Abdulghani Mounir**

Faculty Mentor/Collaborator: Nora Planas-Roure

Poster #78

In today’s economy, energy based on fossil fuels is 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 is presented. One of the main obstacles preventing the implementation of renewable energy is the lack of low cost and efficient energy
storage technologies. Redox flow batteries (RFBs) are fully rechargeable electrochemical energy storage devices that convert and store electrical energy into chemical energy and release it in a controlled fashion, when required. RFBs have low operation costs and high storage efficiency. However, they often suffer from low voltage (~1.2V) and cross contamination. In this research project, we aim to overcome the limited voltages 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 metallation, will yield a series of metal complexes. The resulting species can be characterized by spectroelectrochemical techniques. The electrochemical properties of the complexes will be tested by cyclic voltammetry to determine the maximum voltage attainable. With this study, we aim to gain insight towards a rational design of future electrolytes with improved properties.

**Development of a Fluorescence Excitation Spectroscopy System**

**Michael McDonnell**  
Faculty Mentor/Collaborator: Stephen Drucker  
Poster #102

We have constructed an experimental apparatus that permits computer-controlled acquisition of fluorescence excitation spectra in the visible and ultraviolet regions of the spectrum. The apparatus consists of a tunable dye laser pumped by the second harmonic of a Nd:YAG laser. The dye laser can be operated over the region 375 – 800 nm at a maximum resolution of 0.001 nm; we have incorporated a wavelength-synchronized frequency doubler that extends the coverage of the dye laser output down to 200 nm. The visible-wavelength or ultraviolet laser output is directed into a sample cell equipped with Brewster windows, which afford maximum coupling of the laser light intensity into the cell and minimize scattered back-reflections into the detection system. Fluorescence from the sample molecules is collected by a lens mounted in an f/1 configuration, and the light is directed onto the surface of a photomultiplier module. The transient signal from the photomultiplier is sent to a gated integrator, and the DC output signal is digitized, displayed, and stored on a computer. The entire system is controlled and automated by a LabVIEW program written specifically for this application. The fluorescence excitation spectrometer will facilitate planned studies of photochemically relevant molecules in electronic excited states.

**Polypyridyl Ligands for Renewable Energy Storage**

**Nicholas Reitano, Olivia Hurst**  
Faculty Mentor/Collaborator: Nora Planas-Roure  
Poster #103

To aid in the well-being of the human species, renewable energy technologies must be implemented to offset the negative effects of burning fossil fuels. As renewable energy is generated, the electricity produced must either be consumed right away or it must be stored. A major factor preventing the transition into a new energy era is the lack of energy and cost efficiency of energy storage technologies. Redox Flow Batteries (RFB) are a type of battery that utilize reversible electrochemical reactions to store electrical energy in the form of chemical energy. Current RFBs are limited to a cell potential of 1.26V. Polypyridyl transition metal coordination complexes meet all the requirements as electrolyte components (the species that stores the chemical energy) for RFBs. Additionally, they prospectively have a high cell potential (2.4V) and low manufacturing cost. But these complexes tend to suffer from instability. In this project, to improve the complexes' stability, the use of an hexadentate-polypyridyl ligand is explored. After metallation with various transition metals, the resulting complexes are assessed for the maximum cell potential and their stability in varying pH, temperatures, and solvents can be evaluated. Our results will contribute with knowledge for a future rational design of improved RFB components.

**Purification of Copper-Free Methanobactin-SB2 to Analyze its Shape-Shifting Behaviors**

**Faith Matheka, Kaitlin Toycen**  
Faculty Mentor/Collaborator: Warren Gallagher  
Poster #104

Methanobactins are peptide-derived molecules that are produced by methanotrophic bacteria for the purpose of scavenging needed copper ions from their surrounding environment. In converting the precursor peptides to functioning methanobactins, the peptides have undergone some novel chemical modifications to become impressively strong binders of copper ions. The structures of a handful of copper-bound methanobactins have been structurally characterized. We have evidence that copper-free methanobactin-SB2 may exist in multiple, isomeric forms, which involves the 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 order to pursue our investigations into these shape-shifting behaviors, we have developed a method to isolate and purify the copper-free methanobactin-SB2. This has been a challenge in the past, because unlike the copper-bound methano-
bactins, copper-free methanobactins are quite fragile. We will report on the methods we have developed for purifying intact, copper-free methanobactin-SB2.

**Quantum-Chemical Study of Hydrogen-Bonded Complexes: Understanding Solvent Shifts in the IR Spectra of Alcohols**

**Margaret Phillips**  
Faculty Mentor/Collaborator: James Phillips  
Poster #233

Hydrogen-bond interactions underlie a wide range of unique chemical and physical phenomena. We are using quantum-chemical methods to investigate the structural and energetic properties of 1:1 complexes involving a hydrogen bond. Our initial study consisted of a comparison between H$_2$O and HF clusters, including: (HF)$_2$, (H$_2$O)$_2$, and three structural arrangements of H$_2$O–HF. We predicted equilibrium structures, binding energies, and frequency shifts, and also examined the charge distribution and bonding properties in these systems. In these clusters, the hydrogen bond in H$_2$O–HF is clearly the strongest, with a binding energy nearly twice that of (H$_2$O)$_2$ and (HF)$_2$, which are nearly equal in strength. Currently we are in the process of examining a series of methanol (CH$_3$OH) complexes with various solvent molecules. We are interested in the extent to which the strength of the interactions in these systems parallels our recently measured shifts in the O-H stretching frequencies of methanol in these solvents.

**Quantum Mechanical/Molecular Mechanical Simulations of the Hydride Transfer Reactions in Quinone Reductase 2**

**Clorice Reinhardt**  
Faculty Mentor/Collaborator: Sudeep Bhattacharyay  
Poster #234

Quinone Reductases (QR) belong to the family of flavin-dependent oxidoreductases. With their redox active cofactor flavin adenine dinucleotide (FAD), quinone reductases are known to utilize a ping-pong kinetic mechanism during catalysis in which a hydride is bounced back and forth between flavin and its two substrates. These changes in the active site conformation and dynamics associated with the substrate shuttling are experimentally inaccessible and not well characterized. Using quantum mechanical/molecular mechanical simulations, the ping-pong kinetics in QR2 is being studied. The self-consistent density functional-tight-binding protocol has been used to treat the flavin ring and substrate atoms, while embedded in a solvated molecular-mechanically treated enzyme system. In a cellular environment, QR2 catalyzes the conversion of prodrug into drug and understanding the energetics involved in this ping-pong kinetics will aid in mechanism-based drug development. Initial results indicate that the reduction of flavin by nicotinamide is slower compared to the quinone reduction, leading us to hypothesize that this might be the rate-determining step. The QM/MM setup, methods, and results of this study will be presented.

**Geography and Anthropology**

**2015 City of Eau Claire Deer Survey**

**Niklas Anderson**  
Faculty Mentor/Collaborator: Sean Hartnett  
Poster #1

On Thursday February 26, 2015 a low flying helicopter circled above the City of Eau Claire, conducting the first urban deer survey in over 20 years. This project involves the mapping and analysis of the survey data as a demonstration of how we can use Geographic Information Science in wildlife management. In some areas of Eau Claire, the deer herd is growing exponentially and has become a concern. Citizen complaints prompted the hiring of former Eau Claire DNR wildlife biologist John Dunn to conduct a deer survey, and develop a deer management plan. John asked me to assist in the preparation of aerial maps for the survey, and the creation of GIS maps to study changes in the deer herd between 1993 and 2015. For consistency, this study replicated the survey methodology employed in the masters’ thesis of UWEC biology student Derrick Duchesneau who conducted the 1993 survey. With the completion of the helicopter survey, project work includes the construction of comparative maps and analysis of changes in the number and geographic distribution of deer within the Eau Claire city limits. These maps and the analysis of the deer survey will be included in John Dunn’s report and management plan.
Tracking Chloride and Sodium Levels in Wisconsin Surface Water Using GIS Technologies

David Leifer, Mattheus de Waard
Faculty Mentor/Collaborator: Christina Hupy
Poster #2

The increasing urbanization and use of private transportation during winter months of the last half century has forced the Wisconsin Department of Transportation (DOT) to increase its application of road salt to maintain roads. Runoff of sodium and chloride from these deicing agents into the Lower Chippewa River Basin has the potential to damage local ecology, therefore it is essential to locate the heavily salted portions of road. A risk index model was created to visualize this along the following parameters: proximity of roads to surface waters, slope of terrain, and frequency and mean volume of salt application. This index model was then compared with the stream sodium and chloride estimation computer models called Soil and Water Assessment Tool (SWAT) and LOADES to determine the effectiveness of our index. Decades of research in other parts of the country on chloride and sodium concentrations in surface waters ensures the accuracy of these estimation models while the index model determines the effectiveness of the DOT’s current deicing practices. The findings identified potential risk hotspots for pollution of the state’s natural aquatic resources.

Comparison of Accuracy Results from UAS Image Processing Software

Brendan Miracle
Faculty Mentor/Collaborator: Christina Hupy
Poster #3

In the last several years, unmanned aerial systems have been increasingly used for mapping purposes. Large collections of images are gathered, geotagged and processed in order to generate seamless high-resolution orthomosaics for use in Geographic Information Systems and other geospatial applications. A variety of software packages have come on the market to meet the specialized needs of the UAS mapping community. This study compares the accuracy of orthomosaics generated from two standard UAS image processing software, Pix4Dmapper and Agisoft Photoscan Professional. Multiple ground control points were marked with a tarp in the field and locations were collected with a survey grade GPS before the imagery collection. Multiple orthomosaics were generated in each software with the same set of imagery. In each run, the GPS tolerance was manipulated to assess for sensitivity and resulting accuracy. The resulting imagery were compared in a geographic information system and the error metrics, including average error and pixel error, for each mosaic were reported.

Economic and Environmental Impacts of Additional Shuttle Bus Services from Suburban Areas to Downtown Routes: Greater Milwaukee Area

Brendan Miracle
Faculty Mentor/Collaborator: Christina Hupy
Poster #4

Public transportation is arguably one of the best methods to mitigate greenhouse gas emissions from transportation into the atmosphere. Vehicle emissions contribute to urban air pollution, which exposes large amounts of humans to respiratory illness, disease, and possibly death. While public transportation helps those who live within urban centers, it is much more difficult for those commuting from outside the city to utilize the service. Most urban transit systems offer a shuttle service designed to solve these problems, picking up citizens at designated locations near suburban areas and delivering them on a direct route downtown. This project analyzed the environmental and personal economic impacts of a shuttle bus service from a suburban area to a downtown area during rush hour travel. Using the study area of Milwaukee, Wisconsin, the current locations of shuttle bus services were spatially analyzed and new hypothetical locations were planned in order to maximize the environmental and economic benefits of public transportation. By using network analysis, emission rates and annual gas costs were calculated for driving each route, as well as the amount of money saved by taking the designated bus routes instead.

Constructing a Narrative of the Past: The Story of Skeletal Tuberculosis

Nicole Weiss
Faculty Mentor/Collaborator: Robert Barth
Poster #15

Though anthropologists are first and foremost students of humans and human culture, they are also storytellers. Anthropologists use material remains of antiquity in order to construct a narrative of the past, much like a detective would meticulously gather evidence at a crime scene to construct a narrative of the events that had taken place there. In order to piece together a story, anthropologists rely on a rather unusual source of witness testimony—skeletal remains. Unlike other human testimonies, bones never lie or forget past events, making them an ideal source
from which to draw data. The story being examined here, that of the evolution of tuberculosis, was constructed via the analysis of skeletal remains from England, Hungary, and Egypt. The frequency at which skeletal tuberculosis is observed in certain populations from these regions is compared over time and space in order to better understand the disease's origin, evolution, and spread through Europe. What emerges from the examination of these skeletal populations is a story of the interconnected relationship between humans and tuberculosis—a story of coevolution.

Aiding in Unmanned Aerial Systems Search and Rescue: Land Cover Classification of Aerial Imagery
Timothy Condon
Faculty Mentors/Collaborators: Joseph Hupy, Christina Hupy
Poster #29

Search and rescue is a fledgling application of Unmanned Aerial Systems (UAS) that is being pioneered in many ways by RPFlight Systems under CEO Gene Robinson. This project is a part of a larger goal aiming to develop a tool that predicts probable missing person locations based upon qualities of the proposed search area in order to speed up the UAS search process. This project classifies images gathered by a UAS to determine land cover. The classified images generated are then ranked according to difficulty of travel for a missing person on the ground which will aid in future least-cost path analysis. This project is not necessarily novel in its process, but it is a unique and applied approach to geospatial analysis of UAS imagery. Land cover classification is performed using large orthomosaic of the study area generated with photogrammetric software. Then, several methods such as object-based classification and supervised classification are performed and compared for accuracy. Finally, raster imagery are produced and ranked according to difficulty of travel by land cover type. This will then be exported as a python tool for further analysis within a geographic information system.

Aiding in Unmanned Aerial Systems Search and Rescue: An Automated Custom Python Tool
Aaron Schroeder, Timothy Condon, Joseph Klang
Faculty Mentors/Collaborators: Christina Hupy, Joseph Hupy
Poster #30

When a person goes missing, time is of the essence. The time it takes for searchers to find someone can be greatly reduced with the help of modern technologies. Through the use of Unmanned Aerial Systems (UAS), imagery can be collected and processed at fairly fast speeds to provide an aerial view search personnel on the ground don't have. Although this method has already been implemented all over the world, it is a lengthy process and can be improved to further prioritize Search and Rescue (S&R) resources and speed up aerial image analysis. In this project, an automated tool, built using the Python coding language, allows for the generation of a predictive path model and a suitability model based on the aerial imagery recorded from the UAS platform. In the past, the analysis of the imagery needed to be done by hand, but with this tool the process is automated, allowing information to be available to search personnel faster. The resulting models can then be used to prioritize S&R resources, therefore increasing the chances for a successful recovery of the missing persons.

Aiding in Unmanned Aerial Systems Search and Rescue: Terrain and Least Cost Path Analysis
Joseph Klang, Timothy Condon, Aaron Schroeder
Faculty Mentors/Collaborators: Joseph Hupy, Christina Hupy
Poster #31

Using unmanned aerial systems (UAS) in assistance for search and rescue (S&R) missions is a relatively new technique that provides multiple benefits to the S&R process. UAS provided by RPFlight Systems Inc. gives imagery that, when used in conjunction with a Geographic Information System (GIS), can be used to aid in the process of the S&R. This project's purpose is to take the imagery provided by UAS and perform terrain and least cost path analysis using GIS. Examining how the terrain affects a missing person's behavior opens up more accurate information regarding the location of where the person could be located. Using digital elevation models, and an assortment of other factors relating to the actions of a missing person, a model can be created demonstrating where a person may be potentially found. This model can then be used by the search and rescue workers, as well as the controllers of the UAS, to determine the best search strategies. Combining the use of GIS and UAS in assistance of the search and rescue of missing persons creates a more efficient and precise model of the land and how it affects a lost person.
Evaluating Forest Health Change in the Subalpine Environment of Mount Hood, Oregon
Timothy Condon
Faculty Mentors/Collaborators: Ezra Zeitler, Cyril Wilson

Over the past decades, the impacts of white pine blister rust and mountain pine beetles have resulted in higher rates of mortality among forests in the Pacific Northwest. Mount Hood is the highest peak in Oregon and is populated below the tree line with several tree species including *Pinus albicaulis* (whitebark pine), a species extremely vulnerable to both blister rust and mountain pine beetles. Traditionally, whitebark pine has resided at elevations high enough to prevent the spread of blister rust and mountain pine beetles due to the extreme temperatures and dryer environments. This study examines changes in forest health over the past couple of decades in the subalpine region of Mount Hood, Oregon in order to try and quantify the effects of various drivers on the ecosystem and reveal the degree of change that has occurred in the region. Forest health information is extracted from remotely sensed imagery, and Normalized Difference Vegetation Index values are calculated and applied to advanced classifiers. This process is utilized to quantify the vegetation health change that has occurred throughout the study area. Possible drivers of found change are then discussed to begin to explain the complex processes occurring in the forests around Mount Hood.

High Frequency (225, 450, 900 Mhz) GPR Investigation of the Nippising Beach Ridge, Huron Mountains, MI
Hannah Adams, Alison Olmstead, Sean Morrison
Faculty Mentor/Collaborator: Harry Jol
External Mentor: Walter L. Loope, United States Geological Survey

Our research investigates the internal stratigraphy of the Nippising level beach ridge within a strand plain located along the Huron Mountain section of the Lake Superior shoreline in Michigan. Coastal beach ridges act as a record of past lakeshore positions, and analysis of the subsurface stratigraphy reveals past beach forming processes. The studied primary beach ridge represents the peak of a higher past lake level of Lake Superior. Ground penetrating radar (GPR) sends electromagnetic pulses into the subsurface which reflects off changes in dielectric properties of sedimentary layers. GPR was used to collect transects imaging the subsurface of the beach ridge and allow one to analyze and interpret sedimentary units. Two transects using a sensor and software Pulse Ekko 100 unit with high frequency antennae (225, 450, and 900 MHz) were collected over the beach ridge. The westerly line was 100 m in length while the easterly line was 65 m long. A good depth of penetration, 2-5 m depending on antennae frequency, was achieved with high resolution datasets and for comparison and correlation with a vibracore. The detailed stratigraphy and interpretation provide a better understanding of beach forming processes of this Nipissing beach ridge located along the Huron Mountains.

Viticulture in the Willamette Valley, Oregon: Creating a Predictive Model to Estimate the Incentives of Biodynamic Viticulture
Emily Moothart, Emily Christenson
Faculty Mentor/Collaborator: Ezra Zeitler

Biodynamic agriculture and certification in viticulture has become increasingly prevalent among organic farmers. Recent studies have concluded that biodynamic viticulture improves the sensory experience of the wine and health of the soil. During a geography field course in Oregon, viticulture was analyzed in the Willamette Valley of western Oregon. Keeler Estate, Illahe, and Adelsheim Vineyards were selected based on Low Impact Viticulture and Enology (LIVE) certification and primary production of pinot noir grapes. Keeler Estate Vineyard was selected as a case study to analyze the effects of biodynamic viticulture on mineral additive (potassium, magnesium, boron, and calcium) reduction. A comparative analysis based on Keeler Estate Vineyard was applied to Adelsheim and Illahe Vineyards to estimate the improvements to be expected if biodynamic practices were adopted. The intended result of this analysis was to examine the processes of biodynamic farming to determine if the additional biodynamic certification reduced mineral additive usage and enhanced marketability and profitability of the product. After conducting the research, hypothetically 4,500 pounds of mineral were diverted over the 2011-2014 seasons, which is an indication that biodynamic certification reduces mineral output. This biodynamic sub-industry fits the Triple Bottom Line business approach, which tends to result in profitable business.
Ground Penetrating Radar Imaging of a Strandplain along Lake Superior, Huron Mountains, MI: Preliminary Results from Ground Penetrating Radar Study
Adam Wysocki, Tyler Aken, Sean Morrison, Hannah Adams, Alison Olmstead
Faculty Mentor/Collaborator: Harry Jol
External Mentor: Walter L. Loope, United States Geological Survey

The aim of the project is to study the subsurface stratigraphy of a strandplain located along the Huron Mountains, Marquette County, Michigan. The collected 600m-long shore perpendicular ground penetrating radar (GPR) transect started at the present Lake Superior shoreline and ended at the Nipissing level beach ridge. A pulseEKKO100 GPR system was utilized with 100 MHz antennae, 1.0m antennae separation, and a step size of 0.25m. The depth of the GPR profile was between 10-12m. A topographic dataset was surveyed using a Topcon RL-H3CL laser level to geometrically correct the GPR profile. The collected GPR data was processed with pulseEKKO software using trace-to-trace and down-the-trace averaging, dewow, and automatic gain control. The profile was then plotted in wiggle trace format to show the subsurface stratigraphy of the strandplain. Preliminary results indicate that the lakeward inclined strandplain is progradational with periods of stillstand. The results help to better understand how Lake Superior shorelines have developed during a period of lake level drop. Knowledge of coastline processes and past development can aid in proper managing of coasts.

“Looking Deep” into a Late Holocene Lake Superior Barrier
Alison Olmstead, Hannah Adams, Sean Morrison
Faculty Mentor/Collaborator: Harry Jol
External Mentor: Walter L. Loope, United States Geological Survey

Our research investigates a massive Holocene barrier along the southern shore of Lake Superior at Lonesome Point, Michigan. Barriers are a coastal depositional landform that dominate sediment-rich coastal environments. This project aims to understand the subsurface stratigraphy of the barrier at Lonesome Point by collecting ground penetrating radar (GPR) lines. GPR sends electromagnetic pulses into the subsurface that reflect off of sediment changes in the dielectric properties. The GPR system used for this study is a pulseEKKO 100 with 25 Mhz antennae and a 1000 V transmitter. Data was processed and plotted with pulseEKKO software. The transect collected at Lonesome Point is 250 meters in length and is shot perpendicular from the Lake Superior coast in a northerly direction. Due to the unique sediment properties at this site, we achieved a remarkable depth of penetration of 60 meters. Radar stratigraphic analysis of the processed GPR profiles collected on the barrier indicates three sedimentary packages which are interpreted as representing coastal as well as glacial and aeolian geomorphic environments.

Fire Susceptibility in Oregon A Fire Risk Comparison of Crater Lake National Park and the Umpqua National Forest
Michael Bomber
Faculty Mentor/Collaborator: Ezra Zeitler

Wildfires in our National Parks, forests and other forests across America are a frequent and important occurrence. They encourage new growth in the forests creating more diverse and healthy ecosystems. They also destroy millions of dollars of lumber industry and residential structures every year. The state of Oregon has numerous forest fires every year varying in size and destruction. Many of these fires take place in Crater Lake National Park and nearby National Forests, such as Umpqua National Forest. This project compares these two areas and considers the question of whether or not forest management has any effect on the frequency of fires in them. A fire susceptibility model is developed in a geographic information system (GIS) in order to better predict where fires are more likely to occur. The model incorporates factors like vegetation type, weather patterns, hill slope, elevation and insect devastation. This information can assist in fire prevention planning as well as aid in deciding whether or not logging and other forest management techniques should be used to decrease the likelihood of fires in this park and forest.
Using Radar Stratigraphic Analysis to Identify Erosion and Deposition in the Duluth Bay Barrier, Lake Superior
Sean Morrison
Faculty Mentor/Collaborator: Harry Jol
External Collaborator: Ryan Alger, Alumni
Poster #88

The Duluth Bay Barrier protects the major Great Lakes shipping ports of Duluth, MN and Superior, WI from Lake Superior. Over 2.5 km of shore parallel and shore perpendicular ground penetrating radar (GPR) transects were collected and analyzed on the barrier. This study utilized a pulseEKKO 100 GPR system for data collection with 100 MHz antennae. Data was processed and plotted through pulseEKKO software. Radar stratigraphic analysis divides reflection patterns into radar facies based on changes in geometric characteristics. Interpretation of radar facies allows the evolution of the Duluth Bay Barrier to be reconstructed. A major, continuous, undulating reflection is imaged between 4-6m depth and interpreted as an erosional surface created during a lower lake levels. In shore parallel transects, facies are dominated by northward dipping reflections suggesting that littoral drift from the southeast feeds the Duluth Bay Barrier. Predominant radar facies in shore perpendicular transects are lakeward dipping inclined to sigmoidal reflections interspaced with subhorizontal reflections. Sigmoidal to inclined reflections are interpreted as erosional beach faces, subhorizontal reflections are believed to result from deposition in the surf zone. Radar stratigraphic analysis shows how erosion, littoral drift, and human activity have affected the Duluth Bay Barrier.

The Extent of Tributary Incision in Response to Knickpoint Migration on the Lower Chippewa River in West-Central Wisconsin
Zachary Hilgendorf
Faculty Mentor/Collaborator: Douglas Faulkner
Poster #89

The Lower Chippewa River (LCR) is a tributary to the Upper Mississippi River (UMR) in west-central Wisconsin. Its valley contains several terraces resulting from the apparent episodic upstream migration of knickpoints initiated by UMR incision during Late Wisconsinan deglaciation. We investigated tributaries to the LCR to determine if they reflect this apparent episodic knickpoint migration. First, we interpreted digital elevation models to establish the upstream extent of incision on tributary networks, verifying our interpretations with field checks. Then, using ArcMap, we quantified incision extent for each tributary network by summing the lengths of stream polylines from tributary mouth to the upstream points of incision. A plot of incision extent (normalized by tributary drainage area) against distance from the Mississippi indicates tributaries closest to the Mississippi are more extensively incised. It also reveals a sharp decline in tributary incision upstream from the Red Cedar River (RCR), the largest tributary of the LCR. This suggests that RCR incision, itself initiated by LCR incision, produced a large influx of sediment to the LCR, temporarily halting the LCR knickpoint. Tributaries upstream of the RCR confluence are less incised because they have had less time to respond to LCR incision than those farther downstream.

Investigating the Holy Cave of Nazareth, Israel
Claire Lind, Tom Gugel, Jonathan Luczak, Claire Edel
Faculty Mentor/Collaborator: Harry Jol
External Mentor: Maha Darawsha, University of Connecticut
Poster #94

Ground penetrating radar (GPR) surveys were conducted to examine possible archeological features beneath the present day floor of the Holy Cave in Nazareth, Israel. The Holy Cave is located 7m below street level and in close proximity to the Greek Orthodox Church of the Annunciation and Mary’s Well. The floor was examined using GPR system, pulseEKKO™ 1000, and utilizing 225 MHz antennae frequency. Topographical data was also collected using a laser leveler, TopCon H3L, to geometrically correct GPR data. A 4x6m grid was laid on the cave floor and 16 parallel lines collected data every 0.25m. The collected data was put into a 3D model to better understand sub-surface layering. Interpretation of GPR lines show sub-horizontal layering that was infilled with accumulated materials on the former cave floor. Bedrock was also identified on the northwestern portion of the cave 0.5m below surface. This strengthens the hypothesis that possible archeological features are present beneath the floor. Our study laid the foundation for future research, suggesting the Holy Cave as an original site for excavation. This future site will benefit the community of Nazareth, and also contribute to the academic domains of science and humanities.
Land Use/Land Cover Change Assessment of Dane County, Wisconsin: Contemporary Trend and Future Projections

Eric Fabian
Faculty Mentor/Collaborator: Cyril Wilson

Assessing changes in land/use land cover (LULC) is a very important component of monitoring the health and sustainability of ecological systems. Remote sensing technology is a powerful tool utilized for the assessment of current trends in land change and more importantly when coupled with spatially explicit predictive land change models, can be instrumental in generating future composition and configuration of the landscape. These tools can provide useful information that can be integrated in land and general ecosystem planning and management. Dane County, which houses Wisconsin’s state capital of Madison, has seen increases in urban LULC and some decrease in forest land use over the past decade. However, no complete data exist on the configuration, composition, and trajectory of LULC in Dane County. This study was undertaken to provide an all-encompassing assessment of contemporary changes in Dane County’s urban LULC and more importantly probe into the future state of this phenomenon.

Using Landsat-5 Thematic Mapper (TM) and Landsat-8 (OLI) images combined with an array of ancillary data, this study calculates changes in LULC between 2000 and 2010 and projects the future state of this phenomenon by 2030. Object-oriented rule sets and decision trees were used for image classification while the future landscape was envisioned using land change modeler. Results of the study demonstrate significant changes in some LULC between 2000 and 2010 and the future landscape by 2030 is slated to undergo exponential modifications.

Global Position System Receiver Comparison

Eric Fabian, Brendan Miracle, Drew Briski
Faculty Mentor/Collaborator: Sean Hartnett

Ever since its invention in the early 1970s, Global Positioning System (GPS) receivers have become a vital tool to better our understanding of the spatial environment around us. The technology was originally intended for military use and national defense, but has grown to become a common instrument for scientific data collection and recreational purposes such as geocaching and exercising. GPS devices are produced with different levels of accuracies and prices in mind, depending on the intended use. This study compares GPS receivers ranging from the industry level to the recreational level, and two GPS smartphone applications in three study areas. Each study area was chosen for its unique challenges it would offer to the accuracies of the receivers. Recreational GPS receivers displayed far lower accuracies than their scientific counterparts. The scientific receivers used a corrective measure to assist with accuracy. The recreational receivers were lacking this factor. Assessment among the four units was undertaken to display the proper use for each GPS receiver. The four GPS receivers being tested include: Trimble ProXR, Trimble Juno, and smartphone applications AntiMap Log (1.1), and GPS Essentials (4.0.40) (The model of smartphone used is an LG G2).

A Search for Industrial Waste and Buried Logs in Rib Lake: A Ground Penetrating Radar Test Using Ice as a Platform

Drake Bortolameolli, Sean Morrison
Faculty Mentor/Collaborator: Harry Jol
External Mentor: Arlen Albrecht, UW-Extension

The purpose of this collaborative research project is to use ground penetrating radar to detect the amount of industrial waste that has accumulated in Rib Lake. Between the years of 1882 until 1948 industrial waste from the local timber mill was deposited into the lake. In addition, Rib Lake was used as a holding pond for logs. Occasionally, logs would break away from the cluster and sink to the bottom. Today the organic waste is responsible for deteriorating the health of the lake. Using Sensors & Software ground penetrating radar equipment; we shot multiple lines using 50 and 100 MHz antennae frequencies spanning over 200 meters in length. Earlier studies on the lake have been conducted by towing the equipment behind a boat in the open water. Our study involves towing the equipment across the frozen lake surface on a custom-made dual toboggan transport. We captured data containing information about the thickness of waste and location of sunken logs. After processing the data, we will create maps showing: water depth, thickness of waste, and locations of submerged logs to aid in future planning and offsetting the cleanup cost.
Planning Community Gardens: Soils and Slopes at the University of Wisconsin-Eau Claire Priory, West-Central Wisconsin
Matthew Brueske, Zachary Hilgendorf, Dakota Dorn, Hannah Adams, Miles Hegg
Faculty Mentor/Collaborator: Garry Running

In 2011 the University of Wisconsin-Eau Claire Foundation purchased the 112 acre property south of town known as the Priory. Previous research indicate loess-derived soils are thin or absent on the ridge top and thin and poorly developed on adjacent slopes due to severe, EuroAmerican agriculture-induced erosion and are not suitable for community gardens. The purpose of our research is to determine if lower slope and valley settings are appropriate for community gardens, based on: public accessibility, access to sunlight, well water availability, and appropriate soil fertility. Two soil profiles in toeslope and two in valley positions were described using NRCS methods. The other criteria were assessed using ESRI ArcGIS software (hillshade and slope aspect tools) and LIDAR data. Soil profiles observed formed in sandy bedrock and glacial outwash-derived alluvium (valley) and slopewash (toeslope) overlain by silt. Degree of development and presence of buried soils in some toeslope positions suggest erosion has been episodic throughout the Holocene, but particularly since the advent of EuroAmerican agriculture since the 1850s. We recommend community gardens be established where soils in toeslope and valley settings are most suitable, the water table is near the surface, and on sunny south-facing slopes near existing access roads.

Modeling Phytoplankton Blooms and Hypoxic Zones in the Mississippi River Delta: an Ocean Remote Sensing Perspective
Syler Behrens
Faculty Mentor/Collaborator: Cyril Wilson

Evaluating hypoxic zones, also known as dead 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. This is done using remote sensing technology and various algorithms to measure the changing concentrations of phytoplankton in response to hydrologic events such as peak agricultural runoff, which is presumed to be the contributing factor. This study was conducted to determine the relationship between agricultural runoff and the growth of hypoxic zones in the Mississippi River Delta region. Using SeaWiFS and MODIS satellite image data collected in May and September of 2010, this study compared NPP from times of highest agricultural runoff (September) and periods of low runoff in the early spring (May). By employing a comparative analytical framework of NPP and chlorophyll a content, and by extension phytoplankton concentration, during these two time periods, our study unearthed a better understanding of the influences agricultural runoff has on these marine ecosystems. Results from this study showed statistically significant correlations between phytoplankton concentrations and NPP during the time when agricultural runoff was at its peak in early fall.

Handheld XRF Analysis of Ancient Pottery from Bethsaida, Israel
Lucas Lenard, Mitchell Schreiber, Bailey Carlson, Jonathan Luczak
Faculty Mentors/Collaborators: Harry Jol (Geography and Anthropology), Anthony Wagner (Materials Science), Douglas Dunham (Materials Science)
External Mentor: Carl E. Savage, Drew University

Thirty-two pottery pieces from Bethsaida, Israel were analyzed for elemental composition using a handheld X-ray fluorescence (XRF). Handheld XRFs bombard a sample with high energy X-rays, which then excites the sample to emit its own X-rays. The composition of a sample can be found as each element releases an X-ray with a specific energy. To determine provenance, the compositions of the 32 pottery pieces are compared to previously tested pottery samples of known origins. Traditional methods including wavelength X-ray fluorescence (wavelength XRF) spectroscopy and inductively coupled plasma mass spectrometry (ICPMS), are expensive and destroy part of the sample, which for many archaeological artifacts is not an option. After data collection, we graphed concentrations of strontium (Sr) against concentrations of zirconium (Zr) found in each sample. The concentrations were found in parts per million (ppm) and resulted in three clusters: Cluster A: 3000-4700 ppm (Sr) vs. 40-220 ppm (Zr); Cluster B: 800-1500 ppm (Sr) vs. 400-700 ppm (Zr); Cluster C: 1200-2200 ppm (Sr) vs. 80-310 ppm (Zr). We hypothesize
that our clusters from the Bethsaida dig site will correlate with known northern Galilean pottery manufacturing centers. The results will aid archaeologists at Bethsaida in interpreting their findings in cultural context. Future studies will help archaeologists at the Bethsaida Excavations to acquire elemental and provenance data in an efficient manner without needing to do expensive and/or destructive analysis of the pottery.

**Geology**

*Interstitial Cement Composition within Cambrian Sandstone of Western Wisconsin and Its Implication on Potential Airborne Particulate Matter*

**Justin Poirier, Rachel Fliflet**

Faculty Mentor/Collaborator: J. Brian Mahoney  

Poster #82

Cambrian Sandstone units of Western Wisconsin, including the Wonewoc and Jordan formations are important sources of frac sand used in hydraulic fracturing. Frac sand mining is controversial, particularly due to the potential health concerns (silicosis) caused by fine grained particulate matter. Fine grained particulate matter is likely derived from interstitial cements within the sandstones, and therefore constraining the diagenetic history of the sandstones is critical. Petrographic analysis of Cambrian sandstone located within western Wisconsin has been used to quantify the composition of both detrital grains and interstitial cement. These sandstones are highly valued by industry due to the ultra-pure compositions, and loosely consolidated nature. Interstitial material consists of void space, calcite, dolomite, sericite, authigenic feldspar, and hematite. Silica cement is rare, and is restricted to the upper Jordan. There is a noticeable increase in void space and a decrease in hematite and authigenic feldspar from northwest to southeast in the Jordan formation. The Wonewoc displays a very similar increase in void space and hematite from the northwest to the southeast, and a decrease in authigenic orthoclase feldspar and sericite. The variation in the composition and quantity of interstitial cement both within and between formations suggests a complex diagenetic history.

*Cuenca Uspallata: an Intermontane Basin Records Episodic Uplift of the Cordillera Frontal and Precordillera in the Late Miocene*

**Alexander Hutter**

Faculty Mentor/Collaborator: J. Brian Mahoney  

External Collaborators: Ellen Katherine Buelow, David Kimbrough, San Diego State  

Poster #84

The timing, rate of subsidence and stratigraphy within retroarc and foreland basins is strongly controlled by the kinematics, migration and magnitude of the thrust system. Crustal shortening in the south-central Andes displays a significant decrease in shortening from the flat slab to the normal slab segment. Synorogenic Neogene basins at 33°S, including the Alto Tunuyan, Uspallata and Cacheuta basins, provide a sensitive record of the spatial and temporal patterns of tectonics, magmatism and orogenic exhumation. The question is do these basins represent the cannibalization of an initially contiguous foreland basin, or did they evolve independently during thrust migration. Uspallata Basin lies between the Frontal Cordillera and Precordillera, and contains a complex succession of conglomerate, sandstone and mudstone deposited in an arid fluvial system. Basin strata overlie volcanic rocks of the Cordillera Frontal, and basal units represent a basin margin facies. Sedimentary provenance records an initial influx of detritus from the Cordillera Principal and Cordillera Frontal that interfingers upsection with detritus from the Precordillera. Sedimentation was active from 9-12 Ma, which is significantly younger than synorogenic deposits to the east. These constraints suggest Cuenca Uspallata developed as an intermontane basin and was not part of the main foreland succession.

*Subsurface Geology and Mid-Continent Rift Intrusions of Chippewa County, WI*

**Mazlam Baftiri**

Faculty Mentor/Collaborator: Samuel Castonguay  

Poster #97

The Precambrian geology of Chippewa County, WI is incredibly diverse, but exposure is limited. To better understand the geology, ~600 meters of exploration drill core possessed by the Wisconsin Geologic and Natural History Survey (WGNHS) were examined. Core CH-317, which extends to 289 m, contains the contact with the Cambrian Mt. Simon Formation at 48 m with a thick saprolite horizon penetrating to 73 m into the Precambrian rock. The plagioclase and orthoclase within the saprolite are weathered to green clays. Below the saprolite, biotite amphibolite gneiss with sporadic granitic intrusions extends to the end of the core with foliation alternating from 45° to 85°.
A 44m thick brecciated sulfide-containing zone begins at 159 m, where pyrite-bearing quartz veins are abundant. Mafic intrusions can also be observed in several surface outcrops in Chippewa and adjacent counties. A previous study (Myers, 1980) proposed these mafic intrusions are related to the ~1.1 Ga Mid-Continent Rift (MCR). Samples of mafic intrusions were collected from previously mapped locations and the WGNHS cores. These samples were analyzed using an X-Ray Fluorescence Mass Spectrometer (XRF) and found to be an average of 48 wt% SiO$_2$ and similar major element compositions to those published from the volcanics of the MCR.

**Petrography, Geochemistry, and Geochronology of the Green Mountain Shield Volcano, Oregon**

Chase Friedemann, Forest Friedrichs

Faculty Mentor/Collaborator: Samuel Castonguay

Green Mountain (GM) is a small (~25 km$^3$) shield volcano located central Oregon. The ~740,000 year old shield, and associated young (~13,000 ya; Mackey et al., 2014) lava fields, are approximately 50 km southeast of Newberry Caldera (Jordan, 2004). In a previous study (Friedrichs and Castonguay, 2014), x-ray fluorescence (XRF) results suggested evidence of a single magma chamber that had undergone fractional crystallization and a significant magma recharge event before the most recent volcanism. This study aims to expand on this existing knowledge by applying geochronology, detailed petrographic analysis, and additional XRF analysis. Around the GM shield are several rhyolitic to dacitic domes, one dated at ~4 Ma (Ford, 2011) and thought to be associated with Newberry volcanism. Also, remnants of basaltic tuff cones with central lava lakes below the GM basalt flows suggest that GM initiated as geographically distinct vents. Detailed petrographic analysis and the additional XRF data continue to support the previous hypothesis that the tholeiitic basalts have a short residence time in a crustal magma chamber before eruption. Basalts from several intervals show glomerophytic textures, while others have abundant zoned olivine (Fo$_{80}$ cores to Fo$_{40}$ rims); both suggesting at least some crystallization within the magma chamber.

**Comparative Geochemistry of Unknown Basalts from Paulina, Oregon to Determine Map Units**

Claudia Moore

Faculty Mentor/Collaborator: Samuel Castonguay

The Crooked River region near Paulina, Oregon has exposures of Oligocene to Miocene volcanic rocks. The lowest exposed formation is the Clarno. Above is the John Day formation, Mascall Formation, the Rattlesnake formation and Rattlesnake ash-flow tuff. Atop these, are Columbia River Flood Basalts (CRBs) that erupted 18-8 Ma. During the Neogene, these formations have undergone significant deformation including both broad scale folding and faulting. Recent geologic mapping has revealed a distortion of the volcanic package. In some locations, it becomes difficult to be sure if basalt outcrops are of the lower Clarno Formation or the upper CRB Formation. This study aims to compare the geochemistry of the unknown basalts to compiled suites of basalts from known formations in order to determine the map unit. Elemental abundances, of minor and major elements, were determined using X-ray Fluorescence Mass Spectrometry (XRF). A literature search was conducted to create a database of published Clarno and CRB geochemistry, much of which exists for the CRB group but relatively little data has been published on the Clarno. Of the unknown basalts, we have determined that many are more geochemically similar to the CRBs, while some are similar to the Clarno. These results confirm the presence of large, inactive normal faults previously unrecognized.

**Developing Groundwater Elevation and Contaminant Susceptibility Maps in Eau Claire County**

Matthew Michalski, Justin Dowling, Mitchell Enderson

Faculty Mentor/Collaborator: Katherine Grote

Groundwater demand in portions of western Wisconsin has grown substantially in the last few years due to the increase in sand mining and high capacity irrigation wells. This increased demand requires a better understanding of available groundwater supplies and potential contamination sources. In Eau Claire County, the information related to groundwater flow and susceptibility to contamination is somewhat limited. Existing maps were produced over 25 years ago and were compiled from generalized maps ranging from a scale of 1:250,000 to 1:500,000; these maps are available only as static documents. In this project, we seek to update and improve the publically available groundwater information in Eau Claire County using higher resolution data and updated methodologies. This first phase of this project was to create a digital groundwater elevation map based on monitoring well construction reports and LIDAR elevation data. The second phase was to produce an improved digital groundwater susceptibility map by evaluating factors such as depth to water, soil thickness, topography, and permeability of soil and bedrock. The maps generated from this project are interactive and will be available to municipal officials, homeowners, and other
interested parties and can be used to guide public policy for protection of groundwater resources.

**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  

Frac sand mining is a strong and growing industry in western Wisconsin. Different sand formations, including the Wonewoc and Jordan, are mined 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 extend 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. The first step was point-counting samples from different sand formations to determine a baseline for raw, unprocessed sand. Representative raw sand point-counted yield < 0.9% fractured grains. 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 techniques to analyze grain shape, such as roundness, sphericity, circularity, and roughness are underway on both raw and processed sand and will be compared to manual point count results.

**The Geology of the Flambeau Cu-Zn-Au Deposit**

*Zacharie Zens, Samuel Helmuth*

Faculty Mentor/Collaborator: Robert Lodge  

Volcanogenic massive sulfide (VMS) deposits are polymetallic mineral deposits and are the source of many important base and precious metals (e.g. copper, zinc, gold). The state of Wisconsin has several large, economical VMS deposits and the Flambeau was the only one to be extracted. Remarkably, there has been very little geoscience research in the region. The primary objective of this study is to revisit the Flambeau deposit and describe the geology, geochemistry, and petrography of the strata hosting the deposit in light of almost 20 years of advances in the field of economic geology since the closure of the mine. Relogging and sampling of drill cores was done at the Wisconsin Geological and Natural History Survey core repository. Major and trace element geochemistry were analyzed at the Materials Science Center at UW-Eau Claire. Stratigraphic sections through the Flambeau deposit were developed and the geochemical evolution of the volcanic system host was described. The distribution of alteration mineral assemblages demonstrated the ore-forming hydrothermal system continued to modify the host rocks after forming the Flambeau deposit and subsequently altering younger volcanic assemblages. The geochemical data presented in this manuscript provides valuable constraints on the petrogenesis of Flambeau volcanic assemblages in Rusk County.

**Water in Hydrothermal Feldspar**

*Steven Brost*

Faculty Mentor/Collaborator: Phillip Ihinger  

We present new results on the abundance and distribution of hydrous impurities in crustal feldspar. Feldspar is the most common mineral in the Earth’s crust, and although water is present in only trace amounts (~ hundreds of ppm), this quantity is sufficient to make crustal feldspar one of, if not the, largest reservoir for water on our planet. Here we report on measurements of water contained in feldspar grown in hydrothermal veins of the Swiss Alps. Gemmy specimens of adularia (K-feldspar), albite (Na-feldspar), and quartz have been analyzed using infrared spectroscopy at high spatial resolution (100-μm spot sizes). We note the presence of distinctive absorption bands associated with each type of mineral. We characterize the 3-dimensional variation within single crystals and compare and contrast their variations with other minerals that grew contemporaneously in the same host vein. Our results show potential for discerning variations in fluid conditions present during and subsequent to crystal growth.
Earth’s Toxic Nano-Compartments: Metal Behavior during Natural Nano-Particle Maturation
Ellyn Swenson
Faculty Mentor/Collaborator: Robert Hooper
Poster #112

Nanoparticles are a ubiquitous phase in nature found in the soil we walk on, the air we breathe, and the water we drink. While synthetic nano-particles can be “grown from scratch” and have a world of positive applications, natural nanoparticles are not as well understood and can have deleterious effects on human health. Natural Fe/Mn-oxyhydroxide nanoparticles collected from air, water, soil and sediment samples were studied to determine the ability of these nanoparticles to sequester metals in natural metal-rich environments. In this presentation we are reporting on our study of the fate of metals in nanoparticles during the maturation of nanoparticles from nano-dots (3-5nm in diameter) into more crystalline minerals. Results demonstrate that oxyhydroxide nanoparticles tend to act as critical nano-compartments for toxic metals without regard to their nano-particulate form and that increasing levels of nanoparticle maturation do not result in decreasing levels of metals and probably do not substantially decrease metal bioaccessibility.

Understanding People’s Knowledge and Perceptions of the Silica Sand Mining Industry in Wisconsin
Mitchell Lassa
Faculty Mentor/Collaborator: Scott Clark
Poster #121

The recent surge of silica (a.k.a. frac) sand mining in Wisconsin has affected the social fabric, landscape, and economy. In many counties, the County Board Supervisors (board members) are responsible for permitting these mines. Because of the critical role played by these board members, we created a survey to assess their perceptions and levels of knowledge concerning silica sand mining. Survey results suggest a majority of respondents have a general understanding of the qualities that make silica sand valuable (e.g., 65% of respondents identified desired characteristics such as roundness, hardness, and uniformity of silica sand grains). Regarding potential positive impacts, the most common responses were jobs and local economic activity (61%). The most common concerns were air and water pollution (29%) and road damage due to truck traffic (9%). Whereas the news media was the most used source of information, university-affiliated scientists, the DNR, and the WI Counties Association Frac Sand Task Force Handbook were most frequently cited as reliable sources. Our findings suggest that multiple, respected sources need to be engaged in providing County Board Supervisors, and by extension, the public, with information that encourages evidence-based decision-making regarding the range of potential impacts from silica sand mining.

Expert Opinions in the Media: Analysis of Climate Scientists’ Evolving Stances on Climate Change
Mitchell Lassa
Faculty Mentor/Collaborator: Scott Clark
Poster #122

Historically, climate-related natural disasters have not significantly contributed to the media’s reporting on climate change. However, the potential of a connection has been recently gaining the media’s attention. To better understand the shifting trend in the media’s reporting of climate change and natural disasters, we analyzed quotes from the 15 most frequently cited climate scientists upon whom the media have relied for expert perspectives. Our corpus was U.S. newspaper and wire service articles that mentioned “drought” and “climate change” or “global warming” published between 1980 and 2012. During that span, the positions of three staunch climate-change skeptics trended away from denying the existence of climate change toward acknowledging it, while continuing to maintain that it may or may not be the result of human actions, and that it will not have adverse effects. Concurrently, a majority of the cited scientists became more confident that climate change is measurable, that humans are contributing to the change, and that the change is affecting extreme weather events. Based on these trends, we predict that the media will be increasingly writing articles that discuss the rising probability of climate change’s influence on the frequency and intensity of natural disasters.

Numerical Modeling of Unsaturated Flow to Provide Guidelines for Hydraulic Conductivity
Benjamin Degner, Kinzey Stoll
Faculty Mentor/Collaborator: Katherine Grote
Poster #123

Recent research has shown that Ground Penetrating Radar (GPR) techniques can be used to estimate the hydraulic conductivity of soil in the shallow subsurface. However, to use these techniques, data must be acquired before and after a wetting event such as irrigation, and to meet the mathematical requirements of estimation, steady-state vertical flow conditions must be established in the soil during the wetting event. This project seeks to define the soil and
wetting characteristics needed to establish steady-state vertical flow over a defined depth so that GPR techniques could be used to estimate hydraulic conductivity. Characteristics investigated include initial soil moisture, unsaturated hydraulic conductivity, infiltration rate, and duration of infiltration. The unsaturated zone modeling program Hydrus-1D was used to model infiltration for different soil textures and wetting conditions to simulate typical irrigation or rainfall events. Using the results of these simulations, the combination of soil and wetting characteristics that would result in steady-state flow conditions over a pre-defined depth interval were determined. These data can be used to determine what irrigation rates are appropriate to establish steady-state flow or whether a natural precipitation event was suitable to establish these conditions.

Estimating Hydraulic Conductivity in the Vadose Zone using GPR Techniques
Haillie Passow, Sarah Knutson
Faculty Mentor/Collaborator: Katherine Grote
Poster #124

This project uses recent advances in Ground Penetrating Radar (GPR) methodology to estimate the hydraulic conductivity in the shallow subsurface at the field scale. GPR data were acquired at an agricultural field site in northern Wisconsin before and after irrigation. These data were used to estimate the soil water content over a known depth. Using these water content values with the assumption of steady state flux during irrigation, the unsaturated hydraulic conductivity (K_{unsat}) was estimated. The water content values were then used in conjunction with van Genuchten parameters to estimate the saturated hydraulic conductivity (K_s). To assess the accuracy of the GPR estimates, conventional point-measurement values of saturated hydraulic conductivity were obtained using a double-ring infiltrometer at 15 locations throughout the field. A comparison of the K_s distributions derived from the GPR data and from the double-ring infiltrometer data showed that the GPR-derived distribution matches the pattern of the distribution from infiltrometer data well, although some discrepancies occur in the magnitudes of the values. The correlation between K_s estimates from GPR and from conventional measurement techniques indicates that GPR methods have significant potential for high resolution, field-scale estimation of K_s.

Determining the Sources of Chloride Contamination in Surface Water and Groundwater in Eau Claire, WI
Tanner Bakke, Justin Dowling, Gregory Burgess
Faculty Mentor/Collaborator: Katherine Grote
Poster #125

Runoff from road salting can negatively impact surface and groundwater supplies through dissociation of salt causing high chloride concentrations. This project investigates chloride concentrations in surface and groundwater in Eau Claire, Wisconsin. A strong positive correlation exists between chloride concentrations and electrical conductivity (EC) measurements in surface water, so EC measurements were acquired frequently. Measurements were taken from four stream sites and two groundwater wells, and data were analyzed to determine the impact of urban infrastructure and weather patterns on chloride concentrations. Results indicated that smaller tributaries show more impact from road salting than larger streams, and more urban areas tend to have higher chloride concentrations than more rural areas; urban infrastructure such as roads and parking lots also had a strong impact on local chloride concentrations. Weather was also significant; gradual warming events correspond to higher chloride concentrations than rapid warming, perhaps due to dilution of salt during more rapid melting events. Measurements of EC in groundwater showed that groundwater experiences similar patterns as surface water, but with an approximately two week delay after the surface water EC fluctuations; these data show that road salting impacts both surface and subsurface waters in the Eau Claire area.

Materials Science Center

Synthesis, Characterization, and Testing of PEG-PDMAEMA Diblock Smart Polymers
Elizabeth Stubbs, Elizabeth Laskowski, Brandon King
Faculty Mentor/Collaborator: Elizabeth Glogowski
Poster #55

Smart polymers are polymers that respond to an external stimulus, such as temperature or pH, and have a wide range of applications in industry from drug delivery to cosmetics. Smart polymer properties, including cloud point (the temperature at which the polymer changes solubility), viscosity, and interfacial tension, depend on polymer molecular weight and architecture and must be tuned for specific applications. These polymer characteristics were controlled using atom transfer radical polymerization or ATRP to synthesize a series of diblock copolymers of
poly(ethylene glycol)-block-poly(2-(dimethylamino)ethyl methacrylate) (PEG-PDMAEMA). These polymers were characterized using proton nuclear magnetic resonance spectroscopy (1H-NMR) and gel permeation chromatography (GPC) to determine polymer molecular weight and chain length distribution. Cloud point in response to temperature was determined using ultraviolet-visible spectroscopy (UV-Vis). Pendant drop tensiometry was used to determine interfacial tension of the polymer in solution. A rheometer was used to measure viscosity of polymer solutions. PEG-PDMAEMA smart polymer behavior was tuned for specific potential applications by controlling polymer molecular weight, concentration, pH, and ionic strength.

Synthesis of Smart Copolymer PEG-PDMAEMA and Determination of Cloud Point
Michael Schneider, Phillip Conor, Daniel Alves Heinze
Faculty Mentor/Collaborator: Elizabeth Glogowski

Polymers are some of the most commonplace and useful materials present in today’s society. Smart polymers are a specific type of polymer that can change properties such as color, adhesiveness or shape and are affected by parameters including pH, concentration, temperature and other factors. Smart polymers have been useful in both the medical field and in commercial applications. Diblock copolymers of poly((2-dimethylamino)ethyl methacrylate) (PDMAEMA) and polyethylene glycol (PEG) with different chain length ratios were synthesized by atom transfer radical polymerization. The cloud point was determined using UV-visible spectroscopy (UV-Vis) and dynamic light scattering (DLS). The cloud point is the temperature at which the polymer will aggregate and is a critical parameter in smart polymer behavior. The samples were characterized using proton nuclear magnetic resonance (H1-NMR) to determine the actual ratio of PEG to PDMAEMA and gel permeation chromatography (GPC) to find the chain length distribution and tested to determine their cloud point based on several factors such as concentration, pH, and temperature. Tuning of cloud point has been achieved by controlling polymer molecular weight, polymer concentration, pH, and buffer concentration, which will allow for optimization for future applications.

Analysis of Bismuth-based Superconductor Microstructure through Scanning Electron Microscopy
Gavriel DePrenger-Gottfried, James McFarlane
Faculty Mentors/Collaborators: Matthew Jewell, Amir Kajbafvala

This research is focused on understanding the mechanical properties of a superconducting polyphasic material (Bi-2212) through scanning electron microscopy. Bi$_2$Sr$_2$CaCu$_2$O$_{8-x}$ (Bi-2212) is a high temperature (critical temperature, $T_c > 77$ K) superconducting material capable of withstanding very high magnetic fields. However, it is also mechanically brittle and very susceptible to damage under mechanical stresses. The goal of the research is to investigate the role that each of the non-superconducting secondary phases have on the propagation of stress fractures through the filaments. By analyzing these properties, a stronger, tougher composite can potentially be engineered that will still retain the high-temperature superconducting properties that make the application of this material so advantageous.

Assessment of Metallographic Preparation Techniques for Bi-2212 Superconducting Wires
Sarah Sortedahl, James McFarlane, Mahira Adna Cota Araujo, Joseph Christian, Gavriel DePrenger-Gottfried
Faculty Mentors/Collaborators: Matthew Jewell, Amir Kajbafvala

High-temperature superconductors (HTS) allow superconducting magnets to generate magnetic fields upwards of 20 Tesla. Bi$_2$Sr$_2$CaCu$_2$O$_{8-x}$ (Bi-2212) is the only HTS material available as a round wire, which is preferred for magnets that require cables. Potential applications of Bi-2212 are MRI, NMR, and fusion magnets. Bi-2212 wires contain brittle Bi-2212 filaments embedded in a soft, silver matrix. The difference in the hardness of these two materials existing in one wire makes creating a well-polished specimen difficult. A smooth sample surface is necessary for microstructural analysis through nano-indentation, chemical, and visual analysis to observe phases, voids, and cracks. Ultimately, we want to study how defects affect the critical current of the wires. Thus, it is critical that defects found in a given wire sample are not a result of the polishing technique. In this study, Bi-2212 wires were mounted then ground using silicon carbide papers. Alumina and diamond suspensions were used for final polishing incorporating a variety of techniques including manual, automatic, and vibrational polishing. Scanning electron, confocal, and optical microscopy were used to assess the quality of the polished samples. This systematic investigation of the sample preparation provides confidence for the subsequent quantitative analysis of these brittle, composite wires.
Characterizing Electrical Properties doped and non-doped Silicon-Carbide Nanowires
Kelsey Steinke, Nokoma Kohl-Blomsness, Kyle Tollefson
Faculty Mentor/Collaborator: Douglas Dunham

SiC is well suited for optoelectronic, microelectronics and nanoelectronics due to its unique properties such as high thermal stability, mechanical strength, large band gap, chemical inertness, and high electron mobility. We are investigating the electrical properties of silicon carbide nanowires (SiC NWs) we have grown. Electrical properties are measured using miBot Mobile Robots that are placed in a Scanning Electron Microscope (SEM). With the miBots connected to a source meter, we can measure the resistance of a SiC nanowire by controlling the current that the two outer miBots send through the wire and measuring the voltage drop between the inner miBots. In order to more accurately and easily measure the electrical properties of a single nanowire, we are creating a method to electrically isolate a single SiC-NW. To do this we are fabricating a template structure that will allow one wire to lay across and then the probes can attach to the template instead of the wire itself. We will then dope the SiC-NW with n-type and p-type dopants and see how it affects the resistivity of the nanowires in efforts to dope with n and p type dopants to create a transistor with the nanowire.

The Influence of Trimers in the Microwave-Assisted Synthesis of Triangular Silver Nanoplates
Anneliese Laskowski, Eric Miller
Faculty Mentor/Collaborator: Jennifer Dahl

A solution of silver nanoparticles consisting of spheres and triangular nanoplates was synthesized from aqueous silver nitrate and poly(vinylpyrrolidone) with the aid of a microwave reactor system. The rapid kinetics of the reaction suggest that the products should consist entirely of spheroidal nanoparticles. However, the discovery of triangular nanoplates, usually created via the addition of a shape directing agent, suggests the number of trimers in the silver nitrate solution is proportional to the number of triangular nanoplates in the products. It is known that freshly prepared solutions of silver nitrate contain a high population of Ag\(^{+}\) trimers, while aged solutions contain mostly free Ag\(^{3+}\) ion. We propose that the ratio of spheroidal:triangular particles is proportional to the relative population of trimers in solution prior to initiation of the microwave reaction.

Janus Nanoparticle Formation via Regioselective Ligand Exchange Reactions at Soft Interfaces
Tayo Sanders, Kyle Lobermeier, Connor Richards
Faculty Mentor/Collaborator: Jennifer Dahl

Today, nanoparticles can be readily synthesized, and characteristics such as size and morphology can be effectively adjusted. Still, nanoparticles have yet to reach their full potential due in large part to an inability to control the assembly process. To achieve enhanced control over the movement and arrangement of nanoparticles, the utilization of Janus nanoparticles, i.e. nanoparticles with chemically distinct hemispheres or nanoparticles consisting of affixed heterogeneous particles, may prove integral. The development of effective methods to yield and characterize these sophisticated particles has proven to be a difficult endeavor. This research explores a novel route to Janus nanoparticle synthesis via the restriction of the nanoparticles at a soft interface with an alkanedithiol crosslinking agent. The crosslinked particles form a robust film that restricts particle motion and resists partitioning into organic solvent, allowing the particles to undergo regioselective ligand exchange. To accurately characterize these particles as Janus systems, surface sensitive techniques such as x-ray photoelectron spectroscopy (XPS) and polarization modulation-infrared reflection-adsorption spectroscopy (PM-IRRAS) will be employed. The applications of this fundamental research are wide ranging and include malignant cell targeting and drug delivery, 2-D patterning onto integrated optoelectronics, and fabrication of backside-reflecting nanoparticle films for photovoltaic cells.
Materials Science and Geography and Anthropology

**Is X-Ray Fluorescence Good Enough for Archeologists?**

*Bailey Carlson, Lucas Lenard, Mitchell Schreiber*

Faculty Mentors/Collaborators: Douglas Dunham (Materials Science), Harry Jol (Geography and Anthropology), Anthony Wagner (Materials Science)

In the field of archeology there are typically only a few of methods to ascertain the provenance of a pottery piece. These methods are expensive and usually require damaging the historic artifact. We proposed to use the handheld X-Ray Fluorimeter (XRF), which is a non-destructive technique, to analyze pottery and determine its elemental composition. The elemental composition of the samples will be compared with known historical specimens and help archeologists infer the origins. We have collected data using the handheld XRF on a specific piece of pottery from Bethsaida, Israel. Our plan is to use the Wavelength dispersive XRF and Inductively Coupled Plasma Mass Spectrometry (ICPMS) to test and compare the results with those found from the Handheld XRF to test its validity. Both of these methods require damaging the material. In conjunction with Carl Savage, we were able to acquire samples from the Bethsaida, Israel dig site to use in our destructive testing. We expect the handheld XRF to give sufficient results providing archeologists with a simple, non-destructive way of testing and analyzing pottery. If we are successful, there is potential for using this methodology with different materials other than pottery.

Physics and Astronomy

**Viability of Polycarbonate Plastic Solar Water Heater**

*Avery Van Gaard*

Faculty Mentor/Collaborator: Kim Pierson

This investigation was designed to determine if an inexpensive and durable flat panel solar water heater could be developed from inexpensive twin-wall polycarbonate panels that are manufactured in Wisconsin. Solar power is growing rapidly as a global source of renewable energy. However, commercial solar panels are still quite expensive. The goal of this project is to design a relatively efficient and durable solar panel for an affordable price. These cheaper panels could be used by homeowners to reduce their home heating and/or water heating costs. We calculated the rate of energy transfer of the twin-wall polycarbonate panel to be three times larger than the commercial copper-fin panel designs. Experiments were performed to determine the panel’s durability in typical Wisconsin climate and to determine the best overall panel design. A prototype was constructed and tested for efficiency and durability.

**Intrinsic Magnetoresistance in Organic Light-Emitting Diodes**

*Austin Riedl*

Faculty Mentor/Collaborator: James Rybicki

Organic electronics are a promising emerging technology. They are of particular interest to the scientific community and industry because organics 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 and the bipolaron model. The goal of our research is to determine which of these models best explains the observed OMAR in undamaged organic light-emitting diodes (OLEDs) made with the polymer P3HT. We tested these models by fabricating OLEDs in such a way as to not expose them to damaging x-rays, which allowed us to observe their unaltered, intrinsic magnetoresistive properties. Our data shows subtle, and unexpected effects that cannot be readily explained by either model alone. The subsequent analysis of our data led us to suspect that the magnetoresistive effects we observed are likely a combination of both the bipolaron model and electron hole model.
An Analysis of Proton Therapy: A Method to Reduce Lateral Penumbra
Blake Smith
Faculty Mentor/Collaborator: Matthew Evans
External Mentor: Daniel Hyer, University of Iowa Hospitals and Clinics
Poster #259

To ensure proper treatment of a target tumor in X-ray therapy, large amounts of healthy tissue are put at risk to harmful radiation levels. In proton therapy, radiation treatments can be delivered in a conformal distribution sparing healthy tissue. However, at low energies the lateral dose spread, called lateral penumbra, can compromise the advantage of protons. A dynamic collimation system (DCS) was computationally modeled to investigate the benefit of DCS in reducing lateral penumbra of proton therapy dose distributions delivered in a spot-scanned technique. Proton beam dose distributions in water were calculated with MCNPX simulations and modeled analytically using both integral depth-dose curves along an asymmetric Gaussian function to represent fluence. From this model, a treatment planning system was designed and coded in MatLab to calculate the optimal treatment plans for previous patient datasets. The computational model is capable of accurately modeling individual beamlets resulting from the DCS and enabled its integration into a treatment planning system for clinical datasets. From the analysis of plans produced for these clinical data sets, DCS showed a great reduction in lateral dose spread compared to both aperture and uncollimated treatment plans.

Alignment Sensitivity Study of the St. ANA Beam Line
Michelle Gervais
Faculty Mentor/Collaborator: Lyle Ford
Poster #260

The St. ANA (STable Accelerator for Nuclear Astrophysics) accelerator is being prepared for use with the St. George recoil mass separator. The accelerator is in working condition for use in direct kinematic experiments but the St. George separator works with inverse kinematics and requires a highly controlled beam restricted by severe position and divergence parameters that are not achieved at the present time. A systematic sensitivity study was conducted using a simulation of the beam line in order to assess the impact of a misalignment in each optical element or in the beam itself. Tests were done with the beam to analyze how the beam behaves at various points in the line and to compare this data with simulation results to determine possible causes of misalignment. The results of these tests and simulations are that the beam characteristics are now better understood and the possible causes of the limitations have been narrowed down.

Miniature Bluetooth Controlled Robot
Thomas Stegge
Faculty Mentor/Collaborator: Kim Pierson
Poster #261

My goal is to create a Bluetooth-controlled robot from the Light Blue Bean, which is a low energy Bluetooth Arduino microcontroller, created by Punch Through Design (owned by a UW-Eau Claire alum). A unique capability that I will try to develop is to be able to have the robots communicate with each other to perform coordinated activities, for example to create temperature maps of buildings. This project is important because it can provide a cheap and easy way for K-12 students to learn and understand computer coding and robotics. The Bean also has the ability to be run by a simple graphical interface that young children are able to learn quickly. To my knowledge, there has not been a robot created with this platform, so any advancement can help expand the capabilities of this microcontroller. This project motivated me to learn more about and explore the possibilities of robotics. My methods include researching how Arduino code works and how all the motors and motor controllers work in combination with the Bean. From this research I expect to be able to create a program that will allow our “Bean Bot” to be operated with a Bluetooth controller via an Apple IOS application.

Organic Electronics and the Magnetoresistive Effect
Zachary Kilboy, Peter Zernia
Faculty Mentor/Collaborator: James Rybicki
Poster #264

Organic electronic components are seeing increased use in consumer electronics, but there is still much to be discovered about the properties of these devices versus traditional electronic components. One of the most common organic electronic components, organic light emitting diodes (OLEDs), also exhibits one of the most intriguing unexplained properties, the organic magnetoresistive effect (OMAR). The OMAR effect is a currently unexplained property of certain organic electronic components, wherein the conductive/resistive properties of the component
are significantly influenced by ambient magnetic fields. Research conducted at this university sought to ascertain the origins of this effect using x-ray photoelectron spectroscopy. Research is on-going, but our findings suggest that alternative modeling methods may be more effective in characterizing this phenomenon.

**The Rotational Period of Asteroid 4528 Berg**

**Jesse Bluem, Blake Smith, Sam Fahey**

Faculty Mentors/Collaborators: George Stecher, Lyle Ford

Post #265

The goal of this project was to measure a rotational period for asteroid 4528 Berg. A very small fraction of known asteroids have reliably known periods, and this information is useful in checking models of solar system dynamics. Berg was observed and imaged at Hobbs Observatory for 5.6 hours to find R (red) and V (visual) magnitudes. A light curve was constructed from these magnitudes and a rotational period of 3.47 ± 0.44 hours was calculated. Our results serve to confirm a previous, somewhat uncertain, calculation of the rotational period of the asteroid.

**Fully-Autonomous LabVIEW-Controlled Avatar Robot**

**Dakota Kitzman, Sarah Naegeli, Steven Fuhrman**

Faculty Mentor/Collaborator: Kim Pierson

Post #266

The goal of this project is to develop a self-navigating robot, using multiple types of sensors, capable of interacting with people in an audio-video format. Programmed with National Instruments LabVIEW graphical programming language, these robots are capable of interfacing with a large variety of hardware devices utilized by this project. In order to navigate through a space, we need to develop a depth map of obstacles in the robot’s surroundings by linking infrared and ultrasonic distance data with the objects’ relative locations. This is done with a vector field histogram algorithm. Areas where the sensors determine objects are located are avoided by the robot’s control algorithm as it navigates through its environment. In the event that direct control is desired, the user can take over navigation for the robot. A wireless camera and speaker system allows the robot to interact with environments and people over large distances. It can be controlled using a network connection from anywhere making it portable and convenient. In the future, this “avatar” could then be used to travel and communicate when the user is elsewhere. The modularity of its design allows for quick and easy future expansion when new ideas arise.

**Psychology**

**A Behavioral and Biological Comparison of Rodent Strains Commonly Used in Research**

**Carlee Toddes**

Faculty Mentor/Collaborator: Carla Lagorio

Post #224

Abstract: This study combines data from our laboratory while reviewing the literature to better understand the behavioral and biological differences and similarities between four rat strains commonly used in bio-behavioral research. These strains include: Sprague Dawley, Wistar, Long-Evans, and Fischer-344. This review utilized our lab’s prior research comparing impulsivity differences between Fischer-344 and Sprague Dawley rats as measured by delay discounting. Our research was combined with several other sources noting common behavioral differences between all strains on basic behavioral paradigms. Literature comparing the physical differences, hematological differences, as well as some neurological differences were included as well. This research is important for researchers across all domains that utilize animal models as it may produce a more formalized guideline of the strengths and weakness of different strains and their uses in different research assays. This literature review brings the scientific community one step closer to developing a formalized database that can be utilized when determining appropriate animal models for research.
Watershed Institute

A Novel Approach to Measurement of Atmospheric Ultrafine Silica Particulate Matter
Sean O’Connell, John Tum
Faculty Mentor/Collaborator: James Boulter

This project entails the establishment of a novel analytical method for quantifying respirable, airborne silicon-containing particles and design of an instrument to perform such an analysis. Many previous studies exploit heteropoly acids via reduction to molybdenum blue for a variety of quantitative environmental analyses. This approach substantially extends the sensitivity of the visible absorbance detection of silicotungstic acid and also simplifies the analysis. Applying the molybdenum blue approach to respirable silica, NIOSH estimates a limit of detection (LOD) of 10 mg SiO₂. We estimate that our proposed analytical instrument design will have an LOD on the order of 0.5 μg SiO₂, enabling sampling times of less than an hour to reach the newly-proposed OSHA personal exposure limit of 0.10 mg/m³. Potential applications of such a measurement include many environmental and industrial settings from shipbuilding to petroleum extraction.

Energy Performance of Newly Constructed UW-System Classroom and Student Center Buildings
Andrew Bocher, Rory Smuhl
Faculty Mentors/Collaborators: Karen Mumford, James Boulter

Energy efficiency is a high priority for new construction projects on university campuses nationwide. The University of Wisconsin System is no exception due to Executive Order 145 that establishes energy efficiency goals for new buildings on UW campuses based on the Leadership in Energy and Environmental Design (LEED) green building rating system. The law requires buildings to be constructed to the level of LEED silver, but does not require post-construction LEED performance certification. Post-construction LEED certification verifies that buildings perform at expected efficiency levels. In this study, energy use intensity data from a sub-sample of UW-System buildings were examined to see whether those buildings that did not undergo post-construction LEED certification performed as efficiently as those that were certified. To compare performance, energy use data were collected for buildings from across multiple UW System campuses and then entered into the Environmental Protection Agency’s Energy Star Portfolio Manager program. This program normalizes building data (accounting for building size, operating hours, primary use, etc.) and then estimates energy use intensity for each building. This study will shed light on whether designing to LEED standards is adequate to ensure energy efficiency or if formal LEED certification is needed.

Social Sciences

Communication and Journalism

The Association between Students’ Reported Political Engagement and Knowledge in a Politically Charged Environment.
Katie Carlson, Caitlin Daley, Kimberly Drewiske, Sydney Ellefson, Renee Nelson
Faculty Mentor/Collaborator: Martha Fay

Researchers have shown that student involvement on college campuses is associated with their overall college satisfaction (Webber, Krylow, Zhang, 2013). Past research also shows that college students have low political knowledge and involvement (Bernstein, 2005; Beaumont, Colby, Ehrlich, & Torney-Purta, 2006). At the University of Wisconsin - Eau Claire the campus climate is currently politically charged due to proposed economic challenges, specifically the proposed state mandated budget cuts to the University of Wisconsin system. Based on Impression Management Theory, in a social situation where high political knowledge may be expected, such as this one, it is possible that students either over report their knowledge or decide not to become involved in political activities. This study surveyed students at the University of Wisconsin - Eau Claire to test for relationships between reported political engagement and knowledge in a politically charged environment. Findings may be useful for understanding how students self-report their knowledge in a politically charged climate.
**Spiral of Silence and Fear of Social Isolation in Faith-Based Campus Organizations**  
*Amy Ives, Catherine Sylvester, Jessica Kennedy*  
Faculty Mentor/Collaborator: Martha Fay  
Poster #201

The Spiral of Silence (SOS) Theory (Noelle-Neumann, 1977) states that if two groups differ significantly in their willingness to express views publicly, the group displaying more willingness is more likely to “have the future on its side” (p. 50). In addition, the majority united in opinion expression will take a long time before asserting contrary opinions. Willingness to communicate (WTC) research shows that fear of social isolation (FSI) motivates learning public opinion on issues (Hayes, Matthes, & Eveland, 2011). Research also shows that family and friends’ opinions and perceived support of an individual’s opinion determines the likelihood of the individual expressing an opinion (Moy, Domke, & Stamm, 2001). This study tests whether phenomena predicted by SOS are occurring in faith-based campus organizations and whether individuals who perceive their views to be different than the majority are willing to communicate their views in various interaction types. Data will be collected by survey to examine: 1) initial willingness to communicate contrary opinions, 2) preferred forum for opinion discussion, and 3) the level of FSI expressed in determining WTC. Results will demonstrate whether FSI within conservative faith-based campus organizations inhibits members who hold minority opinions from expressing those opinions.

**Effective Communication between Caregivers and People with Alzheimer’s Disease: A Thematic Analysis**  
*Mitchell Berg, Tyler Graf, Cailen Rock, Michaela Schopf*  
Faculty Mentor/Collaborator: Martha Fay  
Poster #202

In the United States, someone is diagnosed with Alzheimer’s Disease (A.D.) every 67 seconds (Alzheimer’s Association, 2015). As A.D. progresses, communication between patients and caregivers becomes increasingly difficult. Donnelly (2005) explains how communicating to people with A.D. can be challenging due to the behavioral and psychological disturbances such as resistance to care and agitation connected to the disease. However, Fried-Oken, Rowland, Dixon, Fuller, Mills, and Oken (2009) showed that the use of two- or three-dimensional symbols relating to the conversation topic caused people with A.D. to use targeted words more frequently, which improved overall communication. The purpose of this study is to examine what caregivers perceive to be effective communication with people with A.D. Schmidt, Lingler, and Schulz (2009) found that since caregivers have the highest percentage of visit speech opportunities with people with A.D., their communication is an important influence on their lives. Using Grounded Theory by Glaser & Strauss (1999) to analyze interviews with caregivers of people with A.D., we examined how caregivers’ use specific messages in their communication with people with Alzheimer’s Disease. Results should further the understanding of effective communication with people who have AD.

**The Relationship between Social Support, Cohesion, and Family Communication Patterns in the Face of Serious Illness**  
*Alexis Benjamin, Shayla Uting, Allyson Thieme*  
Faculty Mentor/Collaborator: Martha Fay  
Poster #203

Giving social support in families who deal with a serious illness has been associated with higher levels of cohesion (Rosland, Heisler and Piette, 2012). Lower levels of cohesion (Shudy, 2006) have also been associated with lower levels of communication between family members in general. Fitzpatrick and Ritchie (1990) have theorized that families can be classified as either conversation-orientation or conformity-orientation. Conversation-orientation families work to create an environment where all members are encouraged to communicate freely and without restrictions, regardless of conflict (Lull, 1990). Conformity-orientation families work to create an environment center around harmony (a concept similar to cohesion) of familial attitudes, values, and beliefs (Lull, 1990). Given previous findings on social support and cohesion, families who avoid communicating when members have conflicting viewpoints (conformity-orientation) may be less likely to offer support when a family member is facing a serious health issue. Using a web-based survey, this study seeks to clarify the relationship between family communication patterns, provision of social support, and cohesion in the context of a family member’s illness. Results may help individuals better provide social support, thereby enhancing the well-being of the person with a serious illness (Aschbrenner, Bartels Carpenter-Song, Kinney, Mueser, and Pratt, 2013; DiMatteo, 2004)
International Media Framing of Current Territorial Disputes in East Asia
Amelia Kimball, Ashley Klein
Faculty Mentor/Collaborator: Won Yong Jang

The purpose of this project was to look at the differences and similarities of news stories from multiple agencies. This study also examined the ways media framing is reflected in dominant ideology and in the interests of countries. The goal of this project was to see how different countries in Asia report news on territorial disputes. We wanted to see how framing can change the way a situation is viewed and presented to the public. Research questions asked throughout the study were: what types of frames were used in media coverage, what sources were used, and what themes were predominant throughout the news story. We looked at four different territorial disputes involving Japan, China, and South Korea. We collected multiple articles from news agencies directly and indirectly involved in a dispute. Initially, we believed there would be much framing and bias in the articles. As we continue and finish the article coding and data entering process, this continues to be true in several cases, but not all. We will present our final observations and findings at the CERCA event in April.

Student Knowledge, Attitudes, and Behaviors Surrounding Blugold Athletic Event Attendance: Finding Ways to Get Students in the Stands
Michael Fiez, Kelsey Karnopp, Katie Miller, Taylor Pelissero, Cassandra Rudd, Stephanie Tyink, Nathan Zeiter
Faculty Mentor/Collaborator: Evan Perrault

The Blugold athletics program has seen a negative trend of lower student attendance at sporting events (e.g., men's basketball, football) during the past five seasons. Student attendance at marquis sports can help create strong bonds that hopefully will keep students connected to the school after graduation - possibly by purchasing memorabilia, future tickets, or even donating to the program. The purpose of this research was to find the reasons behind this reduction in student attendance, and strategies the Blugold athletics program can employ to draw more students to athletic events. The theory of planned behavior guided the creation of a survey distributed to 620 students, analyzing their knowledge, attitudes, and behaviors, toward Blugold athletics. Results revealed that students who had personally interacted with an athlete or coach had higher attitudes toward Blugold athletics than those who had not. Open-ended responses also asked students why they do not attend games and what would get them to attend more. Analyses of these responses reveal future events need to offer more promotions and entertainment. Future communications also need to be distributed via channels students indicate they would be receptive to receiving athletic updates (e.g., email, posters). Additional evidence-based key recommendations are also provided.

Show You Belong: Organizational Culture Fit and LinkedIn
Nicole Whitrock, Aubry Reed, Tess Landphier
Faculty Mentor/Collaborator: Martha Fay

According to a survey of 31,000 employers, more than one in five use social media to screen applicants (Harris & Rae, 2011). One thing employers are looking for is that potential employees fit their company culture. This study investigates the perceived organizational culture preferences of potential job applicants based on the Five Factor Model (a hierarchical organization of five personality traits: extraversion, agreeableness, conscientiousness, neuroticism and openness to experience) and professional social media content. Cameron and Freeman's Culture Model states that every organization identifies with one of four culture types: clan, adhocracy, hierarchy and market. Using the Organizational Culture Model, participants will identify their preferred culture type. According to Person-Organization Fit Theory, strong P-O fit relies on values between people and organizations aligning. Research has shown that greater fit between the values of an individual and those of an organization result in higher retention, greater organizational commitment, identification and worker satisfaction (Handler, 2004). Assessing college students' perceived PO fit with culture, adds to existing PO fit knowledge by connecting organization culture with social media content and individual personality types. Results will be useful to better match potential employers and applicants.
Undergraduate Poster Presentations: Economics

Investigating the Effects of Direction Specificity on Self-Reported College Learning: A Study of Creativity and Constraint in the Classroom
Mikelle Nepsund, Alyssa Kellagher, Breanna Westra, Hailey Carlson, Hallie Froehlich, Jensen, Rachel Marian; Undergraduate
Faculty Mentor/Collaborator: Martha Fay

Poster #232

This study examines how direction specificity on a college classroom assignment relates to self-reported learning at the university level. Dialectics theory suggests that competing needs coexist and must be continuously managed. One dialectic that may exist in college classrooms is the student need for creativity and constraint in assignments. Past research suggests contradictory evidence for whether constraints produce more or less creativity. However, research implies a connection between creativity and tolerance for ambiguity, stating those with a higher tolerance for ambiguity tend to be more creative (Shalley, Zhou, & Oldham, 2004). Research also suggests that individuals engage in more critical thinking when allowed to experience uncertainty (Jordan & Babrow, 2013). Much of the literature about creativity and constraint is related to consumer patterns and workplace settings. However, the relationship between creativity and constraint and tolerance for ambiguity has not yet been investigated in an educational context. With these findings in mind, we conducted a survey of students at a Midwestern university to look for a link between direction specificity and self-reported learning, using tolerance of ambiguity as the moderator. The results of our study offer important implications for educators in understanding how students can gain the most from college projects.

Communication Sciences & Disorders

Effects of Direct Intervention on Identification, Blending, and Segmenting of Phonemes
Elayne Hansen
Faculty Mentor/Collaborator: Marie Stadler

Poster #137

The purpose of this project was to determine if phonological awareness skills in typically developing preschool children could be increased by providing intervention on identification, blending, and segmenting of phonemes. We were also interested in discovering what other variables affect the development of phonological awareness skills. Phonological awareness is often learned indirectly through various environmental influences and interactions with caregivers, yet when direct intervention is carried out it is generally with children with disabilities or developmental delays. Development of phonological awareness skills is important, as these skills are an early indicator of literacy success. In this research project children were divided into two groups: one control and one in which participants received six 10-minute intervention sessions on identification, blending, and segmenting of phonemes. Both groups were assessed at the beginning and end of a 3-4 week period using The Test of Phonological Awareness: Kindergarten Version (TOPA). Results showed that, on average, children receiving intervention earned higher TOPA scores, indicating increased phonological awareness. In addition, intervention paired with summer school enrollment resulted in the greatest increase in scores. Additional research with a larger sample is needed to determine statistical significance of these results.

Economics

Women, Job Flexibility, and the Gender Wage Gap
Nathanael Schaffer
Faculty Mentor/Collaborator: David Schaffer

Poster #57

In the April 2014 issue of the American Economic Review, the lead article, written by Claudia Goldin of Harvard University, was titled, “A Grand Gender Convergence: Its Last Chapter.” In this article she used several familiar economic data sets for her analysis along with a newer and less familiar data set called “O-Net” to measure job “flexibility.” Unexpectedly, she concluded that, while the gender wage gap in the U.S. still exists, it can be almost completely explained by women’s preferences (versus men’s) for occupations and jobs that are more “flexible.” We decided to look closely at the O-Net data provided by the U.S. Department of Labor, containing detailed descriptions of about 1000 different occupation categories based on surveys of both workers and job analysts. The Labor Department collects answers to more than 500 questions about each occupation. Goldin used the responses to just eight of the 500 questions to determine how “flexible” each occupation is. However, the O-Net database is
very large, and it includes many more than eight variables that relate to an occupation’s flexibility. We are looking at whether Goldin’s reliance on just eight characteristics is too narrow.

**Disparity of Gender in the Fields of Economics and Entrepreneurship**

**Rachel Pratt**

Faculty Mentor/Collaborator: Oleksandr Lugovskyy

Poster #134

There exists a problem of underrepresentation of women in economics and entrepreneurship. We attempt to understand the causes by creating a new measure of placement dispersion of the graduates in these fields. We hope to uncover the reason why there is a disparity of gender in the fields of economics and entrepreneurship. The project is meant to empower women to take an interest in the fields that have been considered male dominated which will contribute to the advancement of education for women. We will collect data on enrollment, graduation, and placement data of men and women in economics. We will produce a measure of placement dispersion based on major and our hypothesis is that higher dispersion is perceived as higher risk. Since there is evidence that women are perceived as risk-averse, we hypothesize that the disparity in gender can be rooted in perceived risk associated with the economics and entrepreneurship majors. We will research the problem in detail at UW-Eau Claire. We will be able to propose sensible and practical solutions of attracting more women to economics and entrepreneurship.

**Local Economic Indicators: Gas Prices and Current Events**

**Rachel Pratt, Yining Li, Jacob Staszak**

Faculty Mentor/Collaborator: Oleksandr Lugovskyy

Poster #135

In this project, we observe the changes in gas prices and motor vehicle registrations. We examine the relevant data from public records, including the American Automobile Association (AAA) and the Department of Motor Vehicles (DMV), and attempt to explain the changes. We then make our analysis publicly available to help the students and the community better understand how news from around the world affect the Eau Claire area. We hope our explanations and projections help the community members develop correct expectations of future gas prices and make sound decisions on motor vehicle purchases.

**Local Economic Indicators: Unemployment and Housing**

**Sam Gullerud, Trenten Stefonek, Daniel Steiner**

Faculty Mentor/Collaborator: Oleksandr Lugovskyy

Poster #136

We collect, analyze, and interpret data relating to unemployment and housing. We attempt to inform the student body and the community about local economic conditions. Our project is important because we compare national, regional, and local data that is not provided by anyone else that we are aware of. We collect data online from websites such as the Bureau of Labor Statistics. These data reveal short-term and long-term trends. We post our results and make them available for the community and UWEC students. Through this project we educate the UWEC students about economics and local economic conditions. Our presentation will highlight analysis of the latest economic trends.

**A Closer Look at the Eau Claire Economy: the Losers, the Winners and the Dogs of the DOW**

**Jacob Raleigh, Jisu Kim, Patrick Lemke**

Faculty Mentor/Collaborator: Oleksandr Lugovskyy

Poster #149

This project takes a close look at the companies that operate in the Eau Claire area. We track the stock performance of 37 companies and compile weekly reports on the best and worst performers. Seeing the week–to-week dynamics and fluctuations helps us understand which companies are performing well and which ones are lagging. Additionally, these stocks can be compared to some of the best stocks from the Dow Jones Industrial Average – known as the Dogs of the Dow. By comparing these two categories, we can see how the best and worst performing companies in the Eau Claire area stack up to some of the most well-known companies in the US.
Eau Claire Area Stock Prices Indicator Project
Abel Tan, Benjamin Halliday, Kheng Horng Gan
Faculty Mentor/Collaborator: Oleksandr Lugovskyy
Poster #150
We designed a stock prices index, similar to S&P 500, comprised of 37 companies who do significant business in the Eau Claire area. The index is constructed every January by determining which publicly traded companies should be included. We invested an imaginary $100,000 equally divided among 37 companies to create an equal weight index called the Eau Claire Baskets (ECB). Observing the fluctuations in the index value allows us to understand how well the companies that have substantial operations in the area are performing and how they impact our local economy. After researching the reasons behind the fluctuations in the index, we share our findings with other students and the community via Facebook and Twitter. Our project is part of the work of the Center for Economic Research @ UWEC.

Comparing City Attractiveness: Eau Claire, La Crosse, and Madison Food Index
Callum Beadles, Erin Grim
Faculty Mentor/Collaborator: Oleksandr Lugovskyy
Poster #151
As Baby Boomers leave the work force, states must find ways to attract the Millennial generation in order to sustain economic growth. This project focuses on what the state of Wisconsin could possibly do to attract college educated members of the Millennial generation. Most economic research suggests that there are various economic factors that attract individuals. Our project concentrates on and measures how attractive cities are within the state depending on their food culture. In order to quantify our idea, we have created a specific measurement that utilizes crowd sourced data and rates cities on a scale of 0-100. The higher the score, the more attractive the city. We were able to obtain results from three metropolitan areas in Wisconsin. Our findings indicate that Madison would be the most attractive city to live in. However, we want the results to be a helpful tool for those who might want to live in Wisconsin. More research and data collection is needed to make this available to more cities and states.

Economics and Management & Marketing
Measuring the Impact of Incentives on School Level (Aggregate) Fruit and Vegetable Consumption in Two Wisconsin Elementary Schools
Jisu Kim, Nicholas Douglass, Emily Koehn, Jonathan Pumper
Faculty Mentors/Collaborators: Eric Jamelske (Economics), Sydney Chinchanachokchai (Management & Marketing)
Poster #132
Fruit and vegetable intake among children in the United States is well below recommended USDA guidelines. Recent research examines the influence of incentives to motivate children to eat more fruit and vegetables. We partnered with two Western Wisconsin elementary schools to examine the influence of a variety of incentives on aggregate school-level fruit and vegetable consumption by children (N=420 and N=440) during school lunch. We observed and recorded consumption over an initial baseline period (3 days) followed by an incentive period (6 days) and a return to baseline period (3 days). Students were informed of what prizes they could earn if consumption increased through school-wide morning announcements and pre-lunch classroom announcements during the incentive period. Our results show aggregate fruit and vegetable consumption increased in both schools during the incentive period, but the increase in school one was larger than in school two. We also found that only one school sustained an increase in consumption during the return to baseline period, but this increase was limited to only fruit. Our results contribute to the discussion and development of best practices that can be used by schools in collaboration with researchers and community partners to increase children’s fruit and vegetable intake.
Successes, Challenges and Recommendations regarding Using Incentives to Increase School Level (Aggregate) Fruit and Vegetable Consumption in Elementary Schools
Alexander Brault, Alaina Culbertson, Zhi Wen Leong, Lucy Ramquist
Faculty Mentors/Collaborators: Eric Jamelske (Economics), Sydney Chinchanachokchai (Management & Marketing)

Poster #133

Fruit and vegetable intake among children in the United States is well below USDA recommended guidelines. Recent research examines the influence of incentives to motivate children to eat more fruit and vegetables. We partnered with two Western Wisconsin elementary schools to examine the influence of a variety of incentives on children's aggregate fruit and vegetable consumption (N=420 and N=440) during school lunch. We observed and recorded consumption over an initial baseline period (3 days) followed by an incentive period (6 days) and a return to baseline period (3 days). We found incentives worked to increase children's aggregate fruit and vegetable intake for lunch. However, there were several challenges over the study. First, we could not control the quality of fruits and vegetables served each day to students which impacted our results. Second, in a short survey assessing the engagement/participation of teachers, only 14 out of 40 (35%) returned completed questionnaires. Additionally, the limited results suggested teachers had a low level of engagement in encouraging students to consume more fruits and vegetables. Our results contribute to the discussion/development of best practices that can be used by schools in collaboration with researchers and community partners to increase children's fruit and vegetable intake.

Economics, Watershed Institute, and Communication and Journalism

A Contingent Valuation Study Comparing Public Willingness to Pay for Climate Change Mitigation in China and the United States
Brittany Flaherty, Hunter Hermes, Joy Larson
Faculty Mentors/Collaborators: Eric Jamelske (Economics), James Boulter (Watershed Institute), Won Yong Jang (Communication and Journalism)

Poster #152

As the world's two largest greenhouse gas polluters, the US and China are of particular interest regarding climate change. Because the costs/benefits of taking climate action arise in a non-market environmental setting, we employ a contingent valuation method to estimate public willingness-to-pay (WTP) as a measure of supporting policy action. Surveys were conducted in the US (n=3,641) and China (n=3,717) between September and November 2013. Respondents were asked if they would support a climate policy if it increased their average monthly household expenditures by one of three initial bid amounts. Responses of no to that bid amount are followed up with a lower amount, while yes responses are followed up with a higher amount. As a validity check, bid value and acceptance rates were examined. Importantly, a declining acceptance for higher compared to lower bids was found. Adjusting for income differences across countries, we find average Chinese WTP is approximately twice the level of US WTP. Our results show a positive correlation between climate change and environmental awareness variables and WTP in both countries. We also find significant influences of political ideology on WTP in the US. These findings are important given the anticipated costs of addressing climate change.

Assessing American and Chinese Citizen Support for Joining an International Climate Change Treaty
Helue Vazquez Valverde, Shawn Peterson, Gregory Sikowski
Faculty Mentors/Collaborators: Eric Jamelske (Economics), James Boulter (Watershed Institute), Won Yong Jang (Communication and Journalism)

Poster #153

China and the United States share the highest importance related to potential climate change mitigation policies because they are the world's two largest greenhouse gas polluters and the two largest economies. Because meaningful climate action will require the cooperation and participation of both China and the US, it is important to better understand what Chinese and American citizens think about this issue. We use data from surveys conducted in the US (n=3,641) and China (n=3,717) between September and November 2013 to explore American and Chinese views regarding whether or not their country should join an international treaty to address climate change. We find significantly greater support for joining an international climate treaty in China (86.5%) compared to the US (68.8%). Support for joining an international climate change agreement drops by approximately 10 percentage points in each country if it is stated that the other country will not also join the treaty. Our analysis also reveals a positive correlation between support for international climate action and acceptance of the substantial scientific consensus regard-
ing the realities of anthropogenic climate change. The results of this study should be interesting and informative to all parties considering the issue of global climate change policy.

**Geography and Anthropology**

**An Interdisciplinary Approach to the Urban Streetscape of Budapest’s Andrássy út**  
Trace Osborn, Amanda Blue  
Faculty Mentor/Collaborator: Ezra Zeitler  
Poster #28

As Budapest’s most prominent boulevard, Andrássy út (Andrássy Way) exhibits a variety of urban land uses designed to showcase Hungarian history and culture and provide modern housing and leisure amenities for the city’s elite. Designed and constructed in the 1870s, it is anchored in by Erzsébet tér (Erzsébet Square) in the city center and extends 2.42 km (1.5 mi) northeast to Városliget (City Park). This study, conducted in summer 2014 by students in UW-Eau Claire’s interdisciplinary Central European Travel Seminar (CETS), examined the cultural streetscape of the boulevard through the lens of geography, history, and music. Teams of researchers were dispatched to designated stretches of Andrássy út to document the ways in which historically and musically significant buildings and institutions coincide with high-end residential and commercial land uses. Landscape analysis was then utilized to document concentrations of specific types of land uses. As the city embarks on a massive redevelopment project that will convert Andrássy út from mixed use corridor into the tourism-focused Andrássy Quarter, this study marks an important transition period in the boulevard’s history.

**Entering the Portland Graffiti Scene**  
Hannah Adams  
Faculty Mentor/Collaborator: Ezra Zeitler  
Poster #33

Graffiti remains a controversial topic for many cities throughout the world drawing the concern of citizens, government officials, and city planners alike. On one hand, graffiti can be hard to interpret and can be seen as vandalism, a criminal act. On the other hand, graffiti is also seen as an art form of human expression that allows an artist to interact with the community. Changes in Portland, Oregon’s street art laws and abatement programs have led to a shift in where street art is found within the city. The goal of this research project was to observe any significant correlation between certain graffiti styles and its environment, such as the surrounding socioeconomic status of residents or zoning classifications. Data were collected on site using a mobile ArcGIS Online application that collected GPS point coordinates as well as the corresponding photos from a variety of neighborhoods and zoning classifications in Portland. Graffiti was found to be more populated in mixed residential and commercial zoning areas. This suggests that these zones are desirable to some graffiti artists due to the populated traffic and wide audience that pass through those areas.

**From Albina Access to a Reduction in Rockwood: Analysis of Access to Low-Income Resources in Portland, Oregon**  
Nathanael Schaffer  
Faculty Mentor/Collaborator: Ezra Zeitler  
Poster #58

The city of Portland, Oregon has been lauded within the planning community for efforts that have led to its consideration as one of America’s most livable cities. However, negative externalities have accompanied gentrification and redevelopment efforts in the inner city. The past five decades have seen the displacement of low-income residents from high-access neighborhoods to the outskirts of the city into neighborhoods with comparatively reduced access. This study seeks to compare access to resources specifically developed for low-income residents using the Albina and Rockwood neighborhoods as types of gentrification and displacement by analyzing quantitative data such as straight-line distance and estimated public transit travel time. Further analysis, conducted with a geographic information system (GIS), identifies low-income resource categories that are less accessible than others for the Rockwood neighborhood in order to inform the placement of future resources by agencies working to meet the needs of Portland’s transitioning low-income population.
**Biking for the Masses: Investment and Education for a More Equitable Infrastructure in Portland, Oregon**

Alison Olmstead  
Faculty Mentor/Collaborator: Ezra Zeitler  
Poster #62

Portland, Oregon is one of the global leaders in bike commuting and infrastructure. Portland has reached and satisfied the needs of its devoted but small bike community, and has come to a crossroads where increased infrastructure and education is needed to convince a wider range of residents to participate. It is in the city’s best interest to increase the use of bikes as there are significant health, environmental and economic benefits. In-person interviews collected in Portland with bike commuters, non-profit bike shops geared towards education, major local business owners, and the Mayor of Portland were conducted to better understand the bike culture and the general outlook on the future of the city. Utilizing GIS (geographic information systems) to map the gender of cyclists at over 200 intersections, shows a substantial gender gap across the entire city. Portland needs to address gender inequalities if they want to increase their cycling population while simultaneously making it more equitable. My analysis concludes that Portland’s ambitious goal of making bike commuting more accessible and promote bicycle use for short trips is possible by adding more safe infrastructure and also with the efforts of non-profits devoted to economically liberating lower-income residents through educational programs.

**Tapping into a Revolution: How Local Hop Production Influences the Craft Beer Industry**

Miles Hegg, Dakota Dorn  
Faculty Mentor/Collaborator: Ezra Zeitler  
Poster #64

In 1854, United States hop production was concentrated in four counties in central New York. By 1920, hop production had migrated through the Midwest to the Pacific Northwest—nearly eliminating production on the East Coast (Parsons 1940). The purpose of this research project is to analyze the historical progression of hop production in this era to provide support to the present craft beer “revolution” in Oregon. In the 1970s, Oregon experienced a cultural movement towards locally made products, and this fostered the development of the state’s craft beer industry. The passing of the Oregon Brewpub Law in 1985 permitted the production and sale of craft beer from one location (Woodward et. al. 2010). To better understand the connection between the migration of hop production, the emergence of craft beer culture, and the particularly provincial nature of the culture, we used Wes Flack’s concept of ‘neolocalism’ as our guide and historical archives, present day literature, and on-site interviews with brew masters, brewpub owners, hop farmers, and Oregonian beer enthusiasts to examine the ways that craft beer thrives on the geographical ties to ‘place’, thus making local hop production a key factor in the growth of Oregon’s craft beer industry.

**Neighborhood Markets in Istanbul: Urban Food Access and Its Spatial, Social and Economic Variables**

Galen Keily, Anna Waller, Nicholas Bartelt, Josephine Kallenbach  
Faculty Mentors/Collaborators: Paul Kaldjian, Cyril Wilson  
Poster #91

It is reported that 70% of Turkey’s population does most of their food shopping at neighborhood bazaars (periodic markets). Across Istanbul, there are approximately 350 of these markets – about 50 on any given day. They are a traditional food distribution institution that survives into the modern era of supermarkets and superstores. This research project examines the contested place of these bazaars in contemporary Istanbul and explores spatial, social, and economic relationships in an attempt to understand the contribution of Istanbul’s markets to meeting basic human needs. We use observational tools such as exploratory pedestrian surveys and retail price surveys, as well as secondary and unpublished data from Istanbul officials. This study seeks to inform the understanding of food access in urban settings.
A Gradient Analysis of Urban Neighborhood Morphology in Istanbul: a Case Study of the Kadıköy-Ataşehir Corridor
Danielle Schroeder, Mercedes Johnson, Lara Bockenstedt, Jessica Trampf
Faculty Mentors/Collaborators: Cyril Wilson, Paul Kaldjian

Urban transformation is one of the most conspicuous phenomena of the past half century with significant implications for urban ecosystems and human life. As a result of the importance of urban areas for a large fraction of a country’s population, it becomes essential to periodically collect information on the morphology and spatial patterns of urban areas for planning and management purposes. A unique technique widely utilized for such updates is a gradient analysis with the use of the transect study. Istanbul has undergone immense urban development and change since the mid-20th century. To help us understand this change and its significance for urban life, it is meaningful to undertake a graded transect survey within neighborhoods of Istanbul. A transect study systematically tracks spatial patterns and accounts for variability of landscape over space. This study will engage a belt transect method along the Kadıköy-Ataşehir corridor in collecting primary data such as field observations, GPS locations, photographs, and other observational data. In addition, secondary data on population will be integrated with primary data to analyze spatial variability of urban morphology in Istanbul. Results of this study will be instrumental in the assessment of changes in Istanbul’s urban landscape.

Lexical Variation within Louisiana French
Mary Eppolite
Faculty Mentors/Collaborators: Ezra Zeitler (Geography and Anthropology), Jessica Miller (Languages)

Does Louisiana French (LF) consist of multiple dialects or one dialect with rich language variation? This research sought to identify varying dialect features, namely vocabulary, in order to find potential geographical patterns within the data. Interaction and close proximity to various languages and cultures significantly impacted the French spoken within Louisiana: the most prominent influences came from English. Starting in 1803, there was a movement to “Americanize” Louisiana: speaking French became taboo until after WWII. Today, French still exists within this region, however, it is quickly dying out. Researchers such as Drs. Albert Valdman and Barry Ancelet have spent significant time working to save LF. Five LF language resources were used to identify 15 words of interest whose English translations carry the meaning of boogyman or monster and ghost or spirit. These five sources and a LF corpus were used to identify parishes where these words were employed. Finally, recorded instances with corresponding parish locations were mapped using Abode Illustrator. While this survey is not exhaustive, it provides a sense of patterns in prevalence of certain terms. These results will help document and preserve LF and provide material that could potentially be used to create language instruction resources.

Provenance of Ancient Pottery From Bethsaida, Israel
Jonathan Luczak, Claire Edel
Faculty Mentors/Collaborators: Harry Jol (Geography and Anthropology), Anthony Wagner (Materials Science)
External Mentor: Carl E. Savage, Doctor of Ministry Program, Drew University

The purpose of this study was to determine whether ancient pottery classified as Herodian oil lamps found at Bethsaida, Israel were produced locally or if they were imported from outside the Galilee region. It is hypothesized that pottery characterized as common ware, e.g. jugs and dishes, were produced locally while Herodian oil lamps were imported from outside the region. A handheld Niton XL3t 900S GOLDD X-Ray fluorimeter (XRF) was used to conduct elemental analysis on a total of thirty-three pottery samples. Seven samples from Bethsaida represented common ware and eighteen were characterized as Herodian oil lamps. Eight pottery samples were recovered by Kinneret College from three known pottery manufacturing centers in the Galilee region that were in operation when Bethsaida was a functioning city. Plotting the strontium concentrations (ppm) of the pottery samples
against their zirconium concentrations (ppm) resulted in three distinctive clusters on an x-y graph. Based on the clusters, all seven of the common ware and two Herodian oil lamps found at Bethsaida were composed of clays that originated in the Galilee region. The majority of the Herodian oil lamps found at Bethsaida (15) were manufactured at a common location, but outside of the Galilee region.

**Kinesiology**

*Perceptions on Same- vs. Opposite-Sex Coaches and Athletic Trainers among Division III Collegiate Athletes*

Sarah Montee, Jerica Breen, Samantha Houle, Calla Karl  
Faculty Mentors/Collaborators: Mary La Rue, Saori Braun  
Poster #142

Since the passing of Title IX in 1974, female sports teams have increased. Despite this expansion, a research study done in 2002 demonstrated that the number of female coaches and athletic trainers remains the same. The purpose of this study is to view the perspectives of athletes and how comfortable they are with coaches and athletic trainers of the same and opposite sex. We intend to measure athletes’ perceptions by employing a questionnaire that presents a scenario of having same- and opposite-sex coaches and their comfort levels with same- and opposite-sex athletic trainers when being treated for different injuries. A total of 100 male and female athletes will be recruited on campus, and the questionnaires will be completed in the athletic training room from March-April 2015. Scores of perceptions on coaches and athletic trainers will be compared between males and females. Results from this study can be used to justify equality in the hiring process in the future.

**Management and Marketing**

*Does Sexual Orientation Sell? A Study of Homosexuality in Advertising*

Laurena Schug  
Faculty Mentors/Collaborators: Sydney Chinchanachokchai, Nancy Hanson-Rasmussen, Lauren Brewer  
Poster #106

This project looks at consumers and their thoughts on advertising by incorporating characteristics of diversity within advertisements. The intention is to determine the effect of diverse advertising, specifically sexual orientation, on diverse consumers. The demographics of some consumer groups are changing, offering rich opportunities to target new, untapped markets. The need to adapt to diverse populations is critical; however, clarity is needed on how to attract and adapt. Two sets of print advertisements will be tested, those using homosexual models and those using heterosexual models. The print advertisements will feature goods of two categories: conspicuous consumption (luxurious) products and utilitarian (everyday) products. Students will be asked for their feelings toward the products as well as their potential purchase intention based on the advertisements. We expect to see students react more favorably to homosexuals in ads for conspicuous consumption products than utilitarian products. In terms of practical applications, the findings of this research would help brand managers strategically create ads that would yield the most positive consumer feedback.

*Is Creativity Slowing Us Down?: The Role of Multitasking on Consumer Creativity*

Emily Karch  
Faculty Mentor/Collaborator: Sydney Chinchanachokchai  
Poster #107

Today, consumers have a tendency to multitask due to the availability of mobile devices. Consumers sometimes need to use their creativity to alter a product or to create a new product (Burroughs et al. 2008). The purpose of this research is to examine how multitasking affects consumer creativity. The two types of tasks in which consumers engage in are classified as perceptual or cognitive. The study consists of three experimental conditions (single task, multitasking with perceptual task, multitasking with cognitive task). The single-task condition had participants perform an idea generation task, which asked participants to generate uses for a newspaper. The other two conditions had participants complete the idea generation task while simultaneously performing a secondary task (cognitive or perceptual). Participants then answered questions assessing task enjoyment. We analyzed the number of ideas generated, the average creativity score of the ideas generated, and the self-assessed task enjoyment using ANOVA. The findings indicate that people who were multitasking were less creative than those who were doing only one task.
Moreover, those in the single-task condition seemed to enjoy the task more. These findings have many implications for further research regarding the underlying reasons as to why these specific effects are seen.

**Perceptions of Service Recovery Among Hispanic Americans: The Role of Language and Ethnic Identification**

Lisa Krautkramer, Katherine Hammel  
Faculty Mentor/Collaborator: Carolin Azab  
Poster #126

Service recovery involves a dynamic interaction between the service provider and the customer after a service failure. In such interaction, salient ethnicity cues, as well as the language customers and service providers use become an integral part of the service encounter evaluation. Yet, the role of language and ethnicity in the service failure and recovery literature is limited. The objective of this research is to add to this limited knowledge by exploring the role that language and ethnic identification play in service recovery among Hispanic Americans. The research uses an experimental design in which the language (English versus Spanish) and ethnicity (Caucasian versus Hispanic) of the service provider were manipulated to create four different scenarios. We hypothesize that consumers who report strong Hispanic ethnic identification will report greater satisfaction with the service recovery, trust, positive word of mouth, and a higher repurchase intention if the service recovery is done in Spanish with a Hispanic provider. The research will aid managers in providing better service recovery strategies to help regain trust and build customer loyalty. It could also affect the recruitment decisions managers make when selecting frontline employees, such as hiring more minority employees or employees who can speak Spanish fluently.

**Viability of Corporate Sponsorship for the National Wheelchair Basketball Association**

Whitney Nyholm, Michaela Perz, Phillip Dickinson  
Faculty Mentor/Collaborator: Scott Swanson  
Poster #127

This research examines the importance of corporate sponsorship in relationship to the financial needs of the National Wheelchair Basketball Association (NWBA). Wheelchair basketball is one of the most popular sports among people with disabilities. Although the NWBA’s growth and popularity is improving, greater efforts are needed to expand current revenues and to explore new methods of increasing operational budgets. Corporate sponsorship is an area that the NWBA must address to help solve these issues. Athletes with physical disabilities competing in the NWBA, staff of various NWBA teams, as well as family and friends and fans of NWBA participants were surveyed (n = 360). A self-administered questionnaire included questions consisting of demographic information as well as general knowledge and attitudes toward consumer beliefs on sponsorship. We clarify respondent’s 1) attitudes toward team and sport identity, 2) beliefs toward the importance of sponsorship of wheelchair basketball and the NWBA, 3) identify word-of-mouth behaviors, 4) purchasing decisions relative to sponsorship of wheelchair basketball, and 5) attitudes toward the firm’s that sponsor athletic events as well as those featuring athletes with physical disabilities. Relationships between the investigated behaviors, attitudes, feelings, beliefs are identified relative to the collected descriptive data.

**NFL 101: Understanding the Female Market for Professional Football**

Brooke Davis, Amanda Cornell, Nathaniel Gurlaski  
Faculty Mentor/Collaborator: Scott Swanson  
Poster #128

The purpose of this research is to better understand the female professional football fan. The proliferation of alternative and competing sports has heightened competition for attendance, television revenue, and sponsorship dollars. The result has been a reinvigorated focus on satisfying fans and executing sound marketing. Perhaps not surprisingly, a wealth of this new marketing effort has been directed toward female spectators with novel approaches to build female fan bases such as NFL 101 camps. A structured, self-completion questionnaire was utilized to collect primary data from a National Football League market development event for women (n = 199). The study findings assessed: 1) attitudes towards the team and event, 2) level of fan identification, 3) specific outcomes related to attendance at the event, 4) motivations for attending the event, 5) behavioral intentions towards the team and team sponsors, and 6) respondent demographics. Based on our analyses we provide an overview of attitudes and opinions regarding the market development event. In addition, a number of significant relationships are identified and we are able to provide strategic recommendations regarding both the NFL 101 camp experience, and how to better approach the underdeveloped female sport segment.
Fan Identification and Segmentation of NFL Workshop Participants
Keith Kubitschek, Brandon Boogren
Faculty Mentor/Collaborator: Scott Swanson

This research utilizes an established measure of fan identification to identify similarities and statistically significant differences across female participants in a national football league promotional event. Fan identification is best described as a person's perception of “oneness or belongings” with an organization. Identification with a brand community is predicted to exert an influence on brand-related support and purchase behaviors. Although there are predicted desirable benefits of fan identification, there is little empirical research on its existence or consequences. Females participating in a National Football League (NFL) workshop were asked to participate in the study. Primary data was collected utilizing a self-completion questionnaire distributed at an NFL 101 camp. Respondents were segmented based on their level of identification with the sports organization. Utilizing SPSS we identified a number of significant relationships between level of identification and workshop attendance motivations, workshop satisfaction, and future intentions towards the team. Based on our analysis we also provide strategic recommendations to the sponsoring NFL franchise.

Globalization and Islam: A Case Study of Indonesian Islamic NGOs
Rebecca Lawrence
Faculty Mentor/Collaborator: Eunsook Jung

Many scholars have argued that globalization has undermined Islamic culture as it promotes Western culture through the media and its economic and political power. However, globalization is not at odds with Islamic culture. I will explain this through two non-governmental organizations (NGOs) in Indonesia, Muhammadiyah and Nahdlatul Ulama (NU). By examining the activities of these two organizations, I argue that globalization has not necessarily affected Islamic cultural identity negatively. Instead, Islamic organizations responded to the challenges of globalization proactively and established interconnectedness, cooperation, and tolerance. As a result, they are reinforcing their Islamic beliefs and practices. In my research, I focused on three key areas – social services, peace building, and the environment. My research is based on open-ended interviews and focus groups with the leaders and members of Muhammadiyah and NU during fieldwork which was conducted in July 2014 in Indonesia.

Excusing Inexcusable Acts: Techniques of Neutralization Use by Priests
Byron Hazard
Faculty Mentor/Collaborator: Jason Spraitz

In 1957, Sykes and Matza published their theory of how people justify immoral or unlawful behavior. Their theory presented five techniques of neutralization that explained how people rationalize their actions. Our research looks specifically at the techniques used by Roman Catholic priests from Chicago and Los Angeles to explain allegations of sexual abuse that have been levied against them. While the knowledge of priest sexual abuse has been known for some time, it was not until recently that Church files containing information relevant to the allegations were released. With this information, we conducted a content analysis of that data in order to determine the techniques that accused priests used. Our results show that all of Sykes and Matza’s techniques have been used by these priests. These findings can help pave the way for future policy changes and continued research.

Psychology

Discriminative Stimulus Effects of Naltrexone in Rats with Limited Access to Sucrose
Kyleigh Twaroski, Katrina Hanson, Aric Staub
Faculty Mentor/Collaborator: David Jewett

In most operant paradigms, large doses of naloxone are typically required to establish naloxone as a discriminative stimulus in opioid-naïve subjects. Chronic, but limited access to sucrose increases endorphin and dopamine function in rats. We wondered if rats given limited access to sucrose could be trained to recognize doses of naltrexone (NTX), an endorphin antagonist, that are typically not discriminable in operant paradigms. In order to test this
hypothesis we used a discrimination study where subjects trained to display a discrimination between being administered NTX or saline, which produces no effect on endorphin levels. Subjects were given 12 hours access to water during the day and 12 hours access to sucrose (25% or 32%) at night, supplied an hour before testing. In a two-lever operant box, NTX (3.2 mg/kg, 15 min PT) was paired with left lever presses and saline was paired with right lever presses. Subjects were considered to have acquired the discrimination after 80% correct responses for 8/10 consecutive training days. Subjects learned to discriminate NTX from saline in a mean of 72 sessions (Md = 63, range 27-135 sessions). These results provide further support for the notion that chronic sucrose consumption increases endogenous endorphin function.

Mindfulness Correlates in University Students
Tom Gugel, Hannah Geis, Zachary Donovan, Carlee Schneider
Faculty Mentor/Collaborator: Mickey Crothers
External Collaborators: LeHandra Felder, Alumni, Hemapreya Selvanathan, University of Massachusetts-Amherst

Mindfulness is 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 a more accepting stance toward distressing thoughts and emotions. Mindfulness has proven useful for stress-reduction (Kabat-Zinn, 2012) and treatment of multiple forms of anxiety (e.g., Hertenstein et al., 2008; Goldin & Gross, 2010; Kearney et al., 2013). This project advances current knowledge by identifying psychological characteristics that covary with mindfulness. The present study builds upon an earlier pilot project by using a refined, extended measure with a larger sample. Self-report data were collected via online questionnaire from a convenience sample of 200 undergraduate students. The composite measure addressed numerous psychological variables, including emotion regulation, distress tolerance, psychological well-being, neuroticism, resilience, anxiety, and depression. Correlational and regression analyses (underway) will determine the variables most likely enhanced by increasing participants’ mindfulness. We anticipate that greater mindfulness will correlate positively with higher levels of emotion regulation and distress tolerance, and correlate inversely with anxiety. The findings will serve as the basis for developing a very brief mindfulness intervention for use in the clinical treatment of anxiety disorders.

Do Music Interventions Reduce Negative Mood? A Review of the Recent Literature
Michael Rawls
Faculty Mentor/Collaborator: Catya von Karolyi

Medication is the first line of treatment for anxiety and depression; but drug therapies can have undesirable side-effects (i.e., Chan, Wong & Thayala, 2011). It is therefore important to determine the efficacy of alternate treatments that do not risk drug-related side effects. Employing Nvivo software, we examined the empirical research and our resulting review of the empirical literature confirmed that music therapy can lessen symptoms of such mood disorders in individuals with (i.e., Erkkilä, Punkanen, Fachner, Ala-Ruona, Pontio, Tervaniemi, Vanhala & Gold, 2011) and without (i.e., Hwang, 2013) clinical diagnoses. Music-related interventions, including music therapy, employ musical activities, such as listening (i.e., Goodling, 2008), performing, composing, or improvising music (i.e., Gold, Solli, Krüger & Lie, 2009). In addition to lessening symptoms of mood disorders, music-related interventions may be helpful in reducing negative mood states in non-clinical populations. Some music-related interventions, however, can retrieve painful memories, which could increase, rather than reduce negative mood (i.e., Baker, 2013). Research is thus needed to examine positive mood change through music-related interventions in nonclinical populations and should target individual differences in relation to the characteristics of the music (such as genre, key, mood-congruence, arousal-level, and familiarity) and type of musical activity.

Early Literacy Assessment: Comparing PALS-K and STAR Early Literacy
Reese Butterfuss, Danielle Meyer
Faculty Mentor/Collaborator: Mary Tusing

Effective screening is essential for identifying children who are at risk for failing to meet academic benchmark standards. However, there is a lack of research on the predictive accuracy and predictive validity for the PALS-K and STAR Early Literacy assessments. We used archival data collected from a school district in Wisconsin to explore predictions for first-grade reading performance. We hypothesized that PALS-K and STAR Early Literacy differ in classification accuracy and accuracy of predictions for first-grade testing.
An Investigation into the Relations of Maternal Relationship Quality, Friendship Quality, and Peer Aggression

Jenna Rosquist
Faculty Mentor/Collaborator: Jennifer Muehlenkamp
Poster #169

The current study investigated whether individuals who reported having low quality relationships with their mothers would report having engaged in more acts of peer aggression and report having lower quality friendships than individuals who reported having an average or high quality relationship with their mother. The study drew from existing theories on attachment, which have suggested that the early relationships one has with their mother are pivotal in influencing the development of social-relational competencies, particularly engagement in interpersonal aggressive behaviors. To test study hypotheses, a survey-instrument comprised of three peer-reviewed measures was employed through Qualtrics to UWEC students (n = 294) in Spring 2014. Data analyses revealed that participants who reported having low quality relationships with their mothers engaged in significantly higher levels of peer aggression and reported significantly lower levels of friendship quality than did participants who reported having average or high quality relationships with their mothers (p < .005). Results allow us to consider how mother-child relationship quality may be a key variable in understanding the development of prosocial and anti-social behaviors, and how future research may use results to invent a social-curriculum that would address this variable and encourage the development of prosocial behaviors during childhood.

Ignorance is Not Bliss: Acknowledging Gender Neutral Bathrooms on College Campuses

Casey Hoffman, Anna Weber
Faculty Mentor/Collaborator: Blaine Peden
Poster #179

The purpose of this study was to examine binary gender issues faced by transgendered students. We conducted a naturalistic observation study exploring the use of public bathrooms by individuals on the UWEC campus. We recorded the apparent gender and age of individuals using traditional and gender neutral bathrooms in Centennial Hall and the Davies Center. We also observed whether users hesitated before entering a bathroom and whether they entered individually or with a companion. The observed ratio of males to females at each location matched the expected campus demographic of 2:3 for both bathrooms. Participants disproportionately hesitated before entering the gender neutral bathrooms verse traditional bathrooms. There was no correlation between gender and hesitation entering the bathroom. Participants that were accompanied by another individual only entered a traditional bathroom; however, there was no association between the type of bathroom and bathroom companionship. The results lead us to conclude that students are indifferent to gender neutral bathrooms potentially indicating equality of nonconforming individuals throughout the student body. Hesitation and no companion might indicate that the individual is embarrassed to enter the gender neutral bathroom.

Gender Differences in Attitudes and Experiences with Alcohol

Carissa Gutsmiedl, Rachel Fischer, Sara Badour, Kelsey Rolefson
Faculty Mentor/Collaborator: David Leland
Poster #180

In 2010, the U.S. Center for Disease Control and Prevention rated the prevalence of binge drinking highest in Wisconsin, bringing attention to the drinking habits of Wisconsin college campuses. Previously we conducted an electroencephalography (EEG) research study and found that women paid more attention to alcohol stimuli than men. We developed a survey to look at University of Wisconsin-Eau Claire students on gender differences in drinking frequency and social factors that lead to differential association (e.g. age of first drink, sensitivity to surroundings, motivations to drink). We will report our findings on the differences between the genders on these measures.

Electrophysiology of Errors: Error-Related Negativities in the Flanker Task

Sara Badour, Kelsey Rolefson, Rachel Fischer, Carissa Gutsmiedl, Calvin Verdegan, Gretchen Bye, Claire Brennan, Rachelle Belott
Faculty Mentor/Collaborator: David Leland
Poster #181

When individuals performing a task during EEG recording make incorrect responses there is typically a negative peak in brain electrical activity roughly 50-100 milliseconds after that response, called the error-related negativity (ERN). This ERN, observed toward the front/center of the head and most likely generated by the anterior cingulate cortex, is associated with response monitoring and error detection. We are piloting an experiment in which the ERN is evoked by errors made in a flanker task: participants performing a computerized task attempt to identify
the direction of a central arrow flanked by four other arrows pointing in the same (congruent) or opposite (incongruent) direction. The incongruent condition typically results in higher error rates, allowing for investigation of the ERN. We will present our methodology and preliminary findings and discuss our plans to look at the ERN as a physiological correlate of anxiety and academic stress. With this line of research, we hope ultimately to better understand how individual traits and performance pressures influence how we react to and learn from errors.

Similarity Between Friends and Romantic Partners in Moral Intuitions

Whitney Joseph, Dana Strothenke, Gregory Sikowski, Mallory Dernbach, Emily Cox
Faculty Mentor/Collaborator: April Bleske-Rechek

Friends and romantic partners are similar to one another in education level, interests and hobbies, attractiveness, and social and political attitudes. In this study, we tested the hypothesis that individuals select relationship partners who are similar to themselves in the moral intuitions that underlie political attitudes: fairness/justice; caring/protecting from harm; loyalty/patriotism; obedience/respect for authority; and purity/sanctity. We approached male-male, male-female, and female-female dyads in a high-traffic lounging area of a public university. This sampling method resulted in 98 pairs of same-sex friends, 38 pairs of opposite-sex friends, and 19 heterosexual dating couples. We assessed each participant's standing on the five moral foundations and their perceptions of the friendship/relationship. In partial support of the hypothesis, dyad members were similar in their endorsement of three moral foundations: harm/care, authority, and purity. The strongest assortment was in attitudes toward purity, which has been linked to people's feelings about abortion, same-sex marriage, and immigration. We found no links between relationship duration and degree of similarity between partners, which suggests that individuals select relationship partners who are similar to themselves rather than become similar to their relationship partners over time. We discuss the implications of assortment for intra-individual stability in attitudes and beliefs.

Attraction and Attractiveness in a Naturally Occurring Sample of Opposite-Sex Friends

Whitney Joseph, Heather Williquette
Faculty Mentor/Collaborator: April Bleske-Rechek

Previous studies of heterosexual adults have found that young men report more attraction toward their opposite-sex friends than women do. To investigate whether discrepancies in attraction between friends are tied to discrepancies in physical attractiveness, we approached, surveyed, and photographed male-female dyads on a college campus. Of the dyads we approached, 40 were friends and 37 were romantically involved (our comparison group). Outside judges (n=71) rated each person's attractiveness. In this sample of naturally occurring friendships, men did not report more attraction to their opposite-sex friend than women did, and judges did not rate female friends as more physically attractive than their male counterparts. Participants' perceptions of attractiveness were tied to attraction, however, such that men and women who perceived their friend as attractive also reported more attraction to their friend. Indeed, men and women rated their friend as more attractive than outside judges rated their friend; and the more biased participants were about their friend's attractiveness relative to what outsiders said, the more attraction they reported toward their friend. We conclude that (1) attraction in opposite-sex friendships varies widely and is frequently not mutual; and (2) both men and women sometimes befriend those they perceive as potential mates.

How Crude! Personality Judgments of Men and Women Who Swear

Yan Lin Lee, Carly Murray, Dana Strothenke
Faculty Mentor/Collaborator: April Bleske-Rechek

We investigated people's first impressions of men's and women's personality traits as a function of their use of taboo language. Drawing from past research on personality and language use, sex differences in swearing frequency, and the negative emotional valence attached to many taboo words, we hypothesized that people will form more negative first impressions of the personality traits of (1) people who swear than of people who do not swear, and (2) women who swear than of men who swear. Using hypothetical vignettes, we asked men and women to imagine overhearing either a man or woman tell a story about a series of events at work. The story included either five high-frequency taboo words (shit, hell, assholes, fuck, damn) or five negatively-valenced non-taboo words. Preliminary analyses revealed that male storytellers who used taboo language were judged to be more impolite, aggressive, and psychopathic compared to male storytellers who did not use taboo language. Female storytellers who used taboo language were judged to be more impolite than female storytellers who did not use taboo language, but overall participants did not form more negative impressions of women who swore than of men who swore. We discuss our future research plans.
Does Test Difficulty Matter? Examining the Influence of Stimulus Difficulty on Cues that Affect Learning Confidence in Young Adults
Yan Lin Lee, Tyler Small
Faculty Mentor/Collaborator: Jarrod Hines

Poster #197

One’s memory for past test performance (MPT) is an important cue used in deciding whether and how to restudy material. Prior research has shown that cues other than MPT relate to people’s confidence in how well they think they have learned material following a second study opportunity. These cues include objective memory accuracy during the first test opportunity (prior to restudy), subjective memory confidence in memory accuracy during the first test, objective response times during the first test, and subjective response time estimates (how fast they think they responded to test questions). In the current research, we will use a cognitive task to investigate the degree to which the above-listed cues for memory confidence are reactive to different learning conditions. Participants will learn multiple word pairs (e.g., IVY-BRIDGE), be tested on their memory for each pair, and be given an opportunity to restudy the same word pairs. Whereas prior research used word pairs that were homogeneous in their level of difficulty, the current research will use a mixture of easy-to-remember (e.g., REASON-THINK) and difficult-to-remember (e.g., CLEMENCY-IDIOM) word pairs. We expect the relative impact of cues on memory confidence to change depending upon the difficulty of stimuli.

Perfectionism, Self-Handicapping, and Academic Boredom: Honors vs. Non-Honors Students
Hannah Geis
Faculty Mentor/Collaborator: Mary Beth Leibham

Poster #207

The negative effects of self-handicapping, perfectionism, and academic boredom are documented in numerous studies; however, few studies examine the relationships among these constructs. This study aims to examine the relationships among self-handicapping, perfectionism, boredom and achievement motivation, and how these constructs differ between Honors and non-Honors students. Perfectionism is a multidimensional construct, consisting of three dimensions: adaptive perfectionism, maladaptive perfectionism, and non-perfectionism. Adaptive perfectionists have high standards, and feel they are able to meet these standards. Maladaptive perfectionists also have high standards, but feel they consistently fail to meet these standards. Non-perfectionists do not have high standards in comparison to perfectionists. Self-handicapping refers to actions that increase the likelihood that one can externalize failure (e.g., staying up late before an exam). Finally, academic boredom refers to a highly aversive affective state experienced while studying or in the classroom. Approximately 200 UWEC students will complete online surveys assessing their levels of perfectionism, self-handicapping tendencies, boredom, and achievement motivation. This data will be analyzed using SPSS to perform regression analyses examining the interrelationships among these constructs. This exploratory study has the potential to help educators identify students who may be at risk for unrealistic expectations, ineffective study strategies, or academic boredom.

Exploring the UWEC Campus Climate Surrounding Disabilities
Katie Beck, Amanda Marx, Melanie Niquette, Alison Prahl, Kellie Risberg
Faculty Mentor/Collaborator: Mary Beth Leibham

Poster #208

An increasing aspect of diversity in higher education is disability with roughly 11% of all students enrolled in college having a disability. In order for students with disabilities to be successful in college, an environment in which they feel supported, accepted, and fully integrated into the campus community is necessary. Unfortunately, students with disabilities often report feeling uncomfortable self-disclosing their disabilities on campus, fearing that others will have negative reactions to them (Baker, Boland, & Nowik, 2012). The purpose of this study is to examine college students’ attitudes toward disability and their perceptions of disability as an aspect of diversity. Further, this study will explore students’ perceptions of the campus climate surrounding disability. By assessing students’ attitudes toward disability, their perceptions of diversity, and the campus climate surrounding disability, we hope to gain a better understanding of the current campus climate as it relates to disability. Approximately 200 UWEC students will complete online surveys assessing their perceptions of disabilities, diversity, and the campus climate surrounding disability. This study has the potential to inform the higher education community of the importance of recognizing disability as an aspect of diversity, as well as highlighting the importance of a positive campus climate surrounding disability.
When Misfortune Befalls Another
Amanda Johnson, Cassandra Abel
Faculty Mentor/Collaborator: April Bleske-Rechek

Schadenfreude is the feeling of pleasure in response to another’s misfortune. We designed the current study to determine (1) the degree of schadenfreude people feel in evolutionarily relevant domains, such as small group belonging, large group status, attractiveness, and mating success; and (2) whether feeling happiness in response to another’s misfortune is more closely tied to disliking them or envying them. We asked participants (N=240) to think of a same-sex peer they either envied (but did not dislike), disliked (but did not envy), or envied and disliked. Then they imagined hearing about that person experiencing four misfortunes -- one involving their small group exclusion, one involving a fall in large group status, one involving a decrement in attractiveness, and one involving a mating failure -- and reported how happy they felt the moment they heard about each misfortune. Participants reported more happiness in response to misfortunes happening to someone they disliked, or to someone they disliked and envied, more than to someone they envied (but did not dislike). All four domains elicited a moderate amount of happiness, and across sex the mating failure elicited the most schadenfreude. Our findings reveal that young adults experience schadenfreude in a variety of contexts.

They Should Have Seen it Coming: Hindsight Bias in Evaluation of Romantic Relationship Outcomes
Michaela Gunseor, Yan Lin Lee
Faculty Mentor/Collaborator: April Bleske-Rechek

Hindsight bias is commonly referred to as the “I knew it all along” effect. First documented by Fischhoff (1975), individuals who are informed of a specific outcome prior to judging how the event will pan out perceive that outcome as more likely to occur than do individuals who are not given any outcome information. In the current research, we investigate hindsight bias in people’s perceptions of romantic relationship outcomes. All participants reviewed a hypothetical scenario about a couple and the development of their romantic relationship; at the end of the scenario, one of the partners was sexually unfaithful. Then, in the control condition, participants assigned a 0-100% likelihood rating to three possible relationship outcomes for this couple dealing with the infidelity. In three different experimental conditions, the scenario was followed by a statement describing one of the three specific outcomes, and participants were instructed to ignore that outcome knowledge as they assigned a 0-100% likelihood rating to all three possible outcomes. Participants also evaluated the quality of the relationship and what they thought the partners should have done. We predict that participants who are given outcome knowledge will be unable to ignore it when evaluating the couple and forecasting outcomes.

Sex Differences in the Focusing Illusion
Katie Plamann, Casey Bloechl
Faculty Mentor/Collaborator: April Bleske-Rechek

The term “focusing illusion” is used to describe the tendency for people’s evaluations of their life satisfaction to be affected by prior exposure to questions about their standing on a specific life domain. In the current research, we tested the hypothesis that men and women succumb to the focusing illusion at different rates depending on context. We used a 4 (context) x 2 (gender) x 2 (question order) between-subjects expericorr design (N=318) to test the predictions that men’s and women’s evaluations of their overall happiness are (1) differentially affected by engaging in prior evaluations of their physical attractiveness (W>M), ambition (M>W), and short-term mating success (M>W); and (2) similarly affected by prior evaluations of their desirability as a potential romantic partner (M=W). In the experimental conditions, participants evaluated themselves on one of the four domains and then reported their life satisfaction. In the control conditions, domain-specific evaluations occurred after people reported their life satisfaction. Analyses revealed no focusing illusion effects for either sex in any context. Because focusing illusion effects have been revealed in numerous previous studies, we suggest that the non-significant effects in the current study are due to restricted range in participants’ life satisfaction ratings and domain-specific self-evaluations.
Comparing Concurrent Choice and Demand Curve Procedures as Assessments of Reinforcer Value  
Allyson Salzer, Molly Barlow, Evan Dahl, Carlee Toddes  
Faculty Mentor/Collaborator: Carla Lagorio

Within behavioral and economic fields, there are several commonly utilized methods for assessing the value of a reinforcer, including concurrent choice, progressive ratio responding and breakpoints, and demand curve analyses. While these methods are utilized when assessing consumer preference and reinforcer efficacy, prior studies have demonstrated that the results of these measures do not always align. The current research analyzes this further, by comparing choice and demand for two different reinforcer types in rats – grain pellets and Ensure. Each subject completed demand functions for the two reinforcer types separately, and were then permitted free choice between the two commodities at different ratio values. Initial results indicate that while Ensure is highly preferred in a concurrent-choice paradigm (near exclusive preference for Ensure over grain pellets), grain pellets retain as high or higher levels of demand as does Ensure. Continued work is assessing how the bias parameter in the matching law and other common assessments of reinforcer efficacy align with these results and could add to the general understanding of reinforcer value.

Efforts to Reduce Student Food Waste in Campus Dining Areas  
Taylor Custer, Maggie Reardon  
Faculty Mentor/Collaborator: Carla Lagorio

Recent environmental and social justice movements have emphasized the importance of reducing food waste, due to the energy required to produce and transport food, as well as the millions of individuals living in food-deprived conditions. In the U.S., food is the number one material taking up landfill space. While some food waste is inevitable, cafeterias not only produce excessive amounts of consumer food waste from unfinished meals but also serve thousands daily and therefore hold potential for addressing this large-scale issue. The current study focuses on the primary buffet style cafeteria at UWEC. After dining, students put their leftover food on a conveyor belt upon exiting, and Sodexo workers empty uneaten food into bins. Student researchers weigh the bins five days per week to generate the weight of leftover food. Two efforts have been underway attempting to decrease student food waste. One has been the introduction of an infographic on the tables in Hilltop Café. The second has challenged students to beat their waste amounts from the previous week. Results of these two manipulations will be discussed. Ideally, these efforts will increase students’ awareness of the impact of their choices and ultimately will reduce food waste on Eau Claire’s campus.

The Implicit Effects of Religious Priming on Prejudice and Prosocial Behavior  
Cody Butcher, Jody Herrmann, Sathya Jeevanba, Kassondra Andereck, Casey Bloechl  
Faculty Mentor/Collaborator: Jeffrey Goodman

Previous research from our lab and others’ has provided evidence that 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. Participants then were given measures to assess their likelihood to volunteer and advocate for certain minority groups. Finally, they completed measures of mood and empathy to test for mediators. We anticipate that priming religious concepts will increase rates of volunteering and advocating among nonbelievers, but decrease rates among believers. Our findings will be discussed in light of their contributions to the understanding of the relationships between religious beliefs, prejudice and prosocial behavior.

Midwest Nice, Southern Hospitality, and Coastal Cool  
Joshua Day, Savanha Drew  
Faculty Mentor/Collaborator: Jeffrey Goodman

Does the quantity of friends and intimacy of those friendships vary as a function of the region of the United States that they reside in? Previous research has shown differences in the big five personality traits that vary by region of the country. Our study aims to expand on those findings as they pertain to friendship quantity and the level of closeness in those friendships. We will be distributing an online survey sampling populations from different regions
of the country. We will be gauging their responses using previously established measures and looking for statistically significant differences between regions. Our hypothesis is that there will be no difference in the number of very close or best friends nor the level of closeness in those friendships. Where we expect to see differences is in the quantity of casual friends and acquaintances as well as the level of closeness individuals perceive in those friendships.

**Heterosexuals’ Sexual Prejudices and Behavioral Reactions to Stigma by Association Threats**

**Jenna Lee, Sarah Nigro**  
Faculty Mentor/Collaborator: Angela Pirlott

Our research sought to understand the sexual prejudices heterosexual men and women hold toward heterosexual, bisexual, and gay/lesbian men and women by applying an affordance-management perspective (Gibson, 1979; McArthur & Baron, 1983; Neuberg et al., 2010; Pirlott & Neuberg, 2014), which proposes that human cognition and behavior serve to manage the perceived threats and opportunities (affordances) posed by others in a social environment. Prejudices between groups arise due to specific affordances each group is perceived to pose, which elicit specific emotions, which lead to specific behaviors to manage that affordance (Cottrell & Neuberg, 2005). Heterosexual participants rated their perceptions of affordances posed by, emotional reactions to, and behavioral inclinations toward heterosexual, bisexual, and gay/lesbian men and women. Mediation analyses determined how perceived stigma by association threats elicited specific emotional and behavioral responses. When participants perceived the threat of being misidentified as non-heterosexual and gender non-normative, participants were more likely to publicly avoid and engage in direct or indirect aggression toward target groups of the same-sex, motivated by anger. Our results demonstrated that same-sex non-heterosexual individuals are perceived to pose threats of stigma by association, which elicits anger, which leads to public avoidance of and aggression toward the target groups.

**Mate Preference Perception Predicts Strategies for Attracting Mates**

**Stephanie Beck, Charles Bakalars**  
Faculty Mentor/Collaborator: Angela Pirlott

Our research examined how perceptions of mate preferences influence a person’s behavior when attempting to attract a potential mate. Participants rated nineteen mate characteristics for their perceptions of mate preferences, and the extent in which they try to appear to possess these nineteen mate characteristics when attracting a potential mate. To examine the relationship between our predictor variable—perceived importance of a mate characteristic, and the outcome variable—the extent in which they strategize to appear to possess the mate characteristic, we ran regression analyses. Our findings overall indicate people strategize themselves to appear to possess the preferred mate characteristic relative to the extent they perceive the preference of that characteristic. For instance, for long and short-term relationships men and women’s perception of the importance of intelligence significantly predicted reports of the extent in which they try to appear intelligent when attracting a potential mate, $\beta = 0.37, p < .001$ and $\beta = 0.31, p < .001$, respectively long and short-term relationships. This suggests when attracting a potential mate a person’s behavior changes as a function of the perceived importance of mate characteristics.

**Understanding Heterosexuals’ Sexual Prejudices and Behavioral Reactions to the Fundamental Motive of Mating**

**Sarah Nigro, Jemma Lee**  
Faculty Mentor/Collaborator: Angela Pirlott

Our research sought to understand the sexual prejudices heterosexual men and women hold toward heterosexual, bisexual, and gay/lesbian men and women by applying an affordance-management perspective (Gibson, 1979; McArthur & Baron, 1983; Neuberg et al., 2010; Pirlott & Neuberg, 2014), which proposes that human cognition and behavior serve to manage the perceived threats and opportunities (affordances) posed by others in a social environment. Prejudices between groups arise due to specific affordances each group is perceived to pose, which elicit specific emotions, which lead to specific behaviors to manage that affordance (Cottrell & Neuberg, 2005). Heterosexual participants rated their perceptions of affordances posed by, emotional reactions to, and behavioral inclinations toward heterosexual, bisexual, and gay/lesbian men and women. Mediation analyses determined which perceived mating threat elicited specific emotions leading to a behavioral response. When heterosexual men and women perceived a sexual interest discrepancy, participants were more likely to behave in avoidant behavior, which was driven by negativity for heterosexual men and fear and negativity for heterosexual women. Our results demonstrate how certain perceptions elicit various emotions, which evoke a specific behavioral response to effectively
Mate Preference Perception Predicts Self-Presentation Mating Strategies among Gay Men and Lesbians
Charles Bakalars
Faculty Mentor/Collaborator: Angela Pirlott
Poster #241

Our research examined how gay men and lesbians adjust their behavior in order to present themselves in ways perceived desirable to a potential romantic partner. Our goal was to contribute new knowledge of gay men and lesbians’ strategies when attracting mates and develop how these strategies affect successful preferred mating acquisition. To test this, gay men and lesbians rated the importance of 19 mate characteristics, their perception of how important these traits are to their preferred dating partner, and their likelihood of presenting oneself as being high on those characteristics to attract a mating partner. We performed regression analyses to determine whether perceiving those traits as important predicted using those traits as mating strategies, while controlling for other strategies. Results suggested that perceiving a particular trait as highly important predicted presenting oneself as having that trait, across most traits.

Social Work

Does an Undergraduate Aging and the Aged Course Have an Impact on Students’ Attitudes towards Working with Older Adults?
Patricia Gibson
Faculty Mentor/Collaborator: Lisa Quinn-Lee
Poster #182

The purpose of this study was to better understand undergraduate students’ attitudes towards working with older adults. Due to the rapidly growing population of older adults, universities must educate more students on the issues facing an aging society. Prior studies have linked poor knowledge of aging to negative attitudes and emotions about aging, as well as to low interest in working with older adults. Some researchers suggest that education about aging may provide a successful intervention for these variables. This study included a mixed-methods approach. Students in the Fall Semester 2014 SW 315 Aging and the Aged course completed a demographic questionnaire at the begin-
ning of the semester. Students also completed a pre-test of the Kogan Attitude Toward Old Persons Scale (Kogan, 1961) at the beginning of the semester and a post-test of the Kogan Attitude Toward Old Persons Scale at the end of the semester. The data is still being analyzed, but we hope to see improved attitudes towards older adults.

Music + Memories = Magic: Wisconsin Nursing Home and Community Projects
Joyce Idarraga, Allison Sontag, Ariel Yang, Alissa Peanasky
Faculty Mentors/Collaborators: Lisa Quinn-Lee, Donald Mowry
Poster #183

Music is a relatively low-cost and low-risk approach to managing the behavioral and psychological symptoms of dementia. Our first project is bringing the national Music and Memories program into 150 nursing homes. Agency staff will be surveyed close to the start of the Music & Memory Project, at 3 months, and at 6 months to evaluate the impact of this program on staff and overall work environment. The second project is taking the Music and Memories program into the Eau Claire community by bringing the benefit of personalized music to 25 persons with dementia living in their homes with a caregiver. Caregivers will complete the Caregiving Distress Scale (CDS) at intake and at 3-month follow-up. In addition, they will also complete a questionnaire about and to evaluate the feasibility and impact of the music on caregivers’ stress level and quality of life. These projects are not yet complete. The kinds of results we expect are that personalized music decreases caregiver stress, including paid caregivers in nursing homes and family caregivers in the home. The hope is that the music intervention will not only help people with dementia, but will also help support caregivers and reduce caregiver stress.

Sociology

Who’s Missing in the Research on Young Adult Relationships?
Nerissa Woehler, Jordan Gilbertson
Faculty Mentor/Collaborator: Kathleen Nybroten
Poster #192

Much of the current research on college student attitudes and behaviors ignores a large segment of that population—that of students involved in strong religious affiliations and active in faith-based student organizations. This study aims to capture the perspective of these missing voices. Using the literature on emerging adulthood, we focus on the concept of “healthy” relationships. Our research questions include: How do young adults define “healthy” relationships? What are student’s expectations about dating relationships in college? In what ways are the relationship attitudes and behaviors between students who belong to faith-based student organizations on campus differ from other students? This research expands our knowledge of union formation during the transition to young adulthood. Our research is conducted using survey methodology with a convenience sample of college students.

Asexuality: An Emerging Sexual Orientation and Identity
ML Tlachac
Faculty Mentor/Collaborator: Peter Hart-Brinson
Poster #193

Since the founding of Asexual Visibility and Education Network (AVEN) in 2001, discussions about asexuality in the academic community have begun. However, academic research on asexuality has not kept up with the evolving self- and collective-identities of the asexual community. Our goal is to create a more comprehensive description of asexual orientations and identities by combining knowledge from both academic research and sources internal to the asexual community. We consult previous studies from outside researchers, newspaper articles, AVEN surveys, and information gathered from self-identified asexuals. This shows that there are many dimensions of asexual orientation and identity, which fall on a complex spectrum. We argue that it is important to study asexuality because it will yield a more in-depth understanding of other sexual orientations and identities by comparison. The more information we amass about different identities, the better we can conceptualize the vast array of orientations. Also, the study of asexuality highlights impacts of our highly sexualized society, the cultural marginalization of asexuals, and ways to incorporate asexuals into the dominant culture.

“Water Privatization” as a Social Problem
Kailee Delveaux  
Faculty Mentor/Collaborator: Jeff Erger  
Poster #213

We investigated water privatization as a social problem from the social constructionist perspective. Much research has been done on the economic and social effects of water privatization, but little has been done to explain why it emerged as a topic of interest beyond those directly affected. Using *New York Times* news articles dating back to 1988, we conducted content analysis looking for key terms that would track the issues and players, and how rhetoric changed over time. Key findings include: water privatization became a “problem” around 2000, rose in coverage to a peak from 2005-2006, disappeared from the news articles by 2007, and was then replaced by “utility privatization”; the date that “water privatization” disappeared coincided with the statement by experts that “water privatization” was a failure; women and children are mentioned in stories only as victims, not as active agents of social change. We conclude that the switch of rhetoric from “water privatization” to “utility privatization” serves the interest of water privatization multinationals by marginalizing discussions using “water privatization” to activist news sources, and by casting discussions on the topic into more abstract economic terms, thus decreasing the mention of “victims” in news stories.

Content Analysis of Energy Conservation Non-Profit Organizations  
Andrew Bocher  
Faculty Mentors/Collaborators: Tarique Niazi, Jeremy Hein  
Poster #263

The environmental nonprofit sector is becoming just as important as traditional environmental social movements. It has been steadily growing in recent decades due to an increasing public awareness of the need to radically transform humanity’s social organization so as not to cause irreversible climate change. Because of the pivotal role that fossil fuel combustion has played in global warming, reducing energy use and transitioning to renewables have been two major components of the environmental nonprofit sector’s growth. This study involves taking a 2% random sampling of 2,369 energy conservation nonprofits and community organizations from “idealirst.org” and comparing certain variables amongst them. The variables researched will be year founded, geographic scope, areas of focus, and types of service provided. Through a content analysis of the various nonprofits’ online information the author will create a spreadsheet to reveal quantitative findings about the trends amongst the organizations of the random sampling. These findings will provide useful tools for explaining how NPOs contribute to social change in ways similar and different from traditional social movement organizations.

Watershed Institute

Do Values Expressed toward Sand Mining Facilities in Western Wisconsin Change over Time?  
Carlie Simkunas  
Faculty Mentor/Collaborator: Karen Mumford  
Poster #26

The rapid pace of frac sand mine siting and development continues to generate conflict among residents living in western Wisconsin. These conflicts are driven by underlying value differences. Those favoring sand mining may invoke economic values (jobs, taxes) while opponents may invoke environmental or quality of life values. We examined articles from news sources to assess whether expressions of value toward sand mining facilities had changed over time. Given increasing numbers of mining operations and increasing public interactions with these facilities, we wanted to assess whether value expressions as identified in newspaper articles remained stable or changed. A database of sand mining articles from 2007-2014 was created from news sources representing three Wisconsin counties with sand mining facilities: Chippewa, Dunn, and Eau Claire. A coding dictionary was developed to code values identified in each article. Value expressions were quantified to examine whether the frequencies of these expressions changed in articles from 2007-2009 compared to articles from 2012-2014. Preliminary analyses suggest that human health values may be increasing in frequency. Tracking these expressions may help policy makers and sand mining officials adjust policies or practices to accommodate shifting values.

Guatemala Immersion: Case Study of a Short-Term International Service Learning Experience
Rachel Ahlf, Kacey Yahnke, Leslie Thompson
Faculty Mentor/Collaborator: Karen Mumford

Poster #35

Of the 289,408 US students who studied abroad in 2013/2014, 61% participated in short-term (8 weeks or less) immersion experiences (IIE, 2014). Short-term experiences are affordable, accommodate non-traditional student schedules, provide international experiences without impacting time to graduation, and often include service learning or volunteer opportunities (Hulstrand, 2006). However, do short duration immersions provide substantive opportunities for students to engage with community members to form reciprocal learning-based relationships? We conducted a case study analysis of the University of Wisconsin Eau Claire service learning immersion experience to Guatemala. For two weeks in 2015, students participated in service learning at three locations: a coffee cooperative, an orphanage, and a volunteer-based mission. This study provides a unique opportunity to compare student experiences across three different settings. Notes and interviews gathered from students are being analyzed using a service learning framework to assess student perspectives on: (1) the level of meaningful and personally relevant service activities; (2) the degree that the activities were collaborative, mutually beneficial, and addressed community needs; and (3) whether the experience promoted understanding of diversity and mutual respect (Facing the Future 2005). We then compare findings across all three experiences to identify strategies to improve short-term international immersion experiences.

Campus Sustainability Survey at the University of Wisconsin Eau Claire: A Comparison of Student and Staff Perspectives
Ben Manley, Michael Becker, Cara Wiskow
Faculty Mentor/Collaborator: Karen Mumford

Poster #36

During Spring and Fall of 2014, students and faculty/staff at the University of Wisconsin Eau Claire (UWEC) were surveyed to determine similarities and differences in their perspectives about and level of support for campus sustainability initiatives. Questions addressed issues associated with food, campus landscaping, water, energy, waste, transportation, commuting behaviors, sustainability priorities, and sustainability communication strategies as well as respondent demographics. Survey questions were developed and tested by members of the UWEC Student Office of Sustainability. Survey questions were then entered into Qualtrics survey software to allow surveys to be disseminated electronically to campus students, faculty and staff. Permission to use listserves for students and faculty/staff were provided by UWEC Student Senate and Human Resources. Survey data were downloaded and then analyzed using SPSS statistical software. After removing incomplete surveys, 497 faculty/staff and 463 student valid surveys were received. Responses among students and faculty/staff indicate support for various campus-based sustainability efforts. Preliminary analyses indicate that faculty/staff and students perspectives vary significantly across a variety of sustainability issues on campus. Results from this survey will be used by the Student Office of Sustainability to inform future campus sustainability initiatives.
Religious beliefs are most often transmitted from parents to their children (Milevsky, Szuchman, & Milevsky, 2008). Arnett and Jensen (2002) have shown that a change of religious identity often takes place in emerging adults transitioning from home-life to college-life. Family communication patterns have been dichotomized into conformity-orientation and conversation-orientation. According to Ritchie (1991), conformity-orientation is when parents work to influence a child to conform or agree and conversation-orientation is the degree to which parents support an open flow of communication. These family communication patterns have been associated with the level of disclosure between children and their parents (Koerner & Fitzpatrick, 2002). The aim of this study is to determine whether there is an association between college students’ change in religious identity, a willingness to disclose that change, and family communication patterns. Using a sample of undergraduate students from a university in the Midwest, a Qualtrics survey was used to gather data regarding students’ change in religious identity, whether they chose to reveal this change to their parents, and their motivation for withholding or disclosing this change. Data was analyzed to determine whether these factors were associated with family communication patterns. With the ever-increasing movement of society toward secularism, strategies these results might uncover may help the current generation effectively disclose a change in religious identification to their families.
### Student Index

<table>
<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abel, Cassandra 94</td>
<td></td>
</tr>
<tr>
<td>Adams, Hannah 62, 63, 66, 84</td>
<td></td>
</tr>
<tr>
<td>Adams, Lauren 52</td>
<td></td>
</tr>
<tr>
<td>Ahlf, Rachel 100</td>
<td></td>
</tr>
<tr>
<td>Aken, Tyler 63</td>
<td></td>
</tr>
<tr>
<td>Allison, Tim 4</td>
<td></td>
</tr>
<tr>
<td>Alves Heinze, Daniel 72</td>
<td></td>
</tr>
<tr>
<td>Amaris, Jessica 3</td>
<td></td>
</tr>
<tr>
<td>Andereck, Kassondra 95</td>
<td></td>
</tr>
<tr>
<td>Anderson, Niklas 59</td>
<td></td>
</tr>
<tr>
<td>Anderson, Samantha 55</td>
<td></td>
</tr>
<tr>
<td>Arvey, Allison 30</td>
<td></td>
</tr>
<tr>
<td>Aumann, Casey 46</td>
<td></td>
</tr>
<tr>
<td>Aken, Tyler 63</td>
<td></td>
</tr>
<tr>
<td>Alves Heinze, Daniel 72</td>
<td></td>
</tr>
<tr>
<td>Amaris, Jessica 3</td>
<td></td>
</tr>
<tr>
<td>Andereck, Kassondra 95</td>
<td></td>
</tr>
<tr>
<td>Anderson, Niklas 59</td>
<td></td>
</tr>
<tr>
<td>Anderson, Samantha 55</td>
<td></td>
</tr>
<tr>
<td>Arvey, Allison 30</td>
<td></td>
</tr>
<tr>
<td>Aumann, Casey 46</td>
<td></td>
</tr>
<tr>
<td>Badour, Sara 91</td>
<td></td>
</tr>
<tr>
<td>Baftir, Mazam 67</td>
<td></td>
</tr>
<tr>
<td>Bakalars, Charles 96, 97</td>
<td></td>
</tr>
<tr>
<td>Bakke, Tanner 71</td>
<td></td>
</tr>
<tr>
<td>Ban-Herr, Allison 43</td>
<td></td>
</tr>
<tr>
<td>Barlow, Molly 95</td>
<td></td>
</tr>
<tr>
<td>Bartelt, Nicholas 85</td>
<td></td>
</tr>
<tr>
<td>Bauer, Kiersten 11</td>
<td></td>
</tr>
<tr>
<td>Beadles, Callum 82</td>
<td></td>
</tr>
<tr>
<td>Becker, Michael 100</td>
<td></td>
</tr>
<tr>
<td>Beckett, Jessie 35</td>
<td></td>
</tr>
<tr>
<td>Beck, Katie 93</td>
<td></td>
</tr>
<tr>
<td>Beckman, Leah 25</td>
<td></td>
</tr>
<tr>
<td>Beck, Stephanie 96</td>
<td></td>
</tr>
<tr>
<td>Behrens, Syler 43, 66</td>
<td></td>
</tr>
<tr>
<td>Belott, Rachelle 91</td>
<td></td>
</tr>
<tr>
<td>Benjamin, Alexis 21, 78</td>
<td></td>
</tr>
<tr>
<td>Berger, Sydney 29</td>
<td></td>
</tr>
<tr>
<td>Bergmann, Henry 27</td>
<td></td>
</tr>
<tr>
<td>Berg, Mitchell 78</td>
<td></td>
</tr>
<tr>
<td>Bernardy, Erin 12</td>
<td></td>
</tr>
<tr>
<td>Beutel, Raina 6</td>
<td></td>
</tr>
<tr>
<td>Bhattacharyay, Sudeep 54</td>
<td></td>
</tr>
<tr>
<td>Bissen, Molly 22</td>
<td></td>
</tr>
<tr>
<td>Bloechl, Casey 94, 95</td>
<td></td>
</tr>
<tr>
<td>Blotz, Kaelyn 69</td>
<td></td>
</tr>
<tr>
<td>Blue, Amanda 84</td>
<td></td>
</tr>
<tr>
<td>Bluem, Jesse 76</td>
<td></td>
</tr>
<tr>
<td>Bockman, Andrew 77, 99</td>
<td></td>
</tr>
<tr>
<td>Boczenstedt, Lara 86</td>
<td></td>
</tr>
<tr>
<td>Bomber, Michael 63</td>
<td></td>
</tr>
<tr>
<td>Boogren, Brandon 89</td>
<td></td>
</tr>
<tr>
<td>Bortolameolli, Drake 65</td>
<td></td>
</tr>
<tr>
<td>Brandes, Elizabeth 57</td>
<td></td>
</tr>
<tr>
<td>Brault, Alexander 83</td>
<td></td>
</tr>
<tr>
<td>Breen, Jerica 87</td>
<td></td>
</tr>
<tr>
<td>Brennan, Claire 91</td>
<td></td>
</tr>
<tr>
<td>Brel, Sarah 53</td>
<td></td>
</tr>
<tr>
<td>Briski, Drew 65</td>
<td></td>
</tr>
<tr>
<td>Brockman, Kyle 34</td>
<td></td>
</tr>
<tr>
<td>Brost, Steven 69</td>
<td></td>
</tr>
<tr>
<td>Brown, Nicole 23</td>
<td></td>
</tr>
<tr>
<td>Brueske, Matthew 66</td>
<td></td>
</tr>
<tr>
<td>Brusaber, Danielle 41</td>
<td></td>
</tr>
<tr>
<td>Bryant, Winnifred 47</td>
<td></td>
</tr>
<tr>
<td>Bunda, Alexandra 52</td>
<td></td>
</tr>
<tr>
<td>Burfield, Megan 28</td>
<td></td>
</tr>
<tr>
<td>Burgess, Gregory 71</td>
<td></td>
</tr>
<tr>
<td>Burish, Emily 10</td>
<td></td>
</tr>
<tr>
<td>Butcher, Cody 95</td>
<td></td>
</tr>
<tr>
<td>Butterfuss, Reese 20, 25, 26, 90</td>
<td></td>
</tr>
<tr>
<td>Bye, Gretchen 91</td>
<td></td>
</tr>
<tr>
<td>Carlson, Bailey 66, 74</td>
<td></td>
</tr>
<tr>
<td>Carlson, Hailey 80</td>
<td></td>
</tr>
<tr>
<td>Carlson, Katie 77</td>
<td></td>
</tr>
<tr>
<td>Carothers, Kari 50</td>
<td></td>
</tr>
<tr>
<td>Carpenter, Benjamin 18, 35</td>
<td></td>
</tr>
<tr>
<td>Carpenter, Leia 27</td>
<td></td>
</tr>
<tr>
<td>Chase, Amanda 22</td>
<td></td>
</tr>
<tr>
<td>Christenson, Emily 62</td>
<td></td>
</tr>
<tr>
<td>Christian, Joseph 72</td>
<td></td>
</tr>
<tr>
<td>Cleereman, Jacqueline 29</td>
<td></td>
</tr>
<tr>
<td>Colwitz, Alyssa 46</td>
<td></td>
</tr>
<tr>
<td>Condon, Timothy 61, 62</td>
<td></td>
</tr>
<tr>
<td>Conjurske, Jonathan 8</td>
<td></td>
</tr>
<tr>
<td>Conor, Phillip 72</td>
<td></td>
</tr>
<tr>
<td>Conway, Kaitlyn 33</td>
<td></td>
</tr>
<tr>
<td>Cornell, Amanda 88</td>
<td></td>
</tr>
<tr>
<td>Cota Araujo, Mahira Adna 72</td>
<td></td>
</tr>
<tr>
<td>Cox, Emily 92</td>
<td></td>
</tr>
<tr>
<td>Culbertson, Alaina 83</td>
<td></td>
</tr>
<tr>
<td>Custer, Taylor 95</td>
<td></td>
</tr>
<tr>
<td>Daas, Melanie 16</td>
<td></td>
</tr>
<tr>
<td>Dahl, Anthony 18</td>
<td></td>
</tr>
<tr>
<td>Dahl, Evan 95</td>
<td></td>
</tr>
<tr>
<td>Daley, Caitlin 77</td>
<td></td>
</tr>
<tr>
<td>Daley, Katie 32</td>
<td></td>
</tr>
<tr>
<td>Daul, Samantha 29</td>
<td></td>
</tr>
<tr>
<td>Davis, Brooke 88</td>
<td></td>
</tr>
<tr>
<td>Day, Joshua 95</td>
<td></td>
</tr>
<tr>
<td>Degner, Benjamin 70</td>
<td></td>
</tr>
<tr>
<td>Delveaux, Kailee 99</td>
<td></td>
</tr>
<tr>
<td>DePrenger-Gottfried, Gavriel 72</td>
<td></td>
</tr>
<tr>
<td>Dernbach, Mallory 19, 26, 92</td>
<td></td>
</tr>
<tr>
<td>Desilet, Emily 28</td>
<td></td>
</tr>
<tr>
<td>de Waard, Matthias 60</td>
<td></td>
</tr>
<tr>
<td>Dickinson, Phillip 88</td>
<td></td>
</tr>
<tr>
<td>Dictus, Christopher 18</td>
<td></td>
</tr>
<tr>
<td>Dixon, Andrew 46</td>
<td></td>
</tr>
<tr>
<td>Doering, Michael 1</td>
<td></td>
</tr>
<tr>
<td>Donegan, Mallory 29</td>
<td></td>
</tr>
<tr>
<td>Donley, Emma 97</td>
<td></td>
</tr>
<tr>
<td>Donovan, Zachary 90</td>
<td></td>
</tr>
<tr>
<td>Dorn, Dakota 66, 85</td>
<td></td>
</tr>
<tr>
<td>Douglass, Nicholas 82</td>
<td></td>
</tr>
<tr>
<td>Dowling, Justin 68, 71</td>
<td></td>
</tr>
<tr>
<td>Drewiske, Kimberly 77</td>
<td></td>
</tr>
<tr>
<td>Drew, Savanna 95</td>
<td></td>
</tr>
<tr>
<td>Dulaney, James 54</td>
<td></td>
</tr>
<tr>
<td>Dupont, Michael 3</td>
<td></td>
</tr>
<tr>
<td>Dylla, Maxwell 41</td>
<td></td>
</tr>
<tr>
<td>Edel, Claire 64, 86</td>
<td></td>
</tr>
<tr>
<td>Egendorf, Rachel 21</td>
<td></td>
</tr>
<tr>
<td>Ehrenberg, Elizabeth 36</td>
<td></td>
</tr>
<tr>
<td>Ellefson, Sydney 77</td>
<td></td>
</tr>
<tr>
<td>Elsing, Matthew 30</td>
<td></td>
</tr>
<tr>
<td>Emerson, Hayley 46</td>
<td></td>
</tr>
<tr>
<td>Emmert, Aaron 19</td>
<td></td>
</tr>
<tr>
<td>Enderson, Mitchell 68</td>
<td></td>
</tr>
<tr>
<td>Epolite, Mary 86</td>
<td></td>
</tr>
<tr>
<td>Erickson, Nicholas 6</td>
<td></td>
</tr>
<tr>
<td>Ericson, Melissa 28</td>
<td></td>
</tr>
<tr>
<td>Euteneuer, Morgan 43</td>
<td></td>
</tr>
<tr>
<td>Evenson, Andrew 45</td>
<td></td>
</tr>
<tr>
<td>Fabian, Eric 65</td>
<td></td>
</tr>
<tr>
<td>Fahey, Sam 76</td>
<td></td>
</tr>
<tr>
<td>Farrell, Brooke 32</td>
<td></td>
</tr>
<tr>
<td>Federspiel, Michael 11</td>
<td></td>
</tr>
<tr>
<td>Fellom, Nathan 37</td>
<td></td>
</tr>
<tr>
<td>Felty, Emma 35</td>
<td></td>
</tr>
<tr>
<td>Fiedler, Natalie 2</td>
<td></td>
</tr>
<tr>
<td>Fiez, Michael 79</td>
<td></td>
</tr>
<tr>
<td>Finley, Melissa 31</td>
<td></td>
</tr>
<tr>
<td>Fischer, Callie 56</td>
<td></td>
</tr>
<tr>
<td>Fischer, Rachel 91</td>
<td></td>
</tr>
<tr>
<td>Fisk, Janine 23</td>
<td></td>
</tr>
<tr>
<td>Fix, Lauren 31</td>
<td></td>
</tr>
<tr>
<td>Flaherty, Brittany 83</td>
<td></td>
</tr>
<tr>
<td>Flanagan, Katherine 22</td>
<td></td>
</tr>
<tr>
<td>Fliflet, Rachel 67</td>
<td></td>
</tr>
<tr>
<td>Forss, Quinn 3</td>
<td></td>
</tr>
<tr>
<td>Forster, Zachary 42</td>
<td></td>
</tr>
<tr>
<td>Fotsch, Danielle 32</td>
<td></td>
</tr>
<tr>
<td>Franson, Haley 27</td>
<td></td>
</tr>
<tr>
<td>Frase, Drew 46</td>
<td></td>
</tr>
<tr>
<td>Freeburg, Morgan 43, 45, 47, 50</td>
<td></td>
</tr>
<tr>
<td>Friedemann, Chase 68</td>
<td></td>
</tr>
<tr>
<td>Friedrichs, Forest 68</td>
<td></td>
</tr>
<tr>
<td>Froehlich, Hallie 80</td>
<td></td>
</tr>
<tr>
<td>Fuhrman, Steven 76</td>
<td></td>
</tr>
<tr>
<td>Furlong, Ryan 9</td>
<td></td>
</tr>
<tr>
<td>Gabriel, Shawny 40</td>
<td></td>
</tr>
<tr>
<td>Gan, Kheng Horng 82</td>
<td></td>
</tr>
</tbody>
</table>
Gapisinski, Margaret 46
Gardner, Caitlin 31
Gehl, Lauren 32
Gehring, Courtney 31
Geis, Hannah 90, 93
Gervais, Michelle 75
Gibson, Patricia 97
Gilbertson, Jordan 98
Gilsdorf, Stephanie 52
Goetz, Jade 8
Gomes Machado, Pedro Henrique 40
Graf, Tyler 78
Grim, Erin 82
Grund, Samuel 51
Grunow, Emilee 4
Gugel, Tom 64, 90
Gullerud, Sam 81
Gunseor, Michaela 94
Guralski, Nathaniel 88
Gussert, Alaina 33
Gutsmiedl, Carissa 91

H
Hagen, Andrew 26
Hagen, Jesse 46
Hahn, Chelsea 29
Halliday, Benjamin 82
Hamlin, Shelby 51
Hammel, Katherine 88
Hansen, Elayne 80
Hansen, Sara 13
Hansen, Erin 21
Hanson, Katrina 89
Hazard, Byron 89
Hegg, Miles 66, 85
Helminiak, Luke 50
Helmuth, Samuel 69
Henden, Jacob 49
Hennen, McKenzie 41
Her, Khong Meng 14
Herman, Savannah 49
Hermes, Hunter 83
Herrera, Alexandria 22, 23
Herrmann, Jody 95
Hessling, Mitchell 18
Hestekin, Derek 26
Hibbard, Danielle 33
Hicklin, Amanda 22
Hilgendorf, Zachary 64, 66
Hillstrom, Alexandra 43
Hodac, An 52
Hodgson, Stephen 29
Hoffman, Casey 91
Holman, Emily 47, 48
Hopp, Christopher 41
Hora, Nicholas 53
Houle, Megan 25
Houle, Samantha 87
Hoyt, Kristina 36

Huizenga, Hailey 2
Hulke, Emily 31, 32
Hurst, Olivia 58
Husnick, Elizabeth 31
Hutter, Alexander 67
Huynh, Joseph 11
Huynh, Tiffany 55
Hynek, Madeline 33

I
Idarraga, Joyce 98
Igel, Timothy 6
Inman, Barry 15
Irber, Aaron 49
Ives, Amy 78

J
Jaskulske, Julia 25
Jeevanba, Sathya 95
Jenkins, Jordan 6, 7, 9
Jerdee, Nicole 33
Johnson, Amanda 94
Johnson, Brian 47
Johnson, Emma 20
Johnson, Kaitlyn 10
Johnson, Mercedes 86
Jones, Ryan 27
Joseph, Whitney 92
Joy, Madison 9
Jungwirth, Robin 11, 13, 34

K
Kallenbach, Josephine 85
Karch, Emily 87
Karl, Calla 87
Kastenpopp, Kelsey 79
Kastenschmidt, Ashly 39
Keily, Galen 85
Kellagher, Alyssa 80
Kennedy, Amy 28
Kennedy, Jessica 11, 78
Kennedy, Matthew 38
Kha, Mai Lee 22
Khw, Winnie 14
Kiefer, Hailey 13
Kilboy, Zachary 75
Kimbball, Amelia 79
Kim, Ji Hyun 40
Kim, Jisu 81, 82
King, Brandon 71
Kitzman, Dakota 76
Kitzrow, Jonathan 56
Klang, Joseph 61
Kleaver, Anne 18
Klein, Ashley 79
Knutson, Sarah 71
Kocik, David 17

Koehn, Emily 82
Koenigsberg, Cynthia 44, 45
Kohl-Blomsness, Nokoma 73
Kralewski, Kaitlyn 43
Kramer, Bailey 44
Kramer, Kevin 29
Krause, Alexandrea 15
Krautkramer, Lisa 88
Kruchten, Brianna 29
Krueger, Amanda 21
Kryzer, Nicholas 37
Kubitschek, Keith 89
Kueppers, Courtney 6
Kuhn, Lindsey 31

Landphier, Tess 79
Lanska, John 24, 55
Larsen Van Alstine, Erinn 49
Larson, Joy 83
Laskowski, Anneliese 73
Laskowski, Elizabeth 71
Lassa, Mitchell 70
Lauffer, Nicole 30
Lawrence, Rebecca 89
Lee, Jemma 96
Lee, Jenna 96
Lee, Yan Lin 92, 93, 94
Leifer, David 60
Lei, Guoxi 42
Leinwander, Aaron 40
Leisen, Erin 48
Lemke, Patrick 81
Lemons, Mitchell 42
Lenard, Lucas 66, 74
Leong, Zhi Wen 83
Levin, Derek 42
Liang, Ruijian 33
Lind, Claire 64
Linder, Taren 51
Liu, Hengzhou 42
Li, Yining 81
Lobermeier, Kyle 73
Lor, Elaine 4
Luczak, Jonathan 64, 66, 86
Ludke, Olivia 46
Luman, Sarah 39
Lyga, Breane 6
Lynch, Andrew 57
Lynn, Kelsey 33
Lyons, Zoe 54

M
Macke, Brian 36
Magyar, Christopher 38
Manley, Ben 100
Mantl, Matthew 1
Marvin, Amanda 31
Marx, Amanda 93
Matheka, Faith 58
Mayer, Kevin 50
McCarthy, Olivia 34
McCullough, Delaney 46
McDonnell, Michael 58
McFarlane, James 72
McKay, Katelyn 45, 51
McMillan, Neil 29
McMunn, Ryan 53
Meise, Kristin 57
Melheim, Joseph 3
Meurett, Samantha 2
Meyer, Danielle 20, 90
Michalski, Matthew 68
Michel, William 12
Miller, Eric 73
Miller, Katie 79
Miracle, Brendan 60, 65
Mitchell, Stanford 55
Mocol, Matthew 55
Moline, Adam 97
Montee, Sarah 30, 87
Moore, Claudia 68
Moothart, Emily 62
Moran, Patrick 43
Morrison, Sean 62, 63, 64, 65
Mott, Leah 25
Moua, Christopher 19
Mounir, Abdulghani 57
Muotka, Haley 37
Murray, Carly 92
Myers, Anna 13

N

Naegeli, Sarah 76
Nakano, Karen 25
Nase, Courtney 33
Nehls-Lowe, Abigail 27
Nelson, Renee 77
Nepsund, Mikelle 80
Neyers, Krista 24
Nigro, Sarah 96
Niquette, Melanie 93
Novoa, Lucas 37
Nyholm, Whitney 88

O

Oakes, Jacqueline 27
O’Connell, Sean 77
Olmstead, Alison 62, 63, 85
Olson, Glen 1
Olson, Robert 51
Opatik, Caitlin 12
Orendorff, Weston 50
Osborn, Trace 84
Oster, Joseph 56
Ouk, Lidia 29


P

Padruitt, Megan 45
Parrish, Valerie 31
Passow, Haillie 71
Paukner, Lyle 41
Peanisso, Alissa 98
Pelissier, Taylor 79
Perz, Michaela 88
Peterson, Shawn 83
Petrie, Stephen 35
Pham, Huyen 4
Phillips, Margaret 59
Plamann, Katie 52, 94
Plant, Miles 6
Poirier, Justin 67
Prahil, Alison 93
Pratt, Rachel 81
Priebe, Mark 16
Prior, Ryan 19
Promer, Hunter 45
Pumper, Jonathan 15, 82

Q

Quick, Jessa 26

R

Radeke, Leah 43, 44
Raleigh, Jacob 81
Ramquist, Lucy 83
Rawls, Michael 90
Rawson, Stephen 6, 7
Reardon, Maggie 95
Reed, Aubry 79
Reichow, Erin 30
Reinhardt, Clorice 54, 55, 59
Reitan, Nicholas 58
Richards, Connor 73
Rich, Dana 24
Richgels, Jamay 26
Riedl, Austin 42, 74
Rinka, Sara 20
Risberg, Kellie 93
Rock, Cailen 78
Rolefson, Kelsey 91
Rolf, Ashley 28
Rosentreter, Karlee 28
Rosquist, Jenna 23, 91
Ross, Rachel 54
Rothaus, Matthew 45
Roth, Grant 41
Rudd, Cassandra 79
Rupnow-Tabb, Patricia 22

S

Sabelko, Katelyn 17
Salzer, Allyson 95
Sanders, Tayo 73
Schadegg, Philip 45, 46
Schaffer, Nathanael 8, 80, 84
Schauer, Courtney 52
Schenk, Jonathan 43, 51
Schermanhorn, Nathan 29
Scherz, Steven 26
Schmeling, Teresa 23
Schmit, Heidi 52
Schmitz, Jennifer 33
Schneider, Adam 39
Schneider, Alexis 29
Schneider, Carlee 90
Schneider, Michael 72
Schopf, Michaela 78
Schreiber, Mitchell 66, 74
Schroeder, Aaron 61
Schroeder, Danielle 86
Schug, Laurnena 87
Schulte, Alison 50
Schultz, Andrew 51
Schumaker, Megan 57
Schwartz, Adam 39
Seravalli, Claudia 44, 45
Servais, Kayla 23
Sexton, Kiah 16
Sherwood, Erin 11
Shortess, Savannah 30
Sievert, Clare 31
Sikowski, Gregory 83, 92
Simkunas, Carlie 99
Skog, Levi 29
Sladek, Katie 29
Small, Tyler 93
Smed, Andrew 40
Smith, Blake 75, 76
Smith, Danielle 54
Smuhl, Rory 77
Snapp, Sierra 83
Sorohanberger, Heidi 31
Sontag, Allison 98
Sorson, Nicole 97
Sortedahl, Sarah 72
Sperstad, Rita 31
Spiegel, David 37
Spray, Heather 13
Staszak, Jacob 81
Staub, Aric 89
Steacock, Trenten 81
Stegge, Thomas 75
Steiner, Daniel 81
Steinke, Kelsey 73
Stoll, Kinzey 70
Stolp, Christopher 45
Strohenke, Dana 92
Stubs, Elizabeth 71
Stupka, Jonathan 38
Swenson, Ellyn 70
Sylvester, Catherine 78
Syryczuk, Alexa 39
Szmanda, Annie 48
Szydel, Sean 17

Tan, Abel 82
Tapia, Raul 46, 48
Tassoul, Taylor 30
Tautges, Madeline 36
Taylor, Nathaniel 2
Tha, Peter 43
Thieme, Allyson 78
Thill, Jordan 40
Thompson, Leslie 100
Tlachac, ML 42, 98
Toddes, Carlee 76, 95
Tollefson, Kyle 73
Toycen, Kaitlin 58
Trampf, Jessica 86
Tran, Thao 42
Tum, John 77
Twaroski, Kylie 89
Tyink, Stephanie 79

Uting, Shayla 78
Utz, Jillian 27

Van Gaard, Avery 74
Vazquez Valverde, Helue 83
Verdegan, Calvin 91
Vlahos, Christina 52
Volzka, Charles 37
Vruwink, Olivia 11
Vue, Andrew 14

Waller, Anna 53, 85
Warren, Les 47
Weaver, Jacob 1
Weber, Anna 91
Weihing, Kayla 45
Weiss, Nicole 53, 60
Wellnitz, Todd 45, 47
Werven, Emily 31
Westra, Breanna 80
Wetzel, Ian 33
Whitrock, Nicole 79
Wilberding, Kaitlyn 30
Williquette, Heather 92
Win, Nay Myo 54
Wirth, Taylor 29
Wiskow, Cara 100
Witherspoon, Kaitlyn 8

Woehler, Nerissa 98
Wojcik, Rachel 28
Woznicki, Nathaniel 34
Wyderker, Grant 38
Wysocki, Adam 63

Xiong, Pada 14
Xiong, Pang 14
Xiong, See 14
Xiong Yang, Pang Houa 33
Xiong, Youa 11

Yahnke, Kacey 100
Yang, Ariel 98
Yang, Ja 14
Yeager, Aubrey 18

Zahradka, Trey 37
Zeiter, Nathan 79
Zens, Zacharie 69
Zernia, Peter 75
Zidon, Hannah 21
Zillmer, John 20
Zimmerman, Elin 31
Faculty Index

A
Ahrendt, Chris 41
Anderson, Julie Ann 43
Applegate, Carey 10, 15, 23
Axelrod, Michael 19, 20
Azab, Carolin 88
Aziz, Mohammad 40

B
Bailey-Hartsel, Scott 54
Bakos, Jon 35
Bao, Li-Ying 26
Barth, Robert 60
Benson, Alan 16, 17
Bhattacharyay, Sudeep 55, 59
Biers, Kelly 36
Bleske-Rechek, April 92, 94
Boellaard, Melissa 30
Boulter, James 77, 83
Brandt, Cheryl 30
Braun, Saori 29, 87
Brewer, Lauren 87
Brisbin, Abra 39, 40
Brown, Joshua 18
Bryant, Winnifred 44, 47
Bui, Peter 37, 38

C
Castonguay, Samuel 67, 68
Chaffin, Melissa 19, 20, 25, 26
Chamberlain, Oscar 17
Chapman, Jennifer 25
Chinchanachokchai, Sydney 87
Clark, Scott 70
Cleary, Patricia 38, 56
Crothers, Mickey 90

D
Dahl, Bart 56
Dahl, Jennifer 73
Davis, Christopher 41
Day, Herschel 40
deKoven, Aram 22
Devlin, Erin 35
Don, Gary 9
Drucker, Stephen 58
Duffy, Colleen 42
Dunham, Douglas 66, 73, 74

E
Eierman, Robert 21
Elledge, Deborah 27
Erger, Jeff 99
Evans, Matthew 75

F
Faulkner, Douglas 64
Fay, Martha 18, 77, 78, 79, 80
Fernandez, Manuel 13
Fessler, Audrey 14
Fisk, Janine 22, 23
Fleck, Steven 29
Ford, Lyle 75, 76
Forman, Pamela 11
Freund, Deborah 43, 48

G
Gallagher, Warren 58
Garcia, Carlos 24
Garvey, Christa 8
Gingerich, Derek 50, 52
Glogowski, Elizabeth 71, 72
Goodman, Jeffrey 95
Greene, Robert 19
Grote, Katherine 68, 70, 71

H
Hanson-Rasmussen, Nancy 87
Hart-Brinson, Peter 98
Hartnett, Sean 59, 65
Hati, Sanchita 52, 53, 55
Hecker Fernandes, Jill 31
Hein, Jeremy 99
Hemmerich, Abby 28
Herman, Daniel 48, 49
Hill, Stephen 18
Hines, Jarrod 93
Hlas, Anne 24
Hoepner, Jerry 9, 22
Hofmann, Debra 31
Hooper, Robert 70
Hsu, Chia-Yu 6
Hupy, Christina 60, 61
Hupy, Joseph 38, 61

I
Ihinger, Phillip 69
Im, Sooyun 26

J
Jadack, Rosemary 25
Jamelske, Eric 82, 83
Jang, Won Yong 79, 83
Janik, Daniel 51
Janot, Jeffrey 29
Jansen, Debra 25
Jewell, Matthew 72
Jewett, David 89
Ji, Jianjun 12
Jol, Harry 62, 63, 64, 65, 66, 74, 86
Jones, David 23
Jones, Ryan 27
Jung, Eunsook 13, 89

K
Kajbafvala, Amir 72
Kaldjian, Paul 85, 86
Kemp, Theresa 12, 13
Kernan, Barbara 9, 35
Kleintjes Neff, Paula 49
Koissi-Kouassi, Marie-Claire 40
Kraker, Jessica 40

L
Lagorio, Carla 76, 95
Larson, Jan 6
La Rue, Mary 29, 87
Lee, Tali 43, 44
Leibham, Mary Beth 93
Leland, David 91
Lewis, Dandrielle 22
Lewis, David 54, 55
Lodge, Robert 69
Lonzarich, David 44, 45, 47
Lu, Der-Fa 30
Lugovskyy, Oleksandr 81, 82
Lyman Gingerich, Jamie 51

M
Mahaffy, Ellen 11
Mahoney, J. Brian 67, 69
Mann, John 35
McMann, Michael 19
Meier, Barbara 22
Merkel, Rachel 33
Meyer, Matthew 36
Miller, Jessica 86
Moch, Susan 33
Moody, Heather 34
Mowry, Donald 98
Muehlenkamp, Jennifer 10, 91
Mumford, Karen 77, 99, 100
N
Niazi, Tarique 99
Nybroten, Kathleen 98

O
O’Halloran, Peggy 8
Orser, Joseph 14
Otto, Carolyn 41

P
Pace, Joel 9
Pattee, Deborah 22
Pedersen, Blaine 91
Pehler, Shelley-Rae 33
Penkava, Michael 42
Perrault, Evan 79
Phillips, James 53, 55, 59
Phillips, Nicholas 6
Pierce, Crispin 33
Pierson, Kim 74, 75, 76
Pignotta, Geoffrey 69
Pirrelli, Angela 96, 97
Planas-Roure, Nora 57, 58
Profaizer, Amanda 15

Q
Quinn-Lee, Lisa 97, 98

R
Riehl, Manda 41
Rondon, Tulio 8
Running, Garry 66
Rybicki, James 74, 75

S
Sanislo, Teresa 24
Sather, Thomas 27
Schaffer, David 80
Schultz, Nicole 21
Sen, Asha 13
Showsh, Sasha 52
Sortedahl, Charlotte 32
Sperstad, Rita 31
Spraitz, Jason 89
Stadler, Marie 80
Stecher, George 76
Stevenson, Daniel 37
Stow, Robert 30
Suppes, Laura 34
Swanson, Scott 88, 89
Sydney, Chinchanachokchau 82, 83

T
Tan, Jack 19
Theisen, Roslyn 21, 57
Thesing-Ritter, Jodi 11
Turnquist, Tadd 28
Turtinen, Lloyd 47, 48
Tusing, Mary 20, 90

V
Yang, Ka 14
VanWormer, Arin 32
von Karolyi, Catya 90
Vue, Charles 14

W
Wagner, Anthony 66, 74, 86
Walker, James 9, 19, 39
Weichelt, Ryan 8
Wellnitz, Todd 43, 44, 45, 46, 47
Westerlund, Blake 15
Whitcher, Ursula 38, 39
Wilson, Cyril 62, 65, 66, 85, 86
Wolter, Lynsey 34

Y
Yang, Harriet 42
Yang, Thao 57

Z
Zeitler, Ezra 62, 63, 84, 85, 86
CERCA
Celebration of Excellence in Research and Creative Activity
2015

2015 APRIL 29-30TH
23RD ANNUAL STUDENT RESEARCH DAYS