Celebration of Excellence in Research and Creative Activity

(27th Annual Student Research Days)

Program and Abstracts of Student Presentations

University of Wisconsin-Eau Claire

April 29-May 3, 2019
Most Presentations in W.R. Davies Center
**Poster Student Presentation Times**
- Wednesday, May 1 4:00 - 6:00
- Thursday, May 2 2:00 - 4:00

**Oral Sessions and Performances/Films**
- Tuesday, April 30 10:00 - 4:00
- Wednesday, May 1 9:00 - 4:00
- Thursday, May 2 8:30 - 2:00

**Provost's Honors Symposium**
- Friday, May 3 1:00 - 6:30

**Spotlight on First-year Research**
- Council Oak
- Tuesday, April 30 11:30 - 1:00

**WiSys Quick Pitch**
- Woodland Theatre
- Tuesday, April 30 4:30 - 6:30

**Reception**
- Dakota Ballroom
- Thursday, May 3 4:00

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**Map of Davies Center with CERCA rooms labeled:**
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monday, April 29, 2019</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:00 am – 5:00 pm</td>
<td>Math Retreat</td>
<td>Hibbard Hall</td>
</tr>
<tr>
<td><strong>Tuesday, April 30, 2019</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:00 am – 11:00 am</td>
<td>Global Experiences Presentations</td>
<td>Davies Center</td>
</tr>
<tr>
<td>11:30 am – 1:00 pm</td>
<td>Spotlight on First-Year Research</td>
<td></td>
</tr>
<tr>
<td>1:00 pm – 4:00 pm</td>
<td>Global Experiences Presentations</td>
<td></td>
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<tr>
<td>4:30 pm - 6:00 pm</td>
<td>Students set up posters</td>
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<tr>
<td>4:30 pm – 6:30 pm</td>
<td>WiSys Quick Pitch</td>
<td></td>
</tr>
<tr>
<td><strong>Wednesday, May 1, 2019</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:00 am - 8:00 am</td>
<td>Students set up posters</td>
<td>Davies Center</td>
</tr>
<tr>
<td>8:00 am - 6:00 pm</td>
<td>Posters on view</td>
<td>Ojibwe Ballroom</td>
</tr>
<tr>
<td>9:00 am – 10:00 am</td>
<td>Domestic Immersion Presentations</td>
<td></td>
</tr>
<tr>
<td>11:00 am – 12:00 pm</td>
<td>Domestic Immersion Presentations</td>
<td></td>
</tr>
<tr>
<td>9:30 am – 4:00 pm</td>
<td>Oral Research Presentations</td>
<td></td>
</tr>
<tr>
<td>9:30 – 10:30 am</td>
<td>Latin American Studies Capstone Presentations</td>
<td>Ho-Chunk Room</td>
</tr>
<tr>
<td>11:00 – 11:50 am</td>
<td>Health and Related Research</td>
<td>Menominee Room</td>
</tr>
<tr>
<td>12:00- 12:50 pm</td>
<td>Education</td>
<td>Ho-Chunk Room</td>
</tr>
<tr>
<td>1:00 – 1:50 pm</td>
<td>Science and Philosophy</td>
<td>Menominee Room</td>
</tr>
<tr>
<td>2:00 – 2:50 pm</td>
<td>Guns, Bikes and Women: An Anarchist’s Tour of Schlegelmilch House (Public History Capstone)</td>
<td>Ho-Chunk Room</td>
</tr>
<tr>
<td>3:00 – 3:50 pm</td>
<td>Healthy Eating</td>
<td>Menominee Room</td>
</tr>
<tr>
<td>3:00 – 3:55 pm</td>
<td>Lecture/Performances</td>
<td>Alumni Room</td>
</tr>
<tr>
<td>4:00 – 6:00 pm</td>
<td>Poster Session</td>
<td>Ojibwe Ballroom</td>
</tr>
<tr>
<td><strong>Thursday, May 2, 2019</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:00 am - 4:00 pm</td>
<td>Posters on view</td>
<td>Davies Center</td>
</tr>
<tr>
<td>8:30 am – 2:00 pm</td>
<td>Oral Research Presentations</td>
<td>Ojibwe Ballroom</td>
</tr>
<tr>
<td>8:30 – 9:20 am</td>
<td>Impacts of Colonialism on Indigenous Peoples in the Americas</td>
<td>Menominee Room</td>
</tr>
<tr>
<td>9:30 – 10:45 am</td>
<td>Literature and Media</td>
<td>Ho-Chunk Room</td>
</tr>
<tr>
<td>11:00 am – 1:00 pm</td>
<td>Women’s, Gender, and Sexuality Studies Capstone Presentations</td>
<td>Menominee Room</td>
</tr>
<tr>
<td>1:00 – 1:50 pm</td>
<td>International Research</td>
<td>Ho-Chunk Room</td>
</tr>
<tr>
<td>2:00 – 4:00 pm</td>
<td>Student presenters at posters</td>
<td>Ojibwe Ballroom</td>
</tr>
<tr>
<td>4:00 pm</td>
<td>Reception: Buffet, research awards, music</td>
<td>Dakota Ballroom</td>
</tr>
<tr>
<td><strong>Friday, May 3, 2019</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:00 – 11:00 am</td>
<td>Distinguished Master’s Thesis Presentation</td>
<td>Vicki Lord Larson 1142</td>
</tr>
<tr>
<td></td>
<td>Stephanie St Peter, School Psychology Prog.</td>
<td>(Ctr. for Excellence in Teaching and Learning)</td>
</tr>
<tr>
<td>10:00 – 12:00 am</td>
<td>Vicki Lord Larson Research Fellowship Pro Sem</td>
<td>Human Science and Services 226</td>
</tr>
<tr>
<td>1:00 pm - 5:30 pm</td>
<td>Provost’s Honors Symposium (nominated oral research presentations)</td>
<td>Davies Ctr: Menominee, Ho-Chunk, Centennial, Chancellors rooms</td>
</tr>
<tr>
<td>5:30 pm</td>
<td>Provost’s Honors Symposium Reception</td>
<td>Dakota Ballroom</td>
</tr>
</tbody>
</table>
Acknowledgements

Many people helped to make this *Celebration of Excellence in Research and Creative Activity* (including The 27th Student Research Days) possible, and we thank them for contributing their part cheerfully and efficiently:

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

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

**Facilities Management** – for hanging the CERCA banner above the Davies Center door and hauling poster boards.

**Terri Knudtson, Travis Welke, and the catering staff** - for producing delicious victuals for the receptions and other events.

**Andy Colburn, Christian Colburn, and Leo Johnson** - for performing at the CERCA reception.

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

**Learning and Technology Services, LTS Training** - for providing training in poster design and creation; **Mike Skarp** - for application software assistance; **Sarah Brower** and the **Help Desk staff** - for managing the poster printing with great calm; **Mark Andrle, Tina Wolfgram** and the **Printing Office staff** - for providing us with our printed materials; **Rob Mattison** - for video assistance; and **Bill Hoepner** and **Shane Opatz** - for recording the event with their cameras.

**Krista Raleigh, Rochelle Hoffman, Lindsey Deans**, and ORSP office staff members - for helping with myriad organizational details including compilation of this abstract book.

**CERCA Moderators**, for seeing that the oral sessions run smoothly. **CERCA Student Assistants**, for helping out with the event.

Lastly, we thank **student researchers** and their **faculty mentors** for all the hard work that led up to the polished presentations we see and hear throughout CERCA week.
# Table of Contents

**Spotlight on First-Year Research** .................................................................................................................. 1

**WiSys Quick Pitch** ......................................................................................................................................... 3

**Global Experiences Presentations** .................................................................................................................. 5

**Domestic Immersion Presentations** .................................................................................................................. 7

**CERCA Oral Research Presentations** ............................................................................................................... 9
- Latin American Studies Capstone Presentations ............................................................................................ 9
- Health & Related Research ................................................................................................................................. 10
- Education ........................................................................................................................................................... 11
- Science and Philosophy ....................................................................................................................................... 13
- *Guns, Bikes, and Women: An Anarchist’s Tour of Schlegelmilch House (Public History Capstone Presentations)* ......................................................................................................................................................... 14
- Healthy Eating ...................................................................................................................................................... 15
- Lecture/Performance ............................................................................................................................................ 17
- Impacts of Colonialism on Indigenous Peoples in the Americas ........................................................................... 18
- Literature & Media ................................................................................................................................................ 19
- Women’s, Gender, and Sexuality Studies Capstone Presentations ....................................................................... 20
- International Research ......................................................................................................................................... 23
- Distinguished Master’s Thesis Award for 2017-2018 ............................................................................................ 24
- Vicki Lord Larson Research Fellowship Pro Sem ............................................................................................... 24

**CERCA Poster Presentations** ............................................................................................................................ 26
- Education and Scholarship of Teaching and Learning .......................................................................................... 26
- Fine and Performing Arts ...................................................................................................................................... 40
- Health Sciences .................................................................................................................................................... 42
- Humanities ........................................................................................................................................................... 53
- Math and Computer Sciences ............................................................................................................................... 60
- Natural and Physical Sciences ............................................................................................................................. 67
- Social Sciences .................................................................................................................................................... 102
Spotlight on First-Year Research

Council Oak Room
Tuesday, April 30
11:30am -1:00pm

Starting around 11:40 first-year students will each provide brief summary of their project and why it is significant. Then visitors will be able to talk to students individually and view their posters. Light snacks provided.

Understanding Generation-Z News Consumption
Sam Panos, Joel Meier
Faculty Mentor/Collaborator: Scott Swanson

The Geography of Mental Health: Wisconsin’s Uneven Landscape and Why It Matters for the UW-Eau Claire Community
Molly Larson, John Francis
Faculty Mentor/Collaborator: Paul Kaldjian

Towards Development of a Computational Screening Tool for Quinone Oxidoreductase Inhibitors
Nathan Barta
Faculty Mentor/Collaborator: Sudeep Bhattacharyay

The Impact of Water Clarity on Home Prices in Vilas and Oneida Counties, Wisconsin
Eric Winkler, with co-authors Shangqian Wu, Si Zhou, Megan Roehl
Faculty Mentor/Collaborator: Thomas Kemp

Social Media Engagement and Domestic Intercultural Immersion Trips: An Examination of Social Media Platforms as Avenues for Assessment of Student Learning in Higher Education
Ta'Leah Van Sistine
Faculty Mentors/Collaborators: Nicole Schultz, Ganga Vadhavkar

Organic Light-Emitting Diode Fabrication and Exploration of the Organic Magnetoresistance Effect
Casey Sroda
Faculty Mentor/Collaborator: James Rybicki

Improving Communication Between International and American Students
Luoluo Zhou, Catrena Jing Yi Choong, Zi Yang Tan, Yuchen Yang, Jiameng Chen
Faculty Mentor/Collaborator: Ami Christensen
A Survey and Analysis of International Students’ Living Experiences
Shuaijie Zhang, TianYi Zhang, Xiaofan He, Anastassiya Kulinich
Faculty Mentors/Collaborators: Ami Christensen

Students’ Understanding of the Center for International Education
Yinxing Xia, Xiaochun Chen, Yuting Ma, Xinyan Yang, Ruifeng Yan
Faculty Mentors/Collaborators: Ami Christensen

Transportation Issues Among International Students
Han Wei, Anastassiya Kulinich, Luqi Chen, Zhen Zhao
Faculty Mentor/Collaborator: Ami Christensen

How International Students Spend Their Time on Vacation
Tianqi Jiao, Ruifeng Yan, Xinyan Du, Yifan Li
Faculty Mentor/Collaborator: Ami Christensen

Helping Students Make Good Use of Library Resources
Xue Xu, Siyuan Huang, Ruifeng Yan, Yufan Yang, Chi Zhang
Faculty Mentor/Collaborator: Ami Christensen

Personal Diction & Character Development: Lord of the Rings
Maria Tomashek
Faculty Mentor/Collaborator: Janice Bogstad

Investigating Structure-Dynamics-Function Differences Among Various Species of Proyl-tRNA Synthetase Using a Hybrid QM/MM Computational Technique
Murphi Weinzetl, Carl Fossum, Alexander Narkiewicz-Jodko
Faculty Mentors/Collaborators: Sudeep Bhattacharyay, Sanchita Hati
1. **Jordyn Beth Fetkenheuer, Nicole Lynn Kleinschmidt and Katie Nicole Paulich** from Psychology, presenting on: “Unwarranted Blame: The Role of Hindsight Bias in Judgments of Suicide Likelihood and Preventability” Mentor: April Bleske-Rechek

2. **Matrice Marie Bloom**, from Psychology, presenting on: “The Effect of Social Media on Women’s Body Satisfaction” Mentor: Jarrod Hines


7. **Timothy Lui**, from Materials Science and Engineering, presenting on: “The Impact of Powder Source on the Processing Uniformity of Bi$_2$Sr$_2$CaCu$_2$O$_8$-x (Bi-2212) Superconducting Wire Using Digital Image Analysis” Mentor: Matthew Jewell

9. **Summer Georganne Peoples, Shawna Renee Helmuth and Madisyn Joy Kephart**, from Nursing, presenting on: “Maternal Exposure to PM2.5 During Embryonic Cardiac Development Leads to Hypoplastic Left Heart Syndrome: A Hypothesis Generated through the IMPACT Program” Mentor: Jeanette Olsen


12. **Alexander B. Stout**, from Computer Science, presenting on: “Clearwater Labs”


14. **Emily Lehmann**, from Food Science at UW-Stout, presenting on: Effects of Secondary Listeria Contamination on Cheese” Mentor: Taejo Kim

15. **Sebastia Witzgall**, from Food and Nutrition at UW-Stout, presenting on: Iron & Vitamin C Intake of Vegetarians & Non-Vegetarians of UW-Stout Students & Developing a Dietary Guideline of Iron & Vitamin C Intake” Mentor: Eun Lee

16. **Prerana Tavade**, from Food and Nutrition at UW-Stout, presenting on: Effect of Soy Protein and Whey Protein on the Textural and Rheological Properties of Protein Fortified Yogurt.
Global Experiences Presentations

Centennial Room  
Tuesday, April 31  
10:00-11:00am

**Ecuador: Culture and Geography**  
Anna Khan, James Morgan, Dakota Tollakson  
Faculty Mentors/Collaborators: Jeff DeGrave, Shanti Freitas

This three-week faculty-led program to Ecuador during Winterim 2017 focused on exploring two geographical landscapes (Andes Mountains and Amazon Jungle Basin) in connection with how global forces are impacting the local environment and people, and how indigenous groups are demonstrating agency in preserving their own cultural practices and telling their own stories through community-based ecotourism. The program included a service-learning project, a 5-day homestay with rural indigenous Kichwa families, and a visit to largest indigenous market in South America. Students will be presenting on what they learned and how they were impacted.

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Centennial Room  
Tuesday, April 31  
1:00-2:00pm

**Study Abroad Alumni Student Panel: A New Cultural Experience**

- **Aberdeen, Scotland, Spring ’18** - Gabrielle Benson  
- **Valladolid, Spain, Spring ’18** – Stephanie Hoeksema  
- **Chiang Mai, Thailand, Academic Year ’17** - Conor McClun  
- **Ireland, Limerick, Spring ’18** - Mary Mcmanamon  
- **England, Winchester, Spring ’18** - Courtney Pagel  
- **Chile, Valparasio, Fall ’18** - Ellie Rabine  
- **Lyon, France, Spring ’17** – Anneka Shaver

This panel is composed of students who have studied abroad for a semester in the past year. They will be sharing their unique experiences, highlighting the host culture, and sharing how their study abroad experience impacted their future goals. This is an excellent opportunity to hear first-hand what it is like to study abroad as a UW-Eau Claire student.
Centennial Room  
Tuesday, April 31  
2:00-3:00pm  
**Central European Travel Seminar**  
Cade Lambrecht, Leslie Peterson  
Faculty Mentors/Collaborators: Jeff DeGrave, Chia-Yu Hsu, Jill Olm  
This four-week travel seminar offered a hands-on understanding of the history and culture of Germany, the Czech Republic, Austria, Hungary, and Poland. Central Europe has a complex history that includes the creation of multi-national empires, the formation of new nation-states after WWI, the rise and dominance of Nazism and Soviet Communism, the divisions of the Cold War, and the peaceful grass-roots revolutions of 1989 that brought down the Berlin Wall. The architecture and art of the region has been shaped by leading local figures of important cultural movements from Romanticism to Post-Modernism. From the Renaissance to the "Roaring Twenties," Krakow, Vienna and Berlin emerged as European cultural capitals. The program explores 5 different cities, and students will be discussing what they learned.

**England: Math and Physics**  
Kyle Glaeser, Jerry Gu  
Faculty Mentors/Collaborators: Colleen Duffy, Paul Thomas  
Students on this faculty-led program traveled to the United Kingdom for four weeks during summer 2018. This program studied the topics of relativity and differential geometry. In addition to lectures, students learned through visiting important scientific locations throughout England. These hands-on experiences took place at: The Royal Society, Woolsthorpe Manor, Cavendish Museum (Cambridge), Museum of the History of Science (Oxford), Science Museum (London), Royal Observatory (Greenwich), and Jodrell Bank Observatory.

Centennial Room  
Tuesday, April 31  
3:00-3:30pm  
**China: Globalization**  
Frankie White  
Faculty Mentors/Collaborators: Maria DaCosta, Tom Sulzer  
This faculty-led program during summer 2018 was a three-week introduction to the language, culture, food, and business etiquette while in Zhuhai and Hong Kong. The main part of the program was hosted by Jinan University-Zhuhai campus, located on the southern coast of China on the Pearl River Delta, and consisted of business and cultural visits in Zhuhai and its surrounding area. In addition, students visited Hong Kong to explore business topics and historical sites. Students will be discussing what they learned personally, professionally, and academically during the program.
India: Global Feminisms
Jacie Jones
Faculty Mentors/Collaborators: Ari Anand, Teresa Sanislo
Students on this faculty-led program traveled to India for three weeks during Winterim 2019. The program focused on gender issues facing women in both rural and urban India, gender in relation to Indian law and public policy, and the rich history and culture of the Delhi metro area and in Agra and Jaipur. UW-Eau Claire students studied alongside Indian students at the Women's Studies Development Center (University of Delhi), and participated in field work together with local NGOs on projects in nearby communities.

Centennial Room
Tuesday, April 31
3:30-4:00pm
Study Abroad Alumni
Emma Zenzen
Aberdeen, Scotland, Fall ‘18
Emma was presented the opportunity to collaborate with The University of Aberdeen to showcase the experience of an exchange student. She created video blogs featuring Scotland, travel, cities, food, and more! She will be presenting on her experience creating these video blogs, her time spent at the University of Aberdeen, and how the skills she gained abroad applies to everyday, academic, and professional situations.

Domestic Immersion Presentations

Centennial Room
Wednesday, May 1
9:00-9:50am
Companeros en Salud y Seguridad/Partners in Health and Safety
Anna Bachmeier, Cassandra Buerger, Amaris Vesely
Faculty Mentor/Collaborator: Lisa Schiller
For 7 days during the fall and spring semester, UW-Eau Claire Nursing students travel to large dairy farms in Western Wisconsin to provide screenings, immunizations, and education to mostly Latino farm workers. Students integrate knowledge of agricultural health and safety, and an understanding of rural and Latino culture into their nursing practice, by providing on-site education and basic health screenings. The program includes preparation in collaboration with partners, culturally sensitive services to farm workers, and debriefing sessions upon completion of the experience.
Civil Rights Pilgrimage
Crystal Ausler, Bryelle Coleman, Sophie Kent, Jamal Shires, Taz Smith, Ciara Thorns
Faculty Mentors/Collaborators: Stacey Jackson, Jodi Thesing-Ritter
Through a fall course, students learned a shared vocabulary for understanding complex systems of racism, the history of enslavement, reconstruction, the Jim Crow era, methods of organizing during the Civil Rights Movement, and key roles that women played. Students then traveled for 10 days to the sites of historical significance, where they met with leaders to hear first-person accounts. Students engaged in various activities, discussions, and reflections to make critical connections.

Something New Alternative Spring Break
Jordan Allen, Anna Larson, Leslie Peterson, Ta’Leah Van Sistine
Faculty Mentors/Collaborators: Josh Nesja, Nicole Schultz, Ashley Sukhu
Over Spring Break 2019, students traveled to Atlanta, Georgia to explore the issues of poverty, community segregation, and refugees in the southern United States. Participants completed an 8-hour King Nonviolence Training Seminar, engaged in community service, met with community leaders involved in current school integration and community redevelopment efforts, and met with leaders of the historic Selma Voting Rights Movement. The 2019 program visited the largest population of resettled refugees in Clarkston and Atlanta.

Centennial Room
Wednesday, May 1
11:00-11:50am
New York City Aspiring Artists
Wesley Boehm, Kayla Murray, Lauren Rosemurgy, Ben Qualley
Faculty Mentors/Collaborators: Arthur Grothe, Kenneth Pereira
12 UW-Eau Claire music and theatre students and 2 faculty traveled over Spring Break 2019 to New York City to be engaged in the study of instrumental and vocal performance, music education, and theatre. Students performed, studied, attended performances, conducted interviews, and interacted daily with artists and people from a wide variety of backgrounds and perspectives. Students also collaborated, interacted, and shared music with students from the Brooklyn High School for the Arts. They will be presenting on what they learned from this one-week high-impact practice.

Embracing the Somali Immigrant Experience in Midwestern Public Schools
Theresa Laporte
Faculty Mentors/Collaborators: Dandrielle Lewis, Frank Watkins
Students traveled to Minneapolis, Minnesota during Winterim 2019. This program provided students with opportunities to expand their cultural competencies, pedagogical practices, and depth of personal interaction surrounding topics related to Somali experiences and to social justice issues in general. This comprehensive educational program combined more than 24 hours of classroom-based instructions, a week-long, full-day, field placement in specially selected
schools that serve primarily Somali youth, and daily excursions in and around the Somali community in Minneapolis/St. Paul.
CERCA Oral Research Presentations

Latin American Studies Capstone Presentations
Ho-Chunk Room
Wednesday, May 1
9:30-10:30am

Access to Health Education for Women in Rural Guatemala: Limitations and Consequences
Regan McGillick
Faculty Mentor/Collaborator: Analisa DeGrave

This research explores the factors that limit the accessibility of health education and resources to rural Guatemalan women. The geography of rural Guatemala constitutes one of the impediments to rural women’s ability to travel to visit health providers, pharmacies, and related resources. Economic barriers also limit rural women’s travel to locations where health services are offered and purchase preventative care and resources such as feminine hygiene products and contraceptives. Additionally, cultural considerations, such as machismo and religion, impact the value society places on women’s health. Taking into account these geographic, economic, and social barriers, this study also explores the health complications associated with rural Guatemalan women’s diminished or lack of access to reproductive and sex education, contraceptives, and basic feminine hygiene products. Data published by academic and non-profit resources as well as the researcher’s professional experience in Guatemala in 2019 identify as lack of knowledge of menstrual and reproductive health position women as being at risk for HIV, cervical cancer, and unwanted pregnancies; as identifiably complications of access to health education and resources.

Experiences of Spanish-speaking English Language Learners in the Eau Claire Area
Theresa Laporte
Faculty Mentor/Collaborator: Eric Torres

The Spanish-speaking population in Wisconsin is growing. According to University of Wisconsin - Extension's report “Latinos in Wisconsin: A Statistical Overview”, between the years of 2000 and 2010, the Latinx population grew between 101-200% in Eau Claire County. As more Latinxs come to live in Eau Claire, our educational system must meet the needs of these students. Eau Claire area schools have seen increases in enrollment of Spanish-speaking students and thus, increases in students in their English Learner program. The goal of this project is to examine the current state of English Language education for Spanish-speaking language learners in the Eau Claire area. To achieve this, I interviewed English Language teachers and other professionals closely involved with the population in order to illustrate the experiences of Spanish-speaking individuals learning English here. Finally, from information gathered from the interviews, I propose suggestions to improve the educational and social experiences of Spanish-speaking English language learners in the Eau Claire Area.
The Effects of Colorism on the Latinx Community
María Sánchez
Faculty Mentor/Collaborator: Gerardo Licón
No abstract available

Health & Related Research
Menominee Room
Wednesday, May 1
11:00-11:50am
Reproductive Freedom as a Women's Issue or a Woman's Issue?
Stephanie Hoeksema
Faculty Mentor/Collaborator: Peter Hart-Brinson
Historically, there has been vast public controversy on the topic of reproductive rights. Institutions of power have oppressed women by shifting the great responsibility of reproductive freedom away from them. The choices that media outlets make when presenting the topic of reproductive rights hold power to shape how the public responds. There is reason to believe that a difference in coverage exists in mass media for reproductive rights. When speaking about reproductive rights, do news outlets frame them as a women’s health issue which needs reform or as a woman’s personal issue to deal with herself? The two outlets analyzed were Fox News and CNN. I developed a system to code articles regarding reproductive rights using a combination of five qualitative and quantitative measurements, including a rhetorical analysis of the lead paragraph, framing as a women's issue, and article lengths. The findings between the two chosen outlets show considerable differences in news coverage, polarizing public opinion on this topic. This research draws attention to an often-overlooked topic in the framework for gender equality, and further research will bring more visibility to this issue. Expanding dialogue is essential for understanding the concealed forms of sexism that persist in today's society.

Human Energy Modalities for Dementia-Associated Symptoms: An Evidence-Based Practice Project
Aimee Marx, Michael Jaeb, Madeline Norman, Omid Razmpour
Faculty Mentors/Collaborators: Norah Airth-Kindree, Der-Fa Lu
Dementia and Alzheimer’s disease impact five million people in the United States and fifty million people globally. Our study focused on alternative therapies to address depression and cognitive decline, symptoms of dementia. Mind clearing (MC) and Body Talk Cortices (BTC) are treatment modalities that utilize the body’s natural energy and has no known adverse effects. Participants were recruited from community agencies, and training resources were provided to facilitate the use of MC and BTC to participants. Utilizing two assessment tools (PHQ-9 and SLUMS) data was gathered at baseline, 3 and 6-month intervals on mood and cognition. Analysis of the project is in progress using ANOVA to determine the effect of MC and BTC on symptom management and participants’ responses. Our study also evaluates implementation facilitators and barriers for future practice considerations. Facilitators include the status of the person performing the interventions and a public setting. Declining health, the word “therapy”
Can a test of visual memory help predict success in post-lingually deaf adults receiving cochlear implants?
Kristin Wichert
Faculty Mentor/Collaborator: Abby Hemmerich
Individuals with significant hearing loss may elect to receive a cochlear implant (CI), which can restore some hearing capabilities. However, clinicians are challenged to identify clients who may be at a higher risk for poor outcomes prior to the invasive implantation procedure. Recent studies have shown that working memory, in addition to hearing status and age, may play a role in the deficits faced by hearing impaired individuals. The purpose of this study was to examine tests of visual working memory as predictors of speech perception outcomes in individuals with CI. Visual working memory tasks were chosen to isolate the potential memory deficits from other audibility factors. Thirty-two CI users participated in the study, completing a battery of assessments for visual working memory and speech perception skills. Preliminary results suggest that these visual memory tasks are positively correlated with speech perception outcomes, which could help care teams, including speech-language pathologists, develop assessment protocols to better predict outcomes prior to CI and to assist in the development of targeted, individualized aural rehabilitation strategies following CI.

Education
Ho-Chunk Room
Wednesday, May 1
12:00-12:50pm
Mathematics Education in the United States versus Asian Nations
Krista Kolar, Madeline Russell
Faculty Mentor/Collaborator: Jennifer Harrison
Our research is titled “Mathematics Education in the United States versus Asian Nations.” Our aim was to compare the approaches to school mathematics in Asia and the United States. The United States has recently attempted to make substantive changes in the teaching of mathematics. However, American students’ mathematics performance ranks lower than students from many Asian Nations. We wanted to see how the nature of the systems may have contributed to Asian nations’ students outperforming students in the United States in mathematics. To explore this question, we analyzed multiple research articles on the topic that varied to include a broad comparison of many Asian Nations and the United States to an in-depth look comparing two specific countries. Each article provided both advantages and pitfalls in the Asian mathematics education system. There is no clear answer to which mathematics program is better. However, we asserted that each can draw strategies from one another to create a more well-rounded mathematics education system. For instance, the United States could encourage more parent involvement and add more rigor and Asian countries could incorporate and encourage more creativity and interest. Combining the best components of each region could result in an impressive mathematics program.
Developing and Assessing an Extensive Reading Program in Japanese
Brianna Kosmer, Elyse Frandsen
Faculty Mentor/Collaborator: Tomomi Kakegawa
The purpose of this student-faculty collaborative project is to develop an Extensive Reading (ER) curriculum in the Japanese courses at UW - Eau Claire. ER pedagogy focuses on reading for pleasure and encourages language learners to read what interests them. Previous research suggests ER’s positive effects on language learners’ development, including improvements of general language competence, writing, reading comprehension, and reading rate. The ER curriculum was implemented in a third semester Japanese course, and feedback from pre- and post-program Qualtrics surveys was analyzed to find (1) reasonable amounts of reading for students at different levels, (2) ER’s effects on learners’ attitude toward reading, and (3) how to motivate learners to read more. Due to a small sample size, the purpose of this study is not to generalize about any such effects; rather, it is to find ways to continue developing the ER curriculum so that it is most beneficial to learners. Additionally, this project suggests the potential benefit of student-faculty collaboration for curriculum development, as student collaborators analyzed existing research on ER in relation to language learning, composed a literature review, categorized Japanese books into various difficulty levels, and made them available to check out in the campus library.

Comparing Asynchronous, Text-Based Discussion Boards to Synchronous, Video Chat Discussion Forums
Gabriella Oswald, Hallee Hoeppner
Faculty Mentors/Collaborators: Abby Hemmerich, Thomas Sather
Student engagement in online courses plays a major role in their learning. Studies have demonstrated the value of the social interaction and deeper thinking required when students respond to prompts in online asynchronous discussion boards as well as in synchronous video chats. However, it remains unclear what form of discussion students prefer. Within this study, students in both an online undergraduate and graduate course in the CSD program participated in faculty-guided synchronous discussion forum video chats throughout the semester. They were given the opportunity to participate in live discussions via Blujeans, a video chat program. If students were not able to attend the live session, they had the ability to watch a recorded video of the chat later on. A survey was created to gather information about students’ preference between synchronous discussion forum video chats and asynchronous online discussion boards. This survey was sent to the students twice: at midterm and after the semester ended. The results were then compared in various ways: undergraduate versus graduate, undergraduate midterm versus final, and graduate midterm versus final. Preliminary results indicate students valued the synchronous video discussions, but generally a class that utilizes a combination of both asynchronous and synchronous discussion is preferred.
Science and Philosophy
Menominee Room
Wednesday, May 1
1:00-1:50pm

*Ab initio molecular dynamics study of structural stability of amorphous Li$_3$BN$_2$ and Li$_3$AlN$_2*

Blake Bomann
Faculty Mentor/Collaborator: Ying Ma

As demand for renewable energy increases, the need for reliable energy storage technology becomes increasingly important. A supercapacitor is an energy storage device with ultra-fast charge and discharge rates, which is important for applications requiring high power output. Recent experimental data suggested that lithium cobalt oxide (LiCoO$_2$), although primarily used as a battery material, has the potential to be used as the electrode material for supercapacitors if the size of the particle is reduced. In this work, surface properties of LiCoO$_2$ were studied using first principles calculation since surface effects tend to dominate when the size of the particle decreases. Surface energies, site energies and lithium diffusion barriers were calculated. We found that on a surface level, the site energy is drastically reduced when compared to that of a bulk structure, which corresponds to faster ionic transport. These results not only confirm previous experimental observations, but also suggest the importance of LiCoO$_2$ as a new material for supercapacitors.

*The Nature of Space-Time in Science and Philosophy*

Melanie Zens
Faculty Mentors/Collaborators: Scott Whitfield, Padraig Gallagher

An interpretation of Richard Feynman’s sum over histories model of particulate behavior is becoming common in the general populace’s understanding of quantum mechanics. This interpretation started as a euphemism, utilized by Feynman himself, and has transformed into the saying that a particle can be at or occupy two or more places at once. Pop-science blogs and even some scientists themselves have touted this saying. In this talk, I will be providing a philosophical critique of the concept, arguing that it entails violations of basic logical principles and should therefore be rejected. I then turn to modern science’s important impact on philosophical theories of time, particularly on how it has led to revision of philosophical A-theory. I predict that science will push philosophers to embrace C-theory, which has, up until recently, been largely overlooked.
Guns, Bikes, and Women: An Unconventional Tour of Schlegelmilch House (Public History Capstone Presentations)

Ho-Chunk Room
Wednesday, May 1
2:00-2:50pm
Faculty Mentor/Collaborator: John Mann

Students enrolled in History 486/686: Seminar in Public History are conducting research to support unconventional, thematic tours of Schlegelmilch House, an historic house museum owned and operated by the Chippewa Valley Museum, on Sunday April 28 and May 5.

**Guns**
Madeline Jagodinski, Logan Jilek, Connor La Favor, Mitchel Orlavsky
Hermann Schlegelmilch, a German immigrant to Eau Claire, was a gunsmith and shooting enthusiast. Students researching this theme focus on the Schlegelmilch hardware and gun store, in downtown Eau Claire, as well as Schlegelmilch’s involvement with the Eau Claire Schutzenverein, a German American marksmen club. The Schlegelmilch family’s historic gun collection will be on display for the tours.

**Bikes**
Adam Azzalino, Elizabeth Peterson, Thomas Reineck, Caroline Saksefski
Hermann’s son Herman was caught up in the bicycling craze that swept the US in the late nineteenth century. Students in this group are documenting Herman’s European bicycling tour, and his involvement with the Eau Claire Cycling Club, which advocated for the first dedicated bicycle paths. Those taking part in the tours will have the option to participate in a bike tour of Eau Claire which will retrace the city’s first dedicated bike path through Putnam Park.

**Women**
Kaitlyn Dehnke, Talyn McFarlane, Kendra Polzin
For the better part of a century, Schlegelmilch House was occupied by women. Students in this group document the lives of three generations of independent-minded Schlegelmilch women: Louisa, Dora, and Agnes. This portion of the tours will include dramatic readings of excerpts from correspondence between family members.
Comparing the Women, Infants and Children Program (WIC) to the Supplemental Nutrition and Assistance Program (SNAP): A Case Study of Benefits Redemption Rates in Wisconsin
Jared Fogarty, Emma Halverson, Rivin Perinchery
Faculty Mentor/Collaborator: Eric Jamelske

The Women, Infants and Children Program (WIC) was established to increase access to healthy foods for low income women with children through benefits provided for targeted healthy foods. The WIC food package was revised to include fruits and vegetables (FV) in 2009 to better align with dietary guidelines. The Supplemental Nutrition Assistance Program (SNAP) is the largest support program designed to increase access to food for low-income households. In contrast to WIC, SNAP benefits are not restricted to targeted healthy foods.

This study reports on Wisconsin data from 2016 and 2017 for the rates at which WIC food benefits are utilized by participating households across each different targeted food category. Specific attention is paid to the rate of usage for FV benefits compared to other food items. Additional comparisons are made for the usage of SNAP benefits by participating households. Preliminary results suggest that WIC benefits are less fully utilized than SNAP benefits. That said, among WIC food benefits, FV benefits are used more than other some other food items. We are just beginning this work and thus we cannot give more specific details at this time. This research is relevant from a policy perspective as it helps us understand the impacts of a WIC program change to increase access to FV for low income families. It is also relevant to the policy discussion regarding restricting SNAP benefits to targeted healthy foods.

Increasing Healthy Food Access for Supplemental Nutrition Assistance Program (SNAP) Households: A Case study of Participation and Benefits from a Wisconsin Farmers Market- Market Match Program
Nathan Gilger, Shelly Stephani, Nevada Sweitzer
Faculty Mentor/Collaborator: Eric Jamelske

Although fruit and vegetable (FV) consumption lowers risks for many chronic diseases, children/adults tend under-consume FV. Research suggests that Supplemental Nutrition Assistance Program (SNAP) households purchase fewer healthy foods and more unhealthy foods compared to non-SNAP households. Thus, increasing purchases of healthy foods, especially FV, among SNAP households has become an important focus among practitioners, policymakers and researchers.

This study reports on a program that doubles SNAP benefits used at the farmers market up to $10/week. Using data collected from the farmers market we characterize program usage from 2014-18. We also report on survey results highlighting benefits of the program reported by SNAP households. Our results show that the market match program has significantly increased the number of SNAP shoppers using the farmers market and has also increased the frequency of trips to the farmers market. Survey responses show that significant percentages of SNAP farmers market shoppers report purchasing/eating more FV and say that it helps increase their budget.
These results suggest that SNAP families are gaining access to healthier food through the market match program. However, the use of SNAP benefits at the farmers market in 2018 represented less than 10% of SNAP households suggesting additional promotions are needed to increase usage which will require additional resources.

This research has policy relevance as it helps us understand the impacts of a program designed to improve access to healthy foods for low income families.

**Characterizing Supplemental Nutrition Assistance Programs (SNAP) Purchases: A Case Study Comparing Shopping Behaviors of SNAP and Non-SNAP Households at One Wisconsin Grocery Retailer**

Benjamin Miller, Kelly Schneider, Levi Soborowicz

Faculty Mentor/Collaborator: Eric Jamelske

Despite research significant health benefits from consuming fruits and vegetables (FV), intake remains below recommended levels for many children and adults in the United States. Research also suggests that the Supplemental Nutrition Assistance Program (SNAP) may contribute to obesity among low income households. A January 2017 New York Times headline claimed food stamp households purchased a lot of soda based on a research study. Thus, increasing FV consumption and decreasing sweetened beverage consumption have become an important focus among practitioners, policymakers and researchers regarding SNAP households.

This study reports on data for SNAP and non-SNAP food purchases at one Wisconsin grocery retailer in 2017. We compare one month of daily transactions from SNAP purchases to one week of daily transactions from non-SNAP purchases. Our SNAP data consists of 39,740 spreadsheet rows representing nearly 3,000 shopping trips while our Non-SNAP data consists of 380,708 spreadsheet rows representing nearly 30,000 shopping trips.

For FV and sweetened beverages, our results are comparable to the research behind the NY times article. We find SNAP households spend less on fruits and vegetables (12.5% < 17.4%) and more on sweetened beverages (5.4% > 3.4%) compared to non-SNAP Households. We are in the process of adding a detailed account of FV juices to our analysis to report in this presentation.

This research has policy relevance as it helps build our understanding of what foods are being purchased by SNAP households before considering changes to the SNAP program.
Lecture/Performance
Alumni Room
Wednesday, May 1
3:00-3:25pm
*Left Out of the Western Classical Tradition: Solo Pieces for Low Brass Instruments*
Benjamin Phillips
Performers: Leo Johnson, Brandon Fuhrman, and Raymond Dorschner
Faculty Mentor/Collaborator: Chia-Yu Hsu
The goal of my project was to write three unaccompanied solo pieces, one for trombone, one for euphonium, and one for tuba. These pieces were written to be at an appropriate pedagogical level for undergraduate students, which is important because low brass instruments are underrepresented in the Western classical tradition and are not seen as solo instruments. Low brass instrumentalists’ resort to studying pieces that were written for other instruments, such as the Bach Cello Suites. This project provides more appropriate works to study for low brass instrumentalists as well as offers a new perspective on the role of these instruments. Trombone is my primary instrument, which is what motivated me to write solo pieces for low brass. Before I began writing, I studied the standard repertoire of each of the three instruments, studied the scores of some of the pieces, and also researched extended techniques and the mechanics of the tuba and the euphonium. My presentation will feature live performances from Leo Johnson, Brandon Fuhrman, and Raymond Dorschner, along with a lecture to contextualize my work. The final outcomes of my project are solo pieces which are idiomatically written for trombone, euphonium, and tuba.

3:30-3:55pm
*The curious case of Benjamin Britten: performance practice and composer intent regarding the role of the piano in Britten’s song cycle “Winter Words”*
Jennifer Lohman
Faculty Mentors/Collaborators: Nicholas Phillips, Mark Mowry
“Historically informed performance practice” (HIPP) is an approach to the performing of classical concert music in which the goal is to be sensitive to the manner and style of the era in which a work was originally conceived. HIPP is usually associated with the study and performance of Classical and Baroque era music; proponents will read treatises on performance, as well as research the historical instruments for which pieces were written in order to understand how the piece was originally experienced. As a result of this background work, these performers are especially sensitive to composer intent. There is no reason that HIPP methods could not be used for music written more recently than the Classical period. The purpose of this project was to research Benjamin Britten’s song collection “Winter Words” (1953) using methods drawn from the HIPP movement. Through reading letters, writings, and interviews by and about Benjamin Britten, and especially by studying Britten’s own recordings of this collection of songs, Britten’s specific instructions as reflected in the score were deduced. This methodology was especially effective in guiding performance decisions about the role of the piano in regards to a contemporary presentation of Britten’s “Winter Words.”
Impacts of Colonialism on Indigenous Peoples in the Americas
Menominee Room
Thursday, May 2
8:30-9:20am
A Critical Analysis of Fair-Trade Impacts on Indigenous Communities with Ecuador
Dakota Tollakson, James Morgan
Faculty Mentor/Collaborator: Jeff DeGrave
The purpose of this analysis was to investigate the fair-trade business practices that are occurring in Ecuador and understanding the role and impacts that Western consumers, like you and me, have in supporting sustainable living conditions for people in other parts of the world. Indigenous communities in Ecuador can maintain their culture and economies through globalization, through the sale of fair-trade products to consumers of the Global North. The goal is to stand up against the use of cheap labor and poor working conditions that large corporations rely on to create huge profits for those at the top of the food chain. Perhaps the most important take away from this study is that we all play a part in the global economy, what we buy is a vote for what we value and believe in. Do our consumer habits truly reflect what we say we believe in.

Impact of the Fort Laramie Treaties on the Lakota Religion and the Yellowstone Bison Herd
Maggie Foltz
Faculty Mentor/Collaborator: Robert Bell
Starting with the Fort Laramie treaties of 1851 and 1868 the United States began assimilation policies that would later develop into the boarding school system as well as the Dawes Allotment Act. In 1883 the United States passed policies to limit the expression of Lakota religion, making it a crime to hold any dances, as these were seen as cover-ups for other resistance activities. These policies were later strengthened in 1892 following the Wounded Knee massacre. The United States also illegally took away the Black Hills and adopted a policy to take the bison away from the Lakota and exterminate the bison as both the bison and the Lakota, were viewed as an obstruction to American progress. Although the United States passed the American Indian Religious Freedom Act (AIRFA) of 1978, there are still many lingering effects of these policies on present-day Lakota. One of which is the debate concerning the policies including the bison within Yellowstone. The impact of the treaties and acts on policies concerning these bison has not been studied as an extension of the impacts on Lakota religion and should be considered when looking at future policies within this area.

The Winter Dam Lawsuit of 1971: The Ecological Indian and the Environmental Movement
Madeline Post
Faculty Mentor/Collaborator: David Soll
The purpose of this project is to examine how the ecological Indian stereotype was used during the Winter Dam Lawsuit of 1971 between the Lac Courte Oreilles reservation and the Northern States Power Company. I will illustrate how this stereotype, which was used in the nineteenth century to justify the taking of Ojibwe land, benefited the Lac Courte Oreilles amid the environmental movement. I have examined a collection of briefs, testimonies, hearings and
newspaper articles that belong to the tribe’s lawyer, Larry Leventhal, to gather portrayals of the Lac Courte Oreilles. Through this research, I will show how the ecological Indian stereotype played an important role in the Lac Courte Oreilles gaining support during the lawsuit. This trope, previously used to divide the tribe’s land in the Chippewa Treaties of the nineteenth century, proved beneficial in the late twentieth century. This represents a larger trend during the 1970s of support for American Indian rights within a post-industrial society. Stereotypes that had previously been used to degrade the civilization of American Indians, now became beneficial in a mainstream movement for conservation and ecological living. This research is an innovative examination of an indigenous stereotype in a consequential event in this region. It is a case study that reflects not only important trends in the environmental movement, but also twentieth century American Indian history.

**Literature & Media**

**Ho-Chunk Room**

**Thursday, May 2**

**9:30-10:45am**

**Re-scripting the Asylum: A Queer Rhetorical Look at Early 20th Institutional American Mental Health**

Zachary Peterson

Faculty Mentor/Collaborator: Jonathan Rylander

Drawing from the works of Sara Ahmed, Bruno LaTour and Robert McRuer, this presentation will queer rhetorics of 20th century institutional mental health in the United States through an analysis of the later half of the Asylum Era, 1850-1950. I will focus on the institution originally known as the Northern Wisconsin Home for the Feeble Minded and the Epileptic, found in 1897. Merging Queer Theory, Actor Network Theory (ANT), and Disability Studies as a methodological lens, I will analyze how a prevailing “happiness script” (Ahmed) of this center operates through 24 oral histories. Examining these oral histories as pieces of performance rhetoric, I will consider them alongside a queering of the buildings at the NWCDD. Building from ANT, I will focus on the brick and mortar of the structures themselves to get at the individual stories of those within the system. Looking to Ahmed for Queer Theory, this presentation will also look to explore how structures and objects themselves play a significant role in the narrative of mental health. It will aim to show how rhetorics of mental health can be creatively reshaped through greater attention to physical manifestations of the asylum era.

**The Stoic Philosophy in Today’s Literature and Media**

Benjamin Dittrich

Faculty Mentor/Collaborator: Matthew Meyer

The central aim of this paper is to take a deep look into the writings of Marcus Aurelius and compare his philosophy to themes in the popular works of today. Interest in Stoic philosophy has become increasingly noticeable in notable books, websites and films. In this paper I compare some of the modern interpretations of Stoicism to the ancient texts that it is rooted in. Reading the Meditations of Marcus Aurelius and The Inner Citadel greatly elucidated my understanding of the Stoic philosophy. This is paired with study of several YouTube videos and blogs that claim to teach the Stoic philosophy. I point to the similarities and differences between recent
accounts of Stoic teachings and the actual texts they are derived from. One interesting finding was that while Ancient Stoicism teaches an ethical relation to the whole universe and the beings in it, Stoic treatments in popular culture today focus more on how Stoicism can help the individual in question, thereby exhibiting a more egoistic application. I will focus on this discrepancy in my conclusion.

**The Effect of Portrayals of Black Brits in Mass Media on Perception**
Scott Procter, Darius Sims, Jefferson Hall
Faculty Mentors/Collaborators: Jan Larson, Jodi Thesing-Ritter
This study assessed the impact of the negative portrayals of black people on the television show Top Boy and how those sentiments contribute to racism. The research consisted of profound analysis of the television show with supplementary insight from British academics gleaned during in person interviews by student researchers in England during a twenty-one-day faculty led international research fellowship. Through the examination of Top Boy’s characteristics coupled with interviews with prominent British academics, researchers found that stereotypical portrayals of black people like those in Top Boy negatively impact the lives and perception of black individuals. We interpreted through our findings that the stereotypical portrayals of black people negatively affect the psyche of black individuals as they only see characters that look like them in the media in negative situations. Similarly, these portrayals affect the perceptions other people have about black people as they also start to associate these negative portrayals with everyday black life.

**Women’s, Gender, and Sexuality Studies Capstone Presentations**
Menominee Room
Thursday, May 2
11:00am-1:00pm
Faculty Mentor: Rose-Marie Avin

**Altoona School District**
Shannon Dixon
In the traditional education model, there is a significant gap in the education of students with marginalized identities. The Altoona School District, along with their teachers and faculty, recognize this gap in the traditional education model and bring in outside professionals and volunteers in order to supplement said model and promote the educational success of all students. Throughout this internship, I will be working with a class of first graders at Altoona Elementary School. While I am there to assist the teacher with daily activities and lend a helping hand to all students, I will be spending most of my time with a few specific English as a Second Language (ESL) students to ensure their success in a system that promotes their failure.

**The Chippewa Valley LGBTQ Community Center**
Sarah Chojnacki
The Chippewa Valley LGBTQ+ Community Center aims to provide services and create educational programs that promote well-being and unity within and among the LGBTQ+
community. For my internship, I will be working to create, and help run, a successful youth group, while also planning a prom for queer youth. These projects work to provide support, community, and a safe place for LGBTQ+ youth in Eau Claire and surrounding areas.

**Eau Claire County Mental Health Court**  
*Madeline Behling*

The Eau Claire County Mental Health Court is a treatment court created to provide alternative responses of the Eau Claire County criminal justice system to individuals with mental health disorders. This is a co-ed court for individuals who have been charged with misdemeanors and non-violent felonies; the court’s goal is to improve the participant’s recovery from mental illness as well as reduce the amount of time spent in the criminal justice system. Recently, there has been a move to separate treatment courts based on gender. I will be analyzing this change throughout the country, looking into what this means in creating safer spaces for women, as well as how it may create additional trauma for transgender participants.

**Eau Claire City-County Health Department Family Planning Services**  
*Sarah Benish, Jacie Jones, Alyssa Rae Plano*

The Eau Claire City-County Health Department Family Planning Services is a local clinic in downtown Eau Claire that provides reproductive health services at low to no cost. The focus of our externship will be working to increase awareness about the services the clinic provides through branding and advertising, as well as planning two main events: a sex education trivia night and condom crawls. Regarding advertising, we will put up posters in public bathrooms around the city, work to update social media accounts, and other awareness efforts. We will also do a few condom crawls focusing on Water Street where we will give out resources. Our large-scale event will be the sex education trivia night, where we will provide fun educational opportunities and resources for partners in the community. Through this externship, our goal is to increase awareness about the clinic and their services and help educate the community on important issues.

**EX-Incarcerated People Organizing (EXPO)**  
*Carter Kha, Zachary Madison, Gabrielle White*

In response to the recent conversations, suggestions, and proposals for the Eau Claire County jail expansion, the local EXPO (Ex-incarcerated People Organizing) chapter has organized a campaign to halt the construction of the fourth jail pod and advocate for allocation of public resources away from the policing and imprisonment regime. As part of our externship, we have worked to support and promote local anti-jail programs and contributed to the broad demands for the abolition of state-supported racist and genocidal operations. In this presentation, we will explain some of the major components of our work by focusing on efforts for mobilization within electoral and governmental politics, as well as both scholarly- and activist-based research we conducted regarding possibilities of a society without the prison industrial complex. With a continued understanding that the penal system is founded on the suppression of people of color, working class and poor people, people rendered gender nonnormative, and people otherwise pathologized by the state, during this externship we have expanded the committed engagement to end the relationship between criminalization, punishment, and violence within our community.
**Family Support Center**  
**Anna Hammer, Kyla Johnson, Hannah Peterson**

The mission of the Family Support Center (FSC) is to empower all individuals, families, and communities to live free from domestic violence, sexual assault, child abuse and interpersonal violence through education, prevention and intervention. Hannah, Kyla, and Anna are called upon to organize a tabling event on the UW-Eau Claire campus April 15th and 16th promoting Sexual Assault Awareness Month with FSC. The theme of this event is “I Ask” and educating others on the importance of consent in intimate situations as well as everyday life. We are also responsible for organizing and promoting an open-mic event in April as well as a film screening, both revolving around Sexual Assault Awareness Month. These events will focus on supporting survivors, providing information on services and resources in the Eau Claire/Chippewa Valley area and to educate community members on preventive methods against sexual assault. We also collaborated with FSC personnel to create a bar/restaurant outreach poster to hang up in the restrooms of various establishments around downtown Eau Claire to assist anyone in a possibly dangerous situation, wanting a safe ride home, or needing specific services that FSC can provide.

**Lutheran Social Services**  
**Ev Andor, Abigail McKern, Elizabeth Nelson**

Lutheran Social Services of Wisconsin and Upper Michigan is one of the largest and most experienced health and human services organizations in the Midwest. Externship students will coordinate a clothing/food drive for people in poverty and teach a coping skills session to youth at the Boys & Girls Club and the Juvenile Detention Center. Throughout their externships, students will shadow LSS employees.

**Western Dairyland - Women’s Business Center**  
**Abigail Johnson**

The Women's Business Center (WBC) specializes in providing services to assist women entrepreneurs. Special efforts are made to assist economically and socially disadvantaged women. The center continues their commitment to provide intensive group and one-on-one business training and technical assistance that will assist women to grow their business ideas and acquire or improve their business management skills. In recent years, as women have been encouraged to work outside the home and join the corporate world, women are now starting businesses at much higher rates than men. However, if you take a look down the road, many of these female-led startups cannot survive past the development phase due to lack of support and resources. There is a great need for services tailored to maintaining and growing existing businesses as well as increasing revenues from these newfound female-led businesses. During my time at the WBC, I have worked towards developing a new mentorship program facilitated by the center tailored to this exact demographic, called "Table for Two." This program is designed to create a strong and sustainable leadership pipeline made up of women entrepreneurs in the Chippewa Valley.
International Research
Ho-Chunk Room
Thursday, May 2
1:00-1:50pm

Understanding Cultural Differences and Similarities Through Small Business Visits in India
Hannah Javoroski, Linnea Rustad
Faculty Mentor/Collaborator: Kranti Dugar
The purpose of the business visits within the faculty-led immersion experience in India was to achieve a comprehensive understanding of cultural differences in business practices and models, along with recognition of similarities to U.S business practices. This was achieved through pre-departure research, facilitated group discussion and direct interactions with the leadership teams and workers from three businesses in India. Faculty facilitated discussions on cultural topics such as poverty, social class, and the role of women in India. These concepts were then applied to economic development. During the immersion experience, three businesses based in India were visited with the purpose to understand the implications of all the cultural matters discussed prior to the visit. When traveling abroad, or conducting business internationally, it is vital to have prior knowledge of cultural aspects of the country. However, personal interaction with people from a different culture transforms research-based knowledge into an understanding of collaborative relationships.

"Budapest Blackout:” The Diaries of Dr. Maria Madi
Hannah Lahti, Cade Lambrecht
Faculty Mentor/Collaborator: James Oberly
There has been a wide range of scholarship produced on the study of the Holocaust since the end of World War II in 1945. Holocaust historians have become increasingly interested in the role of resisters, bystanders, and supporters of the Holocaust. Dr. Maria Madi was a non-Jewish doctor living in Budapest during the Nazi occupation of Hungary. In English, Dr. Madi wrote sixteen diary volumes in which she recorded her wartime experiences, including her protection of a young Jewish boy. This project sought to make Dr. Madi’s diaries accessible to the reading public in the form of a transcribed book in English. Through the study of Budapest census data and city plans, researchers were able to contextualize the people and places that Dr. Madi referenced in her diaries. Researchers were able to transcribe the diaries with translation and transcription assistance from Hungarian students at Károli Gáspár University. Those transcriptions will be developed into a book with the aim of making this history more accessible. This project can be used as resource to understand a perspective from Hungary during the Holocaust.
A Needs Assessment of Teacher Beliefs and PBIS Practices in Early Childhood
Stephanie Ocwieja, School Psychology
Thesis Advisor: Mary Beth Tusing

A review of the still-emerging literature surrounding early childhood Positive Behavior Intervention and Supports (PBIS) suggests that certain contextual factors, including teacher demographic and beliefs, can impact the successful implementation, fidelity, and long-term sustainability of PBIS practices within an early childhood program. In conducting the current needs assessment, the stakeholders of a universal 4K program already implementing PBIS wanted to better understand how these factors were related to the teacher perceptions of implementation of PBIS practices across classrooms. In so doing, they could better target professional development and coaching efforts for their staff and could use this initial survey as a benchmark against which to measure future growth. Overall, the needs assessment identified that early career teachers reported less confidence in their classroom management skills, but that this belief did not appear to impact their perceived levels of PBIS implementation in the classroom. Instead, teacher beliefs about whether or not behavior can be altered by environmental factors and influenced by teachers were more indicative of perceived PBIS implementation levels. By identifying these relationships between educator traits and beliefs, as well as the areas of strength and future growth within the program and among staff groups, recommendations were made so that the program could target specific sub-groups of teachers and support the increase of specific skills or beliefs in their future professional development efforts.
support individuals with TBI, preventing further breakdowns and fostering more enjoyable conversations. The present investigation seeks to identify modifications that meet individualized needs of clients while retaining the core protocol. Preliminary outcomes suggest that adjustments are necessary across individuals and their partners, but core elements of video self-modeling protocols can serve as a framework for effective intervention.
CERCA Poster Presentations

Education and Scholarship of Teaching and Learning

Blugold Beginnings

*Educational Practice Outcomes Resulting from Intercultural Immersion Experience*

Nicholas Walkowiak  
Faculty Mentor/Collaborator: Jodi Thesing-Ritter  
Poster #: 119

Culturally responsive curriculum should be integrated on a long-term basis that combines academic goals with anti-bias training. Educators, school administrators, and researchers must collaborate to integrate anti-bias education into their lesson plans and activities while monitoring the impact of these changes on student learning. Immersion experiences for educators can promote and inspire a change in their educational practices that can create a widespread transformation throughout the institution of education (McKown, 2005). The University of Wisconsin-Eau Claire has sponsored an educator scholarship to engage regional educators in a nine-day intercultural immersion experience with the goal of enhancing culturally responsive curriculum in regional schools. This immersion experience takes participants to sites of historical significance of the Civil Rights Movement. Educators participating in this scholarship are required to incorporate different aspects of the immersion experience into their educational practices to increase culturally responsive pedagogy. Twenty-eight past and current educator participants were invited by formal email to participate in individual interviews. This study provides a qualitative analysis of the various ways that educators integrate learning from the immersion experience into their own educational practices. Researchers analyzed the teacher perceptions of outcomes for students impacted by changing educational practices.

Chemistry

*Impact of Flipping the General Chemistry Laboratory Lecture on Student Performance and Student Attitudes Towards Chemistry*

Katrina Idarraga  
Faculty Mentor/Collaborator: Roslyn Theisen  
Poster #: 153

While flipped chemistry lecture courses have appeared throughout the undergraduate curriculum, flipped laboratory experiences are rare. This study investigates how flipping a general chemistry laboratory lecture effects student attitudes towards chemistry and their understanding of chemistry topics. In this study, two groups—a traditionally taught laboratory and a laboratory with a flipped format—were examined. The traditionally taught laboratory began with a one-hour introductory lecture followed by two hours of experimentation and work time. For the flipped laboratory, before attending lab, students watched and studied a series of locally
produced, experiment specific videos, and completed an online pre-laboratory assessment. During the laboratory period, time usually reserved for pre-lab instruction was reinvested in additional student-centered active learning exercises and enhanced student-faculty discussion. This presentation will describe implementation of the flipped lab curriculum as well as discuss quantitative data collected from a validated and reliable attitude survey (the ASCIv2) and summative assessment data collected from standardized exams for both groups. With these results, we advance our understanding of how students learn chemistry in the laboratory and examine the impact of designing new instructional materials.

**Communication Sciences and Disorders**

*The perspectives of graduate students on the implementation of Twitter as an educational tool in higher level education courses.*

**Kayla Black, Callie Larson, Emily Jaegar**

Faculty Mentor/Collaborator: **Thomas Sather**

Poster #: 20

The primary goal of this research is to investigate the use and effectiveness of Twitter in graduate level courses from the perspective of online and residential Communication Sciences and Disorders graduate students. A survey was developed to gain insight on the perspective of Twitter use in the classroom and the lasting effects in residential and online graduate students. Both residential and online cohorts were surveyed anonymously to determine perspectives of varying degrees of course-based Twitter requirements. Survey data will be reported related to student perceptions regarding required versus optional course-based Twitter requirements as well as optimal implementation of Twitter into course development. Implications will be discussed relating to barriers and facilitators to Twitter usage within a graduate course, and pedagogical strategies to reduce barriers and enhance facilitators in graduate-level coursework. We anticipate our research will guide future Twitter practices in higher education and expand this body of research. Presenters: Kayla Black, Emily Jaeger, and Callie Larson.

**Speech-Language Pathologists’ Perceptions of Undergraduate and Graduate Program Preparation for Evidence-Based Practice Use**

**Kaitlyn Bruggenthies, Dana Walstead**

Faculty Mentors/Collaborators: **Rebecca Jarzynski, Jerry Hoepner**

Poster #: 9

The goal of this study was to investigate practicing speech-language pathologists’ perceptions of their undergraduate and graduate programs preparation for the use of evidence-based practice (EBP). The three pillars of EBP (research evidence, clinical expertise, and client perspectives) are intended to guide speech-language pathologists (SLPs) in their practice. Without addressing all three pillars in combination, SLPs cannot achieve the goal of providing each client with the best treatment possible. The American Speech-Language Hearing Association requires graduate programs to prepare students for the use of EBP. Some undergraduate and graduate programs have sought to meet this requirement by implementing a research project or research methods course, an EBP project, or an EBP course into their programs. In order to investigate SLPs perceptions of their undergraduate and graduate programs preparation for EBP use, we
developed and distributed a survey. 208 practicing SLPs completed the survey. Survey data will be analyzed both quantitatively and qualitatively. Outcomes will help undergraduate and graduate programs identify what they are doing well and areas of need when it comes to preparing students for the use of EBP.

**Perceived Student Values of Formative Feedback**
Jordan Doyle, Katie Parsons
Faculty Mentor/Collaborator: Jerry Hoepner

A wealth of research across disciplines has identified formative assessments as more conducive to student learning than traditional summative assessments. A survey was sent to Communication Sciences and Disorders (CSD) students at the University of Wisconsin-Eau Claire to examine student perceptions regarding formative feedback. A total of 125 surveys were completed by undergraduate and graduate students in CSD. Written responses to open-ended questions such as, “What adds value to individualized feedback?” were coded and categorized using qualitative, grounded theory coding (Strauss & Corbin, 2008). Recurrent themes included improving motivation, enhancing future performance, and building a personal connection with professors, among others. These results may be valuable for educators striving to increase student understanding, as they consider the benefits of taking time to provide individualized, formative feedback.

**Comparing Asynchronous, Text-Based Discussion Boards to Synchronous, Video Chat Discussion Forums**
Hallee Hoeppner, Gabriella Oswald
Faculty Mentors/Collaborators: Abby Hemmerich, Thomas Sather

Student engagement in online courses plays a major role in their learning. Studies have demonstrated the value of the social interaction and deeper thinking required when students respond to prompts in online asynchronous discussion boards as well as in synchronous video chats. However, it remains unclear what form of discussion students prefer. Within this study, students in both an online undergraduate and graduate course in the CSD program participated in faculty-guided synchronous discussion forum video chats throughout the semester. They were given the opportunity to participate in live discussions via Blujeans, a video chat program. If students were not able to attend the live session, they had the ability to watch a recorded video of the chat later on. A survey was created to gather information about students’ preference between synchronous discussion forum video chats and asynchronous online discussion boards. This survey was sent to the students twice: at midterm and after the semester ended. The results were then compared in various ways: undergraduate versus graduate, undergraduate midterm versus final, and graduate midterm versus final. Preliminary results indicate students valued the synchronous video discussions, but generally a class that utilizes a combination of both asynchronous and synchronous discussion is preferred.
**Writing Across the Curriculum within Communication Sciences and Disorders: A Focus on American Psychological Association Formatting**  
**Alison Jozwiak, Emma Flottemesch, Noah Terrell**  
Faculty Mentor/Collaborator: *Abby Hemmerich*  
**Poster #: 22**

The purpose of this project is to evaluate the explicit implementation of American Psychological Association (APA)-style resources on writing products at the graduate level in Communication Sciences and Disorders (CSD). This project aims to develop disciplinary writing skills in future professional environments by assessing APA formatting skills both before and after implementation of specific APA resources within a graduate-level classroom. Future projects could address additional writing needs within the CSD department, as well as across all writing curriculums at the University of Wisconsin-Eau Claire. Submissions of a single written assignment in a graduate voice course were analyzed using the CSD Writing Rubric developed by the department. These analyses from one offering of the course demonstrated that many students displayed errors in accurately formatting their assignments to adhere to APA formatting. APA resources were created and provided to students in a subsequent offering. Preliminary analyses indicate a reduction in errors after the explicit instruction in APA style. The resources provided assisted in decreasing the number of APA errors, thus improving the quality of the writing in the assignment. Positive results on this small scale suggest that explicit instruction should be utilized within the classroom to enhance a specific disciplinary writing goals.

**Examination of Undergraduate Research in CSD**  
**Joey Lim, Skylee Lara**  
Faculty Mentors/Collaborators: *Abby Hemmerich, Jerry Hoepner*  
**Poster #: 40**

Undergraduate research has been shown to provide numerous benefits for undergraduate students. This study examines the benefits of undergraduate research within the Communication Sciences and Disorders department, more specifically for students who are participating in the Scholarship of Teaching and Learning (SoTL) Research Lab. The SoTL Lab utilizes a model with multiple student research teams and multiple faculty mentors working on a variety of projects at any given time. The purpose of this study is to identify how the SoTL Lab environment impacted undergraduate students, as compared to students with other research experiences, such as faculty-student collaborative projects or the undergraduate research in CSD course, and those who have no research experience. Results may indicate how these different types of research experiences impact research knowledge, professional development, student-faculty relationships, and team-based dynamics. Results may guide faculty to choose a specific type of lab model to facilitate both productivity and student outcomes.

**Impact of Biweekly Discussion Forums on the Self-Efficacy of Instructional Interns**  
**Kallie Medenwald, Tara Sanchez**  
Faculty Mentors/Collaborators: *Abby Hemmerich, Jerry Hoepner*  
**Poster #: 23**

Teaching assistants often are an important part of the instructional team. Previous research studies have indicated a lack of standardization and knowledge regarding the most efficient and effective methods of training teaching assistants within and across disciplines. The purpose of
this study is to determine whether the implementation of biweekly discussion forums, moderated by a faculty mentor, regarding teaching literature and strategies, will increase the self-efficacy of instructional interns (i.e., teaching assistants) within the Communication Sciences and Disorders program. Using a mixed research design, we will analyze qualitative data from instructional interns’ reflection essays and discussion forum responses and quantitative data from survey ratings of teaching self-efficacy. The results will determine if biweekly discussion forums are a feasible and effective way to increase instructional interns’ knowledge of and experience with pedagogy, as well as establish whether the method of providing ongoing support and guidance throughout the semester will increase the instructional interns’ self-efficacy in their teaching abilities. Although this study was conducted with instructional interns in the Communication Sciences and Disorders program at University Wisconsin-Eau Claire, the training program and results may be generalized to other disciplines that employ teaching assistants in the classroom.

**Analyzing Faculty Student Relationships in Communication Sciences & Disorders**

Isabella Ott  
Faculty Mentors/Collaborators: Abby Hemmerich, Jerry Hoepner  
Poster #: 41

Analyzing Faculty Student Relationships- Isabella Ott  
A number of studies have shown significant correlations between student-faculty interaction and all types of academic outcomes (i.e., GPA, degree completion) as well as cognitive, personal, and social development, and perceptions of programs and universities (for a review, see Cuseo, 2018). Faculty mentorship can influence decisions to pursue higher educational outcomes and other personal outcomes (Lamport, 1993). While the positive effects of student-faculty interaction are well documented, it is not clear why those interactions are so important or how they can be implemented to reach a greater number of students. A survey is being sent to undergraduate CSD students asking them to reflect on their experiences in faculty interactions. The primary focus of this study is to identify what aspects of the student-faculty interactions are supporting student learning, engagement, and development. Specifically, aspects related to empathy and student-perceived quality of their educational experience will be the target of this study. If specific aspects of these relationships, or specific types of faculty behaviors, are identified as helpful by students, faculty may be able to build on that knowledge to further support students.

**Collaborative counseling: Using course-embedded experiences to train skills and foster confidence**

Heidi Overeem, Erin Zigler  
Faculty Mentor/Collaborator: Jerry Hoepner  
Poster #: 70

Counseling is one of the eight primary practice domains of speech-language pathologists (SLPs). Despite the emphasis in our daily practice, sparse empirical evidence exists regarding the best way to train acquisition of counseling skills. While counseling is within the scope of practice of SLPs, they are considered to be non-professional counselors, as opposed to professional counselors such as psychotherapists. Therefore, they need to understand what techniques fit within that scope. Because SLPs are experts in supporting communication for persons with severe communication impairments, they are often in a position to elicit counseling moments in a way that other disciplines are not. Therefore, knowing how to manage those moments is crucial. Existing evidence suggests that practicing SLPs and recent-graduates feel unprepared to deliver
the counseling interventions their clients need. Collaborative-counseling is a course-embedded practical experience that uses a collaborative process to develop skills while working with real clients. Working alongside of the instructor, graduate students implement techniques with instructor assistance to assure that they provide the support the client needs. Over the course of 3-4 collaborative sessions, skills develop. This investigation examined individual student reflections and group debriefings across each of the sessions to examine development of counseling skills and self-efficacy.

**A Meta-linguistic Approach for School-based Speech and Language Intervention**

**Vanessa Ziehme, Megan Larson, Maris Krekelberg**

Faculty Mentor/Collaborator: *Vicki Samelson*  
Poster #: 11

A Meta-linguistic Approach for School-based Speech and Language Intervention Maris Krekelberg, Megan Larson, and Vanessa Ziehme A challenge for many students on speech-language pathologists’ (SLP) caseloads is the development of metalinguistic awareness to support generalization of newly learned speech-language skills to classroom and home environments. This collaborative study’s aims were to 1) explore the capacity to which elementary-aged students could integrate a metalinguistic mindset into their speech-language sessions, and 2) describe the process of an SLP-Researcher collaborative project. We hypothesized that increasing a student’s meta-awareness of their goals, strategies, and progress would positively alter the student’s mindset, increase their active participation in therapy, and help them internalize what they learned. In recognition of the value of practice-based research, we recruited three school-based SLPs who then selected five third and fourth grade students from their caseloads. The SLPs incorporated a metalinguistic approach into their therapy sessions and recorded a series of interviews and Think Alouds where the students were prompted to reflect on goals and strategies that they could use both in and beyond the therapy room. The recordings were transcribed, coded, and analyzed using a mixed methods approach to determine the depth and frequency of metalinguistic thinking. Variability across the participants’ results will be discussed along with the SLPs’ reflections on implementation of the meta-linguistic approach.

**Economics**

**The Economic Progress of Hmong Refugees in the U.S.: Work and Wage**

**Andrew Moran, Corey Goodrich, Si Zhou, Samantha Majeski**

Faculty Mentor/Collaborator: *Wayne Carroll*  
Poster #: 204

Thousands of Hmong refugees arrived in the U.S. after 1975, along with hundreds of thousands of refugees and other immigrants from other Southeast Asian countries. Over forty years, these refugees and their families surmounted steep obstacles to achieve considerable economic progress in the U.S. In our research, we examine a rich set of microdata to measure the difficulties encountered by Hmong refugees, and we compare their path toward progress with that of other refugee and immigrant groups. Since Hmong refugees came to the U.S. with lower levels of education and English language skills than other groups, on average, it was more difficult for many of them to join the labor force. As a result, they gained less work experience
over time, so their median wages grew more slowly. We use econometric methods to analyze U.S. Census and American Community Survey (ACS) microdata provided by IPUMS at the University of Minnesota. Our data include thousands of Hmong refugees who arrived in the U.S. between 1975 and 2016.

Geography and Anthropology

Investigating the Eastern Algodones Dune Field of Southern California III: Subsurface Imaging
Joseph Beck, Logan Bergevin, August Guenthner, Taylor Limberg, Matthew Mangin, Hunter Wood
Faculty Mentor/Collaborator: Harry Jol
Poster #: 116

The Algodones Dunes are a dune field located southeast of the Sultan Sea in Southern California. The Algodones Dunes are believed to have been formed from aeolian (wind-blown) sedimentation from the ancient Lake Cahuilla. Current studies indicate that the Algodones Dunes are migrating eastward due to prevailing fall winds. To study the movement and stratigraphy of a sand starved dune field on the back erg along the eastern boundary, a pulseEKKO 1000 ground penetrating radar (GPR) system with 500 MHz antennae and the MALA GX with 450MHz antennae system were deployed. A grid with the dimensions of 36 m on the north, 33.5 m on the south, 27 m on the west and 18.5 m on the east was laid out on one dune complex located on the edge of the Algodones Dune Field. Multiple GPR lines were collected including 8 vertical (y-lines) and 8 horizontal (x-lines) to aid in better understanding the dune stratigraphy and the interaction with the underlying sediments. Using radar stratigraphic principles, results show various inclined reflection patterns downlapping onto a subhorizontal reflection. GPR provides a non-invasive methodology to image an actively migrating dune complex.

Investigating the Eastern Algodones Dunes, Southern California II: Using Geospatial Techniques
Madison Galloway, Paige Hanson, Martin Goettl, Brittany Rickey, Whitney Walker
Faculty Mentor/Collaborator: Harry Jol
Poster #: 124

The Eastern Algodones Dunes, located in the Sonoran Desert, Imperial county, Southern California, stretch 72 kilometers and are 9.7 kilometers in width. The dunes were hypothesized to be a result of sediment blown from ancient Lake Cahuilla and are characterized by distinct regions: Glamis Beach, Gordon's Well, Buttercup, Midway, and Patton's Valley. The purpose of the research was to create a digital elevation model (DEM) of the sand starved dune complex by collecting aerial imagery using a DJI Phantom-4PG UAV. To improve overlap and tie points, the aerial imagery has a 75% front lap and a 65% side lap. The flight was flown at 50 meters above ground level and took 20 swaths overhead. To enhance the accuracy of the DEM, ten ground control points (GCP's) were collected using a REACH RS+ RTK GNSS receiver. In addition, a topographic survey was conducted using a Topcon laser leveler to more accurately geometrically correct the collected ground penetrating radar transects.
Investigating the Eastern Algodones Field of Southern California I: Overview and Geomorphic History of a Dynamic Erg [Sand Dune Field]

Taylor Limberg, Hunter Delikowski, Kaisa Kough, Katelyn Niesen, Anna Turner

Faculty Mentor/Collaborator: Harry Jol
Poster #: 123

The Algodones Erg [Sand Dune Field] is located in the Sonoran Desert and span over 72 km in length and 9.5 km in width. It is a complex and understudied erg system with a rich geomorphic history and relationship to the ancient Lake Cahuilla. The purpose of the study is: to collect data to understand sediments below the dunes to determine the relationship between the dunes and the ancient Lake Cahuilla, and to explore the relationship between human impacts and management on the dune system. Examining the relationship between the ancient Lake Cahuilla and the dune field will further our understanding of the surrounding landscapes and various geologic and geomorphic time periods. The knowledge collected will provide insight on potential impacts to communities and water systems in the region of study. An understanding of the geomorphic processes and historical context of this dynamic Eastern Algodones Dune Field will provide park managers (Bureau of Land Management) a more thorough perspective as they sustainably manage competing land uses in this unique geomorphic environment.

Subsurface Imaging of a Late Woodland Effigy Mound Site: Lake Koshkonong Effigy Mounds, Wisconsin

Matthew Mangin

Faculty Mentor/Collaborator: Harry Jol
Poster #: 115

The preservation for Effigy Mound sites continues to be a concern. These landscape monuments and sacred sites remain poorly understood and require innovative, noninvasive and nondestructive techniques for archaeological investigations. A collaborative study of a Late Woodland (ca. A.D. 700 - 1100) effigy mound site on the east shore of Lake Koshkonong was undertaken. The site, protected from excavation by Wisconsin State law, is within Jefferson County, southeastern Wisconsin. Previous geophysical tools (resistivity, EM) were employed to assess the site. Ground penetrating radar (GPR) transects were collected using a pulseEKKO 1000 unit with two antennae frequencies: 225 MHz (0.5 m antennae separation/step size of 0.1m) and 450 MHz (0.25 m antennae separation/step size of 0.05 m). The surveys were conducted along the length and width of several mounds with topographic data being collected with a Topcon laser level to geometrically correct the data. After data processing and using radar stratigraphic principles on the reflection patterns, internal stratigraphy within the mounds were observed. Together with the previous geophysical surveys, the results reveal a complex natural and cultural stratigraphy both within the mound features and between the mounds.

Looking for the Gate: Imaging at Bethsaida, Israel

Katelyn Niesen

Faculty Mentor/Collaborator: Harry Jol
Poster #: 25

The ancient city of Bethsaida is located in the northern Galilee region of Israel along shores of the Sea of Galilee and is mentioned by Pliny the Elder, Josephus as well as several Biblical texts. First excavated in 1987, the site continues to be excavated. During this time, researchers discovered that multiple habitation layers exist, and the site known as et-Tell. The site has been
investigated using multiple geospatial methods including ground penetrating radar (GPR) technology. The GPR methodology sends electromagnetic pulses into the subsurface and records their returns. In collaboration with the archaeologists, a Sensors and Software pulseEKKO 100 GPR system with 100 MHz antennae was used to collect two grids in search of a possible gate structure below the presented excavations. The data was processed using EKKO Project and Voxler software packages with an inclined reflection noted in the 2D and 3D imagery. This continuous reflection pattern was interpreted as subsurface target horizon for on-site archaeologists. A test probe confirmed the GPR results, located another habitation layer, and has led to extensive excavations at et-Tell.

Kinesiology

**Wisconsin Physical Education Teachers’ Job Satisfaction**

*Tyler Vogt, Carley Green, Grace Hoenisch, Adam Knochenmus*

Faculty Mentors/Collaborators: *Yoonsin Oh, Saori Braun*  
Poster #: 151

There has been an increase in teacher shortage and a high attrition rate of teachers in the state of Wisconsin. The purpose of this study was to investigate on job satisfaction for physical education teacher in Wisconsin. The research focused on the correlations in between themes (such as teaching, professional development, coaching, student relations, work load, coworkers, salary/benefits, administration, parents, resources) and teachers’ job satisfaction. One hundred eighty four Wisconsin physical education teachers participated in the study. Each participant took a 51 question Qualtrics online survey. All questions were assigned to one of the ten themes. The survey only took the survey one time, and took them 10-20 minutes. A bivariate correlation test was used to analyze correlation between the themes and overall job satisfaction. There were moderate correlations between administration (r= .58), co-workers (r= .43), and student relations(r= .42). Participants indicated that having ample support from administration, caring co-workers, and positive relationships with students have a positive impact on their positive job satisfaction. Based on the open-ended questions, participants expressed their dissatisfaction related to Act 10 and Governor Walker. We should continue to support teachers, create caring and positive work environments, which may help with Job satisfaction and this could contribute to lowering attrition rate and reduce the teacher shortage in Wisconsin.

Languages

**How International Students Spend Their Time on Vacation**

*Tianqi Jiao, Ruifeng Yan, Xinyan Du, Yifan Li*

Faculty Mentor/Collaborator: *Ami Christensen*  
Poster #: 18

How International Students Spent Their Time on VacationThe purpose of this research is to study how international students spend their time on vacation. As international students, we noticed many students have difficulty choosing whether to go home, stay on campus, or travel
during school breaks. We sent out an online survey to international students at UW-Eau Claire to get learn more information about how other international students make choices about how and where they spend their time during breaks. We also conducted some interviews to get additional details. Our hope was that our findings would help international students make more informed decisions when making vacation budgets and plans. The results of our surveys and interviews found that, while a few international students chose to remain on campus, most international students spend their time during breaks traveling. For most people, the choice was financial, as traveling in the U.S. was more affordable than returning home. A few students, especially those who played sports, chose to study or take additional credits during semester breaks.

**Transportation Issues Among International Students**

Han Wei, Anastassiya Kulinich, Suyu Wang, Luqi Chen, Zhen Zhao  
Faculty Mentor/Collaborator: Ami Christensen  
Poster #: 17

The purpose of our project was to find out more about transportation issues among international students and help them save time and money. As international students we believed bus services were probably the best option, because they are free; however we also believe they can be improved. We created a survey using Qualtrics to learn about the current bus system and possible options for change. We sent our 10-question online survey to international students asking them about transportation problems they typically encounter. We also took the city bus to different places at different times and calculated wait times and travel times. Survey respondents believed wait times were too long and they felt they often spent too much time waiting for the bus. Based on our results, we hope to suggest improvements for the Eau Claire bus system.

**Helping Students Make Good Use of Library Resources.**

Xue Xu, Siyuan Huang, Ruifeng Yan, Yufan Yang, Chi Zhang  
Faculty Mentor/Collaborator: Ami Christensen  
Poster #: 47

As international students, we wanted to know more about how international students' awareness and use library resources and help them use the library more effectively. As international students ourselves, we hold the view that most International students don’t know the functions of each floor in the library. If they make rational use of the library, it will help improve their studies and academic life. We sent a survey to international students by email to learn more about how often international students go to the library, which materials they prefer to borrow, and their use of special functions of the library. Our results led us to the following conclusions. First, many international students often go to library for homework, discussion, or just relaxing; however, they usually stay on the first floor. Second, international students rarely borrow books. However, when they do borrow books, those books are related to their major. Finally, many students don't know the functions of the second floor or above, and they seldom go to these floors. To solve this problem, we suggest holding a lecture at the beginning of each semester for new international students to introduce the library and available resources.
Students’ Understanding of the Center for International Education
Yinxing Xia, Xiaochun Chen, Yuting Ma, Ruifeng Yan, Xinyan Yang
Faculty Mentors/Collaborators: Ami Christensen

As international students, we may face immigration problems, so the Center for International Education (CIE) is a significant place for us. Our project’s aim was to find out what benefits the CIE brings to international students at UW-Eau Claire and what international students think about CIE assistance. Through working on this topic, we hoped to learn about what role the CIE plays among the international students, because more and more international students come to the CIE for help. By creating a 12-question survey, and sending it to international students online, we collected data about international students’ understanding of the CIE. After analyzing the data, we found that most international students get help with documentation and job research; however, they rarely turn to the CIE for other help. International students also expressed a desire for the CIE to be concerned about their problems. Our hope is that our research will help international students understand the CIE better. We also hope our project can help the CIE have a better understanding of international students' needs and, perhaps, make small changes to enhance international students' experiences at UW-Eau Claire.

A Survey and Analysis of International Students’ Living Experiences
Shuaijie Zhang, TianYi Zhang, Xiaofan He, Anastassiya Kulinich
Faculty Mentors/Collaborators: Ami Christensen

The purpose of this project is to find out how many international students want to live on or off campus and to help them choose where to live. The choice of living on or off campus depends on each student's personal habits and hobbies, and the choice of where to live is often based on their personal preferences and finances. For most international students, where they choose to live has a significant impact on their future studies and lives. Where they live is also a topic most of them pay close attention to. We sent a questionnaire with 21 questions to every international student's mailbox and interviewed a sample of international students who lived on and off campus. The result shows that most freshmen choose to live on campus, because they are required to live in the dormitories. However, upperclassmen often choose to live off campus, because they are familiar with the city and they have more free time to arrange their own schedules. We offer suggestions to help CIE and Housing improve experiences for international students.

Improving Communication Between International and American Students
Luoluo Zhou, Catrena Jing Yi Choong, Zi Yang Tan, Yuchen Yang
Faculty Mentor/Collaborator: Ami Christensen

Improving Communication Between International and American Students
The goal of our project is to find a way to help international students reduce the stress of communication with Americans, to make international students have a more comfortable university life, and to build friendly relations between American and international students. As international students ourselves, we know that international students will face culture shock that many people will be surprised cultural differences. We collected information from international and American students by sending them online questionnaires via Qualtrics. We also interviewed UW-Eau Claire students and resident assistants to learn what can cause stress and unhappy conservations.
between international students and American students. From the interviews, we discovered that the American habit of small talk and chatting is really different from many international students, and it’s hard for them to understand the meanings of some American phrases and words. Our survey results also found differences in typical conversations topics, and even locations for conversations, between American and international students. Finally, we provide some suggestions to improve communication between international students and American students.

**Developing a Database of Integrated Performance Assessments**  
Brittany Zine  
Faculty Mentor/Collaborator: Jessica Miller  
Poster #: 45

The purpose of this project was to create Integrated Performance Assessments (IPAs), evaluation tools developed by the American Council on the Teaching of Foreign Languages (ACTFL) and share them with teachers of French online. We looked at previous research on IPAs’ usefulness for teachers and learners and found that educators struggled to balance all modes of communication (interpretive, presentational, interpersonal), and often neglected the interpretive and interpersonal modes because they are less practical to assess. After observing some IPAs previously created, we began to make our own to add online. These targeted various proficiency levels (from beginner to advanced). Our goal was to provide a shareable resource so French teachers can more easily include all modes of communication in their courses and evaluate their students’ language abilities in those modes effectively.

**Music and Theatre Arts**

**Education Students’ Knowledge and Perceptions of Collaborative Learning and Implications for Use as a Teaching Strategy**  
Peyton Grunzke  
Faculty Mentor/Collaborator: Laura Dunbar  
Poster #: 49

Collaborative learning (CL) - a situation where two or more people learn or attempt to learn together - has become common in United States classrooms (Dillenbourg, 1999). It is known that students’ perceptions of their learning context influence consequential learning outcomes, however, little research has been done on student perspectives of CL, especially in a teacher education context. The purpose of this study is to investigate what education students know about CL, how knowledge on the theoretical concepts regarding CL affects learning outcomes, and how this experience with CL in combination with a collaborative project will influence participants’ use of CL. We studied a collaborative project as a part of a fine arts integration course for Middle Childhood to Early Adolescence (MCEA) education majors using pre- and post- surveys and professor interviews. The content was qualitatively analyzed for recurring themes. Results suggest students recognize CL as a concept; however, preservice teachers have a very shallow understanding of the elements necessary to constitute CL, which could potentially limit the benefits they actually receive from CL. We conclude that further research is needed investigating education students’ perspectives and understandings of CL, and how their understanding of CL affects their future use of CL.
Musical Playground: Designing and Implementing a One-Week Summer Experience for K-5 Children
April Schneider, Emma Cruciani, Maya Fabian, Abigail Mason, Nicolas Rojas-Ceron
Faculty Mentors/Collaborators: Laura Dunbar, Christa Garvey

Through this project, we provided content for and led a five-day summer music program in Owen Park for elementary age students. The daily programming consisted of 5 stations with different activities, each lasting about 15 minutes. Throughout the summer we each spent time researching lessons and activities that would work for students in grades K-5. We knew that we had to plan for unpredictable ages, weather, developmental levels, etc., so we had to be ready to adapt our lessons day to day. After each day of camp, we debriefed as a group. We gave each other feedback and feedforward, which we then took to further revise our future lesson plans. As the camp progressed, we also became more familiar with each other and the students, improving our collaborative classroom management. We had to learn how to adapt and modify our lessons quickly. We also learned that routine and structure is critical for this age group; timing and pacing did not always turn out as we thought. The kids that participated brought unique behavioral traits and learning styles. As the week went on, we became more confident as instructors, resulting in a fun learning experience for both the campers and leaders.

Psychology

BEA of reading comprehension
Sara Harris, Julia Post
Faculty Mentor/Collaborator: Melissa Chaffin

This study used brief experimental analysis (BEA) to examine the relative effects of four reading comprehension interventions on comprehension and oral reading fluency for middle school students with comprehension difficulties. The effects of the BEA-identified intervention were examined across time for participants in a single-case design. Interventions took place in a university-sponsored summer reading clinic. Results will be presented and implications for practice will be discussed.

Selective Mutism: Increasing Speaking in the Presence of Unfamiliar Adults
Courtney Stearns, Noelle Wozniak
Faculty Mentor/Collaborator: Melissa Chaffin

Selective mutism can be detrimental for academic and social success. This study evaluated the relative effectiveness of three interventions in a multi-element design for a fourth-grader with selective mutism. The interventions were delivered at a university summer clinic. The conditions included using a game to shape speaking behavior, teaching anxiety coping strategies, and combination of the two approaches. Results of the interventions indicated that gains were made in speaking behavior in all three interventions, with the combined condition and then the game
condition showing the greatest increase in speaking behavior. These results extend the literature on individualized treatments for children with selective mutism.

**Evaluating the Effectiveness of Early Numeracy Intervention I in a Montessori Setting**

Noelle Wozniak, Oriana Vile, Natasha Hanke, Emma Drangstveit, Melissa Trites

Faculty Mentor/Collaborator: Mary Beth Tusing

Poster #: 8

Challenges in early numeracy can be associated with difficulties in math in following years. Early Numeracy Intervention (ENI) is a researched-based intervention program targeting first grade early numeracy concepts. While evidence supports ENI's effectiveness, its use in non-traditional school settings has not been explored. This study evaluated the effectiveness of an early numeracy intervention at a Montessori elementary school with 1st grade students. An ABAB design was used to examine intervention effects. Two progress monitoring procedures used to assess intervention effectiveness: Place Value and Number Identification. Two 1st grade girls participated in this intervention. The intervention was delivered to the students three times a week in 45-minute sessions. Intervention integrity and social validity were also explored. Findings inform ongoing intervention programs at the school.
Fine and Performing Arts

Art and Design

Looking at Asia Poster Exhibition Design
Emily Czudec, Gloria Brown
Faculty Mentor/Collaborator: Hyungjoo Kim
Poster #: 92

The purpose of this project was to curate and design promotional material in collaboration with the Department of Art and Design, Foster Gallery, and KECD (Korea Ensemble of Contemporary Design) for the Looking at Asia poster exhibition. This project explored the research process necessary to develop various design materials that promoted the exhibit in the spirit of connecting the viewing audience to the 150 poster designers, all of whom come from Asian countries. Additionally, we were able to build collaboration skills through teamwork and gain knowledge and experience in exhibition design and event identity design. Through the immense study of the posters displayed in the show, we were able to design materials that reflected the essence of Asia to provide an authentic scholarly and field experience. After several different approaches, this study and design work resulted in a logo, poster, postcard, signage designs, on and off-line advertisements, buttons as promotional pieces and information panel designs for the exhibit.

Health + The Arts Foster Gallery Exhibition Visual Identity
Richard Roth, Roy Cranston
Faculty Mentor/Collaborator: Hyungjoo Kim
Poster #: 91

The goal of this project was to develop a visual identity system and promotional design materials for the latest Foster Gallery exhibit, "Health + the Arts" on UW-Eau Claire’s campus. This exhibition explored the intersection of health and the arts from different perspectives: health and healing as represented in art, and art as a form of healing. Our approach was to display the fundamental theme of the exhibit and be able to promote it in a visual solution that made sense to the public. The design solution took the form of the two entities - health and the arts - visually colliding and intersecting in space, describing the theme and spectacle of the exhibit. This process and method manifested itself into a logo, promotional posters, information designs, advertisements, digital pieces and signage designs for the exhibit. This research project provided an authentic scholarly and field experience for us by exposing to and solving the complex, multidisciplinary and pragmatic problems.
Music and Theatre Arts

**Investigating the Incorporation of "Non-Western" Music in Wisconsin Secondary Music Programs**

Gloria Dorschner  
Faculty Mentor/Collaborator: John Stewart

Promoting multicultural education is how many schools in the United States are encouraging global awareness and creating equitable environments for all students (Souto-Manning, 2014). Today, it is vital that classroom music is relevant to all students. In music classrooms, many teachers utilize “Non-Western” music to teach both concepts and the cultures from which the music originates (Gustafson, 2009). “Non-Western” music is music depicting or originating from cultures that do not belong to dominant western societies. This project’s two research questions were, “What “Non-Western” repertoire are Wisconsin band, choral, and orchestra directors currently programming in their grade six to twelve classrooms?” and, “What criteria do Wisconsin secondary music educators consider when selecting “Non-Western” pieces to teach their students?” Data was gathered by sending a Qualtrics survey to Wisconsin secondary music teachers. Participants were asked to name “Non-Western” pieces they programmed within the past academic year and provide rationales. Findings show, of the 145 respondents, (30%) of them had not programmed a “Non-Western” piece throughout the 2017-2018 academic year. The pieces named in the survey were also examined and compared, and a list of most frequently programmed pieces was developed as a result.

**Creating an instrument maintenance shop / Arranging music from diverse sources for trombone ensemble**

Leo Johnson  
Faculty Mentor/Collaborator: Phillip Ostrander

This project is comprised of two distinct components. The first being the establishment of a workshop in the music department dedicated to the upkeep of school-owned instruments. Through this shop the department will over time save countless funds to be used in more productive avenues as well as provide valuable experience to students desiring to work in instrument maintenance. We worked with a professional instrument technician to gather all necessary equipment and training to execute professional level maintenance including use of a supersonic instrument cleaning tank. This information will be passed on and create a new branch of educational opportunity in the department in addition to improved resource management. The second component involved introduction of modern repertoire from diverse sources to the body of works written for trombone ensemble. To contribute to the widespread effort to diversify the commonly performed repertoire in classical music, I arranged a piece by the African-American, female composer Valerie Coleman for trombone choir. Through examining her works I developed the ability to effectively arrange a selected work to be performed by the university trombone ensemble. This arrangement is a small but important contribution to a greater cause.
Health Sciences

Communication Sciences and Disorders

*How does the home-visit program experience impact students’ knowledge of poverty, family systems, and child development?*

Mary Brennan  
Faculty Mentors/Collaborators: Kathryn Mueller, Rebecca Jarzynski  
Poster #: 10

A partnership between the Eau Claire Area School District’s Parent-Child Home Program and the Department of Communication Sciences and Disorders (CSD) at the University of Wisconsin-Eau Claire offers undergraduate students a contextualized learning experience in the areas of child development, family systems, and the effects of living in poverty. Research on poverty and child development indicates a significant academic and developmental gap emerges between children of low-socioeconomic status and those of higher socioeconomic status. As a part of the Home Visit Program Experience, CSD students take part within an existing initiative run by the Eau-Claire School District - the Home Visit Program - which aims to positively impact children in low-income, high-risk families. This current study aims to assess how student knowledge is impacted by this experience. Student knowledge is assessed via written reflections at three time points: pre-program, mid-program, and post-program. These are analyzed via thematic analysis and for depth and breadth of reflective practice. We anticipate this analysis to show growth in student knowledge in the areas of poverty, family systems, and child development across the course of the Home Visit Program Experience.

Framing Community-Based Aphasia Services Using the Chronic Care Model

April Kramer  
Faculty Mentor/Collaborator: Thomas Sather  
Poster #: 12

Chronic condition frameworks serve to provide lasting support for the life of the patient and their diagnosis through a proactive approach involving education, involvement of the patient, and strengthening the collaboration between the patient and health professionals. The Chronic Care Model (CCM) is comprised of six components used to support individuals within the community and health system. This framework has been used across a multitude of chronic conditions. The CCM supports improvements in the quality of life, care and clinical outcomes of patients with chronic conditions. However, such implementation has been far less transparent among individuals with stroke, and even less so among individuals with aphasia. This project discusses the potential benefits of the CCM for people with aphasia and, additionally, applies the framework to the current service delivery paradigm of the Chippewa Valley Aphasia Network (CVAN), a non-profit collaboration among the organization, the University of Wisconsin-Eau Claire, and Mayo Clinic Health System. The programming of the CVAN was mapped across the six components of the CCM, which identified areas in need of alignment to serve as the impetus for upcoming programmatic changes to better support individuals with aphasia and their families throughout the Chippewa Valley.
**Program evaluation at aphasia camp from the perspective of persons with aphasia**

Megan Schulze  
Faculty Mentor/Collaborator: Jerry Hoepner  
Poster #: 55

People with aphasia are historically underrepresented contributors to program evaluations and research studies, in part due to the inherent nature of their communication difficulties. The purpose of this project was to develop and implement a new type of survey in order to effectively evaluate the experiences of people with aphasia at the Chippewa Valley Aphasia Camp and guide future program development. Typically, a paper survey has been administered at the end of each aphasia camp, however a “ceiling effect” was frequently observed on the survey responses, where all feedback was positive with no statements of what could be changed. In response to that "ceiling effect," researchers developed a new type of survey that would allow camp attendees to prioritize aspects of camp in a more aphasia-friendly manner, in an attempt to give a voice to persons with aphasia. Preliminary results indicate that participants prioritized the social aspects of camp, like connecting with friends, over the planned physical and table activities of camp. The unexpectedness of this prioritization will aid in future camp programming. The results agree with research that has found that persons with aphasia struggle with social isolation. Aphasia Camp acts as an alternative service delivery model that addresses the challenge of social isolation by creating an environment where social connection can be made.

**Can a test of visual memory help predict success in post-lingually deaf adults receiving cochlear implants?**

Kristin Wichert  
Faculty Mentor/Collaborator: Abby Hemmerich  
Poster #: 21

Individuals with significant hearing loss may elect to receive a cochlear implant (CI), which can restore some hearing capabilities. There is considerable variability of short- and long-term speech perception outcomes in patients that cannot be explained solely by their age and prior hearing status. Clinicians are challenged to identify clients who may be at a higher risk for poor outcomes prior to the invasive implantation procedure. Recent studies have shown that working memory may play a role in the deficits faced by hearing impaired individuals. The purpose of this study was to examine tests of visual working memory as predictors of speech perception outcomes in individuals with CI. Visual working memory tasks were chosen to isolate the potential memory deficits from other audibility factors. Thirty-two CI users participated in the study, completing a battery of assessments for visual working memory and speech perception skills. Preliminary results suggest that these visual memory tasks are positively correlated with speech perception outcomes, which could help care teams, including speech-language pathologists, develop assessment protocols to better predict outcomes prior to CI and to assist in the development of targeted, individualized aural rehabilitation strategies following CI.
**Applying aphasia-friendly principles to experience sampling method mobile app development**
Brendan Zember
Faculty Mentor/Collaborator: Thomas Sather
Poster #: 43

Among individuals with aphasia, a better understanding of the daily lived experiences, including daily success and challenges, may provide additional guidance for ongoing beneficial rehabilitation and community programming for those individuals living with aphasia. Experience Sampling Methodology (ESM) (Csikszentmihalyi & Csikszentmihalyi, 1988) utilizes sampling procedures to gather information regarding daily experiences through scheduled or random sampling times, and can easily be incorporated into mobile applications (apps). However, the linguistic challenges that aphasia presents adds increased barriers to usage by individuals with aphasia of currently available ESM mobile apps. In the current study, a prototype ESM app specifically designed for individuals with aphasia has been designed and the barriers and facilitators of the app will be evaluated by individual users with aphasia. Additionally, aphasia-design principles will be mapped both onto the currently designed mobile ESM app for individuals with aphasia as well as onto currently available “off-the-shelf” mobile ESM apps that are not designed specifically for individuals with aphasia. The results of the current study will guide ongoing and future ESM app development designs specifically for individuals with aphasia, as well as more broadly for individuals with other disabilities.

**English**

**Does Low Socioeconomic Status Cause Individuals to Distrust the Healthcare Establishment?**
Cole Haschke
Faculty Mentor/Collaborator: Ruth Cronje
Poster #: 64

The purpose of the study is to investigate the healthcare wishes and priorities of individuals of low socioeconomic status. We interviewed new members of a steering committee formed to steer Community Connections Team (CCT), a partnership between UW-Eau Claire and Marshfield Clinic that connects patients of low socioeconomic status with community resources that offer assistance with social needs. The Steering Committee is CCT’s decision-making body and includes representatives of multiple constituency groups, including community assistance agencies, CCT volunteers, Marshfield clinic staff, UW-Eau Claire academic faculty and students, and people directly affected by health inequity. Our interviews included questions that asked interviewees to describe their understanding of the present and their vision for the future regarding healthcare. Using conventional content analysis, we analyzed subjects’ responses to investigate the presence of themes of stigma, distrust, and other signals of the subjects’ sense of marginalization. This allowed us to test our hypothesis that themes of marginalization will be more prevalent in members of the steering committee who have lived experience of health inequity than in those whose economic status is more privileged. Our study provides insight into the importance of centering the voices of low-income individuals in envisioning solutions to health inequity in our community.
**Kinesiology**

**Scapulohumeral Rhythm and Manual Therapy in Overhead Athletes**
Ryley Freiberg, Jessica Heffel, Emma Lehman, Hannah Wendel, Zachary Williamson
Faculty Mentor/Collaborator: Robert Stow

Normal scapulohumeral rhythm is vital in the stability of the glenohumeral joint. Little research has been conducted regarding scapular dyskinesis but it has been proven prevalent in athletes who perform repetitive overhead movements. Dysfunction in scapular movement can lead to tissue damage, chronic pain and pathology of the shoulder as well as tissue restrictions and limitations in nearby joints. The purpose of this study is to determine an effective treatment for scapulohumeral rhythm in either cupping therapy or muscle energy technique. We will be recruiting three randomized groups in gymnasts, volleyball players, and swimmers, a total of 30-40 participants. Each participant will then be randomly assigned cupping therapy or muscle energy technique intervention. The will be assessed and receive treatment once a week for 4 weeks. Data will be collected from the week of April 1 until the week of April 27 and subsequently be analyzed. This study should give us valuable insight on effective treatments for scapular dyskinesis, as well as how to increase glenohumeral internal and external rotation movements.

**Reflexive Performance Reset® and the Short- and Long-Term Effects on Power, Speed, and Agility in Collegiate Athletes**
Tyler McFadzen, Alyssa Arnold
Faculty Mentor/Collaborator: Robert Stow

Reflexive Performance Reset® (RPR®) is a modality that utilizes special reflex points to eliminate compensation patterns from stress. RPR® claims to increase flexibility and performance while reducing pain. However, RPR® has minimal published research, only anecdotal claims. Similar techniques have been shown to decrease pain levels (Hansberger, Baker, May, & Nasypany, 2015) but not sport performance. Nevertheless, we hope to prove RPR® has a place in sports medicine. This study will determine if an increase in power, agility, and speed is a direct result of RPR® similar to dynamic warm-up (Faigenbaum, McFarland, Schwerdtman, Ratamess, Jie, & Hoffman, 2006). With two collegiate athlete groups, we will measure differences between dynamic warm-up with and without RPR®. We will teach a standardized American College of Sports Medicine dynamic warm-up to all participants, with one group taught self-administered Level 1 RPR®. All participants will perform the broad jump, t-test and 40-yard sprint measured at a baseline, immediately following their warm-up protocol, and at the one-week follow-up. While we expect a slight performance increase throughout the week in both groups, we hypothesize that there will be little to no difference in speed, power, or agility. We deduce this is related to the scarcity of RPR® in literature. Further research is required to assess long-term RPR® effects and claims.
**Relationship Between Occupational Sitting and Metabolic Risk Factors.**

Eric Stadtmueller, Erin Buck, Carrie Rosenthal, Megan Dobbertin  
Faculty Mentor/Collaborator: Saori Braun, Marquell Johnson  
Poster #: 150

Our research study aims to discover if there is a relationship between occupational sedentary behavior and metabolic risk factors despite varying amounts of leisure-time physical activity among low-intensity professions. Current research on sedentary behavior has focused on total sedentary time among US adults, which is beneficial in establishing relationships between metabolic syndrome and sedentary jobs. However, Kim et al. (2015) suggests further research is needed to describe the patterns and duration of sedentary bouts. Further research is also needed to separate the effects of occupational physical activity levels and leisure-time physical activity levels. Data was collected in Fall 2017 and included 13 office workers between the ages of 35-58 years old. The office workers wore two different accelerometers, the ActivPal and Actical, to measure their physical activity levels over the course of 7 consecutive days. Participants underwent a biometric screening that measured height, weight, blood pressure, waist circumference, cholesterol levels, triglycerides, and fasting blood glucose following physical activity monitoring. Data will be analyzed to determine a relationship between physical activity levels and metabolic risk factors among office workers. We anticipate seeing a positive relationship between occupational sedentary time and prevalence of metabolic risk factors.

The effect of the ProprioSox sock on power, speed, and agility.

Eric Stadtmueller, Elizabeth Schwab, Jillanne Noel, Garrett Janicki  
Faculty Mentor/Collaborator: Jeffrey Janot  
Poster #: 143

ProprioSox brand socks are proposed to enhance strength, power, balance, speed, agility, posture, and explosiveness within performance athletes. ProprioSox are also advertised to improve proprioceptive feedback as well as reaction time in a full body range. The purpose of this study was to determine if the ProprioSox amplified measures of strength, power, balance, speed, and agility. Seven women and nine men served as participants in this study. Participants were active, college-aged individuals as described by the American College of Sports Medicine physical activity guidelines. Participants completed four performance tests during the course of the study: the T-test, Biodex Fall Risk test, broad jump, and vertical jump. Three trials of each test were completed while wearing three different types of socks: normal socks, spandex (placebo) socks, and the ProprioSox brand socks. Participants were blinded only to the placebo and ProprioSox brand socks conditions. Scores were averaged and recorded following the completion of each trial. All three trials were completed within a week of starting the study, with each trial separated by at least a 24-hr recovery period. The vertical jump showed no significant difference (p > .05) among any of the three of the socks: control sock (59.16 ± 13.1 cm), placebo sock (60.29 ± 13.16 cm), and ProprioSox (60.4 ± 15.13 cm). The broad jump also showed no significant difference (p > .05) among any of the three of the socks: control sock (218.2 ± 37.64 cm), placebo sock (216.4 ± 38.21 cm), and ProprioSox brand sock (215.3 ± 37.57 cm). The stability index from the Biodex Fall Risk test did not show any significant difference (p > .05) among any of the socks: control sock (1.28 ± 0.77), placebo sock (1.19 ± 1.13), and ProprioSox brand sock (1.11 ± 0.63). The only significant difference (p < .05) observed was between the placebo sock (10.97 ± 1.06) and control and ProprioSox brand sock (10.89 ± 1.06) and control for the T-test trial. In conclusion, based on these findings, the ProprioSox brand sock does not
enhance strength, power, or balance in active, young men and women. This research did not look at posture or explosiveness; thus, at this time, no conclusions can be made regarding the effects of wearing the ProprioSox brand sock on these components.

**A Comparison of Stress on the Ulnar Collateral Ligament in High School Baseball Pitchers versus Softball Pitchers**

**Kelley Steinberg, Nicole Tucker, Mallory Melvin, Hannah Quady**

Faculty Mentor/Collaborator: *Jeffrey Janot*

Poster #: 148

Stress placed on the Ulnar Collateral Ligament (UCL) is known to be a common mechanism of injury for baseball pitchers, and many studies have been conducted observing the reasoning behind this. However, there have been minimal studies looking into stress placed on the UCL during a windmill softball pitch. The purpose of this study was to examine the differences in various aspects of the upper extremity during a pitch (e.g. arm stress, arm slot, arm speed, pitch speed and shoulder rotation) using the motusThrow™ device and a radar gun to collect data during live pitching sessions. It also compared the results found in baseball versus softball pitchers. It was hypothesized that the reason increased stress is seen in the UCLs of baseball pitchers when compared to softball pitchers is due to the angle of the elbow in relation to the shoulder at the time of ball release during the two different types of pitches. This study explored the upper extremity variables seen during baseball and softball pitches and collected data that was examined to compare these aspects and hypothesize why increased UCL stress may be more common in baseball pitchers than softball pitchers.

**Kinesiology and Nursing**

**Effectiveness of a social media discussion board on strength training adherence and self-efficacy in novice college aged females**

**Karina Wait, Madeline Norman, Omid Razmpour, Megan Jacobson**

Faculty Mentors/Collaborators: *Saori Braun, Der-Fa Lu*

Poster #: 141

Background/Purpose: The purpose of the study was to examine the effectiveness of a private social media discussion board on strength training confidence levels/adherence in college females during a six-month intervention. The secondary aim was to examine the effect of strength training on percent body fat and fasting blood glucose. Methods: Participants were randomly assigned to: 1) social media/exercise (SME; n=4), 2) social media only (SM; n=3); 3) exercise only (E; n=3); and 4) waitlist/control (C; n=3). Participants in the SM and SME groups were placed into two separate closed chat groups and engaged in two weekly postings. All participants completed a weekly Qualtrics survey every Monday about confidence level and number of days of strength training during the previous week. E and SME groups were given a six-month resistance training program with a focus on the seven major muscle groups. Results: There was a significant increase in strength training frequency across all groups during the first week but no difference in confidence levels from week 0 to week 1 and week 0 to week 9/11. A significant increase in confidence levels occurred over 14 weeks. Findings suggest that future research needs to focus on maintaining frequency and participant engagement.
Languages and Nursing

Transcultural Nursing Care within the Chippewa Valley Amish Community
Benjamin Peterson, Cassandra Plachetka
Faculty Mentors/Collaborators: Joshua Brown, Norah Airth-Kindree
Poster #: 13

Within the United States, Wisconsin contains the fourth largest population of Amish people. Amish communities in Wisconsin continue to grow in numbers, in fact, Wisconsin has had the largest number of new Amish settlements every year since 2000. With more Amish in the state than ever before, understanding the unique culture of the Amish is vitally important, especially in health care.

The purpose of this collaborative project involving the Eau Claire City-County Health Department and the UW-Eau Claire Departments of Nursing and Languages is two-fold. First, local healthcare providers will be educated on local Amish health care practices to provide culturally-sensitive care. In order to provide the highest level of culturally sensitive care, a comprehensive understanding of Amish culture and beliefs is integral. Second, local resources will be complied for local Amish communities as well as the health care organizations that serve them. The resources focus on select health care issues pertinent to the local Amish community as identified by the Eau Claire City County Health Department.

Nursing

Maternal Exposure to PM2.5 During Embryonic Cardiac Development Leads to Hypoplastic Left Heart Syndrome: A Hypothesis Generated through the IMPACT Program
Summer Peoples, Shawna Helmuth, Madisyn Kephart
Faculty Mentor/Collaborator: Jeanette Olsen
Poster #: 72

Congenital heart defects are present in about 1% of all live births. Within that 1%, the incidence of hypoplastic left heart syndrome (HLHS) ranges from 4.8% to 9%. In utero, the heart begins to develop around week three of pregnancy, and early cardiovascular system development is complete at the end of week eight. Current research suggests that HLHS may be genetically complex, inheritable, and likely linked to teratogenic drugs and environmental and seasonal influences. Particulate matter (PM) has dangerous effects during embryonic cardiac development. PM2.5 is small enough to enter the bloodstream, cross the placenta, and access fetal circulation. High levels of PM2.5 in the blood cause biomarkers of oxidative stress, which are similar to those found in HLHS. PM2.5 levels are highest in urban areas, especially during winter months. Seasonal trends indicate the incidence of HLHS is higher during summer months. Consequently, we hypothesize HLHS is caused by maternal exposure to high levels of PM2.5 in the atmosphere during embryonic cardiac development. Blood levels of PM2.5 should be tested during pregnancy and compared with postpartum blood analyses to test this hypothesis. With a high mortality rate and costly hospital stay, our hypothesis focuses on a preventative action for HLHS.
Developing Professionalism and Communication Through Acute Care Nursing Simulation
Chelsea Scholbe
Faculty Mentor/Collaborator: Meg Lagunas

The educational value of simulation has been demonstrated in areas such as standardized student practice, student confidence, and psychomotor skills (Cantrell, Franklin, Leighton, & Carlson, 2017). However, little is known about how simulation can be used to improve and develop other areas of student learning necessary for a successful career such as communication and professionalism. This study aims to explore if simulation provides effective and realistic opportunities to practice professionalism by measuring if; 1) students can provide family centered care, 2) students can participate in effective interprofessional communication, 3) students can critically reflect on the professional concepts being practiced, 4) students value practicing professionalism concepts in simulation. University of Wisconsin-Eau Claire nursing students participated in the simulation during their senior pediatric clinical. The simulation is designed for two students to participate at a time: one student cares for the child until he is brought into surgery and the other student cares for the child post-operatively. Both students observe through a two-way mirror and write feedback to their peer when they are not caring for the child. Preliminary results suggest that simulation is an effective and realistic method to practice professionalism and communication.

Using Action Research to Develop a Faculty/Student Educational Program for Addressing Incivility in Nursing Education
Hannah Sisto, Kristin Brunsell, Rebecca Wickler, Hannah Mades
Faculty Mentors/Collaborators: Jeanette Olsen, Shelley-Rae Pehler, Rita Sperstad, Rachel Merkel, Linda Sargent

The aim of this project was to prepare nursing students, faculty and staff to address incivility by identifying, developing, implementing and evaluating a quality improvement educational program to address incivility among undergraduate nursing students and faculty. Incivility is recognized as a serious issue in nursing education including in the UW-Eau Claire College of Nursing. A 2017-2018 faculty/student research project indicated 38% students and 50% of faculty consider it a moderate to serious problem. To address this issue, a team of faculty and student co-researchers used action research methodology to develop "Creating a Culture of Civility", a two-part civility training offered to nursing students and faculty. The first portion involved an E-learning module containing education on definitions, perceptions, and recognition of incivility, along with opportunities for reflection. The second portion involved a two hour face-to-face civility training that used role-play simulations with small and large group debriefing to equip students and faculty with skills for responding to incivility. An evaluation survey of both the E-learning and face-to-face sessions inform the outcomes of the quality improvement project and provide feedback on the knowledge and communication skills participants gained for use when faced with uncivil situations. Plans for sustainability will be discussed.
Evaluating Community Chronic Disease Prevention Efforts in a Rural Midwest County
Amaris Vesely
Faculty Mentor/Collaborator: Jeanette Olsen
Barron Co. Public Health Collaborator: Laura Sauve
Poster #: 73

One in three adults has prediabetes and almost 30% have hypertension. Early identification and lifestyle changes can prevent disease progression. In 2013, a rural Midwest county formed a team with public health nurse leadership and representation from three competing healthcare organizations to increase awareness of prediabetes and hypertension through media and educational strategies and health screenings. The purpose of this community-based research project was to conduct a five-year evaluation of their efforts. Media and educational strategy data were collected by a survey of team members and observation on websites and in facilities, the most common strategy being social media and news releases or ads. Five years of deidentified health screening data were analyzed descriptively. The mean age of the 3090 participants was 60.27. Most were overweight or obese (70.3%). Fasting glucose results indicated 27.8% may have been newly identified with prediabetes (n=796) or diabetes (n=63). Blood pressure results indicated 354 new hypertension cases may have been identified. These interventions attracted mostly older, overweight adults, a group at high risk for diabetes and hypertension. Public health nurses are optimally positioned to promote population-level, collaborative chronic disease prevention efforts that generate cooperation among competing healthcare organizations and leverage resources in rural areas.

Forgiveness: Therapeutic Booklists and Playlists
Craig Walther
Faculty Mentor/Collaborator: Ann Recine
Poster #: 83

Nurses need forgiveness intervention tools because forgiveness affects their patients’ health. The goal of this project was to review peer-reviewed literature to discover what lists of books or other media help people to forgive. Bibliotherapy utilizes narrative in the form of fiction, biography, theology, etc., for therapeutic effect. There is limited information on how to build targeted book or media lists to help people forgive. We searched databases, using the search terms, “bibliotherapy”, “forgiv*”, “media”, “qualitative”, and “quantitative” to answer our research question: What reading material and mass media helps people forgive? Our research indicates that while scholars have developed processes that help people forgive, none developed lists of narrative or didactic literature that helped people forgive. We also found that intentionally modeled behavior, broadcast as a radio drama, encouraged the forgiveness process in areas of the Democratic Republic of Congo. These findings connect to research conducted by Albert Bandura, who showed that behavior modeled by others is one way that encourages people to change their own behavior. This research revealed gaps in the scholarly literature to answer our research question, therefore this literature review is the first step in the development of a qualitative study to fill this gap.
Psychology

Enhanced Sensitivity to Ethanol-Induced Hypothermia in Aged Rats: Impact of Blood Ethanol Concentrations
Amelia Schneider, Abigail Kastner, Samantha Scaletty, Rachel Szenay, Sarah Trapp, Ashley Benes, Areonna Schreiber
Faculty Mentor/Collaborator: Douglas Matthews
Poster #: 24

The United States population is continuing to increase in age and data suggests that by the year 2060 the population of people over the age of 65 will more than double, providing a potential massive strain on the healthcare system. Research demonstrates individuals 65 and older continue to consume ethanol, often at high levels. However, preclinical animal models are not well developed to understand how ethanol might interact with the aged population. The current experiment investigated the differential hypothermic response in aged rats compared to adult and adolescent rats. Aged, adult or adolescent male Sprague Dawley rats were administered 1.0 g/kg, 2.0 g/kg or 3.0 g/kg ethanol, i.p., in a balanced Latin square design. Prior to ethanol administration, a core body temperature was obtained, and then repeatedly determined every 60 minutes following ethanol exposure for a total of 360 minutes. In addition, plasma was obtained from a tail nick 60, 180 and 300 minutes following the ethanol injection. Aged rats had significantly greater hypothermia compared to either adult rats or adolescent rats. Additionally, adolescent rats cleared ethanol significantly faster than aged or adult animals. These experiments demonstrate that autonomic responses in aged rats are more sensitive to acute ethanol compared to adult or adolescent rats. Future studies are needed to identify the neurobiological effects underlying the differential sensitivity in aged rats to ethanol. Keywords: Hypothermia; Aged; Blood Ethanol Levels; Rats

Watershed Institute

Particulate Air Quality Around Wisconsin Silica Sand Mines
Orion Allgaier, Connor Barnes, Aleah Gmeiner-Anderson, Alexandra Larson, Josephine Killoren
Faculty Mentor/Collaborator: Crispin Pierce
Poster #: 120

The purpose of our research is to quantify the risk of ambient exposure to airborne particulates around industrial silica sand operations. EPA-certified dichotomous samplers were calibrated before and after sampling, and pre and post filter weights recorded. Over a two-year period, we observed increases in average PM2.5 concentrations of 2.6 and 16.1 µg/m3 over concurrent DNR background levels near industrial sites in Bloomer and New Auburn, WI, respectively. Using published studies, we estimate this increase in PM2.5 exposure to cause a loss of life expectancy of one day per year of exposure in Bloomer and three days in New Auburn. In Albertville, WI we conducted yearlong background air quality monitoring where mining operations are planned to begin. Here we found an average PM2.5 concentrations of 11.8 µg/m3 using our EPA-certified dichotomous sampler and 15.0 µg/m3 using a spectroscopy based DustTrak II monitor. Collaborating with the DNR, academic colleagues, and community organizations such as Save
Limited research in the U.S. exists exploring Methicillin-resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* in pool water. Previous studies in Europe and Africa detected MRSA and *C. difficile* in 7.5% and 50% of pool water samples, respectively. No research has explored the presence of either bacteria on pool surfaces, like shared swim equipment and pool walls or floors. This study aims to explore the presence of MRSA and *C. difficile* in U.S. pool water and the surrounding environment. *C. difficile* is a spore-forming, fecal-oral pathogen that spreads rapidly and can survive harsh environments. The bacterium is capable of causing severe damage to the colon and can be fatal. MRSA is an antibiotic resistant pathogen transmitted through direct contact with an infected individual or through contact with contaminated surfaces or media. To date, 10 swimming pool water samples and 10 swab samples from pool walls, floors and shared equipment (kick boards, weights, chairs, etc.) have been collected and tested in Eau Claire, WI for MRSA and *Clostridium difficile*. No samples have tested positive for either organism. This study is ongoing and expected to be completed spring, 2020.
Humanities

Art and Design

Interdisciplinary and Cross-cultural Research of Internet Communication
Foong Min Wong
Faculty Mentor/Collaborator: Li-Ying Bao
Poster #: 94

Website development is an interdisciplinary collaboration, involving professional fields of graphic design, computer science, public communication, and a given subject of a website associated with a discipline. The purpose of this project is to develop a UX friendly, aesthetic and effective visual communication of a cross-cultural subject, representing the “Society for Song, Yuan, and Conquest Dynasty Study (SSYCDs)”. The Society is an international, scholarly and non-profit professional organization committed to the encouragement of the study of Chinese, Jurchen, Khitan, Tangut and Mongol history. It is a challenging task to effectively integrate artistic design, and programming technology into a cohesive website. Throughout our project, we research and explore advanced theories, concepts, visual solutions, and technology using HTML, CSS and Javascript in order to develop a responsive website (songyuan.org) to communicate the quality of the scholarship activities of the Society.

History

The Veda Stone Papers: A Digital Exploration
Kaitlyn Dehnke
Faculty Mentors/Collaborators: James Oberly, Gregory Kocken
Poster #: 176

The purpose of this project was to have an organized method in which researchers would be able to sort and find data easily within the many primary sources left by Veda Stone. Veda Stone was a remarkable woman who through her work was able to bring aid and different programs to American Indians. The McIntyre Library was fortunate to be given the collection of Veda Stones work and personal notes. Having an organized calendar of Veda Stone’s work gives researchers the opportunity to explore the immense impact that Veda Stone had locally. The Veda Stone calendar was created out of collaborative work conducted by twenty-seven researchers. Each researcher went through one box of the Veda Stone Papers collection and documented what was in each box. Next the individual research was combined into one digital calendar archiving the contexts of the Veda Stone Papers collection. The completed digital calendar will allow researchers to efficiently conduct research through the expansive Veda Stone collection. Furthermore, now that the Veda Stone Papers collection has been digitized more research, papers, presentations, and projects can be done on the immense work that Veda Stone conducted in Eau Claire.
Using Digital Humanities to Encourage Dialogues with the Past in the Secondary Classroom
Alex Hoff, Jessica Jones, Jacob Halls, Taylor Deling, Riley Rakowiecki, Mitchell Wozniak, Kathryn Boucher
Faculty Mentor/Collaborator: Patricia Turner
Poster #: 175

For this project, teams of students in History 288: Sophomore Seminar in Historiography and Historical Methods used Articulate Storyline software to design digital programs for the secondary classroom. Digital humanities projects have to date been primarily designed for and utilized by students and faculty in higher education. In contrast, these interactive programs are designed for middle and high school students to encourage engagement with primary sources and to provide inclusive and culturally responsive historical perspectives. Students engage in a dialogue with the past, listening and contributing to different perspectives on topics that align with standard secondary history and social studies curricula. These programs or “dialogues” are designed to be used individually and collectively within and beyond the classroom. The results of this project will be made available to the public for non-profit, educational use.

"Budapest Blackout:” The Diaries of Dr. Maria Madi
Hannah Lahti, Cade Lambrecht, Elizabeth Peterson, Katherine Ciolkosz, Chue Tu Her
Faculty Mentor/Collaborator: James Oberly
Poster #: 147

There has been a wide range of scholarship produced on the study of the Holocaust since the end of World War II in 1945. Holocaust historians have become increasingly interested in the role of resisters, bystanders, and supporters of the Holocaust. Dr. Maria Madi was a non-Jewish doctor living in Budapest during the Nazi occupation of Hungary. In English, Dr. Madi wrote sixteen diary volumes in which she recorded her wartime experiences, including her protection of a young Jewish boy. This project sought to make Dr. Madi’s diaries accessible to the reading public in the form of a transcribed book in English. Through the study of Budapest census data and city plans, researchers were able to contextualize the people and places that Dr. Madi referenced in her diaries. Researchers were able to transcribe the diaries with translation and transcription assistance from Hungarian students at Károli Gáspár University. Those transcriptions will be developed into a book with the aim of making this history more accessible. This project can be used as resource to understand a perspective from Hungary during the Holocaust.

Holocaust Memory and Public History: Examining Holocaust Museums from 1947-2001
Hannah Lahti
Faculty Mentors/Collaborators: James Oberly, Teresa Sanislo
Poster #: 146

Holocaust museums and memorials are central features to Holocaust memory and education. The phrase “Never Again” continues to be a theme in Holocaust memory, which has led to support for Holocaust education. The Auschwitz-Birkenau Memorial and Museum, Yad Vashem World Holocaust Remembrance Center, United States Holocaust Memorial Museum (USHMM), and Jewish Museum Berlin (JMB) were established in different geographic locations and at different
times since 1945. These museums are influenced by different factors, such as nationalism, religion, politics, and culture. Each museum teaches about the Holocaust similarly, but their unique exhibits are designed to evoke emotion and memory in different ways. Public history allows historical content to be shared outside of a standard academic setting, encouraging the public to learn history outside of a classroom. For this reason, Holocaust museums have become some of the most important facilitators of Holocaust education. This study aims to examine the ways in which historical memory is reflected in four different Holocaust museums. Contextualizing and comparing these museums and their unique exhibits will further the understanding of Holocaust memory and representation over time and in different locations.

History and Geography

Queen Cow and the Eau Claire Rule: Eau Claire as the New Deal Base Point for the Federal Milk Marketing Order
Carissa Dowden
Faculty Mentors/Collaborators: James Oberly, Ezra Zeitler
Poster #: 144

The Federal Milking Marketing Order (“FMMO”), established as a part of President Roosevelt’s New Deal in 1937, supposedly established Eau Claire as the national base point, or the site from which minimum fluid milk prices are set. The reason for this selection is shrouded in mystery, and has become mythologized in the dairy industry today. This research seeks to identify geographic and economic reasons why Eau Claire was selected by the federal government in the development of what has since become known as the “Eau Claire Rule.” Primary documents, including government documents published before and during FDR’s administration, and agricultural yearbooks published by the U.S. Department of Agriculture, are used to analyze and evaluate statistical data on fluid milk in western Wisconsin before and during the New Deal. Results suggest that there is no statistical explanation why Eau Claire was selected as a base point for the dairy pricing, and claims that this label emerged by dairy farmers during the New Deal are baseless. While the U.S. dairy industry no longer operates on the original form of the FMMO, perceptions of Eau Claire’s dominance in the industry still hold fast among dairy farmers today.

Languages

Chaos Demon: A Comparative Study on the Origins of Characteristics Concerning Monsters and Cosmic Battles
Julian Emole
Faculty Mentor/Collaborator: Matthew Waters
Poster #: 19

This project aims to identify the characteristics of the serpent (inter alia monsters) in the dragon-slayer narratives, as they are manifest in the Graeco-Roman and Norse myth, paying particular attention to those elements which are shared between these two traditions. A particular feature,
which has been recognized by classical scholars, is one of reciprocity: both the serpent and its combatant often deploy similar weapons (e.g., Typhon’s fire-breathing and Zeus’s thunderbolts) against one another. Moreover, this symmetry manifests itself in other ways, particularly in the representations of both serpent and hero/deity. Of particular interest is the striking presence of this ‘symmetricalness’ in the Norse tradition, which has received no attention in the context of its similarities to classical myth. The serpent, therefore, is an ideal reference point to compare these two traditions. Previous work on the dragon-slayer myths of the Indo-European family have sought to establish an underlying Indo-European proto-myth (i.e., a hypothetical myth reconstructed from the myths of the Indo-European language family) from which all of the present manifestations derive. This research, however, argues for significant (though not exclusive) Graeco-Roman influences on Norse dragon-slayer myths.

**Impact of Foreign Language Acquisition on Undergraduate Marketability**

*Caitlin Hedberg, Alexander Richert*

Faculty Mentor/Collaborator: *Kaishan Kong*

The world is becoming increasingly globalized, making it more and more important for businesses to operate internationally. It then follows that demand for individuals with foreign language and communication skills as well as knowledge of international culture would rise in the new business world. This assumption then prompts the overarching question on which this research is founded: How do foreign language skills impact an individual’s marketability? This research utilizes both qualitative and quantitative data sets from American businesses and Chinese university students to explore the importance of foreign language proficiency in American businesses, what, if any, languages are prioritized during a hiring process, as well as to assess a baseline of useful qualities in potential hires. By quantifying useful qualities to businesses, university students can better tailor their studies to present a more marketable front for job applications post-graduation in an increasingly competitive job market.

**Postvernacular Dutch in Wisconsin**

*Rachyl Hietpas*

Faculty Mentor/Collaborator: *Joshua Brown*

The term “postvernacular” refers to a time when a “language’s secondary, symbolic level of meaning is always privileged over its primary [spoken] level” (Shandler, 2005). In looking at the postvernacular use of a heritage language, one can discern what aspects of the language remain in active use or in the memory of community members—informing linguists as to what remains when a language dies within a community. The goal of the present study is to examine what remains of the Dutch language in the Fox River Valley and how the remnants of the language are expressed in the community through sociolinguistic identities. For this project, we visited the Fox River Valley of Wisconsin and conducted semi-structured interviews in order to analyze the postvernacular use of Dutch through its influence on the English of community members, its linguistic landscape, the ideologies about Dutch shared by members of the community, and any attempts at preserving and/or revitalizing the language. We conclude that a Dutch cultural identity persists in the area without the continued use of the language. The postvernacular Dutch that is present in the area is relegated to phonological and lexical borrowings into English, and language used for tourism.
**Latin American Studies**

**Cost-Benefit Analysis of Driver Cards in Wisconsin**  
Mirella Espino  
Faculty Mentor/Collaborator: Gerardo Licón  
Poster #: 79

Prior the 1990s, unauthorized immigrants could obtain drivers licenses; however, in 1993 states started implementing restrictions. In 2011, states started re-issuing drivers licenses to the unauthorized immigrant population in their state. Throughout the United States, twelve states provide driver’s licenses with federal limits to unauthorized immigrants. Unauthorized immigrants’ access to driver’s licenses in Wisconsin was removed after representatives reformed state law to coincide with the new federal law, the REAL ID ACT. The REAL ID Act sought to standardize the process of obtaining driver’s license and identification cards. We should note that the REAL ID Act grants states the right to create “special provisions.” Such provisions included a state’s right to create a non-REAL ID compliant drivers’ licenses and/or identification card for those that could not provide the REAL ID required documentation (e.g. Social Security Number, birth certificate, etc.). Recently, there have been efforts by Wisconsin representatives and nonprofits to allow unauthorized immigrants to apply for non-REAL ID Act compliant driver's licenses. If unauthorized immigrants were granted access to driver’s licenses, an additional $980,000 to $1.96 million would be added to the state through driver’s license and eye exam fees.

**McNair Program**

**Billboards and Farmland: Semiotic Analysis of Western Wisconsin’s Landscape in terms of Welcoming Values**  
Carissa Dowden  
Faculty Mentor/Collaborator: Kelly Wonder  
Poster #: 121

Along a given automobile landscape, individuals are exposed to certain messages, including but not limited to government signs, privately funded advertisements, and temporary or handmade signs. However, these messages convey underlying values, which theoretically relate back to an adjacent community or neighborhood. Building on concepts of welcomingness from “Is Tolerant Good Enough?” Eau Claire and the Practice of Welcomingness, this project analyzes and evaluates these messages shared on the driven landscape for welcoming (or unwelcoming) values. In order to analyze signs, photos were taken from a car’s perspective on local highways or roads, with a 25 mile route calculated to a specific point in Eau Claire determined by Google Maps. These images were evaluated through a qualitative semiotic analysis of advertisement visuals, textual messages, and overall cultural meaning. Semiotic analysis of road messages suggest that the hypothesis is partially supported in more affluent communities, but poor or rural communities are often excluded, as most advertising in is bought by more affluent corporations for capitalistic reasons (therefore having little relation to the thoughts and opinions of locals).
Psychology

An Examination of Minority Students Experiences on a Predominately White Campus
Rebecca Krueger, Rebekah Damitz, Elaine Kruswicki, Saudamini Agarwal
Faculty Mentor/Collaborator: Stacey Jackson

Research has supported the negative relationship between minority status stress and ethnic minority students’ psychological well-being (Cokely, Hall-Clark, & Hicks, 2011). However, there is some inconsistency regarding whether minority status stress explains the significant variance in psychological distress compared to other factors. Research also demonstrated that on predominantly White campuses, students of racial and ethnic minorities report having more negative experiences, which can impact their mental health (Smith, 1985). The current study examines the relationship between minority student status stress and various mental health outcomes (e.g., anxiety and depression). We hope to articulate the experiences of ethnically diverse students on a predominately White campus to provide strategies for creating a supportive campus for minority students. Our study had 191 participants who were mostly female (N=137), ages 18-20 (N=150), and in their freshman year (N=90). Results suggest statistically significant correlations between minority student status stress and mental health, as well as ethnic identity development and minority student status stress. Ethnic differences pertaining to various demographics and psychosocial factors will also be reported. This study could be useful for campus administrators to determine risk factors of ethnic minority students’ mental health outcomes and intervention and prevention strategies.

Women's Gender and Sexualities Studies

Christianity and Its Effect on Hmong Clan Structure and Family
Susan Vang
Faculty Mentor/Collaborator: Kong Pha

This research examines the impacts Christianity has had on Hmong family/clan structures over the last several decades. Christianity has impacted Hmong families and has brought tensions to Hmong families through a change in cultural practices. Considering that Hmong communities have historically stressed collectivism over individualism, tensions often arise when an individual's beliefs and practices are transformed without consideration of the family and clan units. Christianity has also impacted family/clan structures by creating a conversation among Hmong communities on how to enact traditional cultural practices such as weddings and funeral rites. Religious conversion thus allows researchers to bring to light unspoken rules among Hmong about the role religion has played in the transformation of everyday life. On a larger scale, this research allows Hmong communities to reflect on the ways in which they can measure their progress while deconstructing their cultural beliefs as it relates to religion and life in the U.S.
Math and Computer Sciences

Computer Science

Analyzing Pronoun Usage in Yelp Reviews
Garrett Dekan, Nicole McMahon
Faculty Mentor/Collaborator: Heather Amthauer

The purpose of this research project is to analyze the relationship between pronoun distribution and star groups in Yelp reviews to determine if the emotional aspect of an experience influences the types of pronouns people use to describe it. We hope to illuminate how pronouns are capable of conveying significantly more information than is commonly thought. The Natural Language Toolkit in Python tagged the pronouns in each review. Statistical analysis verified significant differences in pronoun counts between star groups and between pronoun categories for each star group. We found that reviews given fewer stars had a greater concentration of first-person pronouns, which indicates that people are generally more focused on themselves when writing a review about a negative experience. Low-star reviews also had high concentrations of third-person-singular pronouns indicating that people are more likely to focus on a single individual or aspect when the experience is negative. Reviews given more stars had a greater concentration of second-person pronouns, indicating that people shift their focus to sharing their experience with the reader of the review when their experience was positive. Such conclusions could be applied to many other pieces of informal writing, helping readers infer the emotional state of the author.

Leveraging Machine Learning to Build Stronger Dota 2 Team Compositions
Connor Laehn
Faculty Mentor/Collaborator: Alexander Cobian

While competitive “eSports” video games continue to gain prominence both in terms of number of players engaged and in terms of the total economic footprint of the industry, the domain remains insufficiently unexplored from a statistical analysis perspective. In this project, we use machine learning methodology to analyze the underlying statistical factors that impact the winner of games of Dota 2, a competitive online game with 12.6 million monthly players. Valve, the developer and publisher of Dota 2, makes data from billions of played matches available for analysis. Looking at a small sample size of a quarter million matches, the percentage of games won by characters, can be vastly different depending on who they are on a team with and who they are playing against. Our aim is to construct multiple models which predict the winning team in a game from the single character selected by each of the 10 players – a decision made before the match begins. In doing so, we can both provide a system to assist players in choosing characters which will increase their likelihood of victory and statistically explore the nuanced interactions between the 117 characters in the game.
Mathematics

On the indeterminacy of Milnor's triple linking number
Jonah Amundsen, Eric Anderson
Faculty Mentor/Collaborator: Christopher Davis
Poster #: 198

In the 1950s, Milnor defined a family of higher order linking invariants generalizing the linking number. Even the first of these new invariants, the triple linking number, has been of intense and fruitful study since its inception. In the case of a link with vanishing pairwise linking numbers, this triple linking number gives an integer valued invariant. When the linking numbers fail to vanish, this invariant is only well defined modulo their greatest common divisor. In recent work, Davis-Nagel-Orson-Powell produce a single invariant refining the triple linking number taking values in some abelian group which we call the total Milnor quotient. The goal of this poster is to compute this group and show that when the number of components $n \geq 6$, it is nontrivial. Thus, this refined triple linking number carries information for every $(n \geq 6)$-component link, even when the classical triple linking number carries no information.

Random Forest Analysis of Breast Cancer Age at Onset
Hannah Bettack, Foong Min Wong
Faculty Mentor/Collaborator: Abra Brisbin
Poster #: 199

This research aims to identify potential genetic variants for breast cancer age at diagnosis. Currently, only 40% of the genetic risk for breast cancer can be accounted for by genetic variants; more variants need to be identified so that people can receive accurate risk assessments and effective treatment options for the disease. We used ordinal regression to develop a model for the binned age at onset using variants that are already known to be associated with breast cancer. We then used random forests to find additional genetic variants associated with that model’s residuals. Using simulated data, we compared the residuals calculated from the mean, median, and mode of the predicted age at onset. We also compared random forests on all individuals to random forests on only the individuals whose age at onset was poorly predicted by the regression model. We found that using all individuals and the mode of the predicted age at onset provides the best fit to the simulated data. We will also present our preliminary findings from real, non-simulated data.

Algorithms for counting paths of fixed faces
Bryce Bjorkman, Geoffrey Glover
Faculty Mentor/Collaborator: Colleen Duffy
Poster #: 214

We construct an object called an algebra related to the 4-dimensional icosahedron ($H_4$) by encoding $H_4$ into a graph. We study the structure of this algebra by counting the paths in the graph related to the symmetries of $H_4$. This has been done for other shapes in the past, for example, hypercubes, semi-hypercubes, and the icosahedron. For each unique symmetry, we consider the fixed faces of the shape under the action and create a subgraph of the original. To understand the algebra we must count the chain of containments of these fixed faces (paths in the subgraph). The current goal of our project is to develop a programming method that will give us the ability to obtain the graph of the algebras related to these different higher dimensional shapes.
polygons, determine the fixed faces under each symmetry, and count the paths within each subgraph. In addition, we are trying to obtain the confirmations of these results by using different combinations of algorithms within the programs. This then allows us to describe the complete algebraic structure of these algebras using a branch of mathematics called representation theory.

**Minimal Complexity of C-Complexes**
Daniel Guyer, Jonah Amundsen, Eric Anderson
Faculty Mentor/Collaborator: Christopher Davis

In knot theory, a link is a disjoint union of circles, (i.e. components), in 3-dimensional space, and a goal of knot theory is to measure the interaction between the various components of a link. Recently, the surfaces bounded by these components, together referred to as a C-Complex, have been used as one such measure. We ask the question, “Given a link, what is the least number of clasps amongst all C-complexes bounded by that link?” We achieve lower bounds for the number of clasps for two and three component links. For two-component links, we have found a precise formula for the minimal number of clasps. While in the case of links consisting of three components, we prove a bound in terms of a generalization of the classical linking number called the triple linking number, and we are currently working to relate this problem to minimal perimeter polyominoes. This is a joint project between faculty member Chris Davis and students Dan Guyer, Jonah Amundsen and Eric Anderson, titled "Minimal Complexity of C-Complexes."

**Analytics for Local Collegiate Baseball League: Improved Statistics and Favorable Factors**
Hunter Hartke, Brett Schulte
Faculty Mentor/Collaborator: Jessica Kraker

This project focuses on analytics methods based on traditional, historic statistics gathered for baseball players, as well as team win-loss records within a defined competitor framework. Methodologies for both team-level and player-level analyses were adjusted for the Northwoods League, including the local team Eau Claire Express, using historical data. We hope to be able to provide value to the local community by sharing some of the insights gained. Assessments of individual player batting and pitching strengths were computed, based on statistics developed recently within Major League Baseball; explanation of these metrics are available on sites such as at FanGraphs. Comparisons of these newer metrics are made to historical assessment measures. Summaries of team records were gathered across the most recent four seasons, for 18-20 teams in the league. Various recursive record-updating methods were considered for predictive purposes. The current analysis examines summary statistic values that appear to be most associated with streaks of wins or losses. Methods for modeling streaks by incorporating team statistics and other metrics are examined.

**Clairaut's Equation on Time Scales**
Hunter Hartke, Melany Puser
Faculty Mentor/Collaborator: Chris Ahrendt

For this project, we studied a generalization of Clairaut's equation to an arbitrary time scale, more specifically, on isolated time scales. We compared our results to the solutions found when
solving the classic Clairaut equation in the real numbers. In the case of \( f(x) = x^3 \), we solved Clairaut's equation, and we found a general solution and a rather complicated singular solution. We identified regions in both the solution domain and phase portraits to help us analyze how the solution would behave given a particular initial condition. Using a strategic substitution, we explored various regions of behavior of the singular solution in the substitution domain. Then, we mapped those regions onto two different phase portraits so that we could visualize the behavior of the solutions in the original domain. Finally, we graphed our regions in the original domain and compared the solution behavior to the classic case of the Clairaut equation.

**The Moduli Space of 3|2-dimensional Complex Associative Algebras**  
Grant Keane, Tyler Gonzales, John Lazowski  
Faculty Mentor/Collaborator: Michael Penkava

We study the moduli space of 3|2-dimensional complex associative algebras. We use extensions to compute the moduli space, and then give a decomposition of this moduli space into strata consisting of complex projective orbifolds, glued together through jump deformations. This research project studies the non nilpotent algebras, as they can be classified using the Fundamental Theorem on Non nilpotent finite dimensional algebras. The theory behind the construction of the algebras and the process of computing the deformations is explained in detail, as well as covering what algebras we have constructed and how they deform.

**Random Forest Analysis of Macular Degeneration**  
Hannah Lewis, Eric Mallmann  
Faculty Mentor/Collaborator: Abra Brisbin

Age-related macular degeneration (AMD) is a major cause of blindness, affecting approximately 11 million people in the United States. Our research goal is to find undiscovered genetic variants which may be associated with AMD. Using simulated data, we ran a linear regression with known associated genetic variants. We then used random forests to predict the residuals from the linear regression. We examined Receiver Operator Characteristic (ROC) curves of the variable importance scores to determine which residual type to analyze on real genetic data. While there was no statistically significant difference on our simulations, we found that the Pearson residuals gave the best area under the curve. We will also present results using random forests on Pearson residuals from real data.

**Modeling Mortality-Linked Securities: a study with the Swiss Re bond**  
Kola CH Loh  
Faculty Mentor/Collaborator: Marie-Claire Koissi-Kouassi

The Swiss Re bond is the first mortality risk contingent security. In this research, we introduce two modifications, to address some criticisms about the bond's original index. Firstly, we added an economic variable into our mortality index, because mortality experience is affected by economical parameters. Secondly, we modified the location parameter in the index to capture the mortality experienced in different locations. Then, we studied how the new index could affect the bond's price. Projections and calculations were made using R.
Mathematical Analysis of an Alternative Power System in a Northern Wisconsin Home  
Sicheng Mo, Hannah LeMoine, Yuchi Dong  
Faculty Mentor/Collaborator: Wufeng Tian  

The effects of global warming have been causing irreversible damage to the Earth over the past decades. Human beings are the main producers of carbon emissions that cause this climate change and we, are also the main victims. One way we can reduce our individual impact on the environment is to focus on the production and consumption of eco-friendly sources of electricity such as solar, wind, or bioelectric energy. Based on the current available and suitable energy options, we have proposed to modify our house by using a hybrid system including solar energy and wind turbine energy to replace the traditional power grid. Considering the electric rate, size of house, sunlight-time, wind speed in Northern Wisconsin, we have predicted the immediate and long-term fiscal and environmental impacts. From this cost-benefit analysis, we project that the best hybrid option is a combination of 95% solar power and 5% wind energy, which would save about $41,000 over the next 30 years.

The Zero Forcing Polynomial of a Ladder Graph  
Dawn Paukner, Skyler Hanson  
Faculty Mentor/Collaborator: Shanise Walker  

Zero forcing is a graph infection parameter which allows vertices of a graph to be colored using the color-change rule. Vertices of a graph are initially colored either blue or white. The color-change rule states that if a blue vertex has only one white neighbor then it can color its neighbor blue. A zero forcing set of a graph is a set of initially colored blue vertices such that all other vertices in the graph become blue when the color-change rule is applied. Zero forcing was first introduced in 2008 and has applications in quantum physics, computer science, power networks, and mathematical physics. The zero forcing polynomial of a graph counts the number of zero forcing sets of all possible sizes of a graph. Our research team is working to find a generalized formula for the zero forcing polynomial of a specific type of graph - the ladder graph.

Pricing a Student-Funded Incentive to Encourage Four-Year Graduation  
Christopher Shields  
Faculty Mentor/Collaborator: Herschel Day  

The main goal of this project is to price a theoretical financial tuition incentive to increase the four-year graduation rate at The University of Wisconsin-Eau Claire. The university’s 2020 plan calls for increased four-year graduation rates by the year 2020 and beyond; this is one way to facilitate that improvement. Financial tuition incentives created with private funding have been shown to improve graduation rates; this project explores how such an incentive could be sustained through differential tuition alone. Research into the graduation rates of UW-Eau Claire’s peer institutions as well as other universities within the University of Wisconsin system was used to establish a target four-year graduation rate to improve to by the graduation of the 2040 cohort. The connection to Actuarial Science manifests in how the improvement in four-year graduation was modeled; this project required applications of both probability and interest theory. More specifically, an actuarial technique used for the modeling of improvement in
mortality rates was applied in order to more accurately estimate the future four-year graduation rates between now and 2040. This model was used to obtain a reasonable estimate of the cost of the incentive as well as its ability to stay solvent.

**Tait Graphs and Properties of Virtual Knots**  
**Izabel Steinmetz**  
Faculty Mentor/Collaborator: Carolyn Otto  
Poster #: 215

The primary objective of our research project is to discover relationships between graph theory and knot theory. We are particularly interested in virtual knots, a knot that has three different types of crossings, and how they relate to their Tait graph. A Tait graph is a graph that is associated to a knot. A way to color a Tait graph for virtual knots was established where classical and virtual crossings can be easily identified. We described how these graphs are invariant under the Reidemeister moves, both normal and virtual. We also established a way to produce a Tait graph for normal and virtual doubling operators for a Pure Double, Whitehead Double, or Bing Double of a knot given the original Tait graph. Formulas for the number of edges and vertices of a Tait graph for a doubled knot were made using the number of edges in the original Tait graph.

**The Collatz Conjecture**  
**Alexander Townsend, William Venables**  
Faculty Mentor/Collaborator: Feroz Siddique  
Poster #: 227

The Collatz Conjecture is an unsolved problem in mathematics and is named after Lothar Collatz who is believed to have proposed it in one of his papers. This problem is also called the *Hailstone problem* because the rising and falling numbers symbolically represents the motion of a hailstone in a storm rising due to updrafts and falling due to gravity. We will highlight what the problem is, some of the approaches that have been taken to solve it and explain why the problem is so difficult and why all of those approaches fail. We will show a 3D model of the Collatz conjecture for a set of integers that we have 3D printed to better understand the sequences. We will also show several important characteristics of those sequences, the patterns we recognized and possible ways through which we can obtain partial solutions to this problem.

**Visualization of Algebraic Surfaces Using Python and Bertini_real**  
**Foong Min Wong, Daniel Hessler**  
Faculty Mentor/Collaborator: Danielle Brake  
Poster #: 185

There are several modern tools that can render algebraic surfaces, allowing us to visualize their important geometric properties and mathematical concepts. Bertini_real is one of the open-source numerical software for decomposing real algebraic curves and surfaces in any number of variables. The software has been using MATLAB for the visualization of smooth algebraic surfaces and exporting surfaces as stereolithographic (STL) files for 3D printing. Our research aims to extend the software’s functionality by adding a Python-based Bertini_real visualization suite, for free educational access for students. We use the Python library Glumpy to plot the raw and smooth sampled decomposed surfaces and the library numpy-stl to write out 3D STL surfaces. Students who do not have a MATLAB license will now be able to use the graphical interface of Bertini_real to visualize algebraic surfaces freely.
Create a navigation and control program to allow a smart phone to maneuver a robot, both remotely and autonomously. Robots are currently driven almost exclusively on specialized hardware and programs. While some instances of this hardware can be inexpensive in the case of the Arduino, they do not offer long range and high computational power to run a robot either remotely or autonomously. The purpose of this project is to create a set of apps that would allow a robot to be driven by widely available smart phones. These programs would provide the ability for robots to be easily controlled in more remote locations using hardware that is constantly updated and nearly ubiquitous. The apps I have created can connect across the internet and allow the robot to be controlled and viewed remotely with an app. Currently, I am developing an autonomous driving system for the robot using data gathered by the ARCore library from Google. Further development of the apps may allow for simpler and more precise autonomous control as well as modularity across different types of robots.
Natural and Physical Sciences

Biology

Creation and Characterization of LRB (Light-Response BTB) /PIF (Phytochrome-Interacting Factor) Mutant Lines in Arabidopsis thaliana
Meghan Bauer
Faculty Mentor/Collaborator: Derek Gingerich
Poster #: 194

Work done in the Gingerich lab and others has indicated that genes in the PIF and LRB families play an important role in the red-light signaling pathway in the model flowering plant Arabidopsis thaliana. PIFs (Phytochrome Interacting Factors) are transcription factors that negatively regulate red-light responses while LRBs (Light-Response BTBs) act as target adapters in the E3 ubiquitin ligase complex that targets the red/far-red light receptor phytochromes for ubiquitylation and degradation. To better understand how the PIF and LRB genes interact with each other in the red-light signaling pathway we have been working to generate Arabidopsis plants with various combinations of these genes disrupted. After persistent effort we have been unable to isolate plants with specific PIF LRB genotypes, which suggests that disruption of these genes in certain combinations is either lethal (likely at a very early stage of development) or that certain genotypes prevent pollination/fertilization. This poster details research plans to further explore this.

Dose Response Studies in Creek Chub Using Alarm Substance
Rachel Bayer, Eleni Seyoum
Faculty Mentor/Collaborator: Winnifred Bryant
Poster #: 226

We have published data showing that alarm substance derived from a primary culture of fish epithelial cells, induce anti-predator behavior in Creek Chub. In this study, we used alarm substance to perform dose-response studies in Creek Chub. We used alarm substance at 100%, 10%, and 1% to determine the minimal and maximal doses that induce anti-predator behavior in Creek Chub.

Testing the Bacterial Cleansing Activity of the Norwex™ Microfiber Cloth
Jaclyn Buttafuoco
Faculty Mentor/Collaborator: Daniel Herman
Poster #: 191

Bacillus subtilis is an aerobic organism found in the gastrointestinal tract of ruminants and humans. Certain strains of this bacteria may cause food poisoning if proper kitchen hygiene is not maintained. Norwex™, a company that claims to be an alternative way to cleaning, has developed a product to counteract kitchen prevalent pathogens. The Norwex™ microfiber clothes have silver nanoparticles woven in between the fibers. The company claims that the microfiber is capable of removing 99% of bacteria from surfaces and that the silver is an antimicrobial agent that will inhibit the growth of microbes in the cloth. In this study, the ability of the Norwex™ microfiber cloth to remove microbes from surfaces and inhibit microbial growth within the cloth is compared to a similar microfiber cloth that lacks the silver nanoparticles.
Preliminary results using the bacterial species *Bacillus subtilis* do not show a significant difference between the two types of microfiber cloths in removing bacteria from surfaces nor in inhibiting the growth of microbes within the cloth. Future experiments will utilize additional species of bacteria as well as the yeast *Saccharomyces cerevisiae* to determine if the results obtained for these species are consistent with the results we have observed for *Bacillus subtilis*.

**Separating species and functional group diversity effects on plant tissue chemistry and biomass production under elevated CO₂ in a grassland ecosystem**

*Adara Coker*

Faculty Mentor/Collaborator: *Tali Lee*  
Poster #: 162

Our planet is undergoing environmental change at an accelerated rate. Increases in carbon dioxide (CO₂) concentrations are leading to rising temperatures and biodiversity is declining. Ecosystem responses to environmental change might differ depending on the number of species present (species diversity) and/or the functional attributes of the species present (functional group diversity). Plants grown under elevated compared to ambient CO₂ often show reduced leaf N which can limit other ecosystem functions such as herbivore success and N cycling. To better understand the significance of functional diversity, I evaluated leaf C and N concentrations of species representing three functional groups as part of a long-term grassland field study. Samples were collected from plants growing at ambient and elevated CO₂ and in monoculture or 4-species plots consisting of 1 or 4 functional groups to test the hypothesis that plants grown in communities with greater functional diversity show less elevated CO₂-induced decline in N. We found that in functionally diverse plots, higher N levels were maintained in some species and greater total growth occurred. The relative abundance of each species will be evaluated to determine how species responses manifested at a community level. Understanding the role of functional diversity in ecosystem resilience will improve our ability to accurately model the future effects of our changing climate.

**Human Dimensions of Chronic Wasting Disease**

*Samantha Edwards*

Faculty Mentor/Collaborator: *Paula Kleintjes Neff*  
Poster #: 192

CWD is a disease caused by prions (an infectious protein particle similar to a virus). CWD can affect deer, elk, moose and reindeer. The first case of CWD in Wisconsin was discovered in 2002 and in Eau Claire County in 2018. Its arrival initiated the creation of the Chippewa Valley CWD Advisory Team (CVCAT). The CVCAT is made up of 7 members of the public that have prior knowledge of deer herd management and hunting practices. The goal of CVCAT is to provide the WDNR recommendations regarding local surveillance areas and methods, and management options for white-tailed deer potentially exposed to CWD. The objective of this study is to qualitatively assess the effectiveness of the CVCAT, i.e., assessing what the public thinks it wants and what the WDNR would like to see happen. The assessment includes interviewing and surveying four focal groups who have a stake in either deer hunting, and/or deer population management (CVCAT members; members of public who attend CVCAT meetings; WDNR employees working directly with CWD; and students/deer hunters in the UW-Eau Claire Rod and Gun Club). Survey results will be summarized and analyzed to gauge local perceptions of CWD and the effectiveness of the CVAT. The data will then be potentially used...
by the WDNR as they face the challenge of working with the public to manage deer and this emerging infectious disease.

**A phase response curve for light-to-dark transitions in mice**  
**Anna Fix, Brandon Polzin, Summer Clark**  
Faculty Mentor/Collaborator: **Daniel Janik**  
Poster #: 165  

The circadian clock controls daily rhythms of sleeping, waking, hormone levels and many other body functions. To be an effective clock, it must be reset in relation to the local environment. Arousal and activity associated with light-to-dark (LtoD) transitions have been shown in some species to cause major resetting during the light phase. However, this has not been shown in mice. Recent work has suggested that the presence of low light levels (< 0.1 lux) during what is normally the dark phase of the cycle enhance clock resetting induced by LtoD transitions. Therefore, we investigated the ability of LtoD transitions at various points in the daily cycle to reset the clock of mice held in light cycles with complete night-time darkness and with dim light during the night. We found that all the mice with BD light treatments had greater phase shifts at ZT 4 and 6 than those treated with LD. Males showed increased phase shifts during the latter part of the light phase regardless of light treatment. Females had greater resetting for BD light cycles at ZT 4 when compared with males. These results show that mice can have strong clock resetting like other animals previously studied.

**Investigating Gp93 Biology Via Cloning Drosophila Toll and Integrin Genes**  
**Ruby Gravrok, Ceana Olson, Ashley Walker**  
Faculty Mentor/Collaborator: **Crystal Del Valle**  
Poster #: 225  

In *Drosophila melanogaster* (fruit flies), the protein glycoprotein 93 (gp93) appears to be homologous to the mammalian protein glycoprotein 96 (gp96). As a chaperone, gp96 is required for Toll-like receptor and integrin expression, two protein families with roles in innate immunity and which also have *Drosophila* homologues. Due to this link with innate immunity, gp96 further contributes to cancer, colitis, autoimmunity, and other diseases. Although a better understanding of gp96 biology is needed, this system is unfortunately complex and hard to study. Thus, we aim to characterize the simpler gp93 system to better understand the more complex gp96 system, and thus further development of immunotherapies directed at gp96 for the aforementioned diseases. This project aims to clone *Drosophila* Toll and integrin genes. Once cloned, these genes will then be inserted into a *Drosophila* cell line where they can be easily identified and investigated. Thus, we are ultimately creating tools to study the gp93 pathway and to ascertain whether gp93 is a chaperone for *Drosophila* Tolls and integrins. Future experimentation with these tools will allow for better understanding of the gp93 and, by extension, the gp96 system which will aid development of gp96 targeted therapies.
**Collaborative Study of Trimtect® as a Plant Growth Regulator on Shrub Physiology and Drought Tolerance**

Megan Hottmann, Monica Zoellner, Hannah Jahnke, Jaden Shelley, Taylor Kysely, Jacqueline Archbold, Kerry O'Keefe  
Faculty Mentor/Collaborator: Tali Lee  
Poster #: 159

Paclobutrazol (PBZ) is a plant growth regulator that blocks a key step in the formation of gibberellic acid, a hormone that directs responses such as stem elongation, breaking seed dormancy, and flowering. Evidence suggests that PBZ can also confer drought tolerance. **Trimtect**, a product made by Rainbow Treecare Scientific Advancements, incorporates PBZ and is sprayed on plant foliage to help maintain a manicured appearance with less maintenance. To better understand plant growth regulation, we partnered with Rainbow Treecare to study the physiological responses of three plant species to **Trimtect** and drought. Following **Trimtect** applications on *Hydrangea macrophylla*, *Buxus sinica*, and *Rhus aromatica*, plants were subjected to one of two drought treatments (well-watered and reduced water availability). Following one month, **Trimtect**-treated plants did not respond differently than non-treated plants. However, following 6 months, **Trimtect**-treated plants were less negatively impacted by low water availability in some species. For example, in Hydrangea, **Trimtect**-treated and droughted plants-maintained leaf water potential and higher photosynthetic rates compared to the controls. The effects of **Trimtect** appear to take time to manifest and vary among species. This information is helping Rainbow Treecare Scientific Advancements refine formulations to improve their product for plants in low maintenance landscapes.

**Plant functional community assembly is scale dependent**

Julia Jehn, Kathleen Marcus, Dhiyanni Arumugam, Madisyn Hammick, Keith Jorgensen, Kelly Lemke, Dana Lind  
Faculty Mentor/Collaborator: Evan Weiher  
Poster #: 189

Functional community assembly seeks to understand and explain communities in terms of mixtures of functional traits. Ecological filtering can produce communities of similar species, while competition can favor resource partitioning and produce communities of functionally different species. Previous work has shown that these patterns depend on the spatial extent of the species pool. With a large-scale perspective, communities are made of similar species (are clustered), but with a small-scale perspective communities are sometimes made of functionally different species (are overdispersed). Few studies have been done to investigate how plot size (grain size) influences community assembly. In northern Wisconsin forests we sampled plants in 3 plots in each of 13 sites using three grain sizes: (0.1m², 1m², 10m²) and collected data on four functional traits (two size traits and two leaf economic traits). Using a large-scale species pool perspective, communities were consistently clustered and the effects became stronger with increasing grain size. With a small-scale species pool perspective, communities consistently became more overdispersed. However, the effect of grain size was idiosyncratic across the traits, and did not follow an observable trend.
**Isolation of Antibiotic-Producing Bacteria from Soil**

Sierra Kleist, Caitlin Monson  
Faculty Mentor/Collaborator: Daniel Herman  
Poster #: 190

Antibiotics are produced by microorganisms to inhibit or kill other microorganisms, and they can be modified to be used against human pathogens. The same few classes of antibiotics have been continuously modified, and bacteria are becoming resistant to the effects. One solution is to discover new antibiotic-producing microorganisms, which has only been done once in the last 32 years. On the UW- Eau Claire campus and an Iowa farm field, soil samples were collected in an attempt to discover antibiotic-producing bacteria. Bacterial colonies were isolated from the soil samples and patched onto various nutrient-rich media. Those bacterial isolates were then patched onto plates containing tester strains closely related to human pathogens (Enterococcus faecalis, Escherichia coli, Salmonella enteritidis, Staphylococcus aureus) to identify colonies secreting an antibiotic. Many antibiotic-producing colonies have been isolated. The 16S rRNA gene of each isolate has been amplified and sent out for sequencing in order to determine bacterial identity. If novel antibiotic-producing strains are discovered, further testing will be done to identify the gene(s) responsible for production, along with other identifying characteristics.

**Ground-layer invertebrate communities are more strongly influenced by the tree canopy than by the understory plant composition**

Dana Lind, Todd Wellnitz, Lawton Menard, Samir Shaikh, Sorfina Suzali, Tasha Schneider, Dhiyanni Arumugam  
Faculty Mentor/Collaborator: Evan Weiher  
Poster #: 188

Ground-layer invertebrates (GLI) are an integral part of forest communities because of their ability to break down leaf litter. As key players in the process of nutrient cycling, they are essential to ecosystem functioning. GLI were collected on two occasions during the summer of 2018 using 65 pitfall traps from 13 sites across northern Wisconsin. Traps were set for one week, then collected and identified at either the order or class level to determine species composition at each site. Because the bulk of leaf litter comes from the tree canopy, it was hypothesized that GLI composition would be influenced more by tree canopy composition than by other factors including understory composition, or abiotic factors like soil moisture content, or percent organic matter. Non-metric multidimensional scaling (NMDS) was used to simplify GLI composition. Structural equation modeling showed slightly stronger effects of tree canopy than understory plant composition on GLI composition. It also showed that abiotic factors had only indirect effects on GLI composition, which were mediated by both tree canopy and understory plants.

**Worms, genetics and healthy kidneys: the candidate PKD-2 localization factor, papl, may play a role in polycystic kidney disease.**

Madison Lucas, Molly Svoboda, Anneka Johnson  
Faculty Mentor/Collaborator: Jamie Lyman Gingerich  
Poster #: 223

Polycystic Kidney Disease (PKD) places a large burden on both family and society. PKD causes cysts to form in the kidneys leading to decreased kidney function, and, eventually, kidney failure. Previous research has shown the involvement of cilia in disease progression. Cilia, small,
antennae-like structures on the cell surface, are crucial for the cells’ ability to detect and respond to the surrounding environment.

To examine how symptoms of PKD arise, our lab examines the genetics of cyst formation. In previous research, we identified *papl* as a gene with a potential role in cyst formation in zebrafish kidneys. We then asked whether *papl* gene function is needed for proper localization of the PKD-2 protein in cilia; precise localization is important for proper function. To examine the role of *papl*, we used *C. elegans* as a model because PKD-2 protein can easily be detected, and its localization is similar to humans. We found when the *papl* gene expression is down-regulated using RNA interference, PKD-2 protein mislocalization increases. These results suggest that the *papl* gene may play a role in the proper localization of PKD-2 in *C. elegans* and suggest that *papl* may be involved in cyst formation in humans.

**Detection assay for residual Sendai viral particles in induced pluripotent stem cell derived retinal pigment epithelium**

Muriel Metko

Faculty Mentor/Collaborator: Julie Anderson

Mayo Clinic Collaborators: Cynthia Andrews-Pfannkoch, Jarel Gandhi, Alan Marmorstein, Jose Pulido

Induced pluripotent stem cell (iPSC) derived retinal pigment epithelium (RPE) transplants are a potential therapy for retinal degenerative diseases. Human fibroblasts can be reprogrammed into iPSCs using a modified form of the Sendai virus and further differentiated into RPE. Prior to transplantation, RPE need to be tested for residual Sendai virus. Human fibroblasts were grown, harvested, and then spiked with known concentrations of Sendai viral particles. RNA isolation, cDNA synthesis, and qPCR were performed to create standard curves of viral transcripts. These standard curves of Sendai viral particles in a background of fibroblast RNA served as the detection assay and will be further used to analyze RPA cells prior to transplantation. With this detection assay, Sendai viral particles can be detected in a background of fibroblast RNA to a sensitivity of at least 0.03 viral particles per cell.

**Spider functional community assembly is dependent on the scale of the species pool**

Amber Mutka, Dhiyanni Arumugam, Madisyn Hammick, Sophie Maksymkiw, Julia Jehn, Keith Jorgensen, Kelly Lemke

Faculty Mentor/Collaborator: Evan Weiher

Functional community assembly seeks to understand and explain communities in terms of mixtures of functional traits. Ecological filtering can produce communities of similar species (trait clustering), while competition can favor resource partitioning and produce communities of functionally different species (trait overdispersion). Previous work has shown that these patterns depend on the spatial extent of the species pool. With a large-scale perspective, communities are made of similar species (are clustered), but with small-scale perspective communities are made of functionally different species (are overdispersed). Nearly all of the evidence is based on plants. We sampled ground-dwelling spiders at 5 locations across 13 sites and collected data on 10 functional traits (e.g., femur length, body shape, eye size and spread, and feeding/mouthpart size). Using a large-scale species pool perspective, there were strong, significant patterns of trait
clustering for all traits. When using a small-scale species pool, the patterns always shifted toward overdispersion, were mainly random, and only one trait was overdispersed. Functional assembly in spiders is similar to what has been observed in plants.

**An Analysis of Antibiotic-Producing Bacteria from Soil at UW-Eau Claire**
Victoria Neuman, Mikayla Chadbourn, Abigail Varsho, Dana Lind
Faculty Mentor/Collaborator: Sasha Showsh

The increase in antibiotic resistance is of great concern in the medical community. Many bacteria previously susceptible to commonly use antibiotics have evolved resistance, resulting in serious medical and public health concerns. Many of these infections are difficult and costly to treat; in response to this growing crisis, we sought to identify novel antibiotics. We screened for antibiotic-producing bacterial isolates from soil samples around the University of Wisconsin-Eau Claire campus. We characterized the isolates by analyzing their antibiotic activity against *Staphylococcus aureus* and *Escherichia coli*. In addition, we purified the antibiotic and determined isolate plasmid content. We found 4 isolates producing antibiotics both *S. aureus* and *E. coli*. Additionally, 3 isolates produced antibiotics against only *S. aureus* and 3 isolates produced antibiotics against only *E. coli*. These observations indicate the production of different antibiotics. Moreover, plasmid analysis revealed different plasmid composition in isolates which perhaps is indicating the location of antibiotic-producing genes. 9 of the 10 isolates were resistant to oxacillin/ampicillin. Additionally, one of the 9 isolates (V02) was resistant to fusidic acid and streptomycin. The presence of resistance genes indicates a potential source for dissemination of antibiotic resistance.

**Coexisting sedges are functionally similar and may be distantly related in evolutionary history**
Kerry O'Keefe, Kelly Lemke, Keith Jorgensen, Samir Shaikh, Dhiyanni Arumugam, Madisyn Hammick, Julia Jehn, Dana Lind, Sophie Maksymkiw, Kathleen Marcus, Lawton Menard, Naomi Plack, Tasha Schneider, Raja Selvarajan, Sorfina Suzali
Faculty Mentor/Collaborator: Evan Weiher

Organisms tend to coexist in one of two ways: either by having similar functional traits that meet the requirements of a habitat or by having non-similar traits that reduce competition via resource partitioning. A classic study showed that coexisting oak trees in Florida tend to be more functionally similar and more phylogenetically diverse compared to a random model. This means that certain functional traits associated with habitat filtering evolved convergently. Sedges (genus *Carex*) are a hyperdiverse and ubiquitous genus. We sampled pairs of coexisting sedges across northern Wisconsin (from dry pine forests to wet bogs) and added new samples to a previously collected data set from open habitats (i.e., grasslands, oak savanna, and wetlands) in western Wisconsin. Height, specific leaf area, leaf dry matter content, and leaf size of each plant were measured ($n = 94$). Three of the four traits (height, specific leaf area, and leaf dry matter content) were underdispersed (more similar) compared to random expectation. Most of the pairs have individuals from different subgenera, which suggests the pairs are often distantly related but share similar functional traits. If more detailed analysis supports this, then Wisconsin sedges have a similar evolutionary history as the Florida oaks.
**Expected Morphological Effects of the Plant Growth Regulator Trimtect® on Landscape Shrubs Takes Time and Varies by Species**  
Kerry O'Keefe, Jacqueline Archbold, Taylor Kysely, Isabelle Henrich, Hannah Jahnke, Jaden Shelley, Megan Hottmann  
Faculty Mentor/ Collaborator: Tali Lee  
Poster #: 160

Gibberellic acid is a naturally occurring plant hormone that leads to stem elongation, breaks seed dormancy, and promotes flowering. Paclobutrazol is a growth regulator that inhibits the formation of gibberellic acid resulting in altered growth. Trimtect, a formulation incorporating paclobutrazol, is used commercially on landscape plants to sustain desired growth forms and reduce maintenance. Rainbow Treecare Scientific Advancements, the manufacturers of Trimtect, partnered with our Plant Form and Function class to research Trimtect’s effects on the morphology of three woody shrub species in order to advance research and development of the product. Hydrangea macrophylla, Buxus sinica, and Rhus aromatica individuals were subjected to foliar Trimtect treatments (Trimtect treated, not treated). To determine growth inhibiting properties of Trimtect, we measured internode length, plant circumference, and height over the course of six months. Morphological changes were not seen until three months following Trimtect application, and the magnitude of changes varied among species. Two of three species resulted in more compact growth when Trimtect treated compared to not treated. Our study provided empirical evidence for Rainbow Treecare Scientific Advancements and is being used to guide new formulations and improved guidelines for commercial use.

**Prevalence of Staphylococcus succinus and Staphylococcus equorum in Three Communities of the Loja Province of Ecuador**  
Mellen Omweno, Eryn Mares  
Faculty Mentor/ Collaborator: Daniel Herman  
Poster #: 163

*Staphylococcus equorum* and *Staphylococcus succinus* are bacterial species commonly associated with livestock including equine and avian species as well as certain food products. Human infection as a result of these species is rarely reported and there are currently no reports citing these species as components of the normal human flora. During the summer of 2010, nasal swabs were taken from volunteers at various hospitals and communities in Ecuador. The samples analyzed during fall 2017 and spring 2018 were from Loja community. Bacteria isolated from these samples were initially characterized using cultural methods. Isolates that were mannitol fermenters and oxacillin sensitive were further characterized using multi-plex PCR and XapI restriction fragment length polymorphisms of the dnaJ gene. Approximately 17% of samples analyzed thus far contain either *S. succinus* or *S. equorum*. These preliminary data suggest that these species can at least be transient members of the human nasal flora and can possibly be established as a more stable component.
Zebrafish, genes, and human kidneys: gene mapping of a zebrafish mutation may help uncover additional pathways related to polycystic kidney disease
Katie Paulich, Megan Schleusner
Faculty Mentor/Collaborator: Jamie Lyman Gingerich
Poster #: 224

Polycystic Kidney Disease (PKD) affects 12 million people worldwide, placing a sizeable burden on society as well as on those affected individuals’ families. Therefore, it is important that we understand how PKD develops so that we can better develop strategies to alleviate symptoms. Previous work identified the spinner mutant zebrafish, which causes a curved body morphology and kidney cyst formation. By identifying the causative gene, we will be able to use spinner mutant fish to identify changes in gene expression that occur during cyst development. Using molecular mapping techniques, we have narrowed the genomic region containing the spinner mutation. The genes in that region do not have identified roles in cystogenesis, thus, spinner may represent a novel gene related to PKD.

Differential Protein Expression in Asthma and COPD
Ryan Schmidt
Faculty Mentor/Collaborator: Julie Anderson,
Additional Collaborators: Sarah Wicher, Christina Pabelick, YS Prakash
Poster #: 218

Pulmonary diseases such as asthma and chronic obstructive pulmonary disease (COPD) are common ailments caused by lung inflammation, accumulation of mucus, and airway constriction. Collectively, these symptoms impair breathing and cause chronic cough. The goal of this research is to determine if pulmonary diseases alter the expression of proteins within the lungs. To better understand possible changes occurring within the lungs, the proteins P21, Mfn2, and CaSR were evaluated in different age groups of men and women diagnosed with asthma and COPD. Human whole lung samples were obtained from consenting patients undergoing thoracic surgery, and standard western blotting techniques were used to measure protein expression in the samples. Analysis revealed that the expression of p21 increased with age and decreased in asthma and COPD when compared to controls. The expression of Mfn2 decreased with age and increased with disease when compared to controls, while the expression of CaSR remained constant in all tested conditions. No significant differences in expression of the evaluated proteins were observed between males and females. Further research on additional related proteins and translational factors will be conducted to better understand changes within the lungs of patients with asthma and COPD.

Analysis of the PHYB gene sequence in Arabidopsis lines identified in a red light genetic suppressor screen
Cole Theisen
Faculty Mentor/Collaborator: Derek Gingerich
Poster #: 219

The flowering plant Arabidopsis thaliana contains the genes LRB1 and LRB2 (Light-Response BTB 1 and 2) which encode proteins functioning as target adaptors in BTB/Cullin 3 E3 ubiquitin-ligase complexes. These complexes target phytochromes for ubiquitylation and degradation. The phytochromes are red/far-red light receptors and plants containing mutations of both the LRB1
and 2 genes express hypersensitivity to red light due to increases levels of these photoreceptors. In an attempt to identify additional genes involved in red-light response, the Gingerich Lab conducted a genetic screen which identified mutations which suppress the phenotype caused by the lrb1-1 lrb2-1 mutations. All suppressor mutants thus far analyzed have had mutations in the PHYB gene, which encodes a phytochrome that functions as the major red-light receptor in Arabidopsis. My project has been to sequence the PHYB gene in suppressor mutants not yet analyzed. I will present my progress in that work. Absence of a mutation within the PHYB gene could indicate a mutation in a separate gene involved in red-light response, which could lead to the discovery of new genes involved in the response.

Geographic Search Tool for Taxonomic Records in the Galapagos Islands
Joel Wilson
Faculty Mentor/Collaborator: Paula Kleintjes Neff
Poster #: 193

The goal of this project was to create a geographic search tool to show where data was collected in the archipelago for the Charles Darwin Research Station, Galapagos, Ecuador. First, I efficiently updated about 28,000 records in the database by assigning coordinates to them using Structured Query Language (SQL) statements. The tool was then created allowing scientists to search the database using taxonomic family, Genus, and species. This update and database tool empowers scientists to visualize the distribution of species on the islands, whether the species occupy the ocean, a rocky beach or the rainforest. The tool allows easy access to data as a result of a streamlined downloading process from the database. I used SQL statements along with common web development coding practices to accomplish the project. Currently, this search tool is in use only by scientists with security clearance due to the sensitive nature of the species data associated with Galapagos National Park - UNESCO World Heritage Site. My hope is that this new data access tool will continue to facilitate research for species found nowhere else on earth.

A Novel Procedure to Process Ocean Whitefish, Caulolatilus princeps, Otoliths in the Galapagos Marine Reserve
Emily Witt
Faculty Mentors/Collaborators: Paula Kleintjes Neff, Wilson Taylor
Additional Collaborators: Jarrin Marin, S. Andrade-Vera
Poster #: 220

Ocean Whitefish (Caulolatilus princeps) is an important species in the Galapagos Islands both economically in the artisanal fishery and as a food source for locals. However, little is known about its life history in this region. To discern age structure information in the fishery for bony fish like C. princeps, it is common to count the annual growth rings on the species’ otoliths, or ear bones. The goals of this study were to 1) identify the most repeatable and accurate method for aging C. princeps from the examination of adult otoliths, and 2) characterize the age structure of fish caught in the Galapagos Island the fishery. During the summer of 2018, we obtained 49 samples from around Santa Cruz Island, Galapagos and extracted otoliths to compare age estimates among four previously established procedures and one novel procedure of our own design. Our Coefficient of Variance results indicated that otoliths are most accurately processed with our novel procedure (20% Agreement, 6.54 Coefficient of Variance between readers, Standard Deviation 1.20). We applied this procedure to an additional 200 otoliths from the same artisanal fishery and found that the fishery is taking a majority of young adults, which may not
be reproductively mature. Our data suggest that artisanal fishing could negatively impact the sustainability of future C. princeps populations, if not properly managed.

Chemistry

Towards Development of a Computational Screening Tool for Quinone Oxidoreductase Inhibitors
Nathan Barta
Faculty Mentor/Collaborator: Sudeep Bhattacharyay
Poster #: 158

NAD(P)H:quinone oxidoreductase 1 (NQO1) and its paralog NRH:quinone oxidoreductase 2 (NQO2) function by reducing quinones into hydroquinones via a two-electron reduction, which is mediated by the cofactor flavin adenine dinucleotide (FAD). These enzymes also catalyze a similar reduction of nitroaromatic compounds to produce cytotoxic drugs. This study details the development of a computational automation protocol designed to screen many molecules in order to ultimately predict the binding orientations of various small aromatic molecules to NQO1 and NQO2. The protocol consists of geometric positioning of molecules on the flavin ring, calculating binding free energy, and scoring these ligand molecules bound to the active site. The system is treated by a hybrid quantum mechanical/molecular mechanical approach, applying approximated quantum mechanics only to the flavin ring and ligand atoms. The computational setup and preliminary results including the binding energies and predicted orientations will be presented.

Integration of a 5-hole probe onto unmanned aerial system (UAS)
Caitlin Hedberg, Justin Anderson
Faculty Mentor/Collaborator: Patricia Cleary
Poster #: 134

The goal of this project is to integrate sensors onto an unmanned aerial system (UAS) to better profile meteorology and composition of the atmosphere. We have been working on the testing of five-hole probe, with the intent of collecting air velocity vectors. The commercially available probe is meant to be mounted onto a fixed-wing UAS and uses differential pressures and an onboard microcomputer to measure relative air velocity, angle of attack, and angle of side slip. In order to analyze the data, a LABVIEW program was written to record data from the microcomputer, using RS232 protocol. This connection, via RS232, required five ports on the probe connection board to be filled by four corresponding lines on the USB cable. Testing the data in-lab requires the construction of a wind-tunnel, which we have been working on. Once the probe data acquisition has been tested and developed into a robust protocol, integration and test flights can become a reality. This probe will be used in conjunction with a Personal Ozone Monitor and an HMP60 probe to study ozone levels on the shoreline of Lake Michigan.
A Study of the Interaction of Monosaccharide and Polysaccharides with Tryptophan Using Fluorescence Spectroscopy
Benjamin Johnson
Faculty Mentors/Collaborators: Sanchita Hati, Sudeep Bhattacharyay
Poster #: 137

Fluorescence spectroscopy has become a pivotal tool in biochemical research by virtue of its robustness and high sensitivity. In particular, intrinsic protein fluorescence, that originates mainly from the aromatic amino acid tryptophan have been extensively explored to study protein dynamics and conformational changes. Tryptophan has the strongest fluorescence quantum yield of all the amino acids found in proteins and its fluorescence is highly dependent on the surrounding environment. Therefore, properties including absorption and emission wavelengths, fluorescence intensity, and quantum yield have been used to probe conformational changes in a protein due to the change in external environment. Intrinsic tryptophan fluorescence spectroscopy is routinely used to study the impact of common metabolites and metal ions on proteins conformations and functions. However, the impact of some of these metabolites, specifically monosaccharides and polysaccharides, on free tryptophan has remained unknown. In our lab, we are performing a thorough investigation of the impact of monosaccharides and polysaccharides on free tryptophan using fluorescence spectroscopy. We will present the preliminary results of our study.

How Much is Too Much? Testing the Boundaries of Hydrogen Bonded Liquid Crystal/Inhibitor Networks
David Lindberg
Faculty Mentor/Collaborator: Kurt Wiegel
Poster #: 186

Liquid crystals are compounds that have phases in between those of conventional solids and liquids that exhibit the ordering of a solid while possessing a liquid’s ability to flow. This project looks to increase the understanding of these phases by studying those present in hydrogen-bonded liquid crystal complexes. These complexes are synthesized by melting a bisacid donor, tetraethyleneglycoxy-bis-4-napthoic acid (4EOBNA), with an acceptor, 1,2-di(4-pyridyl)ethylene (2RP), to produce a material held together by hydrogen bonding interactions. Varying amounts of a crosslinking inhibitor, tetrakis(4-pyridoxymethane) (4PD), are then introduced into these existing complexes. The liquid crystal phases present in these crosslinked hydrogen-bonded liquid crystal networks are then investigated using differential scanning calorimetry (DSC). The compositions are then compared as a function of the ratio of acceptor to inhibitor to determine how the presence of inhibitor affects type of phase present across a temperature range. These systems are also examined visually via thermal polarizing light microscopy, which enables direct viewing of phase changes through a microscope. Studying how the addition of inhibitors to hydrogen bonded liquid crystal complexes affects the liquid crystal phases produced will help better the understanding of these materials for future utilization in the electro-optical display industry.
Native ligand shell rigidity and crosslinking ligand dimensions determine interparticle spacing in 2-d arrays of covalently-crosslinked gold nanoparticle films
Muriel Metko, Zachary Walbrun, Brianna Check, Cailin McCracken
Faculty Mentor/Collaborator: Jennifer Dahl
Poster #: 187

Alkane thiol-capped gold nanoparticles were compressed into 2-d arrays using a Langmuir trough, and covalently crosslinked using a solution of alkanethiols to yield a flexible film of nanoparticles. These nanoparticles were prepared via Brust route and differed only in the length (L) of the alkyl chain of the thiol. Nanoparticle 2-d arrays were transferred to a substrate by Langmuir-Blodgett deposition and imaged using Transmission Electron Microscopy to analyze interparticle spacing. It was found that for films of nanoparticles with softer, liquid like native ligand shells, the interparticle spacing with the finished array was dictated by the length of the incoming crosslinking agent. Conversely, nanoparticles with rigid, semi-crystalline native ligand shells maintained predictable interparticle spacing of 2L, in accord with the thickness of the ligand shell. Crosslinking attempts with 1,6-hexanedithiol determined that the molecule was too short to effectively function as a crosslinker. In contrast, 1,6-hexane bis(11-mercaptoundecanoate) was found to be too long to effectively function as a crosslinker. Computational analysis using Gaussian View and the Blugold Supercomputing Cluster showed that 1,6-hexane bis(11-mercaptoundecanoate) maintains a cyclic structure in chloroform solution, inhibiting its capacity to perform the crosslinking reaction.

Comparison of Isomeric Aryldibenzopyrylium Salts as Highly Conjugated Planar Dyes
Samantha Meyer, Eva Charlesworth-Seiler
Faculty Mentor/Collaborator: Bart Dahl
Poster #: 156

Many planar conjugated organic compounds can be incorporated into a variety of useful applications, such as sensors and dyes, due to their unique optical properties. One such class of these compounds contains the pyrylium unit, which is capable of reversible pH-driven conformational changes. This project focuses on the synthesis of novel aryldibenzopyrylium dye compounds with optimized pH sensitivity, fluorescent capabilities, and the ability to reversibly alter their conformation, and thus produce variable optical properties. We set out to synthesize a new class of isomeric compounds, which incorporate a doubly benzannulated pyrylium unit in each structure, to determine how the molecular shape impacted the optical properties. These properties can be studied using UV-vis and fluorescence emission detection techniques. These analyses will allow for a deeper understanding of the electronic properties of these molecules and how both the conjugation path length and structural motifs alter these properties. This work has not only yielded an entirely new class of pH-sensitive fluorescent molecules but has contributed to the constantly evolving understanding of electronic activity in conjugated pathways.
The 2017 Lake Michigan Ozone Study (LMOS) was a collaborative, multi-agency field campaign that ran May 22, 2017, through June 22, 2017, in eastern Wisconsin and northeastern Illinois. The UW-Eau Claire mobile platform operated in between Sheboygan, WI and Grafton WI. We drove an automobile and measured ozone via Personal Ozone Monitor, temperature and relative humidity via Kestral sensor in order to investigate ozone gradients between ground monitoring stations at coastal and inland locations north of Milwaukee. The mobile platform deployed on targeted event days to coincide with other LMOS measurements on June 2, 3, 12, 13 and 17th. On June 2nd, a large lake breeze extended inland and ozone observations varied little across the study’s sites; however, on June 3rd there was a shallow lake breeze that formed and large temperature and ozone gradients were observed. The mobile data will be used to discern local ozone gradients in comparison to ground-based WI-DNR and Illinois EPA sites.

Investigations using ozone, wind speed and direction, and temperature data collected from WI-DNR and Illinois EPA ground stations will construct an understanding into the onset of lake breezes at different sites will also be presented.

The goal of this research is to understand how and why some molecular complexes, which refers to any association of two otherwise stable molecules, undergo major changes in structure when their environment changes (e.g. gas phase to solid or solution). In this study, we are concerned with the effects of the halogen substitutes in the complexes of the form: OC–BCl3 (X= F and Cl).

Most complexes retain the same structures across a variety of environments, and in this work, we seek those that change (X=F), or in some instances have distinct structures with different bond lengths (X=Cl). Exploration of these complexes involved quantum chemical computations; computer simulations of electron distribution and bonding. From these models, we obtained equilibrium structures, bond energies, and vibrational frequencies. The OC–BCl3 complexes have the potential to bond as OC–BCl3 or CO–BCl3 and either structure can be a long or short bonded complex. Furthermore, we will present preliminary results for low temperature, matrix isolation-IR experiments (which involve trapping the complex at 20K in solid Ar and recording its infrared spectrum). For the complexes, IR data may offer a clear indication of what is complexing in the sample: OC–BCl3, CO–BCl3 or OC–HCl.

The solvatochromism of the 4-amino-1,8-naphthalimide fluorophore is well established, with the wavelengths of maximum absorption and maximum emission showing a hypochromic shift as the dielectric constant of the solvent decreases. We have synthesized a new naphthalimide dye
with bulky 2,2,6,6-tetramethylpiperidine (TMP) groups at both the 4-, and N- positions. In preliminary trials, we have observed this dye exhibits solvatochromic behavior that differs from what we expected on the basis of precedent. Herein, we report our findings of the solvatochromic behavior of this dye compared to a naphthalimide dye with sterically undemanding \(n\)-butyl substituents in the same positions.

**Computational Docking of Caffeine Derivatives and Binding to Xanthine Oxidase**  
Jake Ratanawong  
Faculty Mentor/Collaborator: Thao Yang

Building off of previous research on Xanthine Oxidase (XOD) ligand docking, the purpose of this project is to seek a caffeine derivative compound structurally similar to Urate and Allopurinol that would exhibit a similar binding mechanism to XOD with high affinity. These modified caffeine molecules could potentially serve as an alternative drug compounds to Allopurinol, an effective inhibitor for XOD. Standard caffeine structure consists of a six-membered and five-membered ring with two carbonyl and three methyl groups directed externally. Our derived caffeine ligands consisted of aldehyde and carboxylic acid side groups replacing the standard methyl groups. Carboxylic and aldehyde side groups were chosen to promote greater polar interactions within the XOD active site. Computational ligand docking to XOD was performed via the Autodock Vina program and ligand analysis focused on ligand binding affinity in comparison to standard Urate values. Our findings indicate that a standard caffeine molecule exhibits poor binding and low affinity to XOD in comparison to Urate. However, a caffeine derivative with a lone carboxylic acid side group and no methyl groups displays a high affinity value comparable to that of Urate and Allopurinol values.

**Focus on Flavor - Helping Small Brewers Make Big Decisions**  
Samantha Reiter, Anna Meier, Claudia Waters, Gabrielle Rigden  
Faculty Mentor/Collaborator: Scott Bailey-Hartsel

As the popularity of microbreweries grows in Wisconsin, young breweries such as Modicum Brewery found in the Eau Claire area are encountering obstacles not faced by larger, more established facilities that have access to research and quality control laboratories. Chemical analysis of volatile flavor compounds greatly improves a brewer’s ability to characterize and fine-tune their product. In our research, we have developed a novel approach to beer analysis using Solid Phase Microextraction (SPME) with Monotrap activated carbon disks in tandem with Gas Chromatography Mass Spectroscopy (GC-MS). Our analysis will allow regional microbrewers to attempt new and innovative processes in brewing as well as provide them with quality control data. Some examples that will be discussed include analysis of off flavors present during the fermentation process, comparisons between the volatile organic compounds in various styles of beer, and a semiquantitative analysis of the variability of flavor producing compounds during fermentation and within the end product.
**Lanthanide Electrocatalysis for CO₂ Reduction Reactions**
Hannah Van Steenburgh, Jacob Draghicchio
Faculty Mentor/Collaborator: Krysti Knoche Gupta

CO₂ accumulated in the atmosphere can be converted into hydrocarbon fuels using CO₂ reduction, however, this type of reaction alone is inefficient. Through exploration of salts from the lanthanide family, we may be able to catalyze CO₂ reduction reactions to provide an efficient and clean source of renewable energy. Recently, a bench-top method for electrochemical catalysis of lanthanides in common solvents has been developed. This method opens up a new group of chemicals to explore potentially being useful in catalysis of CO₂ reduction. Preliminary data suggests that CO₂ reduction can be catalyzed by ytterbium(III) trifluoromethane sulfonate. Any type of reduction reaction is driven by movement of electrons and is best visualized through cyclic voltammetry performed with a potentiostat. A three-electrode set up with Pt mesh counter electrode, Ag/Ag⁺ wire reference electrode and Pt working electrode, coated with a Nafion® film is used. To characterize the lanthanide salt, cyclic voltammetry will be performed on solutions of ytterbium(III) trifluoromethane sulfonate in acetonitrile with tetrabutylammonium tetrafluoroborate electrolyte. Each solution will be purged with N₂ gas and a N₂ blanket will be maintained during analysis. Later, CO₂ gas will be introduced to the system to examine electrocatalysis. After initial characterization of ytterbium(III) trifluoromethane sulfonate, we will further explore other lanthanide salts and electrocatalysis by lanthanide salts in different solutions and conditions.

**Site-Directed Mutagenesis and Intrinsic Tryptophan Fluorescence Study to Probe the Conformational Change in Escherichia coli Prolyl-tRNA Synthetase (Ec ProRS)**
Katelyn Weeks, Benjamin Johnson, Murphi Weinzetl, Jessica Liebau
Faculty Mentors/Collaborators: Sanchita Hati, Sudeep Bhattacharyay

Amino-acyl tRNA synthetases (AARSs) belong to a class of an important family of enzymes that are critical for proteins biosynthesis in all living organisms. They catalyze aminoacylation of tRNAs, a key step in protein synthesis. An important member of AARSs is prolyl-tRNA synthetase (ProRS), a multidomain enzyme in which domain-domain communications are essential for function. These intra-domain communications are mediated by coupled-domain motions, which could be affected by any change in the surrounding environments such as increased concentration of metabolites and biomolecules (molecular crowders). To explore the impact of molecular crowding on the coupled-domain dynamics and functions of ProRSs, we are using synthetic crowding agents to mimic the highly crowded intracellular environment. Our initial kinetics and molecular dynamic simulation studies on *Escherichia coli* (Ec) ProRS have revealed alterations in catalytic function and protein conformation in the presence of molecular crowders. To determine the site of conformational change(s), site-directed mutagenesis and intrinsic fluorescent studies have been performed. Changes in fluorescence emission intensity and wavelength, which indicate conformational change in the presence of various crowding agents, have been monitored for wild-type and mutant variants of Ec ProRS. Herein, we will present the preliminary results of our work.
**Investigating Structure-Dynamics-Function Differences Among Various Species of Proyl-tRNA Synthetase Using a Hybrid QM/MM Computational Technique**  
Murphi Weinzetl, Carl Fossum, Alexander Narkiewicz-Jodko  
Faculty Mentors/Collaborators: Sudeep Bhattacharyay, Sanchita Hati  
Poster #: 154

All living organisms contain amino-acyl tRNA synthetases (AARSs) – a family of enzymes critical for protein synthesis. They are responsible for the covalent ligation of proline to its specific tRNA molecule, called tRNA$_{Pro}$, using ATP. The structures of prolyl-tRNA synthetases (ProRSs) have been found to contain a number of domains. The “eukaryote-like” species of ProRS consist of a zinc-binding domain instead of the insertion domain (INS domain) present in “prokaryote-like” proteins. These domains are in constant motion and work in a concerted manner to facilitate the catalytic reaction step. Coupled domain dynamics have been found to be necessary for the catalysis. This calls into question the differences in structure and dynamics between the two non-catalytic domains and how it influences the catalytic steps. A comparative study of the structure-dynamic-function relationship among various species of ProRS is being investigated using molecular simulations. In parallel, a computational study of the sequence homology amongst various species of ProRS using the Dali server for the comparison of proteins is being performed. In order to further investigate the evolution of the ProRS protein family, the similarities and differences of different ProRS species are being studied. The preliminary results for this investigation will be presented.

**Lead levels in paint**  
Michael Wenzel  
Faculty Mentor/Collaborator: Patricia Cleary  
Poster #: 157

The scope of this research was aimed to develop a method to obtain the lowest limit of detection for lead (Pb) on the Agilent 4200 microwave plasma atomic emission spectroscopy (MP-AES) and to determine Pb levels in paint based on the color and condition as well as soils that may have been contaminated with Pb by flaking paint. Samples were taken from the same building in Eau Claire, along with colored paint from different sources. The amount of lead found in these samples will be discussed.

**Geography and Anthropology**

**Investigating the Trakas Holocaust Mass Execution Site: Subsurface Imaging**  
Joseph Beck, Samuel Schneider, Madeline Fuerstenberg, Chloe Kofman  
Faculty Mentor/Collaborator: Harry Jol  
Poster #: 96

The Trakas-Pempiškis woods, located to the south of Rokiškis, Lithuania, is the site of a mass execution of an estimated 28 Svėdasai Jews in the summer of 1941. During WWII, 95 percent of the Jewish population in Lithuania were killed by the Nazis, Lithuanian militiamen and Nazi sympathizers. The militiamen were of a group known as the Lithuanian Activist Front (LAF) and as the then-Soviet occupied Lithuania awaited the inevitable German invasion of the Soviet Union, LAF used this opportunity to eliminate the Jewish presence in Lithuania under the guise
of patriotism and support for the Nazis. According eyewitness accounts, the 28 Jews who were killed at Trakas were brought to the forest in horse-drawn carts. Two eyewitnesses identified two potential locations for the mass grave. In the summer of 2018, an investigation of the subsurface of the two potential burial sites was undertaken. Ground penetrating radar (GPR) was used to examine the stratigraphic layers of each site, and a laser-leveler was used to take topographic measurements at each location. The datasets gathered at Trakas have proven effective, showing indications of what may be a mass grave; just as GPR has done so in past studies of mass burial sites.

**Locating Subsurface Structures at the Krošinskių Manor in Rokiškis, Lithuania**

**Joseph Beck, Samuel Schneider, Madeline Fuerstenberg, Chloe Kofman**

Faculty Mentor/Collaborator: Harry Jol  
Poster #: 117

Ground penetrating radar (GPR) surveys were conducted at the former Krošinskių Manor, located in Rokiškis, Lithuania, searching for remnants of the manor complex. The manor belonged to the Krošinskių family, who ruled the Rokiškis area for 200 years, dating back to the 16th century. Due to modern development and a lack of restoration resources, many of the manor’s past structures are no longer standing, and their locations are left unknown. Earlier structures include defensive fortifications, servant quarters, a sauna, and a mill. In the search for the missing buildings, two GPR grids were collected at the site using a Sensors and Software pulseEKKO GPR system with 500 MHz antennae, with 0.25 m line spacing. Both GPR grids were processed using GFP_Edit, EKKO_Project, and GPR Slice. The first GPR grid measured 9.5 m x 32 m, resulting in 38 lines, and the second grid measured 27 m in width, resulting in 108 lines collected at various lengths. The results of the GPR survey will provide local Lithuanian archaeologists with important data that will aid in future excavations, as well as provide the citizens of Rokiškis a better understanding of a prominent historical site in their community.

**Subsurface Imaging at Magdala, Israel: Better Understanding a Former Fishing Village along the Sea of Galilee**

**Logan Bergevin**

Faculty Mentor/Collaborator: Harry Jol  
Poster #: 89

Magdala is an ancient city located in Northeastern Israel on the Sea of Galilee. The city is believed to have been inhabited as early as the Hellenistic period (200 BCE). Known as the tower of fishes due to its history of salting fish and building boats the once prosperous city was also the birthplace of Mary Magdalene. Changing lake levels and sedimentation have caused Magdala and other ancient cities to be abandoned and lie in ruins 100’s m from the present-day coastline of the Sea of Galilee. Using ground penetrating radar (GPR), the study looks to help uncover archaeological features and stratigraphic changes related coastline and lake level changes. The study at Magdala used a pulseEKKO PRO GPR system with frequencies of 225 and 450 MHz and a step sizes between 0.5-0.1m. At Magdala eight grids were collected varying in size from 1-5m in width and up to 10m in length. Grids were taken in the ancient city which is currently under excavation. The findings from the research will be used to help further excavate the ancient city and find archeological structures.
Exploring the Subsurface of an Ancient Harbor at Tel Akko, Israel: Using 3D Ground Penetrating Radar Imaging and Software
Logan Bergevin, Joseph Beck
Faculty Mentor/Collaborator: Harry Jol
Poster #: 122

From the Late Bronze Age to the Hellenistic period, Tel Akko, Israel was a thriving port city located on the northern portion of the Haifa Bay. Due to stable sea levels, longshore coastal drift, and associated aeolian deposition on the prograding Zevulun Plain, Tel Akko’s coastline prograded out. The study presents ground penetrating radar (GPR) surveys collected at the south and southwest base of Tel Akko, which is where the coast is theorized to have been located. Three GPR grids were collected using a Sensors and Software pulseEKKO 1000 GPR system. The data was analyzed using EKKO_Project, and Voxler. The frequencies used in the study were 225 and 500 MHz, with corresponding step sizes of 0.1m and 0.05m. GPR survey results indicate that within grid A there is a drop-off associated with the end of the Kurkar Sandstone. Locations beyond the “drop-off” would be viable locations for a coastal harbor. Grid B contained areas interpreted as sedimentary downlap in an east to west direction. Grid C contains multiple areas of chaotic reflections indicating disturbances. On the eastern side of Grid C, the subsurface stratigraphy revealed regions of right-angled patterns. The right-angled patterns are interpreted as human-made features.

Applying interpolation methods for ground penetrating radar topographic correction at a Lithuanian Holocaust mass burial site
Wil Blouin, Joseph Beck, Samuel Schneider
Faculty Mentor/Collaborator: Harry Jol
Poster #: 98

A ground penetrating radar (GPR) grid was collected to find a Holocaust mass burial site in the Trakas-Pempiškis woods of Rokiškis, Lithuania. The survey, shot with a pulseEKKO Pro GPR system and 500 MHz antennae, consisted of 28 parallel GPR lines approximately 9 m in length and spaced 0.25 m apart. A Topcon RL-H4C laser leveler was used to measure topographic points surveyed every 1 sq. m. Historical eyewitness testimony and a truncation in subsurface stratigraphy beneath a surface depression suggest the presence of the burial site. Aiding interpretation of GPR data, thirteen unique Ordinary Kriging (OK) and Radial Basis Function (RBF) digital elevation models (DEMs) for GPR line topographic correction were identified. Presumably, OK and RBFs produce DEMs passing through input points and predict values beyond minimum and maximum input point values, both desired attributes for logical consistency. In practice, OK DEMs insignificantly exceeded sample data peaks and depressions while RBF DEMs exceeded both, necessitating different sampling schemes with future use of OK and the same parameters. Due to relatively large topographic sample point spacing, profiles are only adjusted for general trends in elevation change, and an analyst must be cognizant of individual lines’ placement affecting uncertainty of correction.

Eric Drost, Joseph Beck
Faculty Mentor/Collaborator: Harry Jol

Poster #: 95

The Nagliai Nature Reserve protects a large aeolian (wind-blown) dune field known as the “Dead” dunes which over time has buried four villages and two old cemetery sites. Dead (Mirusios), or Gray (Pilkosios) dunes are large sand hills (> 60 m) built by strong winds coming onshore from the Baltic Sea. The Reserve also protects habitats for rare plants. Human activity is limited to a single trail within the Reserve except for scientific observations. In collaboration with the Vilnius University and the Reserve, multiple ground penetrating radar transects were collected to image the internal structure of the Dead dunes to better understand their formation and to test the ability of GPR to map paleosols in this environment. GPR is a non-invasive imaging system which can give insight into the earth below the surface and is based on the propagation and reflection of pulsed electromagnetic energy. Data was collected using a pulseEKKO 1000 GPR system with topographic data collected for each transect using a TopCon RL-H3CL laser level. Using radar stratigraphic principles to guide the interpretation of the processed transects resulted in observing inclined reflections (prograding) and subhorizontal reflections (paleosols). The project provides an initial “look” inside these unique aeolian environments.

Comparing Antennae Frequencies (225, 450 and 900 MHz) of a windblown dune, Kuršių Nerija National Park, Lithuania

August Guenthner, Brittany Rickey, Joseph Beck, Samuel Schneider
Faculty Mentor/Collaborator: Harry Jol

Poster #: 90

The Kuršių Nerija National Park is one of the five national parks in Lithuania. The Park was established in 1991 to protect the unique environments of the Curonian Spit and Curonian Lagoon and is also recognized by UNESCO as World Heritage site. Within the Park, the natural landscapes are dominated by coastal and windblown geomorphic processes. To test the applicability of ground penetrating radar (GPR) to image windblown dunes on the Curonian Spit, a collaborative project with Vilnius University focused on comparing a variety of antennae frequencies to compare the “range vs resolution” question within the dunes. GPR, a non-destructive geophysical imaging methodology, allows one to use lower antennae frequencies to provide deeper imaging into the subsurface versus higher antennae frequencies which allow greater resolution of the sedimentary patterns. Data was collected using a pulseEKKO 1000 GPR system using with three antennae frequencies (antennae separation/step size): 225 MHz (0.5 m/0.1m), 450 MHz (0.25m/0.05m) and 900 MHz (0.17m/0.02/m). To geometrically correct the data, a topographic survey was conducted using along each transect using a TopCon RL-H3CL laser level. The results highlight the importance in understanding the “range vs resolution” question when investigating sedimentary environments.
Topographic Correction of GPR Lines, Curonian Spit Sand Dunes
Kelly Jerviss, Samuel Schneider
Faculty Mentor/Collaborator: Harry Jol
Poster #: 87

The Curonian Spit is located off the western coast of Lithuania in eastern Europe. The Curonian Spit is 98 km long spit that separates the Baltic Sea from the Curonian Lagoon. The Curonian Spit is covered in very large sand dunes that are always changing due to environmental factors. Ground penetrating radar (GPR) lines were collected across 7 sand dunes on the Curonian Spit. These lines were collected with a pulseEKKO GPR system equipped with 500 MHz antennae. Topography data was also collected with a Topcon RL-H4C laser leveler. Topographic measurements were collected along the GPR lines at every 1 meter increments. The topography data is used to geometrically correct the GPR lines within the EKKO Project 5 software. The original GPR data shows no elevation along the line, but the topographically corrected GPR data shows the topography of the sand dunes as they were when the data was collected. These topographically corrected GPR lines can aid in the correct interpretation of the GPR data and show another perspective of viewing these aeolian landscapes.

Henning’s Lonesome Apple Tree Ridge Site, Eau Claire County, Wisconsin: An Investigation of Soils and Best Land Use Practices
Brittany Rickey, Eric Drost, Glen Hook, Luke Semingson
Faculty Mentor/Collaborator: Garry Running
Poster #: 113

In this poster we present the results of investigations conducted at the Henning’s Lonesome Apple Tree Ridge Site (the site) located about ten miles southeast of Eau Claire, Wisconsin. University of Wisconsin-Eau Claire students investigated soil profiles across this site to provide the owners with best land use recommendations. The site, a four-hectare parcel, currently in pasture, is located on the north and east-facing slopes of a Late-Cambrian sandstone bedrock-controlled ridge overlain by Late-Pleistocene age loess. Initial reconnaissance revealed that slope steepness and position are the most variable soil forming factors at the site. In 2016 four soil pits were excavated along a north-facing slope (from summit to toe slope) as well as three more soil pits along an adjoining east-facing slope in 2018. Soil profiles exposed in them were described following USDA-NRCS methods and nomenclature and were compared to soil series descriptions accessed from the USDA-NRCS Web Soil Survey. The soil profiles we described are consistent with the USDA-NRCS descriptions of Plainbo Loamy Sand (6-12% slopes), Seaton Silt Loam (12-20 % slopes), and Gale Silt Loam (20-30% slopes). Based on interpretive data from the Web Soil Survey we recommend land uses that don’t expose bare soils to erosion.

Locating the Former Synagogue of Šeduva, Lithuania
Samuel Schneider, Joseph Beck, Madeline Fuerstenberg, Chloe Kofman
Faculty Mentor/Collaborator: Harry Jol
Poster #: 86

Šeduva, Lithuania is a small town that has been impacted greatly by Nazi and Soviet rule. Many buildings, including synagogues, were destroyed during the changes of governing powers over the city. To search for one of the synagogues that was destroyed in Šeduva, a ground penetrating radar (GPR) survey was collected over a paved parking lot. The GPR data was collected with a Sensors & Software pulseEKKO GPR system equipped with 500 MHz antennae. The survey grid
was 18mx32m with a line spacing of 0.25m. The GPR data was processed within the software packages: GFP_Edit, EKKO_Project 5, and GPR Slice. The results from the data analysis showed many horizontal patterns as well as right-angle features. The patterns and features which are at various depths below the grid surface are interpreted as structural walls of the previously standing synagogue. The study results were corroborated with old blueprints of the synagogue that were recently discovered.

**Subsurface Imaging of the Bilioniai Hillfort, Lithuania**

**Samuel Schneider, Joseph Beck, Madeline Fuerstenberg, Chloe Kofman**

Faculty Mentor/Collaborator: Harry Jol

Poster #: 99

Nearly 4,000 potential hillforts exist throughout the Baltic region. Hillforts served multiple purposes, including defensive forts to protect against attack, wooden castles, and settlements. A ground penetrating radar (GPR) study was conducted on a hillfort in the Šilalė district of western Lithuania. GPR is a noninvasive technology that sends high frequency pulsed EM energy into the ground. A pulseEKKO GPR system equipped with 500 MHz antennae was used to collect a 40mx20m grid, with the Y-Lines extended when needed. Other tools such as a GPS and a laser lever were used to supplement the GPR data. The GPR data was processed using the software EKKO_Project 5. The results of the grid contain: 1) two rectangular shaped structures with one 5.2mx11.5m in size, the second 4.7mx11.3m in size, both approximately 0.6m-1.4m in depth, 2) linear feature approximately 3.3m long at a depth of 0.75m-1.0m, and 3) two circular shaped objects, one is approximately 2.1m in diameter at 0.15m-0.4m in depth and the second approximately 3.9m in diameter at 1.1m-1.5m in depth. The results will help guide future archaeological excavations and aid in preserving cultural artifacts within the Bilioniai hillfort as well as helping to further explain the history of hillforts.

**Mapping Post-Glacial Terraces in the Lower Cannon River Valley, southeastern Minnesota: Geomorphic and Archaeological Significance**

**Adria Slade**

Faculty Mentor/Collaborator: Douglas Faulkner

Poster #: 152

The Lower Cannon River (LCR), an important but poorly understood archaeological area in southeast Minnesota, was a glacial meltwater tributary of the Upper Mississippi River (UMR) during the Late Wisconsinan. During deglaciation, the LCR responded to deep UMR incision by incising into its valley’s outwash fill (based on studies of other UMR tributaries). This study’s objective was to lay a foundation for unraveling that history by ascertaining the heights and spatial patterns of terraces within the LCR valley. Using LiDAR-derived DEMs in ArcMap, we manually identified terrace remnants, mapped their treads, and calculated their heights (above the modern river). We discovered terraces are most common (based on areal extent) in the lowermost and uppermost reaches, where the bedrock valley is widest, with the lowermost reach dominated by higher terraces and the uppermost by lower ones. While relatively scarce, remnants in the narrow middle reaches suggest a transition from higher to lower terraces in the upstream direction. Based on these findings, we hypothesize that LCR incision was nearly continuous as it propagated upstream from the UMR, with little time for floodplain formation. Therefore, cultural material of archaeological interest is likely accessible to standard shovel testing methods used by archaeologists.
Sand Stringers in southeastern Minnesota and west-central Wisconsin: A Progress Report
Adria Slade
Faculty Mentors/Collaborators: Garry Running, Douglas Faulkner
Poster #: 139

More than 600 aeolian sand stringers were recently identified in SE Minnesota and in west-central Wisconsin. Additionally, sand stringers have also been identified in northeastern Iowa. Few data exist from the >600 other stringers recently mapped. A large spatial gap exists in prior mapping, particularly in southeastern Minnesota. Our objective is to fill that spatial gap by mapping sand stringers in 8 counties in SE Minnesota. We used methods previously demonstrated to be successful for mapping stringers by using LiDAR DEMs, SSURGO data, and remotely sensed imagery. We conservatively identify over 200 additional sand stringers across southeastern Minnesota. These landforms are morphologically consistent with previous descriptions of sand stringers, i.e., they are 10s to 100s of m long, < 100 m wide, 1-3 m high, and oriented WNW-ESE. We noted sand stringers associated with sandy and silty texture surface deposits. Sand stringers with silty surface textures are ubiquitous in southeastern Minnesota. Consistent with prior work, stratigraphic relationships suggest sand stringers formed during or after the Last Glacial Maximum, probably about 11,000 to 14,000 years ago. To further refine the depositional chronology, OSL age control is pending and additional ground-truthing is still needed.

Geology

Petrogenesis of Archean (2.7 Ga) Mafic Volcanic Assemblages near Ely, MN
Natalie Brock
Faculty Mentor/Collaborator: Robert Lodge
Poster #: 129

The Vermilion District in northeastern Minnesota contains one of the classic Neoarchean Archean granite-greenstone belt terranes in the United States that formed between 2722 Ma to ~2661 Ma. Crustal development during Archean is controversial. Scientists do not know if the formation of the crust was due to subduction or non-subduction tectonic processes. This study describes the geochemistry of Archean mafic volcanic assemblages near Ely, MN and documents geochemical geospatial/stratigraphic variations. The geochemical variations throughout stratigraphy will test volcanic and tectonic models for Archean crustal development. Compiling data from newly collected samples with existing data will provide a near-complete geochemical transect throughout the Archean mafic volcanic assemblages in northeast Minnesota. The interpretations from this project can improve our understanding of the role of modern, subduction-dominated plate tectonics or plume-dominated mechanisms in the formation of Archean cratons. A comprehensive study of the geochemical characteristics of the rocks in this region can improve scientists understanding of Archean tectonic processes, crust formation, and crustal architecture. The interpretations will not only be important for the study of Minnesota’s geology, but also will allow for more regional geodynamic interpretations and correlations with Archean rocks that extend into Ontario, Canada.
Origin and Evolution of the Sulfide-Rich, Mafic Igneous Intrusion at Eagle Mine, Upper Peninsula, MI
Elliot Draxler
Faculty Mentor/Collaborator: Phillip Ihinger
Poster #: 85

The Eagle Mine of the Upper Peninsula, Michigan is host to a productive copper-nickel, sulfide-rich ore deposit that is hosted within the Yellow Dog Intrusion, a mafic intrusive igneous rock. The origin of the ore and its relationship to its host intrusion are not known. To better understand the processes responsible for the formation of the deposit, we collected a series of rocks from the mine that represent distinct crystallization phases of the intrusion. Here, we apply a new model for differentiation within mafic magma chambers: the Sequential Extraction model. The model invokes the process of liquid immiscibility to generate complementary Si-rich and Fe-rich melts that, due to significant differences in density, rapidly segregate upon formation. We use whole-rock and trace-element geochemistry to follow chemical evolution within the magma chamber, and we apply petrographic techniques to observe characteristic textural features associated with segregated liquids within a crystallizing magma body. We show that the Cu, Ni deposits are co-magmatic, and that their origin is tied to the segregated Fe-rich liquid.

Volcanic Setting of the 1.8-1.9 Ga. Eisenbrey Cu-Zn Deposit. Rusk County, Wisconsin.
Jeffrey Hessburg
Faculty Mentor/Collaborator: Robert Lodge
Poster #: 102

The objective of this research is to complete a petrographic and geochemical characterization of the least-altered volcanic rocks hosting the Eisenbrey Cu-Zn deposit in Rusk County, WI. Major and trace element geochemical data was used to assess the magmatic characteristics of the volcanic system that formed the Eisenbrey ore body. In addition, the geochemical data will be used to characterize the stratigraphy and hydrothermal alteration hosting the Eisenbrey ore body and will ultimately allow for the reconstruction of the physical volcanology and tectonic setting that created this deposit. Reconstructing the Eisenbrey volcanic system will lead to a better understanding of the tectonic history of the 1.8-1.9 Ga Penokean orogen in northern Wisconsin. The analyses will also aid to give a better understanding on the petrogenesis and metallogeny of the volcanogenic massive sulfide deposits in the region. Preliminary results show that there is a bimodal volcanic suite of basalt and dacite. The magmatic affinity of the basalts via discrimination diagrams reveal they are island arc tholeiites.

Evaluating Groundwater Quality and Behavior at UW-Eau Claire Campus
Glen Hook, Madelynn Gorg
Faculty Mentor/Collaborator: Sarah Vitale
Poster #: 84

To provide a baseline understanding of groundwater flow and quality on the University of Wisconsin-Eau Claire campus, measurements in fourteen (14) monitoring wells across lower campus have been collected monthly. Standard water quality parameters, including temperature, pH, dissolved oxygen, oxidation-reduction potential, and specific conductance were measured using an In Situ AquaTROLL 600. Nitrate concentrations were also measured. The parameters can provide information about how the geology and land use practices in the local area influence
our groundwater as it migrates from upper campus to the Chippewa River. Water level measurements suggested enhanced recharge and mounding may be occurring, potentially in response to construction of the new pedestrian walkway along the Chippewa River. Solinst Levelogger pressure transducers were installed in two monitoring wells in the area to monitoring hourly changes in water level and quantify infiltration rates and subsequent impact on groundwater flow and quality.

**Septic contamination of groundwater in subdivisions built on fractured bedrock.**
Glen Hook
Faculty Mentors/Collaborators: Robert Hooper, Sarah Vitale
Poster #: 101

Groundwater is the primary source for both public and private water supplies in much of the country. In the Midwest, the Paleozoic sandstone, bedrock-aquifers are an increasingly important source of drinking water (e.g. Madison, WI; Twin Cities metro; Eau Claire, WI) and recent studies in Wisconsin and Minnesota have shown that groundwater flow in the sandstones occurs primarily along fractures and bedding planes, which increases the potential for contamination of a well when compared to an isotropic porous media. This study examines groundwater flow and quality beneath a recently-developed unsewered subdivision built directly on top of the Cambrian sandstones (Mt Simon Fm., and Eau Claire Fm.) in the Eau Claire area. Subsurface geology was reconstructed using data collected from well construction records (depth of different geologic units) and outcrop investigations within and near the subdivision. The stratigraphy, combined with measurements of fracture spacing and orientation, is used to reconstruct groundwater flow. This study uses specific human wastewater indicators (caffeine, artificial sweeteners, pharmaceuticals, and household disinfectants) using high-performance liquid chromatography (HPLC) to determine the impact of septic systems on local groundwater quality for subdivisions built on sandstone bedrock.

**Reconstructing Paleoproterozoic volcanism in northcentral Wisconsin: Geology of the Lobo Zn-Cu deposit**
Regan Jacobson
Faculty Mentor/Collaborator: Robert Lodge
Poster #: 110

This study describes the petrology and geochemistry of the hosts rocks of the Lobo Zn-Cu deposit, near Pelican Lake, WI, to improve our understanding of the mineralization and alteration styles of this deposit. The Lobo deposit is one of many volcanogenic massive sulfide (VMS) deposits in northern Wisconsin and are part of the 1.8-1.9 Ga Penokean Orogen. The Lobo deposit is a small, high-grade Zn-Cu deposit and its close proximity to the 60 Mt Crandon Zn-Cu-Pb deposit and numerous other advanced prospects may indicate a shared genetic history that is of interest to local mineral exploration companies. Detailed core logging, petrography, and analytical work will characterize volcanic rocks hosting the Lobo and test its relationship to surrounding deposits. Using trace and major element geochemistry to study the Lobo deposit will help to assess the magmatic affinity of the host rocks and relate them to other VMS deposits in the region. The core logs indicate that the Lobo deposit is primarily hosted by felsic to intermediate lapilli tuff that are heavily altered by sericite and are locally interleaved with mafic intrusive rocks. Ongoing trace element geochemical analysis will more clearly document the tectonic origin of this volcanic suite.
An Assessment of Nutrient Loading through Lacustrine Groundwater Discharge in Mud Lake, Wisconsin
Chloe Malin, Jonah Shoemaker-Gagnon
Faculty Mentors/Collaborators: Sarah Vitale, Brian Mahoney

This study seeks to quantify phosphorous (P) loading through lacustrine groundwater discharge in Mud Lake in Barron County, Wisconsin. Phosphorous-laden runoff has been associated with lake eutrophication throughout the upper Midwest. Although P has been thought to be immobile in groundwater, an ongoing investigation at UW-Eau Claire suggests that P is actively transporting throughout the groundwater system in large quantities. Mud Lake is one of five interconnected lakes which experience seasonal eutrophication events. The geology is Cambrian sandstone overlaid by sand and gravel glacial deposits. Ten (10) mini-piezometers (5 ft length, 1/2” ID, 4” screen) were installed around the perimeter of the lake. Surface water, groundwater, and soil were sampled every 2 to 3 weeks to measure standard water quality, nitrate, and metal concentrations. Measurements were used to estimate nutrient flux into Mud Lake. The results of these calculations yield an average phosphorous flux of 43.6 kg/day during the 2018 field season, with variable groundwater P concentrations up to 790 ppb. A deionized water extraction analysis of P held loosely in sediment pore spaces show excessively high P ranging from >300ppb to >1700ppb. This suggests that P may be concentrating in lake bottom sediments under the measured aerobic conditions.

Using Infrared Spectroscopy to Distinguish Prism from Rhombohedral Sector Zones in Hydrothermal Quartz Crystals: Implications for Growth Dynamics
Tyson Noffke, Trevor Nelson
Faculty Mentor/Collaborator: Phillip Ihinger

Gemmy hydrothermal quartz crystals typically exhibit each of their six prism and six rhombohedral crystal faces. However, discerning which of the crystal faces were actively growing at any given time during construction of an individual crystal has been problematic. Recently, we have shown that hydroxyl-bearing impurities are readily incorporated into active rhombohedral growth faces, but not so in active prism growth faces. Infrared spectroscopic measurements reveal that distinct sector zones with unique impurity concentrations identify the active growth faces responsible for growth of each sector zone. However, it is still not known whether activity on a growth face reflects conditions reflective of the external environment or internal to the crystal lattice. Here, we use infrared spectroscopy and polarized light microscopy to characterize the evolving sector zones within a series of quartz crystals that grew at the same time inside a single vug. In a preliminary set of measurements on three crystals, we observe that thick prism sector zones correlate with proximity to the fracture wall and may reflect that flow dynamics within the host hydrothermal fluid may connect with growth activity on prism walls. Here, we further explore this intriguing correlation.
Characterization of 18th Century French Glass from Saint-Nicolas-des-Biefs, Auvergne-Rhone-Alpes, France: Chemistry and Infrared Spectroscopy
Duabchi Vang, Katherine Langfield
Faculty Mentor/Collaborator: Phillip Ihinger

Poster #: 127

Glass beads manufactured in Europe were brought to North America and used in trade with native American peoples. The style and composition of glass beads can be used to trace intercontinental connections between the 16th and 20th centuries. To date, no connections have been made between beads recovered in North America and their site of manufacture in France. Here, we characterize a series of distinctly blue 18th century glass artifacts provided by the Musee du Verrier in Saint-Nicolas-des-Biefs, Auvergne-Rhone-Alpes, France in order to characterize their chemical composition. We use x-ray spectroscopy to quantify their major and trace element composition and Fourier Transform infrared spectroscopy to characterize the total water and hydroxyl speciation of the glass. The amount of water incorporated inside the glass is a direct measure of the humidity level that was present within the furnace when it was formed, and the speciation can be used to determine how quickly the glass cooled when it was quenched. Both sets of chemical information are potentially useful for pinning down the precise location of manufacture in Europe. We compare our measurements with those of blue-colored glass artifacts collected at Fort Mackinac, an 18th century French trading post located in northern Michigan.

Assessment of Long-Term and Recent Trends from USGS Groundwater Level Records in Wisconsin from 1947 to 2017
Duabchi Vang, Emily Finger
Faculty Mentor/Collaborator: Sarah Vitale

Poster #: 111

This study examines the relationship between regional groundwater level trends and climate variability in Wisconsin. Monthly groundwater level data were obtained from the U.S. Geological Survey (USGS) and monthly outputs of WI divisional climate data were obtained from the Midwestern Regional Climate Center (MRCC). Data were analyzed for long-term (1937-2017) and the recent short-term (2002-2017) by MRCC climate zone. Well records were required to span at least fifteen years for long-term analysis, and ten years for short-term analysis, with fewer than 15% omissions. Out of 15 total wells for long-term analysis, six (6) are in sand and gravel, six (6) are in the Cambrian-Ordovician aquifer (sandstone), and three (3) are in the Silurian-Devonian aquifer (carbonates). Groundwater trends show increasing gradients of 0.01 to 0.19 m/yr in southwest Wisconsin (MRCC climate zones 7 and 8). 38 well records met the criteria for short-term analysis (15 sand and gravel, 13 Cambrian-Ordovician, 10 Silurian-Devonian). Short-term analysis shows groundwater trending upward across much of the state with increasing gradients up to 0.28 m/yr. T-test analyses show that differences observed in short-term records are significantly different from the long-term records.
Characterization of 18th Century French Glass Trade Beads from Fort Mackinac, MI: Chemistry and Infrared Spectroscopy
Duabchi Vang, Jackelyn Anderson, Katherine Langfield
Faculty Mentor/Collaborator: Phillip Ihinger

Glass trade beads made in Europe were an important commodity in colonial North America. The style and composition of glass beads were unique to each manufacturing site and can be used today to trace trading relationships between Europeans and native American peoples. Here, we characterize a series of glass beads sampled from Fort Mackinac, MI, a vital 18th century French trade post in the upper Midwest. Major and trace element chemistry are measured using dispersive x-ray spectroscopy. Water content and hydroxyl speciation of the glass is measured using Fourier Transform infrared spectroscopy. The bulk water content is a direct measure of the humidity level inside the kiln from which it was manufactured, and the speciation can be used to determine how quickly the glass cooled when it formed. These data can potentially be used in conjunction with major and trace element chemistry to determine the precise location of its origin in Europe. We present measurements from 15 glass beads provided by the Collections Committee at Fort Mackinac and compare our measurements with those of 18th century glass artifacts collected at manufacturing sites in France. Our results provide further insight on trade routes within and between colonial North America and Europe.

Regional Geochemical Analysis of Lower Paleozoic Strata, Western Wisconsin
Daniel Weber
Faculty Mentor/Collaborator: Brian Mahoney

Lower Paleozoic clastic strata of western Wisconsin were deposited during a series of transgressive marine incursions into the mid-continent in Cambrian to Ordovician time. These strata consist of intercalated sandstone, siltstone and shale that form a series of fining-upward/coarsening upward stratigraphic cycles resulting from repetitive sea level changes. The coarser grained units (i.e. Wonewoc and Jordan Fms.) are highly valued by the silica sand industry for their consistent grain size, shape and rounding. The finer grained units (Eau Claire and Lone Rock Fms.) are too fine grained to be utilized for silica sand and are considered waste rock by the silica sand industry. The materials need to be removed, stored and reclaimed during the mining process. Concern has been raised about potentially high levels of trace metals and phosphorous in these units that could pose an environmental hazard. A regional analysis of the whole rock major and trace metal geochemistry of these finer-grained units will constrain the composition of these rocks, and permit an assessment of the environmental danger posed by these strata. Initial results indicate that these strata do not contain elevated levels of trace metals and do not represent an environmental hazard.
Geology and Materials Science & Engineering

**Evaluating the Source of Elevated Groundwater Phosphorus Levels in Western Wisconsin through Sequential Extraction Geochemistry**
Emily Finger, Evan Lundeen, Jacob Erickson
Faculty Mentors/Collaborators: Brian Mahoney, Sarah Vitale, Laurel McEllistrem
Poster #: 71

Lake eutrophication is becoming an increasingly important issue with dramatic consequences for aquatic biodiversity, water quality, and recreational activities. Eutrophication is characterized by excessive algae growth due to the increased availability of limiting nutrients, such as nitrogen or phosphorus. According to the 2018 WDNR Impaired Waters report, 76% of the 240 identified water bodies contain phosphorus levels exceeding the Wisconsin phosphorus water quality standards (>30-40 ppb). An ongoing investigation of surface water and groundwater chemistry has identified elevated phosphorus levels in lakes, streams and groundwater throughout western Wisconsin. Although phosphorus is widely considered immobile in groundwater, our research strongly suggests phosphorus is mobile and perhaps even concentrating in groundwater. The source of phosphorus in groundwater may be anthropomorphic or naturally derived from local bedrock. The role of bedrock phosphorus in groundwater must be assessed through a sequential extraction technique that quantifies phosphorus mobility under natural conditions. In this process, bedrock samples are subjected to a series of reagents designed to determine if the phosphorus was held as a loosely bound fraction, a carbonate fraction, an organic fraction, an oxide fraction, or a residual fraction.

Materials Science & Engineering

**Synthesis and Application of Smart Polymers in Architectural Coatings**
Colton Carney, Cole Castel, Jacob Ramsey
Faculty Mentor/Collaborator: Elizabeth Glogowski
Poster #: 181

The focus of this research has been the synthesis and use of “smart” diblock copolymers as dispersants in architectural coatings such as paints, primers, and stains. Smart polymers are stimuli-responsive and change properties based on the surrounding environment. These polymers are expected to perform as smart dispersants to enhance the dispersion of titanium dioxide. Dispersants are substances designed to prevent suspended particles from aggregating. Titanium dioxide is an industry standard for the production of white pigmented materials. Poly(2-dimethylaminoethyl methacrylate) (PDMAEMA) has the ability to flip between being hydrophobic or hydrophilic as temperature and pH are altered. Diblock copolymers of PDMAEMA and polyethylene glycol (PEG) were synthesised using atom transfer radical polymerization (ATRP). Gel Permeation Chromatography (GPC) and Nuclear Magnetic Resonance (NMR) Spectroscopy were used to determine if targeted chain lengths were reached. The properties of the various smart polymers were examined with a variety of methods. Viscosity, interfacial tension, and dynamic light scattering (DLS) techniques were used to analyze the diblock copolymer characteristics in varied environments. Ultimately, PDMAEMA
copolymers will be evaluated as smart dispersants for titanium dioxide in architectural coating applications.

**Examining Phenyl Disulfide Chain Molecules as High Capacity Cathodes for Lithium-Ion Batteries**

Emma Fischer  
Faculty Mentor/Collaborator: Ying Ma  
Poster #: 179

Lithium ion batteries have become an increasingly important to the world of technology, due to the demand for portable electronics that contain a battery with a high energy density. This demand has motivated research in high capacity cathodes for these batteries, such as lithium-sulfur. Specifically, this research involves examining phenyl disulfide chain molecules to determine the ideal cathode for use in lithium ion batteries. Computational tools were used to simulate the reactions involving the cathode materials to determine the equilibrium structure, energy differences between the reactant and the product, and other electrochemistry after lithiation of the molecules. The results of this research will lead to a better understanding of the electrochemistry of phenyl disulfide chain molecules and similar molecules, which can contribute to existing data about materials used as cathodes for lithium-ion batteries.

**pH Triggered Growth of Gold Nanoparticles**

Andrea Hunger  
Faculty Mentor/Collaborator: Marcus McEllistrem  
Poster #: 180

Methanobactin (mb) is a small peptide produced by methanotrophic bacteria (that is, bacteria that live exclusively on methane as their source of carbon and energy). It reduces copper (II) found outside the cell to copper (I). The copper (I) is then transported inside the cell and is available for enzymes, including those that oxidize methane to methanol. There are two main types of methanobactin that have been isolated and characterized by others: SB₂ and OB₃b, isolated from different methanotrophic bacteria. This study used only OB₃b. Methanobactin has been shown experimentally to reduce several metal ions in addition to Cu(II), including gold [as Au(III)]. Specifically, methanobactin reduces Au(III) to Au0 (atomic gold). Au0 aggregates to form nanoparticles which can be characterized using TEM and UV-visible spectroscopy. The focus of this study is to determine pH effects on the rate of the reaction between methanobactin and Au(III). This work has implications for treating copper deficiency in humans, bioremediation of halogenated hydrocarbons, furthers our understanding of the metabolic pathway used by methanotrophs to oxidize methane to methanol, and illuminates novel biochemical oxidation-reduction reactions that likely have analogs in other organisms (including human beings) and for other metals.

**Nanoindentation of Silica Colloid Thin Films**

Karen Knoke, Grace Baker  
Faculty Mentor/Collaborator: Douglas Dunham  
Poster #: 173

Silica colloid films are technologically important as they can serve as the matrix to hold nanoparticles for fabrication of thin film sensors. Thin film sensors need to be durable to function in a variety of environments. Nanoindentation tests were performed to determine the
hardness and reduced modulus of silica colloid thin films that were sintered at temperatures ranging from $800^\circ$ C to $1100^\circ$ C or spin coated with different amounts of coats. The spin coated samples also introduced Au:Si ratios with samples at 1:1 and 1:20. The thin films were prepared by undergraduates in Dr. John Kirk’s research group at Carthage College. Our findings indicated that the samples sintered at higher temperatures had a higher hardness, and the spin coated samples leveled off at 5 to 10 coats meaning more layers would be unnecessary. We also concluded that the introduction of gold nanoparticles into the silica matrix did not compromise the hardness of the thin film.

**Synthesizing and Characterizing Triblocks of the Smart Polymer PDMAEMA.**
**Sorfina Suzali, Maryam Al Eid**
Faculty Mentor/Collaborator: *Elizabeth Glogowski*  
Poster #: 174

Smart polymers have switchable properties depending on changes in the environment. These polymers are needed for many applications such as tissue engineering, drug delivery and much more. This research focused on the synthesis and characterization of poly(2-dimethylamino)ethyl methacrylate)-block-polyethylene glycol-block-poly(2-dimethylamino)ethyl methacrylate, or PDMAEMA-PEG-PDMAEMA, triblock smart copolymers. A synthesis of Activators ReGened by Electron Transfer Atom Transfer Radical Polymerization (ARGET ATRP) was conducted to prepare the triblock to limit copper catalyst used and to control the polymerization. Molecular weight of PEG and PDMAEMA and a narrow molecular weight distribution were controlled and determined by Nuclear Magnetic Resonance (NMR) Spectroscopy and Gel Permeation Chromatography (GPC). The solubility properties of the polymer as a function of pH, temperature, polymer concentration, buffer concentration, and polymer composition were determined by Ultraviolet–Visible Spectroscopy (UV-Vis) and Dynamic Light Scattering (DLS). By determining the functionality of this triblock copolymer, current applications can be enhanced, and new applications can be found in bioengineering.

**Wire Positioning and Degradation in Superconducting Cables Subjected to Electromagnetic Cycling**
**Colin Fackler, Anthony Doan**
Faculty Mentor/Collaborator: *Matthew Jewell*  
Poster #: 172

The goal of this research is to use image analysis techniques to understand the impact of electromagnetic cycles on superconducting cable-in-conduit conductors for fusion reactors that contain brittle Nb3Sn superconducting filaments. We wish to identify a set of ideal operating conditions that will minimize the mechanical and electrical degradation of the superconductor. In this study we are comparing virgin conductors that have been manufactured but not tested with those that have undergone electromagnetic testing and in which performance degradation has occurred. Our process involves two main tasks: (1) to mechanically disassemble the conductors and look for visual evidence of wire and filament damage, and (2) to look for wire rearrangement during testing by doing digital image analysis on transverse cross-sections of the conductor. (see figure) We do this by quantifying the overall areal density of the wires in the cross-section relative to the Lorentz force direction, the fraction of wires in contact with other wires, and the extent of plastic deformation of the wires. We expect these analyses will allow us to identify the mechanical source(s) of the electrical degradation, propose design improvements.
for future conductors, and help specify a safe operating envelope that minimizes damage. Acknowledgments: This work was financially supported by the ITER Organization, contract 43-1665 and benefited from the support of the Materials Science & Engineering Center at UW-Eau Claire.

**Characterization of REBCO Superconducting Tape Damage Induced by Various Sample Preparation Methods**

Nate Hartnett  
Faculty Mentor/Collaborator: Matthew Jewell  
Poster #: 171

Superconductors are materials that conduct electricity with no resistance at low temperatures. Superconductors have many applications ranging from MRIs to fusion reactors. Rare-earth barium-copper-oxide (REBCO) superconductors are high-temperature superconductors fabricated in a tape geometry. The sample preparation procedures for mechanical testing and for industrial slitting of the tape can introduce cracks and micro-peels in the REBCO layer, thus potentially limiting its electrical performance of the conductor, or reducing the mechanical strength of the composite tape. In this work, we investigated the damage found in the REBCO layer after industrial slitting and after guillotine cutting in a laboratory environment by imaging the samples using laser confocal microscopy, scanning electron microscopy (SEM), Auger Electron Spectroscopy and digital image analysis. We subsequently quantified the extent of fracture propagation along the slit or cut edge of the samples and the area of the REBCO layer absent. In the slit samples, fracture events in the buffer layers are found to correlate to those in the REBCO layer. Additionally, we identified the exposed buffer layer and quantified its thickness. With a better understanding of how the superconductor is damaged during tape slitting, the slitting process as well as the overall manufacturing process can be improved to provide a more mechanically stable and cost-effective superconductor. Acknowledgements: This work was financially supported by the U.S. Department of Energy, Office and High Energy Physics, award DE-FG02-13ER42036, and benefited from the support of the Materials Science & Engineering Center at UW-Eau Claire.

**The impact of powder source on the processing uniformity of Bi$_2$Sr$_2$CaCu$_2$O$_{8-x}$ (Bi-2212) superconducting wire using digital image analysis**

Timothy Lui, Brynn Dallmann  
Faculty Mentor/Collaborator: Matthew Jewell  
Poster #: 182

This study investigates the quantitative and qualitative geometric differences between two powder-in-tube superconducting wire filaments using different powder sources. To do this, the transverse cross section of the wire is mounted, polished, and imaged with a scanning electron microscope (SEM). The SEM images are then analyzed using the ImageJ program. Within ImageJ, a thresholded image of wire filaments allows for quantitative digital image analysis of parameters such as filament size, roughness, circularity, fill factor, and spacing, the latter as measured by the nearest edge distance of each filament to an adjoining filament. Statistically significant differences were found for filament size and filament spacing as a function of powder source, and for circularity as a function of location within the drawn billet. To check the reproducibility of these results, additional samples of the same wire from adjacent locations were also characterized. Quantifying the differences between these wires helps us understand how
powder quality impacts the processing and overall uniformity of the wire, and allows the powder and wire manufacturer to optimize their production processes and ultimately improve the wire performance. Acknowledgments: This work was financially supported by the U.S. Department of Energy, Office of High Energy Physics, award DE-FG02-13ER42036, and benefited from the support of the Materials Science & Engineering Center at the University of Wisconsin-Eau Claire.

Physics and Astronomy

Creating a Cost-Effective Solar Water Heater
Julia Kocen, Jack Tyler
Faculty Mentor/Collaborator: Kim Pierson

Currently, a vast amount of the world’s energy is used for creating heat for various industrial processes and for heating buildings. The goal of our research is to create an ecofriendly solution for heat production. We are developing an inexpensive flat plate solar water heater panel that will be used in conjunction with a water-source heat pump to more efficiently heat water. This unique configuration will create a heating system that is more than twice as efficient as a natural gas water heater. In order to create the most efficient panel, we have tested the system parameters and performed a cost analyses of our design. Instead of the costly and heavy materials used for current commercial solar water heaters, we will use more lightweight and cost-effective polycarbonate twin wall paneling. Our design is theoretically three times more efficient than current flat plate designs at transferring incident solar energy into heated water. It also weighs 1/3 as much and costs approximately 1/3 to 1/2 as much as commercial panels. This suggests that our system will be commercially competitive, which in turn will promote further research in clean energy technologies.

Detecting Eruptions of Steamboat Geyser with Convolutional Neural Networks
Nicholas Lydeen
Faculty Mentor/Collaborator: George Stecher

Steamboat Geyser, located in the Norris Geyser Basin of Yellowstone National Park, WY, was dormant for several years prior to 15 March 2018. Now the tallest-erupting active geyser in the world, it erupted 32 times in 2018, as many times as in the 35-year period between 1983 and 2017. The nearby Norris Geyser Basin Museum houses a seismograph from which seismic traces are available in real-time. Using these traces, I successfully created a real-time monitoring system, the Steamboat Geyser Eruption Alert System (SGEAS), that detects eruption starts using an ensemble of convolutional neural networks and correspondingly dispatches text message alerts. In my poster, I outline the design and implementation of SGEAS.
The Effect of Eddy Currents on the Thompson Jumping Ring Apparatus
Patrick McCaughin
Faculty Mentor/Collaborator: Lyle Ford
Poster #: 229

The Thomson Jumping Ring apparatus is widely used in physics classes to demonstrate magnetic induction effects. Although many aspects of this apparatus have been studied theoretically, little research has been done to understand the effects magnetically induced eddy currents in the iron core have on the performance of this device. To observe the impact of eddy currents, a solenoid was designed to accommodate ten interchangeable iron cores of similar mass. Nine of the cores were constructed from C1018 steel rods with diameters from 1/16-inch to 9/16-inch in 1/16-inch increments. The tenth core was a single 1-inch diameter C1018 steel rod. The hypothesis was that as the core rod diameter was increased, the resulting jump height of the ring would decrease because of the larger area available to form eddy currents in each rod. The jump height was found to decrease linearly with rod diameter, supporting the proposition that larger eddy currents develop in the larger diameter rods.

Simulating Crystal Growth with Contaminant Diffusion
Colleen Olson
Faculty Mentor/Collaborator: Paul Thomas
Poster #: 233

Radiometric dating is one of the most popular methods of exploring the history of Earth, but in environments where radioactive isotopes are not reliable, other methods must be implemented. One approach is to analyze crystals and their contaminant concentrations to reveal information about the state of the environment at different times in the crystal’s lifespan. Crystals grown in natural environments have contaminant concentration profiles that display time-dependent relationships. In this analysis, chemical contaminants such as lithium hydroxide and aluminum hydroxide are treated as a fluid within the crystal subject to diffusion. This can be modeled using a partial differential equation analogous to the heat equation, in which diffusion occurs at different rates in distinct directions. The differential equation modeling diffusion is solved by the numerical method of explicit finite differences, requiring the Courant condition to be below a specified level to assure a stable and accurate solution. This limits the size of the numerical time step for a given spatial step. A comparison of the results of this simulation to natural diffusion profiles are used to determine time scales of processes in the Earth.

Searching for Rotationally-Modulated Variability in the X-Ray Output of the Hot Star Zeta Puppis in Chandra Satellite Data
Jacob Richardson
Faculty Mentor/Collaborator: Nathan Miller
Poster #: 228

Hot stars such as Zeta Puppis are strong X-ray emitters but the precise mechanism causing their X-ray emission is unclear. In this project we examine the temporal behavior of the X-ray emission from this star. If the X-rays are formed far out in the stellar wind, we would expect the X-ray output to fluctuate randomly. If the X-rays are formed close to the stellar surface (e.g. in magnetic structures), we would expect X-rays to vary clock-like on a rotational time scale. Recent work has identified a 1.78-day rotational period for this star, so we folded the data on this time scale to try to identify rotationally-modulated variation. In addition to examining the overall
X-ray photon count rate, we evenly divided the data into short-wavelength (“Hard”) X-ray counts (from high-temperature gas) and long-wavelength (“soft”) X-ray counts (from low-temperature gas). This allowed us to construct the “hardness ratio” by calculating the difference between the hard and soft count rates and dividing by the total count rate. When examining the folded total, hard, soft, and hardness ratio data we found no case where there was unambiguous evidence for variation on the rotational time scale.

**Organic Light-Emitting Diode Fabrication and Exploration of the Organic Magnetoresistance Effect**

*Casey Sroda*

Faculty Mentor/Collaborator: *James Rybicki*

Poster #: 232

This project is a continuation of previous work on fabrication of organic light emitting diodes (OLEDs) with the intent on refining the process and improving efficiency and longevity of the devices for future experimentation. OLEDs are semiconductor devices that have become the recent focus in the commercial electronics industry for their ideal properties, such as low-power consumption, flexibility, and higher quality, self-produced illumination. In the past, OLEDs have been fabricated at the University of Iowa; however, transitioning to on-site fabrication is preferred for logistical and experimental reasons. Once the fabrication process yields satisfactory results, some unique fundamental physics questions can be further investigated. Two big questions are the role an electron’s spin plays in the operation of organic electronics and how devices are affected in externally-applied magnetic fields. This includes the organic magnetoresistance effect (OMAR), the tendency for a material to change its electrical resistance in a magnetic field, and magnetic electroluminescence (MEL), a field’s effect on light output. The goal is to explore OMAR and MEL in detail upon the finalization of a fabrication process for OLEDs at UW-Eau Claire facilities.

**Acquisition and Analysis of the Light Curve of Binary Star System BX Tri**

*Janessa Weise*

Faculty Mentor/Collaborator: *George Stecher*

Poster #: 230

The light curves of binary star systems can be used to reveal important physical information about the component stars. Among the simplest things we can learn from light curves are period and type of binary system. We have obtained and analyzed a light curve of the contact binary star system BX Tri. We chose this system because of its very short period, which is below a theorized limit for contact binary systems, and also to help us determine the sensitivity of our observing system. We obtained a series of 90 second exposures over the course of two nights, and then analyzed them with the program AstroImageJ. Our observations are consistent with a previously reported period of 0.1926 days and the light curve is that of a contact binary. In addition to the information learned about this star system, we have also obtained important data establishing the sensitivity of our observing system.
Social Sciences

Blugold Beginnings and Management & Marketing

Comparative Analysis of Black Owned Businesses in the United States and England
Zachary Zilm, Leeshaun Evans, Lewis Balom, Collis McCloud, Gary Butcher
Faculty Mentor/Collaborator: Jodi Thesing-Ritter, Nancy Hanson-Rasmussen
Poster #: 118

Of the forty million businesses in the world, only 2.5 million of those businesses are Black owned. To understand the barriers and opportunities for business ownership for Black entrepreneurs, researchers conducted a comparative analysis of six Black owned businesses in London, England and six similar businesses in Milwaukee, Wisconsin. Through face to face interviews, researchers asked business owners twenty questions about the process of beginning, financing, and sustaining a business. Business owners shared their most significant challenges and opportunities. Interview recordings were transcribed and coded to compare and contrast the results we received from each interview. The transcribed interviews provided a greater understanding of the issues and opportunities of owning a black business in two different countries. Results were analyzed for similarities and differences between the two major cities in two different countries. Data gleaned from this study will inform African-Americans, seeking to start a business, about the experiences of established Black business owners in developing their respective businesses.

Communication and Journalism

The Effects of Various Persuasive Factors on an Individual's Intention to Change an Environmentally Harmful Behavior
Michelle Brassel, Calli McCarver, Jacob Toffler, Paul Willett, Leah Bauer
Faculty Mentor/Collaborator: Kristine Knutson, Martha Fay
Poster #: 132

Although it has been widely promoted, climate change has not garnered the same individual attention as have other global social issues (Parant, Pascual, Jugel, Kerroume, Felonneau, & Guéguen, 2017). Nonetheless, many scientists believe that the environment is headed towards devastation and that climate change is a major public policy issue (Spence & Pidgeon, 2010). Research also stresses that climate change communication is often and too abundantly about global-level change (i.e. changing technology to reduce gas emissions), ignoring the importance that individual-level change can have (Spence & Pidgeon, 2010). However, recent research has shown that through personal diet choices, people can actively work to combat the damaging effects of climate change (Hedenus, Wirsenius, & Johansson, 2014). Using Protection Motivation Theory (PMT), this research will analyze how the framing of a message, prior knowledge, and self efficacy can influence intention to change one specific factor impacting
climate change (i.e. red meat consumption). The results of this study will align to fill the gap in research on individual-level factors impacting consumer intention to change potentially harmful behaviors.

**Campus Safety and Online Resource Accessibility: Active Shooting Threats**  
Madeline Forrest, Janel Riegleman  
Faculty Mentor/Collaborator: Mary Worley  
Poster #: 81

The unfortunate reality of active shootings on college campuses has increased campus safety communication and the types of resources provided for students, faculty and staff. The current study uses content analysis methodology to examine online resources from 294 colleges and universities across the United States. Results from this study highlight ease of resource accessibility as well as the types of content and sources made available: videos, written documents, emergency notifications, and in-person/online training. Results from this study can be used to better understand how colleges and universities communicate about active shooting preparedness and whether or not resources are easily accessible to students, faculty, and staff.

**Analysis of Message Framing Regarding Active Shooter Training**  
Hannah Kabelitz, Hannah Moen, Jenna Matthias  
Faculty Mentor/Collaborator: Martha Fay  
Poster #: 108

Since 1996, there have been 162 mass shootings that resulted in four or more deaths in the United States alone (Berkowitz, Lu, Acantara, 2019). One result has been an increase in active shooter training programs utilizing an informational approach and a fear-based strategy for students and faculty members in schools (Johnson, 2017). Previous studies have concluded that students who watched an active shooter training video versus an informational video said they felt more afraid that an active shooting would occur on campus, while also feeling more prepared to respond to a shooting incident (Peterson, Sackrison, & Polland, 2015). With the knowledge that both fear-based messaging and informational messaging are effective, we are looking to specifically study UW-Eau Claire college students and their reaction to fear-based versus information-based active shooter training advertisements. Students will participate in a fifteen-question online survey via non-probability sampling, during which they will look at two poster prototypes, one using the information approach and one using the fear tactic. We will then analyze the students’ responses and determine which tactic makes them more likely to commit to the training. This study will provide a better understanding of message framing with regard to active shooter training.

**Real Eau-topias**  
Clara Neupert  
Faculty Mentor/Collaborator: Ellen Mahaffy  
Poster #: 105

Real Eau-topias contextualizes students’ experiences at UW-Eau Claire and what the values of equity, diversity, and inclusivity (EDI) mean to them. The research is important in that it can help us understand how the university can more fully live up to its values. Each student in the research group undertook a different facet of EDI. This facet of the project contextualizes queer experiences at UW-Eau Claire. The 2015 UW-Eau Claire Climate Survey found 71.4 percent of
trans* and nonbinary students considered leaving campus. We sought to find what the ideal campus looks like for these students. Qualitative research involved conducting three to four focus groups of two to five people. Participants completed two questionnaires, one measuring their demographics and the other a post-discussion evaluation. For EDI goals to be met, the campus must continue to work to improve the experiences of minority populations by actively combating white supremacy and the heteropatriarchy, providing resources, and ensuring safe, inclusive learning environments. This project is a continuous work, as researchers hope to hold more focus groups in the coming semesters.

**Analyzing How Messages from Influencers Affect Consumer Brand Attitudes and Purchase Intentions**

Megan Roth, Alyssa Addleman, Allison Hassemer, Amber Karn, Jordan Stelzer

Faculty Mentor/Collaborator: Martha Fay

Poster #: 131

Leveraging the new age of social media, many consumer brands have ramped up the use of celebrity influencers to enhance brand awareness and increase sales (Thomas & Fowler, 2015). Research has shown that celebrities increase awareness of a company’s advertising and create positive feelings toward brands (Schlecht, 2003). Conversely, a consumer can also have negative attitudes toward a message or source if they are conveyed improperly (Ogunsiji, 2012). For example, research has shown that consumers’ attitudes toward endorsers become negative after a brand transgression occurs; however, studies suggest that celebrities may be able to overcome negative effects that result from their relationship with the brand by dispatching appropriate responses (Thomas & Fowler, 2016). However, whether controversial actions by celebrities impact consumer perceptions of the brand they represent has not been studied. Utilizing the Social Identity Theory, this study explores potential associations between consumer attitudes toward a brand and their purchase intentions, and controversial messages produced by a liked celebrity (Lam, Ahearne, Hu, & Schillewaert, 2010). Results may help brand managers in deciding among celebrities to represent their brand and in mitigating potential negative effects of their liked celebrities’ transgressions.

**Covering Singapore: International Media Framing of the 2018 North Korea-United States Summit**

Rachel Schmidt

Faculty Mentor/Collaborator: Won Jang

Poster #: 80

The Singapore summit in June 2018 between United States and North Korea focused on denuclearization and marked the first face to face meeting between a sitting US president and a leader of North Korea. This comparative study investigates news coverage of a nuclear deal with North Korea from the media in the United States, Europe, China, Russia, South Korea, and North Korea. News coverage is influential on how the public interprets a situation, therefore style and focus of coverage is important. The main research question focuses on the extent coverage of the peace talks is interconnected with the relationship of the media and national interests. To determine whether this relationship between source of media coverage and national interests exists, a quantitative content analysis was performed and combined with a qualitative assessment of the overall framing and images in different news sources. This study looks at news frames used around the world, how the media portrays the countries involved, and what sources they
choose to include and cite in the article. The findings of this study support the idea that new agencies adopted frames for the issue that were consistent with the dominant ideology and interests of their respective nations.

**What Do You See?: Examining the Association between Perceptions of Minority Students in Diversity Messaging and Organizational Identification**  
Kimberly Theisen, Gabrielle Knauer, Maria Theisen, Loralei Zimbauer, Erica Oawster  
Faculty Mentor/Collaborator: Martha Fay  
Poster #: 109

Recently, universities have implemented diversity initiatives on their campuses (Martinez-Acosta & Favero, 2018). One recruitment strategy is prominently picturing minorities throughout university websites and recruitment materials. However, this portrayal may not accurately represent the population. In a content analysis of 10,000 photographs from 165 institutions, Pippert, Essenburg, and Matchett (2013) found that photographic portrayals and actual percentages were significantly different for each race studied. Based on the Similarity-Attraction Theory, individuals are attracted to those similar to themselves, resulting in higher social integration and more communication (Rupert, Jehn, Engen, & Reuver, 2009), suggesting that the over-portrayal of minority populations may be intentional. While this may initially attract minority students to a university, little is known about how minority or majority students perceive the discrepancy between representation and actuality, or whether this difference is even salient. Research on organizational identification (OI) suggests that diversity represents a unique difference that strengthens students’ OI with the university, but whether OI plays a role in intensifying or mitigating the effects of misrepresentation is unknown. This study examines UW-Eau Claire students’ perceptions on diversity messaging and the possible association between OI and message accuracy. Results may help universities improve message design for diversity recruitment and retention.

**Social Media Engagement and Domestic Intercultural Immersion Trips: An Examination of Social Media Platforms as Avenues for Assessment of Student Learning in Higher Education**  
Ta’Leah Van Sistine  
Faculty Mentors/Collaborators: Nicole Schultz, Ganga Vadhavkar  
Poster #: 104

This study analyzed the extent to which social media engagement enhances domestic intercultural immersion trip experiences. Dumford and Miller (2018) examined students’ use of social media as an assessment of student learning outcomes and found that it is an efficient and convenient method for assessing such. While there is research in the literature related to the advantages of using social media as an assessment of student learning outcomes, there is a paucity of studies pertaining to social media as an assessment tool for immersion programs. The purpose of this study is to contribute to existing literature with a focus on social media usage to assess students who participated in the Something New Alternative Spring Break (SNASB) immersion experience at the University of Wisconsin-Eau Claire. Data was collected via a closed (by invitation only) Facebook group of students registered for the SNASB trip. Students were instructed to create posts in response to eight prompts related to the university’s liberal education responsibility outcome. Data was analyzed via content analysis with thematic analysis as a
secondary form of examining data. Results reveal that students engaged across a variety of social media platforms, utilizing multiple communication tools in sharing their immersion experiences.

**Leadership, Sexism and Equality in the Context of Collegiate Forensics**  
**Caleb Webb**  
Faculty Mentor/Collaborator: Martha Fay, Kristine Knutson, Karen Morris  
Poster #: 130

In the intercollegiate forensics community, gender inequality has become a topic of interest in the past few years with conversations ranging from why women do not participate in Limited Preparation events and the expectations for dress for women (Nadler, 2014). However, research to date has focused on forensics students and not the people who manage the forensics programs. Perhaps because of their underrepresentation within Forensics, women, in particular, have been overlooked (Greenstreet, Joeckel, Martin & Peircy, 1998). Although communication researchers have challenged claims that women communicate in less powerful ways, the gender norm of women as more nurturing than men has contributed to a continuing view of leadership as a masculine quality (Rogus-Pulia, Humbert, Kolehmainen & Carnes, 2018). This study aims to understand forensics students’ perceptions of female and male directors of forensics, using a survey to collect data from two Midwest programs, one directed by two women, another directed by two men. Results will aid in understanding potential differences in ratings of leadership and coaching effectiveness in the forensics community.

**University Students and Balance: Investigating Social Support, Self-Efficacy, and Family Communication Patterns**  
**Ashley Wiswell, Shelby Trusty, Kelly Anthony**  
Faculty Mentor/Collaborator: Kristine Knutson, Martha Fay  
Poster #: 82

Current studies indicate that university students in the United States are experiencing mental health concerns, including stress, at rising rates (James, 2017). Students are expected to succeed in every area of their lives, whether it be attending class 12-18 hours a week, completing homework 24-36 hours per week, working a job, worrying about finances, enjoying college life by attending all social events, making time to eat healthy and exercise, or getting the recommended 7-9 hours of sleep per night (Cederwall, 2017). The multiple demands placed on students are experienced as stress and can lead to feelings of imbalance (Smeltzer, Cantrell, Sharts-Hopko, Heverly, Jenkinson, Nthenge, 2016). While the associations between stress and social support (Cohen, Hoberman, 1983), self-efficacy (Wilcox, Felsten, 1992), and family communication (Schrodt, Ohrt, 2007) have been researched in the workplace, college-level student stress, and the factors that may mitigate it, have largely been ignored. This study surveys university students to look for possible relationships between these variables. Results can be used to help future university students alleviate stress and achieve balance.
**Gender and Communication: Perceptions of Diffuse Status Characteristics in Workplace Email**
Cole White, Leslie Peterson, Lucy Grogan-Ripp, Gwendolyn Smith, Caroline Walz
Faculty Mentor/Collaborator: Martha Fay

Previous research has shown that perceptions of gender act as a diffuse status characteristic which impacts how interlocutors perceive the competence, ability, and value of others (Carli, 1990). However, this research was conducted prior to the proliferation of electronic communication, and focused primarily on verbal communication; this is important because visual cues contribute to perceptions of communication as gendered, and stereotypically feminine traits are evaluated less favorably than masculine traits (Carli, 1990). One communication style typically associated with femininity is tentative language; conversely, dominant language is usually associated with masculinity (Carli, 1990). These communication styles manifest not only in face-to-face interaction, but also in electronic and written interaction. Although Ma and Atwell Seate (2017) found that both men and women use tentative language via workplace email when the topic is perceived to be gender salient, little research has been done to show how tentative and dominant communication are associated with perceptions of diffuse status characteristics. Using social identity theory (Tajfel, 1979), this study evaluates use of language strategies in workplace emails for their possible association with interlocutor perceptions of diffuse status characteristics. Results may be used to help employees understand how their use of language impacts others’ perceptions of them.

**Hmong Students in Higher Education: Analyzing Perceptions of Success, Family Communication Patterns, and Cultural Identity**
Thomas Xiong, Mai Zer Vang
Faculty Mentor/Collaborator: Martha Fay

Making the transition into college, students must learn how to navigate the challenges of higher education. Hmong students may experience additional challenges common to those shared by students of lower socioeconomic status, belonging to ethnic minorities and/or first generation college students (Xiong & Lam, 2013). Although efficacy, or the belief that one can accomplish a goal, has generally been associated with success, the relationship between efficacy and student outcomes has received less attention (Wright, Jenkins-Guarnieri & Murdock, 2013). Although it seems plausible that certain cultural and communication patterns in the family impact Hmong students’ beliefs that they can overcome any obstacles to higher education, this hasn’t been studied. Little attention has been given as well to how these factors—family communication patterns, cultural identity and efficacy—may be associated, nor have Hmong students been asked to participate in a definition of what success on the university level means to them. Undergraduate Hmong students will be surveyed across a variety of Midwestern universities to determine how they define success in higher education and to identify what factors have contributed or detracted from their experiences in higher education. The Revised Family Communication Patterns Scale (Fitzpatrick & Ritchie) and Cortes, Rogler and Malgaday Bicultural Scale (CRM-BS) will be used to analyze the data. Results will help isolate ways Hmong students can succeed at the university level.
"Working" Revisited: Narratives of Work Meaning and Meaningfulness Across Generations
Emma Booth, Miles McQuay, Shaun Petrovich
Faculty Mentor/Collaborator: Kristine Knutson
Poster #: 103

"Working" (Terkel, 1974) is a compilation of oral history interviews focused on the meaning individuals ascribe to their work and the meaningfulness individuals derive from their work. Building off Terkel’s (1974) narratives, this project aims to articulate the various meanings of work and experiences of meaningfulness in work for individuals from various generations. Students in HNRS 127 will conduct a series of oral history interviews with members of the Silent Generation, the Baby Boomer generation, Generation X, the Millennial generation, and iGen. Interview transcripts will be analyzed using thematic analysis techniques. The results of this investigation will illuminate the various ways that individuals of different ages think about and interact with work. These findings could help employers evaluate if their practices align with the expectations of the individuals currently working in their organizations.

Criminal Justice Program

A systematic review of the impact of organizational justice on workplace attitudes of police officers
Courtney Wiemer
Faculty Mentor/Collaborator: Ming-Li Hsieh
Poster #: 239

Organizational justice theory noted by Greenberg (1987) has indicated that an employee’s perception of justice would affect their behavior in the workplace. The current study aims to further explore what internal organizational justice would impact law enforcements’ performance within police organizations worldwide through a systematic review on peer-reviewed articles. The result indicates that distributive justice and procedural justice play a positive role in shaping law enforcement officers’ job commitment and job satisfaction. In terms of better police performance, policy makers should put emphasis on police legitimacy improvement by promoting internal organizational justice and recalibrating communication channels between officers and supervisors.

Economics

Forecasting Future U.S. Housing Markets
Andrew Fink, Wyatt Pajtash
Faculty Mentor/Collaborator: Yan Li
Poster #: 206

Forecasting is vital and has far-reaching impact on business performance and economic development. Housing price is a crucial indicator because it reflects the health of an economy. By using a linear regression model with autoregressive-moving-average components along with
quarterly census data dating back to 1975, we carry out forecasting on median housing prices in various regions across the United States. Our model generates a quality forecast and allows us to predict how U.S. housing prices may vary over the next few years.

Comparing the Women, Infants and Children Program (WIC) to the Supplemental Nutrition and Assistance Program (SNAP): A Case Study of Benefit Redemption Rates in Wisconsin
Jared Fogarty, Emma Halverson, Rivin Perinchery
Faculty Mentor/Collaborator: Eric Jamelske

The Women, Infants and Children Program (WIC) was established to increase access to healthy foods for low income women with children through benefits provided for targeted healthy foods. The WIC food package was revised to include fruits and vegetables (FV) in 2009 to better align with dietary guidelines. The Supplemental Nutrition Assistance Program (SNAP) is the largest support program designed to increase access to food for low-income households. In contrast to WIC, SNAP benefits are not restricted to targeted healthy foods. This study reports on Wisconsin data from 2016 and 2017 for the rates at which WIC food benefits are utilized by participating households across each different targeted food category. Specific attention is paid to the rate of usage for FV benefits compared to other food items. Additional comparisons are made for the usage of SNAP benefits by participating households. Preliminary results suggest that WIC benefits are less fully utilized than SNAP benefits. That said, among WIC food benefits, FV benefits are used more than other some other food items. We are just beginning this work and thus we cannot give more specific details at this time. This research is relevant from a policy perspective as it helps us understand the impacts of a WIC program change to increase access to FV for low income families. It is also relevant to the policy discussion regarding restricting SNAP benefits to targeted healthy foods.

Increasing Healthy Food Access for Supplemental Nutrition Assistance Program (SNAP) Households: A Case Study of Participation and Benefits from a Wisconsin Farmers Market – Market Match Program
Nathan Gilger, Shelly Stephani, Nevada Sweitzer
Faculty Mentor/Collaborator: Eric Jamelske

Although fruit and vegetable (FV) consumption lowers risks for many chronic diseases, children/adults tend under-consume FV. Research suggests that Supplemental Nutrition Assistance Program (SNAP) households purchase fewer healthy foods and more unhealthy foods compared to non-SNAP households. Thus, increasing purchases of healthy foods, especially FV, among SNAP households has become an important focus among practitioners, policymakers and researchers. This study reports on a program that doubles SNAP benefits used at the farmers market up to $10/week. Using data collected from the farmers market we characterize program usage from 2014-18. We also report on survey results highlighting benefits of the program reported by SNAP households. Our results show that the market match program has significantly increased the number of SNAP shoppers using the farmers market and has also increased the frequency of trips to the farmers market. Survey responses show that significant percentages of SNAP farmers market shoppers report purchasing/eating more FV and say that it helps increase their budget. These results suggest that SNAP families are gaining access to healthier food.
Forecasting U.S. Retail Sales
Madeleine Mayer
Faculty Mentor/Collaborator: Yan Li
Poster #: 205

Forecasting is vital and has far-reaching impact on business performance and economic development. Retail sales are a crucial economic indicator since the United States is a consumer-driven economy. By using a linear regression model with autoregressive-moving-average components, we conducted forecasting on U.S. retail sales obtained from the U.S. Census Bureau. Our model generates a quality forecast and allows us to predict what may happen with retail sales over the next few years in the United States.

The Sources of Happiness: A Comparative Study between China and the U.S.
Madeleine Mayer
Faculty Mentor/Collaborator: Yan Li
Poster #: 208

In this project, we investigated the issue of happiness in China and the United States. By using data from the World Value Survey (WVS) and a linear regression model, we empirically tested how various factors related to the overall happiness in China and the United States, respectively. The lack of such a comparative study has indicated the importance and relevance of our research. Our results will add new knowledge to the happiness research in the context of developing and developed countries and contribute to the understanding of economic well-being.

Characterizing Supplemental Nutrition Assistance Program (SNAP) Purchases: A Case Study Comparing Shopping Behaviors of SNAP and Non-SNAP Households at One Wisconsin Grocery Retailer
Benjamin Miller, Kelly Schneider, Levi Soborowicz
Faculty Mentor/Collaborator: Eric Jamelske
Poster #: 212

Despite research significant health benefits from consuming fruits and vegetables (FV), intake remains below recommended levels for many children and adults in the United States. Research also suggests that the Supplemental Nutrition Assistance Program (SNAP) may contribute to obesity among low income households. A January 2017 New York Times headline claimed food stamp households purchased a lot of soda based on a research study. Thus, increasing FV consumption and decreasing sweetened beverage consumption have become an important focus among practitioners, policymakers and researchers regarding SNAP households. This study reports on data for SNAP and non-SNAP food purchases at one Wisconsin grocery retailer in 2017. We compare one month of daily transactions from SNAP purchases to one week of daily transactions from non-SNAP purchases. Our SNAP data consists of 39,740 spreadsheet rows representing nearly 3,000 shopping trips while our Non-SNAP data consists of 380,708 spreadsheet rows representing nearly 30,000 shopping trips. For FV and sweetened beverages,
our results are comparable to the research behind the NY times article. We find SNAP households spend less on fruits and vegetables (12.5% < 17.4%) and more on sweetened beverages (5.4% > 3.4%) compared to non-SNAP Households. We are in the process of adding a detailed account of FV juices to our analysis to report in this presentation. This research has policy relevance as it helps build our understanding of what foods are being purchased by SNAP households before considering changes to the SNAP program.

Multiple Job Characteristics and Average Hourly Earnings
Levi Sobotowicz
Faculty Mentor/Collaborator: David Schaffer
Poster #: 211

Jobs with certain characteristics pay higher wages, other jobs with different characteristics pay less. Why? We know some of the answers: required higher levels of education and job experience are associated with higher paying jobs, as are higher levels of physical risk. Then there are the other characteristics of each job. We are sure that some of them influence wage rates, but we are not sure about which ones matter the most and have the largest impact on wage rates. In this study, we begin to sort this out by combining data sets from the 2015 revision of the Occupational Information Network (O*NET) and the 2003 through 2015 March Current Population Surveys (CPS) to analyze this. This combined data set includes extensive information on workers' wages and personal characteristics along with 407 characteristics of the jobs in their occupations. We use OLS regressions along with factor analysis and a variety of other empirical methods to identify individual job characteristics, or groups of related job characteristics, that have both a statistically significant and an economically significant impact on wage rates.

The Impact of Water Clarity on Home Prices in Vilas and Oneida Counties, Wisconsin
Eric Winkler, Shangqian Wu, Sisi Zhou, Megan Roehl
Faculty Mentor/Collaborator: Thomas Kemp
Poster #: 177

This study estimates the residential property value gains associated with improvements in water clarity on 60 Northern Wisconsin lakes. Using a two-stage hedonic model applied to Wisconsin DNR water clarity data and data associated with 271 residential home sales obtained from Zillow.com and County property records. We conclude that a one (1) meter improvement in water clarity would produce a $8,090.87 – $32,171.12 improvement in the market price of an average residential property on a lake within the study area. We also conclude that in addition to water clarity the main non-housing attributes that drive property value in the region are the local tax rate and the distance to a public airport.
Climate change is one of the most important, challenging and costly issues of our time. Because of the global causes/consequences of climate change, international cooperation is essential in implementing and financing successful mitigation policy action. The willingness of citizens across nations to incur the costs of reducing GHG is an important component of achieving meaningful policy success. The United States and China are of particular interest in international climate negotiations because of their significant greenhouse gas emissions and dominant economies. Surveys were conducted in China and the U.S. in 2015 (N=7,556) and 2017 (N=7,415) to investigate their citizens’ willingness-to-pay (WTP) for climate change policy action to reduce GHG emissions. In this study we employ contingent valuation analysis to estimate WTP. Our results show a significantly higher mean WTP among Chinese respondents compared to Americans in purchasing power parity terms in both 2015 and 2017. Our results also show a greater mean WTP in 2017 compared to 2015 in both countries. Regression analysis reveals similar results for 2015 and 2017; variables describing climate change acceptance, knowledge, and concern correlate with WTP for climate action in both countries. Political affiliation also influences WTP among Americans in both years. Advancing upon last year’s presentation on this topic, we are undertaking a more detailed examination into the determining factors of the increased WTP from 2015 to 2017, in both countries.

Insights into Public Views on Climate Change in China and the United States: Content Analysis of Open-Ended Survey Question Responses

Andrew Moran, Michelle Jia Wei Beh, Adara Coker, Carly Morris
Faculty Mentors/Collaborators: Eric Jamelske, James Boulter Poster #: 209

As the world’s two largest economies and greenhouse gas polluters, China and the United States are key players in international climate change negotiations. However, public views of climate change in these nations are diverse and complex and may often be uninformed or misinformed. To better understand climate change views in the US and China, we use survey data collected in 2015 (N=7,556) and 2017 (N=7,415) to analyze responses to the question “what comes to mind when you hear the words ‘climate change’?” We manually coded open-ended responses to examine respondents’ perceptions related to the consequences of climate change, and actions or solutions to address it. We also probed who they assigned responsibility for climate change to, and what groups they projected negativity toward. Quantitative correlations will be drawn between coded open-ended responses and other variables from our survey including calculated climate change acceptance/knowledge/concern scores and support for international climate treaties. Preliminary results indicate that Chinese respondents very rarely mentioned actions, solutions or assignment of responsibility, focusing mostly on consequences of climate change. Americans mentioned politics much more frequently than Chinese and projected negativity...
toward opposing groups. But they also mentioned actions or solutions to mitigate climate change.

**Chinese and American Support for an International Climate Treaty Across Countries and Years: Analysis by Calculated Knowledge/Acceptance/Concern Scores**

Trung Nguyen, Connor Adams, Clayton Cavanaugh, Elise Chapin

Faculty Mentors/Collaborators: Eric Jamelske, James Boulter

Poster #: 210

The importance of the roles of China and the United States cannot be overstated regarding the development/implementation of international climate change mitigation policies. Surveys were conducted in China and the U.S. in 2015 (N=7,556) and 2017 (N=7,415) to investigate people’s support for an international climate treaty. A climate change acceptance/knowledge/concern score (from -10 to 10) was calculated for respondents in both years using a set of eight questions from the survey. In both 2015 and 2017, scores for Chinese were on average higher than Americans, while the American scores were more variable. Largely due to an increase in concern among U.S. respondents in 2017, the difference in American and Chinese mean scores decreased compared to 2015. Two additional questions were used to explore support for an international climate treaty. One question was unconditional, while the other was conditional on non-participation of the other country. Responses from both nations indicate a significant withdraw of support for the conditional question. However, Chinese respondents showed significantly greater support in both years compared to Americans. Like the climate change score, US unconditional and conditional treaty support increased in 2017 with little change in China, decreasing the gap between American and Chinese respondents.

**Education Studies**

**Sustaining Hmong American Identity Through Hip-hop**

Lue Khang

Faculty Mentor/Collaborator: Anjela Nga-Wing Wong

Poster #: 63

My research examines the experiences of Hmong American hip-hop artists in the Wisconsin area. Although there has been previous research done on Hmong hip-hop artists (Vue, 2012), my research amplifies the younger generation of Hmong hip-hop artists’ lived experiences and show how hip-hop has played a role in developing and/or sustaining Hmong ethnic identity in Hmong youth. Prior research on hip-hop focused in the form of rap, thus my research adds to the literature by examining hip-hop in the form of dance and rap. The guiding question for this research is: What role and impact does hip-hop in the form of rap and dance play in validating, sustaining, and supporting young Hmong ethnic identity? Qualitative case study will be utilized, as it would grant me the best opportunity to understand and connect with my participants.
Since the mid-1930s, highway maps distributed by the State of Minnesota have become more detailed and comprehensive while integrating themes reflecting aspects of the state’s diverse economic activities. This study identifies the themes emphasized in Minnesota highway maps, how they have changed, and how technological advancements have influenced the cartographic elements employed in their design. A manifest content analysis of imagery and text included in ten highway maps produced by the State of Minnesota between the years of 1936 and 2009 reveals several thematic paradigms focused on: “Up North” tourism during the 1930s, patriotism and history in the 1940s and 1950s, wilderness-related tourism during the 1960s and into 1970s, when new interstate and highway systems were emphasized, and a shift in emphasis towards the state’s urban cultural amenities from the late 1980s to the present. Recent scholarship in feminist cartography informed a critical latent analysis of the sampled maps highlighted an equitable inclusion of women but revealed problematic representations of Indigenous peoples. Considering the current print/digital navigation crossroads in society, we suggest that paper highway maps still meet the needs of their users and have the potential to be more inclusive in their design and thematic content.

Based on eyewitness and historical reports, the decimated remains of an old Jewish bathhouse and mikveh, or ritual bath, are believed to be buried in the backyard of a home in Pandėlys (Ponedel), Lithuania. Using ground penetrating radar (GPR), we examined this site during the summer of 2018 in order to determine the validity of these claims, map out any potential structures, and determine whether any further archaeological investigations are justified. During World War II, the Nazis and non-Jewish Lithuanian militiamen murdered about 90-95 percent of Lithuanian Jews in a span of about three years. In addition, thousands of Jewish cultural structures were destroyed all around the country. Research such as this allows for Lithuanian Jews to reclaim some of their history and locate potential locations for memorialization. For the research, we collected datasets using a pulseEKKO GPR system with 500 MHz antennae. Fifty-three parallel lines were shot at 0.25 m spacing. The collected 3D datasets were then analyzed using pulseEKKO, GFP Edit, and EKKO Project software. Partial subsurface anomalies are visible within the natural stratigraphy with further exploration suggested before excavation is undertaken.
Gone but Not Forgotten: The Jewish History of Šeduva, Lithuania
Chloe Kofman, Madeline Euerstenberg, Samuel Schneider, Joseph Beck
Faculty Mentor/Collaborator: Harry Jol

People know that the Holocaust was devastating to Europe’s Jewish population, but the true scope of the Holocaust is not always fully comprehended. Larger countries like Germany and Poland were greatly impacted, but so were smaller, lesser-known ones. Case in point: Lithuania. This project is branching off ongoing joint research efforts between the United States and Lithuania. The research is aiming to restore Jewish artifacts and shed new light on the effects of the Holocaust in Lithuania; this project focuses on Šeduva, a small northern town that once had a thriving Jewish population. Four UW-Eau Claire students and a professor have traveled to Šeduva to map underground features and anomalies that may indicate remnants of Jewish life. We collaborated with Lithuanian professionals as well in order to ensure cultural competency and foster connections between our two nations. The research has received both national and international news coverage in recent years and has produced groundbreaking insights into what Jewish life may have been like during the World War II era. This project, funded by the International Fellows Program, will speak in depth about some of these findings.

The Geography of Mental Health: Wisconsin’s Uneven Landscape and Why It Matters for the UW-Eau Claire Community
Molly Larson, John Francis
Faculty Mentor/Collaborator: Paul Kaldjian

Across the state of Wisconsin, there are huge disparities in disease and mortality associated with mental health. What accounts for this disparity? How does this relate to the overall state of mental health in Wisconsin? Furthermore, why should this matter to students at UW-Eau Claire and other universities across the state? In search of answers, we researched different factors that could be contributing to this vast difference: access to health care, the location and number of treatment centers in the state, the number of licensed therapists in each county, and the amount of funding each Wisconsin university receives from the state government for mental health care. Overall, we discovered a huge disparity in mental health resources between rural and urban counties. Counties with fewer mental health resources in general had more alcohol-related deaths and suicides in 2017. Mental health, particularly anxiety and depression, has become an epidemic—luckily, it’s a treatable one. With more research like ours and funding to improve services, reformed mental health across the state of Wisconsin and the country is attainable.

College Readiness of Secondary Education Institutions in Northwest Wisconsin and First Year Retention at the University of Wisconsin-Eau Claire
Michael Lewis
Faculty Mentor/Collaborator: Ryan Weichelt

In 2011, Act 10 was passed in the Wisconsin State Legislature, making sweeping changes to the rights of public employees, including teachers. The impacts of Act 10 are still seen today. This research examines the relationships between Act 10’s impacts on public education and student success at the undergraduate level. Using several measurements of proficiency in the secondary education system in Northwest Wisconsin, this research aims to identify patterns between high
school achievement and first year success and retention at the University of Wisconsin-Eau Claire. Patterns are identified using mapping of variables and statistical analysis. The variables used include District On Track Post-Secondary Readiness Scores, District Accountability Scores and admissions data. The initial patterns show no direct relationships between variables. While these patterns are not statistically significant, it adds to the greater conversation on educational measurements and retention factors and offers a basis for future research.

Management & Marketing

Segmenting the News Consumption Marketplace
Megan Glaeser, Addison Borchert, Alexa Brooks
Faculty Mentor/Collaborator: Scott Swanson

The increase in the volume of information available online, together with the emergence of new tools and services that act as intermediaries and enable interactivity around the news, has changed people’s relationship with the news. This changing environment raises questions about the nature and amount of news consumed. Thus, understanding the prevailing processes of news consumption and media choices is of significance for news organizations and their marketing strategists, as well as policy makers. This study investigated: 1) attitudes towards the news media, 2) consumption patterns, 3) news media source preferences, and 4) online news participation behavior. An on-line questionnaire using Qualtrics was distributed through a variety of social media sites. Analysis was conducted utilizing appropriate statistical routines in SPSS. Findings provide insights regarding important relationships between the amount of news consumed and several of the news related constructs investigated.

Understanding Generation-Z News Consumption
Sam Panos, Joel Meier
Faculty Mentor/Collaborator: Scott Swanson

Generation Z is the first cohort to have Internet technology readily available at an early age and be exposed to an unprecedented amount of information in their upbringing. The development of technology has given mobility and immediacy to Generation Z's consumption habits. While social media is mainly used for developing and maintaining relationships with people with whom they are close in proximity, it is also used for keeping up with news. The growing number of available information channels and sources, as well as greater possibilities for interaction and co-creation among consumers of information, is fundamentally changing the consumption of news. Research on the interaction of a changing media ecology with generational adoption of news habits and the implications of this interaction for news engagement is needed. This study is the only one the researchers are aware of that segments the current generation-Z adult marketplace for news consumption. Respondents were contacted via social media with an embedded link to an on-line structured, self-completion questionnaire that utilized both behavioral and personality inventories. Research findings identify three generation-Z adult news consumption segments. The findings are useful for the development of appropriate marketing strategies based on the identified segments.
**Understanding Vicarious Embarrassment of Students in the College Classroom**

Sarah Peirchel, Haley Stark  
Faculty Mentor/Collaborator: Scott Swanson  
Poster #: 236

The purpose of this study was 1) to demonstrate the existence of vicarious embarrassment in a classroom environment; 2) to ascertain the consequences of vicarious embarrassment, including corresponding emotions; 3) to classify the situational variables that create vicarious embarrassment in a classroom context, and 4) identify behavioral consequences. Vicarious embarrassment is a negative emotion, which is experienced by an individual when others misbehave. To date, the relevance of vicarious embarrassment in physical service environments has not yet been analyzed in the context of the college classroom encounter. It is not known if observed classroom incidents can elicit feelings of vicarious embarrassment, and if so, to what degree negative consequences (e.g., negative evaluations of the class and/or the instructor) are caused by vicarious embarrassment. Utilizing an intercept approach, undergraduate students (n = 200) at an AACSB-accredited college of business of a mid-sized, 4-year public university located in the Midwest were interviewed. The study included both a qualitative and quantitative approach to build a comprehensive understanding of this phenomenon. Findings suggest that experiencing vicarious embarrassment in a classroom environment can significantly influence the emotions experienced during provision of the learning experience, which, in turn, impact student word-of-mouth and future course attendance behaviors.

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**Political Science**

**Judicial Scrutiny and Disability**

Nathan Altman  
Faculty Mentor/Collaborator: Eric Kasper  
Poster #: 140

The U.S. Constitution’s Equal Protection Clause has been an invaluable tool to usher in sweeping anti-discrimination protections for many of America’s most vulnerable minorities. Judges enforce the 14th Amendment’s Equal Protection Clause by applying a series of tests to the challenged discriminatory state action in question. These tests are classified through three different levels, named: strict scrutiny, intermediate scrutiny, and the rational basis review. Strict scrutiny and intermediate scrutiny has been used to strike down discriminatory statutes that target people based on race, gender, age, and sexual orientation. The remaining test, the rational basis test, is the test used when analyzing a statute that discriminates upon disability and most other personal characteristics. My research analyzes the landmark case that established this precedent, *City of Cleburne v. Cleburne Living Center, Inc* (1985), and argues that the Court’s rationale did not properly apply the precedent in *Frontiero v. Richardson* (1973), and therefore erred in its rationale that disability classifications need only meet the rational basis test.
**Our Online World: An Overview of Cyberbullying Issues from 2009-2019**  
Elli Becker  
Faculty Mentor/Collaborator: Justin Patchin  
Poster #: 240

From the creation of the world wide web, our society has quickly woven the internet into our everyday lives. While it provides countless resources, the internet has also become a tool for those who seek to put others down. "Cyberbullying" emerged as a real issue that has finally begun to be addressed in the past years. We studied many aspects of cyberbullying and the effects it has on individuals. As its prevalence grew, cyberbullying became illegal in many states. Seeking to truly find if the internet has "destroyed the minds of a generation" and if cyberbullying has gotten worse, we looked at the changes in apps, laws, and effects (depression and suicide rates) over the span of a decade. Our analysis shows that cyberbullying is an issue, but that it is no more prevalent than bullying itself, and the internet should not take the brunt of the blame. We aim to educate on cyberbullying with facts and provide an empirically backed explanation for the trends of the time.

**Continued Examination of Sexual Grooming by Clergy: An Analysis of One Wisconsin Archdiocese**  
Nathalie Burmeister, Sofia Earle  
Faculty Mentor/Collaborator: Jason Spraitz  
Poster #: 241

Several earlier studies have identified and provided support for a typology of sexual abuse grooming perpetrated by clergy offenders on minor victims. Sexual grooming encompasses a series of techniques that abusers use in order to gain the trust of their eventual victims with the goal of lowering inhibitions and normalizing the abuse. In this study, we conducted a retrospective content analysis of unsealed publicly available files of clergy from the Archdiocese of Milwaukee. Each priest whose file was available has been credibly accused of sexual abuse of minors. We read 42 priest files, a total of 4,228 pages of documentation, and identified all instances of grooming. Findings of our analysis suggest that priests from this archdiocese engaged in any of eight sexual grooming behaviors in order to build a relationship with their victims as well as the families of their victims as part of the abuse process. Findings support earlier research that has been conducted using samples of accused clerics from dioceses and other Catholic institutions throughout Minnesota and in Illinois.

**An Examination of the Relationship Between Child Maltreatment and Teenage Parenthood Using Official Data from a High-risk Sample**  
Megan Manthey  
Faculty Mentor/Collaborator: Kristen Benedini  
Poster #: 207

In recent decades, the rate of adolescent pregnancy has decreased in the United States. Despite this promising trend, the U.S. has one of highest rates of teenage pregnancy among developed countries. Non-white American teenagers are especially at risk for experiencing pregnancy. One focus of research on the etiology of teenage parenthood is the association between child maltreatment and teenage pregnancy. Results of this research have been contradictory, as some researchers found a link between various types of abuse and teenage parenthood, while others found that the two experiences are not related. The current study examines the relationship
between child maltreatment (sexual abuse, physical abuse, and both types of abuse) and teenage pregnancy using prospective longitudinal data from a racially diverse sample. Use of this data addresses issues of past studies that examined the maltreatment/teenage pregnancy relationship using cross-sectional data from clinical samples. Results from logistic regression analyses indicate that neither sexual abuse nor physical abuse was related to teenage pregnancy among sample females. Future studies examining the relationship between maltreatment and teenage pregnancy should utilize prospective, longitudinal data from diverse samples.

**Psychology**

*College Students’ Perceptions of Stigma Surrounding Depression and Anxiety*

Chris Acton, Jenna Baranowski, Paige Borreson

Faculty Mentor/Collaborator: Mary Beth Leibham

Poster #: 57

The number of students with disabilities enrolling in higher education is steadily increasing, although the retention rates of students with disabilities is lower than students without disabilities. One factor underlying a student's decision to leave college is campus culture, and for students with disabilities, their peers' and staff members' attitudes towards or beliefs about disabilities is an important aspect of campus culture. Since a significant proportion of UW-Eau Claire students who are registered with the Services for Students with Disabilities Office (SSD) are receiving services for psychological disorders, this study is interested in this type of disability. Specifically, the purpose of this study was twofold: 1) to explore the prevalence of Depression and Anxiety, and 2) to assess stigma surrounding Depression and Anxiety on the UW-Eau Claire campus. We conducted an online survey assessing UW-Eau Claire students’ self-reported experiences with Depression and Anxiety, in addition to their experiences with stigma surrounding Depression and Anxiety. We expect that many students who report having Depression and/or Anxiety are not currently registered with the SSD office. Further, we expect that those who report have Depression and/or Anxiety will be more likely to report perceived stigma compared to those who report having neither.

*Impact of First-Year Coursework on College Students’ Academic Motivation, Use of Learning Strategies, and Understanding of Liberal Education*

Armando Armenta, Sofia Earle, Edward Sobottka

Faculty Mentor/Collaborator: Lori Bica

Poster #: 65

Participants were first-year college students enrolled in one of two courses at UW-Eau Claire, Interdisciplinary Studies 155 Exploring Liberal Education or Psychology 100 Introduction to Psychology. IDIS 155 was designed specifically to introduce students to UW-Eau Claire’s Liberal Education Core, as well as teach learning strategies. PSYC 100 was part of the First-Year Experience Program and included information on learning strategies as part of a unit on human memory. Using a pretest/posttest design, we measured participants’ understanding of Liberal Education using open-ended questions that asked about the purpose of LE and connections to students’ majors and future careers. We used Pintrich, Smith, Garcia, and McKeachie’s (1991) Motivated Strategies for Learning Questionnaire to assess academic
motivation (e.g., emphasis on grades, confidence as a learner), use of different cognitive and metacognitive strategies (e.g., organizing information by constructing charts or diagrams, identifying the most important ideas), and management of resources (e.g., asking an instructor for help, spending time on classes vs. other activities). We offer recommendations for course design that would be of interest to anyone teaching classes intended primarily for first-year college students.

**Those Shoes Are So You! Personality Impressions from Shoes**
Stephanus Badenhorst, Rian Drexler, Katie Paulich
Faculty Mentor/Collaborator: April Bleske-Rechek

Individuals provide a variety of clues – such as the bumper stickers they display on their car, the music they listen to, and the dirt they leave on their kitchen floor – that signal their attitudes and personality traits. In the current study, we test two hypotheses: (1) the shoes people wear are tied to various aspects of their personality (e.g., more extroverted people wear more colorful shoes), and (2) people can judge others’ personality traits (albeit not perfectly) and demographics (e.g., sexual orientation, socioeconomic status) by looking at others’ shoes. Participants completed a measure of the Big Five personality traits (Openness to Experience, Conscientiousness, Extroversion, Agreeableness, Neuroticism), reported demographic variables, and then provided a picture of the pair of shoes they own that best represents their personality. One team of researchers coded various aspects of the shoes (e.g., durability, colorfulness, trendiness, cleanliness) and another team of researchers used each participant’s picture of their shoes to estimate the participant’s standing on the Big Five and various demographic characteristics. We describe what analyses reveal about links between shoe characteristics and shoe owners’ personality traits, and the degree to which observers can accurately infer shoe owners’ personality traits by looking at their shoes.

**Comparing several procedures to assess impulsivity and self-control in rats**
Alleah Baltzer, Jasmine Edge, Emily Cheasick
Faculty Mentor/Collaborator: Carla Lagorio

Delay discounting describes how the value of an outcome is affected by how quickly it is delivered. How rapidly reinforcers are discounted differs across species as well as individuals and is a standard metric for assessing impulsivity and self-control. Several methods have been developed to study impulsivity in the nonhuman laboratory; however, they take a long time to complete. This can limit studies interested in assessing how impulsivity changes over the lifespan, or how adolescent impulsivity can be affected by other variables, since these stages are abbreviated in nonhuman species. The current study will compare a commonly published procedure with a novel variant developed in our lab that aims to assess discounting in about a week. In both procedures, rodent subjects make repeated choices between receiving one food pellet immediately and a larger number of food pellets after some delay. The delay is manipulated either within or across sessions. Post-hoc analyses will examine the consistency across measures to assess whether reliable outcomes can be attained in as little as one week. Ideally, results can lend confidence in using the novel discounting assay in studies examining potential correlates with time-sensitive variables such as adolescence and also later aging or pharmacological research.
Using Independent Components Analysis to Better Understand the Electrophysiology of Error Processing
Samuel Becker, Sarah Westerland, Sierra Dortch, Emily Hite, Madison Moeller
Faculty Mentor/Collaborator: David Leland
Poster #: 61

The Pe (error positivity) is a positive deflection in the electroencephalogram (EEG) peaking around 250ms following a response when a person makes a task error, especially if they are immediately aware of having made that mistake. In our two prior studies of error processing, participants completed a 2-choice response task (the Flanker task) to invoke error-related EEG activity, including the Pe. The Pe normally appears as a positive deflection at posterior electrode sites, and we observed this, but we also saw what appears to be a mirror-image negativity at frontal sites at the same time; we tentatively call this an “inverted Pe”). It is unclear, however, whether these two deflections reflect the same underlying neural activity or separate neurocognitive events. We are currently using independent components analysis (ICA), a computational method for separating complex, mixed signals into simpler subcomponents, to address this question. We predict that the canonical Pe and “inverted Pe” will be appear together in ICA components, suggesting a common neural generator. If they appear in separate ICA components, that will imply distinct neural generators. In either case, resolving this question will advance our knowledge of the electrophysiology of error processing.

Attitudes Toward Immigrants: The Impact of Vivid Testimonials vs. Statistics
Emmanuel Castellanos
Faculty Mentor/Collaborator: April Bleske-Rechek
Poster #: 34

The topic of immigration is a politically polarizing issue despite the U.S.A.’s characterization as a post-racial nation-state. In the current research, we tested the hypothesis that people’s attitudes about immigration are influenced more by exposure to vivid, emotional stories about an immigrant than by exposure to non-partisan statistics about immigrants. Participants were 369 undergraduate students enrolled at a public, Midwestern university in the U.S.A. In the study, some participants were exposed to a positive story about an undocumented immigrant, some to a negative story, and some to no story at all. In addition, half of the participants in each story condition were exposed to national statistics about immigration through a “Did you know?” quiz, while the other half in each story condition were not exposed to the statistics. All participants reported their attitudes toward immigrants. Data analysis revealed that attitudes towards immigrants were moderate-to-positive regardless of condition, and exposure to the non-partisan statistics had a small, positive effect on attitudes. The current findings suggest that statistics can sway attitudes; however, we question whether the findings will replicate in a sample drawn from a more politically and educationally diverse population.
**Perceptions of Balance Across the Adult Lifespan: A Comparison of Younger and Older Adults**

Anais Chloe Cross, Alexandra Ziepke

Faculty Mentor/Collaborator: Jarrod Hines

This project is intended to help explain why older adults may possess a fear of falling. Previous research discussed risk factors for a fear of falling, including general anxiety, gender, medication intake, and age. However, no one has investigated the potential role of stereotyping and expectations about falls in the development of a fear of falling. Both undergraduates and older adults (aged 55+) were surveyed about the ability of adults of various ages (i.e., 20-100, by decade) to maintain their balance in general and in specific situations, how their own balance has changed in the past, and how they expect it to change in the future. As expected, balance was thought to decline slowly from early to mid-adulthood and then decline at a faster rate toward late adulthood. Older adults perceived the balance of persons aged 40 to 60 years as being better than was perceived by younger adults. Results also reveal individual differences in both personal balance and age-based expectations of balance, which are expected to relate to concerns about future falls in younger participants and present concerns about falling in older participants. This study is a first step toward a possible cognitive intervention for fear-of-falling in the elderly.

**College Students’ Experiences with Stress, Coping Mechanisms, and Awareness of the Physical Effects of Stress**

Rebekah Damitz

Faculty Mentor/Collaborator: Mary Beth Leibham

We have long known that the mind and body affect each other. Stress has been associated with adverse effects in each bodily system, including the reproductive, gastrointestinal, and cardiovascular systems (Tovian et al., 2018). College students have unique stressors for their life stage (e.g., career decisions) and may be especially vulnerable to potential mental and physical health consequences (Hayman, Lucas, & Porcherelli, 2014; Hintz, Frazier, & Meredith, 2015). Compared to other populations, college students report exercising less frequently and eating less healthy foods (Hintz, Frazier, & Meredith, 2015). These health behaviors can exacerbate any mental health or physical health conditions. This study expands research on the stress-health relationship by examining students’ knowledge of psychosomatic illnesses. Using a survey methodology, over 400 college students were asked about their experiences with stress (measured by the Perceived Stress Scale, 1983), health symptoms (Subjective Health Complaints Inventory, 1993), and their coping mechanisms (Coping Inventory for Stressful Situations [CISS-21], 1999). Additionally, students were asked to rate their awareness of the associations between stress and physical impacts. I expect that students who report more stress and more physical health symptoms will have a better understanding of the psychosomatic connection, as well as more adaptive coping strategies.
Changes in Distress and Iatrogenic Effects while Participating in Longitudinal NSSI Research
Sierra Dortch, Kristina Olson, Carley Owens
Faculty Mentors/Collaborators: Jennifer Muehlenkamp, Christopher Hagan

It is important to determine whether exposing individuals with a history of non-suicidal self-injury (NSSI) to self-injury related stimuli could be harmful. Previous literature suggests that initial exposure to self-injury images or topics could be distressing (Jackson et al., 2000). However, other research shows that completing questionnaires and research tasks on NSSI does not lead to iatrogenic effects (Muehlenkamp et al., 2015), and evidence suggests that distress decreases with exposure. However, nobody has examined the impact of these stimuli in longitudinal studies to see if repeated exposure has a different outcome. We hypothesized that iatrogenic effects would not occur from viewing NSSI-related stimuli as part of a research study. We also expected participants’ initial distress ratings during their second visit to decrease relative to their baseline initial distress ratings due to previous exposure to the study. 130 university undergraduates with a history of NSSI completed at least two laboratory sessions, completing self-report and response time tasks involving NSSI stimuli. Participants self-reported their distress level before and after completing the study tasks. Participating in detailed, sensory-rich studies of NSSI does not appear to cause harm to participants regarding self-reported distress, urge to harm, or intent to kill oneself (ps=.07 to .71). Additionally, initial distress decreased from the first to second visit (t(129)=4.18, p<.001). Researchers can have confidence that NSSI research using self-injury stimuli is unlikely to harm participants.

Motivated Numeracy: Gender and Gender-Role Attitudes as Predictors of How People Interpret Statistics about Gender Differences
Rian Drexler, Keith Jorgensen, Katie Paulich
Faculty Mentor/Collaborator: April Bleske-Rechek

Numeric problems that require calculating proportions tend to evoke an automatic, heuristic-based – but incorrect -- response that must be overridden to answer correctly. However, research has shown that when people interpret numbers on topics they have a strong bias about, their ideological bias can inhibit their ability to reason carefully about the data. In the current study, we test this effect in the context of men’s and women’s attitudes toward gender equality and their ability to correctly interpret hypothetical data pertaining to a sex difference in men’s and women’s choice of traditional household roles. In the study, we present participants with a proportions problem (via a 2 x 2 matrix) and manipulate whether the numbers suggest that one sex is more likely than the other sex to choose a breadwinner role or that one sex is more likely than the other to choose a homemaker role. We predict that participants who have more sexist attitudes will be more likely to succumb to a heuristic-driven interpretation of the numbers (e.g., that men are more likely than women to choose the breadwinner role and women the homemaker role), even when their performance on other items shows that they understand proportions and probabilities.
Unwarranted Blame: The Role of Hindsight Bias in Judgments of Suicide Likelihood and Preventability
Jordyn Fetkenheuer, Nicole Kleinschmidt, Katie Paulich
Faculty Mentor/Collaborator: April Bleske-Rechek
Poster #: 30

When a suicide occurs, individuals often look back and wish they had seen the signs or done things differently. What is clear in hindsight, however, may have been unclear in foresight (Fischhoff, 1975). In this study, we investigated the effects of outcome knowledge on individuals’ perceptions of the foreseeability and preventability of a suicide. All participants read the same text conversation between two friends, one of whom shows signs of depression. Then, participants assigned to the experimental condition (outcome knowledge) viewed one additional sentence stating the friend subsequently died by suicide, whereas participants assigned to the control condition (no outcome knowledge) did not view any additional information about the friend. Following the manipulation, all participants rated the perceived likelihood and preventability of the friend’s potential suicide; they also provided their judgments of the friend and the people who were close to her. If our findings replicate past research (Goggin & Range, 1985), they have important implications because they indicate that after a suicide, the warning signs of the suicide may seem obvious (even though they weren’t obvious because suicide is hard to predict) and could lead outsiders to wrongfully blame those who are closest to the victim.

Effects of the Kappa Agonist U69,593 on Naltrexone’s Discriminative Stimulus Effects in Subjects Given Chronic, Intermittent Sucrose Access
Nicholas Fruit, Emily Schulz, Oriana Vile, Hannah Stutt, Jonathan Zajac, Holly Dorn, Alex Petrey, Morgan Marek, Caitlin Herzberg
Faculty Mentor/Collaborator: David Jewett
Poster #: 5

Effects of the Kappa Agonist U69,593 on Naltrexone's Discriminative Stimulus Effects in Subjects Given Chronic, Intermittent Sucrose Access Naltrexone (NTX) is a nonspecific opioid antagonist that binds to mu-, kappa-, and delta-opioid receptors. Previous research has demonstrated that rats given chronic, intermittent sucrose access have increased endorphin function. We have shown that male Sprague-Dawley rats under these conditions can discriminate 1.0 mg/kg NTX from saline in a two-lever, operant choice procedure. We hypothesized that NTX’s discriminative stimulus effects were mediated by kappa-opioid receptors. To examine this, we tested the effects of the kappa-opioid agonist U69,593 in our discrimination procedure. Once discrimination criteria (80% or greater condition-appropriate responding for 8 of 10 consecutive sessions) were reached, generalization testing began. A cumulative dosing procedure was used to determine if U69,593 alters the ability of NTX to produce its discriminative stimulus effects. Subjects were pretreated with U69,593 (0.0001 mg/kg - 0.1 mg/kg, s.c.) followed by increasing doses of NTX (0.001 mg.kg - 10.0 mg/kg, s.c.). Injections continued until response rates were suppressed or 10.0 mg/kg NTX was administered. U69,593 did not significantly alter the discriminative stimulus effects of NTX. This suggests that kappa-opioid receptor antagonism is not sufficient to produce NTX’s discriminative stimulus effects in rats given chronic, intermittent sucrose access.
**Smartphone Usage: Associations with Cognition, Motivation, and Sleep Patterns**  
Emily Hite, Madison Moeller, Sarah Westerland, Sierra Dortch, Samuel Becker, Camryn Langley, Margot Lortie  
Faculty Mentor/Collaborator: David Leland  
Poster #: 62

The extensive use of smartphones raises questions about reliance on these devices and their relationship with mindfulness, sleep quality, attention difficulties, and the pursuit of mental stimulation. We are surveying UW-Eau Claire students on their smartphone use and reliance (Ward et al., 2017; Yildirim, 2014) and a number of other psychological and behavioral measures. We hypothesize positive correlations between smartphone use/reliance and both the pursuit of mental stimulation (sensation seeking; Zuckerman, 1978) and ADHD-related attention difficulties (Adler et al., 2005). We also predict negative associations between smartphone measures and both sleep quality and one’s ability to pay attention to what is happening in the present (mindfulness; Brown & Ryan, 2003). Our research aims to describe the smartphone use and reliance patterns of UW-Eau Claire students and reveal potentially detrimental associations with mental function and well-being.

**Impact of Race and Criminality Upon Employment**  
Karin Knapp, Austin Van Cleave, Jena Wagner  
Faculty Mentor/Collaborator: Jarrod Hines  
Poster #: 36

This study examines the role of applicants’ race, past criminality, and time since criminal conviction on participants’ evaluations of the fitness of fictional job candidates. Our experimental design is a 2(Applicant's Presumed Race: Black, Caucasian; within-subjects) x 2 (Type of Criminal Conviction: Misdemeanor, Felony; within subjects) x 3 (Time Since Conviction: 1, 15 or 30 years; within-subjects) x 2(Participant Age: Younger adults aged 30 and older adults 55+ years; between-subjects). The participants will be shown researcher-constructed applications that will include information like their names, type of non-violent crime committed, and the time since the offense. Race will not be mentioned explicitly; instead, a preliminary study tested name-race associations and those name categories were used here. Our factorial ANOVA results are expected to indicate an age difference such that older participants will rate the fitness of Black applicants as worse than Caucasian applicants. Younger adults’ ratings are expected to be more similar across levels of offense and time from offense than those made by older adults, who are expected to be less forgiving or more likely to stereotype applicants. This research is one of several projects planned to investigate reasons why past convicts may encounter discrimination as they try to find a job.

**Female college students' thoughts regarding childbearing, family, and parenting practices**  
Madigan Knuth  
Faculty Mentor/Collaborator: Mary Beth Liebham  
Poster #: 69

Female college students' thoughts regarding childbearing, family, and parenting practicesStudent Researcher: Madigan KnuthFaculty Mentor: Dr. Mary Beth Leibham, Ph.D.The main goal of this study was to examine the variability in current UW-Eau Claire female students' reported aspirations and knowledge surrounding childbearing, family structure, and parenting practices,
particularly those practices that may have been less common 25 years ago (e.g., cohabitation, water births). This project is significant for the field of Maternal and Child Health because it highlights female young adults’ thoughts and beliefs surrounding childbearing and family practices. More specifically, if practitioners know the intentions of women having children in the next 5-10 years, they will be able to adapt services and education according to patient needs. Approximately 250 UW-Eau Claire female students completed a 30-item anonymous online survey. Items were divided into four content areas including childbirth, family structure, parenting practices, and demographics. I expect that a large proportion of the participants in this study will be more accepting of non-conventional childbearing, family, and parenting practices that were not common 25 years ago. Furthermore, I expect that participants’ responses may vary according to their academic majors and their own mothers’ experiences with childbearing and parenting practices.

**The Impact of Practice Effects on NSSI Stroop Task Reaction Times**

Mckenzie Kostreva, Christopher Hagan, Carley Owens
Faculty Mentor/Collaborator: Jennifer Muehlenkamp

Accurate measurement of Non-Suicidal Self-Injury (NSSI) is vital in addressing mental health. Due to stigma, self-report regarding NSSI may be inaccurate. Attentional bias towards stimuli, like NSSI, is measured by reaction time tests including the Stroop Task (Cha et al., 2010). However, practice effects, repeating a test, can result in decreased response time (Roe, Wilsoncroft, & Griffiths, 1980). Studies have yet to examine whether repeated NSSI Stroop tasks result in practice effects. We hypothesized practice effects will decrease participants’ reaction time from session one to two. The study used data from 197 University students (mean age= 19.06, 89.2% white) who completed the NSSI Stroop Task at two time points six months apart. Paired sample T-tests were used to compare Stroop Task reaction times. Our results showed that although there was a decrease in mean response time from Time 1 (428.64ms) to Time 2 (424.70ms), this change was not statistically significant (t(196) = .53, p = .60). Our hypothesis was not supported, as practice effects did not have a significant impact between session one and two on the reaction time of NSSI Stroop Task. This study suggests that practice effects will not affect reaction time when completing NSSI Stroop Task.

**Effects of Impulsivity and Fearlessness about Death on Non-Suicidal Self-Injury**

Levi Marquardt, Emily Billingsley
Faculty Mentors/Collaborators: Jennifer Muehlenkamp, Christopher Hagan

Non-suicidal self-injury (NSSI) is problematic among college students, with studies suggesting a strong relationship between NSSI and suicide attempts (Brausch & Muehlenkamp, 2018; Muehlenkamp & Brausch, 2019). Research suggests that higher levels of impulsivity are associated with NSSI (Maxfield & Pepper, 2018), and studies looking at relationships between fearlessness about death and NSSI have been sparse and inconsistent (Monteith et.al., 2017; Gauthier et.al., 2018). We hypothesized there will be interactive effects between high levels of both impulsive behavior and fearlessness about death, explaining greater frequency of NSSI. Participants included 323 college students with a history of NSSI (Mage =19.06, SD=1.63; 83.6% female; 92.6% White) who completed measures of impulsivity and fearlessness about
death in a lab setting. Regression analyses indicated that there was not an interactive effect between impulsivity and fearlessness about death (B=-.03, p=.72), but that impulsivity had a significant main effect (B=2.36, p=.02) on NSSI frequency. These results indicate that impulsivity and fearlessness about death, together, are not significant indicators of NSSI frequency. However, impulsivity is significantly related to higher frequency of NSSI, indicating that attention should be placed on reducing impulsivity in college students.

Assessing Students’ Perceptions of the University Counseling Center
Cassidy Mattson, Lindsey Drachenberg
Faculty Mentor/Collaborator: Jarrod Hines

The present study will investigate if student perceptions of counseling services become more positive after viewing a video where fellow students share their experiences with university counseling, and if the associated perception change is stronger when the video is viewed in person instead of online. Past research has demonstrated both the importance of counseling services, and the issue of stigma surrounding services being a prevailing reason for avoiding seeking out help (Barksdale & Molock, 2009; Kaplan, 2012; Mori, 2011). It has been shown that a video can help break down stigma surrounding Counseling Services, but it is unclear if this effect is stronger for those who view the video in-person opposed to online. To examine this connection, we will administer a pre-test to participants which looks at attitudes related to likeliness to seek out professional help in addition to self-stigmatization. A video showcasing UW-Eau Claire students’ positive experiences with University Counseling Services is then viewed, followed by the same questions in a post-test. We hypothesize that students will be both more likely to seek out professional help and exhibit less self-stigmatization after viewing our video, and this effect will be stronger for those who view the video in-person.

Suicide Ideation Protective Factors for Sexual/Gender Minority Young Adults
Kristina Olson, Sierra Dortch
Faculty Mentor/Collaborator: Jennifer Muehlenkamp

Individuals identifying as sexual and/or gender minority (SGM) report higher suicide ideation rates than heterosexuals/cis-gendered individuals (Stone et al., 2014). Identifying protective factors against this discrepancy is important for preventing their suicide ideation. Most studies regarding SGM suicidal ideation focus on risk factors. In protective factors studies, SGM individuals with greater empowerment (Lin, 2015) or SGM-positive environment experience, like the Gay-Straight Alliance (GSA), have reduced rates of suicidal thinking (Hatzenbuehler et al., 2014). Participants included 347 undergraduate students identifying with non-heterosexual orientations or gender non-binary (Mage=20.03, SD=3.99) recruited from psychology department study boards at two midwestern undergraduate universities. Participants completed self-report measures. Two moderated mediation models using PROCESS with 1,000 re-sample bootstrapping methods indicated GSA participation was not a significant moderator between minority stress and either thwarted belongingness (b=0.00; p=.19) or perceived burdensomeness (b=0.00; p=.35) on suicidal ideation. Empowerment’s moderation on perceived burdensomeness was close (p=.06), though remained non-significant on thwarted belongingness. The main effect of minority stress for both models was significant. These results indicate preventing suicidal...
ideation for SGM youth may include reducing minority-related stressors and improving interpersonal connections but further study is needed.

**Younger and Older Adult Perceptions of Health-Related Risk**  
Emily Onken  
Faculty Mentor/Collaborator: Jarrod Hines  
Poster #: 26

Older adults are more likely to experience hypertension, hypercholesterolemia, and cardiovascular disease than are younger adults. Likewise, older persons also often engage in more health-preservation efforts (e.g. following a healthy diet and exercising). Although these patterns of behavior may lead to the conclusion that older adults perceive a larger risk toward their health than do younger adults, risk perception varies greatly—especially when predicting personal susceptibility to future illness. The current study will use measures of risk perception and participant reports of physical activity to compare younger and older adults’ perception accuracy. We will also examine the role of age-based stereotype threat in risk perceptions. If older adults are reminded of their age and their greater susceptibility to future illness due to their age, their mindset may be altered such that they experience an increased perception of disease-related risk compared to those in a control condition. We therefore hypothesize that older adults will report an overall increased perception of disease-related risk, increased action self-efficacy, and greater motivation for health preservation than will younger adults, and this difference will be larger following older adults’ exposure to our age-based stereotype threat manipulation.

**Interpersonal and intrapersonal functions of NSSI**  
Carley Owens, Skyler Kociuba  
Faculty Mentors/Collaborators: Jennifer Muehlenkamp, Christopher Hagan  
Poster #: 60

Previous literature indicates intrapersonal functions are fulfilled by Non-Suicidal Self-Injury (NSSI) engagement (Sadeh et al., 2014), while other research suggests interpersonal functions are associated with higher frequency of NSSI (Muehlenkamp et al., 2013). We hypothesized there would be a positive correlation between frequency of NSSI and both interpersonal and intrapersonal functions. We predicted the intrapersonal correlation with NSSI frequency would be stronger than that of interpersonal functions. We also hypothesized an interaction between interpersonal and intrapersonal functions of NSSI such that high levels of both will result in more frequent NSSI. 319 university students (Mage=19.06) completed in-lab, computer-based surveys including the Inventory of Statements About Self-Injury (ISAS) and the Self-Injurious Thoughts and Behaviors Inventory (SITBI), consisting of self-report data on motivation for and frequency of NSSI. Our first two hypotheses were not supported. There were no significant correlations between inter- (r = -.11, p = .15) or intra-personal functions (r = .12, p = .10) and NSSI frequency. There was no significant interaction (B = .07, p = .34), however there was a significant main effect of interpersonal functions (B = -.20, p = .02) on NSSI frequency. This was opposite of our prediction. Future NSSI prevention research should further explore the effect of both functions on NSSI.
**Primed to Perceive Harm: People’s Responses to Ambiguous Statements as a Function of Priming**  
Katie Paulich, Stephanus Badenhorst, Eleni Seyoum, Grace Nuck, Keith Jorgensen  
Faculty Mentors/Collaborators: April Bleske-Rechek, Michael Axelrod  
Poster #: 33

Microaggressions were originally defined as “brief and commonplace daily verbal, behavioral, or environmental indignities, whether intentional or unintentional, that communicate hostile, derogatory, or negative racial slights and insults toward people of color” (Sue et al., 2007, p. 271). Since then, awareness of microaggressions has increased and use of the term “microaggression” has spread to multiple domains (Lilienfeld, 2017). In the current study, we tested the hypothesis that priming individuals to perceive others’ words as harmful leads them to perceive others’ words as harmful as well as to report a lower likelihood of using those words themselves. To test this hypothesis, we randomly assigned participants to read one of three phrases before rating the harmfulness of various statements or their likelihood of using those statements: (1) “…people say or ask about all kinds of different things”; (2) “…people say or ask things that they don’t even realize are harmful and can create a hostile environment for others”; (3) “…people intentionally say or ask things that are harmful and can create a hostile environment for others.” Our findings may elucidate the conditions in which people are likely to perceive others’ words as harmful, and the conditions that might influence people to self-censor.

**The Effect of Social Media on Women’s Body Satisfaction**  
Alyssa Roberts, Molly Svoboda, Gaoyer Lee, Matrice Bloom  
Faculty Mentor/Collaborator: Jarrod Hines  
Poster #: 27

This research explored the impact Instagram has on young adult women’s self-esteem and body image. One-hundred and ninety female participants, ages 18-26, viewed images either associated with fitness that contained #fitspiration and #thinspiration hashtags or neutral images associated with home decoration and travel. Participants were randomly assigned to three experimental conditions. Those in condition one viewed only fitness images; those in condition two viewed 50% fitness images and 50% neutral images; those in condition three viewed only neutral images. Half of the participants in each condition were chosen at random to complete a pre-test before viewing images, and every participant completed a post-test after exposure. The pre- and post-tests consisted of a modified version of Tylka and Wood-Barcalow’s (2015) Body Appreciation Scale-2 and was used to measure self-esteem related to body image. Our results indicate that participants who were exposed to 50% or 100% fitness images reported lower self-esteem compared to those who viewed only neutral images, suggesting that exposure to fitness images on Instagram has a negative impact on young adult women’s self-esteem and body image.

**Aversion to NSSI Images as a Mediator of the NSSI - Suicide Relationship**  
Megan Schildt, Emily Billingsley  
Faculty Mentor/Collaborator: Jennifer Muehlenkamp  
Poster #: 58

Non-suicidal self-injury (NSSI) has been consistently shown to be a strong predictor of future suicide attempts (Hamza, Stewart, & Willoughby, 2012). NSSI has been associated with implicit
associations with death (Glenn, Werntz, Slama, Steinman, & Teachman, 2017) and diminished aversion to self-injury (Franklin, Puzia, Lee, & Prinstein, 2014). We hypothesize that low aversion to self-injury images will mediate the relationship between NSSI frequency and implicit self-associations with death and suicide. 319 undergraduate students who screened positive for NSSI came into a research lab to complete computer-administered surveys and reaction-time tasks as part of a larger, longitudinal study. Aversion to self-injury images, NSSI frequency, and implicit association with death/suicide were assessed. While significant relationships between NSSI and low aversion to NSSI images (B = -.05, p = .005) and between low aversion and implicit self-associations with death and suicide (B = -.002, p = .003) were found, there was no direct (B = .00, p = .21) or indirect (B = .00, p = .21) relationship between NSSI and implicit self-associations with death and suicide. Because the significant results that were obtained were weak, low aversion to NSSI images appears to have a slight relationship with increased NSSI frequency and implicit associations with death.

**College Students’ Reports of Overparenting, Academic Entitlement, and Contingent Self-Worth**

Breanna Schultz, Hailey BeBeau, Amy Travers

Faculty Mentor/Collaborator: Mary Beth Leibham

While parental involvement has been associated with positive outcomes (e.g., academic achievement), recent research has highlighted potential disadvantages (e.g., anxiety) of excessive parental involvement. Overparenting is the term used to refer to excessive levels of parental involvement, and more specifically, overparenting refers to developmentally inappropriate levels of parental involvement. Two concepts that may be related to parental involvement are academic entitlement and contingent self-worth. Academic entitlement refers to the tendency to expect academic success without taking personal responsibility for achieving that success. Contingent self-worth refers to self-worth that is based on the approval of others or on social comparisons. Utilizing a survey methodology, this study will assess college students’ reports of overparenting, academic entitlement, and contingent self-worth. While there are a multitude of factors underlying college students’ well-being, examining these three factors could be helpful for understanding the various mechanisms playing a role in college student development. We anticipate that overparenting and academic entitlement are related, such that as overparenting increases, academic entitlement increases. We also anticipate that overparenting is linked with contingent self-worth. In other words, students who report higher levels of overparenting will be more likely to report that their self-worth is dependent on family approval.

**Perceptions of racial socialization in White parent-child dyads**

Emily Wagener

Faculty Mentor/Collaborator: Jenna Zucker

While parents of color cite racial socialization as an important aspect of parenting, White parents often do not share these views. White parents are often reluctant to discuss race and racism with their children, even in relevant situations, either because they fear it will induce racism or they believe that race is no longer relevant. This study investigated how White parents talk to their children about race and the extent to which racial attitudes align. We presented ten White parent-child dyads with two race-relevant news clips and asked them to watch and discuss the clips. We
then separated parent and child for independent interviews during which we asked what they had discussed, if they had talked about these or other issues before, and how the subject of race may be approached in their household. Parents and children were also given appropriate racial socialization and bias measures. The data suggests that parental perceptions of their socialization efforts differ from the messages their children are receiving. Although most parents recalled having conversations about race with their children, usually prompted through schoolwork, the children reported these conversations as lessons about bullying, rather than race. When parents addressed discrimination or racial injustice, it was in terms of historical context, failing to connect to other current race-related issues.

**US Religious Beliefs and Attitudes**  
Nicholas Walkowiak, Abigail Schmidt, Caitlin Miller  
Faculty Mentor/Collaborator: Jeffrey Goodman  

In 2017, White Christians (WCs) became a religious minority in the United States. We propose that, for WCs, learning about this demographic shift may result in a type of group-identity threat. When exposed to group identity threat, previous research has found people evince an attitudinal shift toward lower acceptance of groups other than one’s own. We conducted a between-subjects online experiment in which participants (one UW-Eau Claire student sample; one national online sample) were exposed to a religious identity threat or a control condition. Thereafter, we measured their attitudes toward religious pluralism, multiculturalism, and social/political issues. We predict that WCs who read about the US religious identity shift will show less support for religious pluralism and multiculturalism and more conservative social/political view. Findings from our study will contribute to identity threat theories and may also hold practical significance for understanding unanticipated consequences of racial and religious demographic changes in the US.

**Social Work**

**A Glimpse at Child Welfare**  
Ashley Baumgarten  
Faculty Mentor/Collaborator: Jamie Tester  

As the number of children within the child welfare system grows higher than ever before, the UW-Eau Claire Social Work Department works to educate students on just what it means to work in child welfare world. Giving students the opportunity to learn what child welfare means while in college provides a once in a lifetime chance to experience, learn, and practice what child welfare means while in a controlled and safe environment. With guidance from the instructors, students have the opportunity to tour a family’s home, interview active members, and make child protective decisions. Throughout the second half of this experience, students are able to learn about, interact with, and be immersed in various cultures in which the students could one day work with while touring the AIDS Foundation, The Hull House, The Cradle, and Chicago’s Child Advocacy Center. This domestic immersion is an incredible glimpse at what students
An Innovative Community Based Technique in Mental Health
Klaudia Buehl
Faculty Mentor/Collaborator: Mary Nienow
Poster #: 1

The purpose of this research is to implement innovative mental health techniques from Trieste, Italy into the Trempealeau County Health Care Center’s facilities. The community based mental health care facility in Trieste, Italy is currently the leading model of mental health care in the world. This research explores non-traditional models of mental health care in Italy in the hopes some of these methods can be used to improve the care delivery system in the United States. Trieste’s care model focuses on building up communities around the patients living in them by providing hospitality along with care. An ethnographic approach will be used to study Trieste’s culture as well as to obtain interviews and experiences of those who receive these mental health services first-hand. Although there is more research to be completed on this topic, this study shows that decreasing mental health stigma and partnering with communities allows for an inclusive and well-rounded care plan.

Sociology

Analysis on Life Satisfaction of the Chinese Elderly
Janet Bebo
Faculty Mentor/Collaborator: Jianjun Ji
Poster #: 74

Utilizing China’s national survey on the elderly population in 2014, this study intends to examine the status of life satisfaction of the Chinese elderly while, using the following theories as support, Modernization Theory, Social Stratification Theory, and Social Resources Theory. This study is to test the hypotheses that life satisfaction of the Chinese elderly is associated with their 1) demographic characteristics, 2) economic characteristics, 3) social characteristics, 4) social resources, and 5) psychological well being while, to avoid spurious effects, eight control variables will be used among the 22 variables. Since the data is cross-sectional in nature, for the association test, the appropriate statistical methods to be applied in this analysis will be Chi-square significant test, Pearson correlation, first-order table cross-tabulation, and Multiple Linear Regression. It is highly expected that this project will not only shed new light on the linkages between life satisfaction and social-economic-demographic characteristics and psychological well being of the Chinese elderly, but also contribute to the literature archive the elderly research of the Chinese aging population. We hypothesize that the life satisfaction of the Chinese elderly is likely to be associated by certain areas of their lives such as Social well being and psychological well being.
The purpose of this research project was to understand students’ perspectives on the values of equity, diversity, and inclusivity (EDI), and the resources that the University of Wisconsin-Eau Claire has to offer. This research aims to uncover what exactly the students expect of the University regarding EDI and resources and to provide feedback to help UW-Eau Claire to achieve its EDI goals. The two student researchers conducted a total of seven focus group interviews with 25 students to measure their group perspectives and collected data from both pre- and post-questionnaires to measure various demographics and personal opinions. Focus group participants were drawn from a variety of programs, organizations, and naturally-occurring social groups from the researchers’ personal networks. In general, focus groups discussed EDI in terms of potential for progress; participants recognize the steps that the University is taking towards its goals but are critical of their actual accomplishments. Resources are talked about as supplemental services that should be provided to students who need them, rather than core aspects of higher education that everyone utilizes. These results reflect an acceptance that students have relatively small power for change and an assumption that change happens at the administrative level.

This project is one of three "Real Eau-topias" projects being conducted as a collaboration among three faculty members (Peter Hart-Brinson, Melissa Bonstead-Bruns, and Ellen Mahaffy). The overall project used focus group research methods to learn about students’ experiences and cultural worldviews on campus pertaining to issues related to equity, diversity, and inclusiveness (EDI). Each project investigated a specific topic within the larger project. This specific sub-project has explored the factors that shape peoples’ thoughts on police brutality, the NFL players who were protesting police violence by kneeling during the national anthem, and the Black Lives Matter Movement, and how their thoughts on these issues are related to their thoughts on EDI on campus. Our assumption is that an individual’s perceptions about these kinds of wider social issues may play a role in their willingness to see EDI as an important aspect of their university experience. Three focus groups were conducted, each varying on racial make-up of the members. One group was made up entirely of students of color, representing a variety of racial and ethnic groups on campus. The second group was made up of a group of African American male students--most of whom are current or former Blugold football players. The final group was made up of white males--most of whom were current or past Blugold football players. Focus group participants were first asked questions centered on three topics: students’ positive experiences at UW-Eau Claire; what “equity,” “diversity,” and “inclusivity” mean to them; and what kinds of resources best enable the free expression and success of different student groups. Each group was then asked questions about a specific incident of suspected police brutality. Results indicate that, while all group expressed support for EDI efforts on campus, each group's
understanding and support of EDI issues off campus (i.e. issues related to police brutality) varied considerably. Members of more racially diverse focus groups expressed greater understanding and support of the off-campus EDI-related issues and more readily discussed how EDI issues off-campus are connected to EDI efforts on campus.

**Drink like a Man! Toxic Masculinity and Bifurcated Consciousness in College Drinking Narratives.**
Alyson Sundby
Faculty Mentor/Collaborator: Jeff Erger

Drink like a Man! Toxic Masculinity and Bifurcated Consciousness in College Drinking Narratives. Presenter: Alyson Sundby The purpose of this project was to examine how gender influences problematic drinking on college campuses. In addition to close to 2000 college students dying per year, a host of other problems result from excessive alcohol consumption. We add to the extensive literature on gender and college drinking by employing a Feminist analysis of the “college drinking career narratives” of 20 females and 20 males found in qualitative research articles and on the internet, explicitly looking for instances of “toxic masculinity” and “bifurcated consciousness”. Using NVivo qualitative analysis software we coded and performed content analysis on college stories centered on drinking and resistance to drinking. The findings indicate that toxic masculinity was very influential on excessive male drinking behavior, whereas bifurcated consciousness was highly influential on female drinking behavior. While the connection between gender ideology and social behaviors such as drinking are complex our results suggest that intervention strategies targeted towards prevention of problematic drinking, as well as interventions for problematic drinking, may have greater success if designed with consideration for the differential influences of toxic masculinity and bifurcated consciousness on men and women.

**Watershed Institute**

**A Study to Reduce Transportation-Induced Carbon Emissions at the University of Wisconsin-Eau Claire**
Ellie Rabine
Faculty Mentors/Collaborators: James Boulter, Karen Mumford

According to their 2018 Campus Climate Action Plan, transportation is currently University of Wisconsin-Eau Claire’s largest source of carbon emissions, with approximately 12,725 metric tons of eCO2, accounting for 35% of the total carbon emissions on campus. Based on the plan, I quantified the current transportation emissions data, identified the key drivers of transportation-related carbon emissions, recognized university initiatives, and examined ways in which these emissions can be reduced. The three main drivers for this sector include Study Abroad/National Student Exchange Program, University Financed Travel, and Campus Commuting. Because the university does not wish to diminish or revoke student experiences, the Climate Action Plan recommends purchasing offsets for air and ground travel through Xcel and independent sources through the use of the green fund, as well as encourages students to offset their carbon
individually through reliable resources. Additional emission reduction strategies are provided within this document such as the use of biofuels, improved pedestrian-oriented infrastructure, and incentive opportunities. In order to make significant progressive change within the transportation sector, much weight is placed on the individual and their daily lifestyle choices, which can be addressed through creating a sustainability culture on campus.
Faculty
Ahrendt, Chris, 61
Airth-Kindree, Norah, 10, 48
Amthauer, Heather, 59
Anand, Ari, 7
Anderson, Julie, 71, 74
Andrews-Pfannkoch, Cynthia, 71
Andrade-Vera, S., 75
Avin, Rose-Marie, 20
Axelrod, Michael, 128
Bailey-Hartsel, Scott, 4, 80
Bao, Li-Ying, 53
Bell, Robert, 18
Benedini, Kristen, 117
Bhattacharyay, Sudeep, 1, 2, 76, 77, 81, 82
Bica, Lori, 118
Bleske-Rechek, April, 3, 119, 120, 122, 123, 128
Bogstad, Janice, 2
Bonstead-Bruns, Melissa, 132
Boulter, James, 3, 111, 112, 133
Brake, Danielle, 64
Braun, Saori, 34, 46, 47
Brisbin, Abra, 60, 62
Brown, Joshua, 48, 56
Bryant, Winnifred, 66
Carroll, Wayne, 31
Chaffin, Melissa, 38
Chia-Yu, Hsu, 6, 17
Christensen, Ami, 1, 2, 34, 35, 36
Cleary, Patricia, 76, 79, 82
Cobian, Alexander, 59
Cronje, Ruth, 44
DaCosta, Maria, 6
Dahl, Bart, 78
Dahl, Jennifer, 78
Davis, Christopher, 60, 61
Day Herschel, 63
DeGrave, Jeff, 3, 5, 6, 18
Del Valle, Crystal, 68
Duffy, Colleen, 6, 60
Dugar, Kranti, 23
Dunbar, Laura, 37, 38
Dunham, Douglas, 95
Eger, Jeff, 133
Faulkner, Douglas, 87, 88
Fay, Martha, 101, 102, 103, 104, 105, 106
Ford, Lyle, 99
Freitas, Shanti, 5
Gallagher, Padraig, 13
Gandhi, Jarel, 71
Garvey, Christa, 38
Gingerich, Derek, 66, 74
Glogowski, Elizabeth, 94, 96
Goodman, Jeffrey, 130
Grothe, Arthur, 8
Hagan, Christopher, 122, 125, 127
Hansen-Rassussen, Nancy, 101
Harrison, Jennifer, 11
Hart-Brinson, Peter, 10, 132
Hati, Sanchita, 2, 77, 81, 82
Hemmerich, Abby, 4, 11, 12, 28, 29, 30, 43
Herman, Daniel, 66, 70, 73
Hines, Jarrod, 3, 121, 124, 126, 127, 128
Hoepner, Jerry, 24, 27, 28, 29, 30, 43
Hoff, Alex, 54
Hooper, Robert, 3, 90
Hsieh, Ming-Li, 107
Ihinger, Phillip, 3, 89, 91, 92, 93
Jackson, Stacey, 8, 58
Jamelksi, Eric, 15, 16, 108, 109, 111, 112
Jang, Won, 103
Janik, Daniel, 68
Janot, Jeffrey, 46, 47
Jarzynski, Rebecca, 27, 42
Jewell, Matthew, 3, 96, 97
Jewett, David, 123
Ji, Jianjun, 131
Johnson, Marquell, 46
Jol, Harry, 32, 33, 82, 83, 84, 85, 86, 87, 113, 114
Kakegawa, Tomomi, 12
Kaldjian, Paul, 1, 114
Kasper, Eric, 116
Kemp, Thomas, 1, 110
Kim, Hyungjoo, 40
Kim, Taejo, 4
Kleinjes Neff, Paula, 67, 75
Knoche Gupta, Krysti, 81
Knutson, Kristine, 101, 105, 107
Kocken, Gregory, 53
Koissi-Kouassi, Marie-Claire, 62
Kong, Kaishan, 56
Kraker, Jessica, 61
Lagorio, Carla, 119
Lagunas, Meg, 49
Larson, Jan, 20
Lee, Eun, 4
Lee, Tali, 67, 69, 73
Leibham, Mary, 118, 121, 124, 129
Leland, David, 120, 124
Lewis, Dandrielle, 8
Lewis, David, 79
Li, Yan, 107, 109
Licón, Gerardo, 10, 57
Liebham, Mary, 124
Lodge, Robert, 88, 89, 90
Lu, Der-Fa, 10, 47
Lyman Gingerich, Jamie, 70, 74
Ma, Ying, 13, 95
Mahaffy, Ellen, 102, 132
Mahoney, Brian, 91, 93, 94
Mann, John, 14
Martin, Jarrin, 75
Marmorstein, Alan, 71
Matthews, Douglas, 51
McEllistrem, Laurel, 94
McEllistrem, Marcus, 3, 95
Merkel, Rachel, 49
Meyer, Matthew, 19
Miller, Jessica, 37
Miller, Nathan, 99
Morris, Karen, 105
Mowry, Mark, 17
Muehlenkamp, Jennifer, 122, 125, 126, 127, 128
Mueller, Kathryn, 42
Mumford, Karen, 133
Nesja, Josh, 8
Nienow, Mary, 131
Oberly, James, 23, 53, 54, 55
Oh, Yoonsin, 34
Olm, Jill, 6
Olsen, Jeanette, 4, 48, 49, 50
Ostrander, Phillip, 41
Otto, Carolyn, 64
Pabelick, Christina, 74
Patchin, Justin, 117
Pehler, Shelly-Rae, 49
Penkava, Michael, 62
Pereira, Kenneth, 8
Pha Kong, 58
Phillips, James, 79
Phillips, Nicholas, 17
Pierce, Crispin, 51
Pierson, Kim, 65, 98
Prakash, YS, 74
Pulido, Jose, 71
Recine, Ann, 50
Running, Garry, 86, 88
Rybicki, James, 1, 100
Rylander, Jonathan, 19
Samelson, Vicki, 31
Sanislo, Teresa, 7, 54
Sargent, Linda, 49
Sather, Thomas, 12, 27, 28, 42, 44
Schaffer, David, 110
Schiller, Lisa, 7
Schultz, Nicole, 1, 8, 104
Showsh, Sasha, 72
Siddique, Feroz, 64
Soll, David, 4, 18
Sperstad, Rita, 49
Spraitz, Jason, 117
Stecher, George, 98, 100
Stewart, John, 41
Stow, Robert, 45
Sukhu, Ashley, 8
Sulzer, Tom, 6
Suppes, Laura, 52
Swanson, Scott, 1, 115, 116
Taylor, Wilson, 75
Tester, Jamie, 130
Theisen, Roslyn, 26
Thesing-Ritter, Jodi, 8, 20, 26, 101
Thomas, Paul, 6, 99
Tian, Wufeng, 63
Torres, Eric, 9
Turner, Patricia, 54
Tusing, Mary, 24, 39
Vadhavkar, Ganga, 1, 104
Vitale, Sarah, 3, 89, 90, 91, 92, 94
Walker, Shanise, 63
Waters, Matthew, 55
Watkins, Frank, 8
Weichelt, Ryan, 114
Weihre, Evan, 69, 70, 71, 72
Whitfield, Scott, 13
Wicher, Sarah, 74
Wiegel, Kurt, 77
Wonder, Kelly, 57
Wong, Nga-Wing, 112
Worley, Mary, 102
Yan, Ruifeng, 34, 35, 36
Yang, Thao, 80
Zeitler, Ezra, 55, 113
Zucker, Jenna, 129

**Student**

Acton, Chris, 118
Adams, Conner, 112
Addleman, Alyssa, 103
Agarwal, Saudami, 58
Al Eid, Maryam, 96
Allen, Jordan, 8
Allgaier, Orion, 51
Altman, Nathan, 116
Amundsen, Jonah, 60, 61
Anderson, Eric, 60, 61
Anderson, Jackelyn, 93
Anderson, Justin, 76
Andor, Ev, 22
Anthony, Kelly, 105
Archbold, Jacqueline, 69, 73
Armenta, Armando, 118
Arnold, Alyssa, 45
Arumugam, Dhiyanni, 69, 70, 71, 72
Ausler, Crystal, 8
Azzalino, Adam, 14
Bachmeier, Anna, 7
Badenhorst, Stephanus, 119, 128
Baker, Grace, 95
Balom, Lewis, 101
Baltzer, Alleah, 119
Baranowski, Jenna, 118
Barnes, Connor, 51
Barta, Nathan, 1, 76
Bauer, Leah, 101
Bauer, Meghan, 66
Baumgarten, Ashley, 130
Bayer, Rachel, 66
BeBeau, Hailey, 129
Bebo, Janet, 131
Beck, Griffin, 65
Beck, Joseph, 32, 82, 83, 84, 85, 86, 87, 113, 114

Index 137
Becker, Elli, 117
Becker, Samuel, 120, 124
Beh, Michelle Jia Wei, 111
Behling, Madeline, 21
Benes, Ashley, 51
Benish, Sarah, 21
Benson, Gabrielle, 5
Bergen, Logan, 32, 83, 84
Bettack, Hannah, 60
Billingsley, Emily, 125, 128
Bjorkman, Bryce, 60
Black, Kayla, 27
Bloom, Matrice, 3, 128
Blouin, Wil, 79, 84
Bomann, Blake, 13
Booth, Emma, 107
Borchert, Addison, 115
Borreson, Paige, 118
Boucher, Kathryn, 54
Brassel, Michelle, 101
Brennan, Mary, 42
Brock, Natalie, 88
Brooks, Alexa, 115
Brown, Gloria, 40
Bruggenthies, Kaitlyn, 27
Brunsell, Kristin, 49
Bryson, Hannah, 3
Buck, Erin, 46
Buehl, Klaudia, 131
Buerger, Cassandra, 7
Burmeister, Nathalie, 117
Butcher, Gary, 101
Buttafuoco, Jaclyn, 66
Carney, Colton, 94
Castel, Cole, 94
Castellanos, Emmanuel, 120
Cavanaugh, Clayton, 112
Chadbourm, Mikayla, 72
Chapin, Elise, 112
Charlesworth-Seiler, Eva, 78
Cheasick, Emily, 119
Check, Brianna, 78
Chen, Jiameng, 1
Chen, Luqi, 2, 35
Chen, Xiaochun, 2, 36
Chojnacki, Sarah, 20
Choong, Catrena Jing Yi, 1, 36
Churchill, Haley, 113
Ciolkosz, Katherine, 54
Clark, Summer, 68
Coker, Adara, 67, 111
Coleman, Bryelle, 8
Cornett, Roy, 3
Cranston, Roy, 40
Cross, Anaís, 121
Cruciani, Emma, 38
Czudec, Emily, 40
Dallman, Brynn, 97
Damitz, Rebekah, 58, 121
Dehnke, Kaitlyn, 14, 53
Dekan, Garrett, 59
Delikowski, Hunter, 33
Deling, Taylor, 54
Dittrich, Benjamin, 19
Dixon, Shannon, 20
Doan, Anthony, 96
Dobbertin, Megan, 46
Dong, Yuchi, 63
Dorn, Holly, 123
Dorschner, Gloria, 41
Dorschner, Raymond, 17
Dortch, Sierra, 120, 122, 124, 126
Dowden, Carissa, 55, 57
Doyle, Jordan, 28
Dracheneberg, Lindsey, 126
Draghichio, Jacob, 81
Drangstveit, Emma, 39
Draxler, Elliot, 89
Drexler, Rian, 119, 122
Drost, Eric, 85, 86
Du, Xinyan, 2, 34
Earle, Sofia, 117, 118
Edge, Jasmine, 119
Edwards, Samantha, 67
Emole, Julian, 55
Erickson, Jacob, 94
Espin, Mirella, 57
Euerstenberg, Madeline, 113, 114
Evans, Leeshaun, 101
Fabian, Maya, 38
Fackler, Colin, 96
Fetkenheuer, Jordyn, 3, 123
Finger, Emily, 92, 94
Fink, Andrew, 107
Fischer, Emma, 95
Fix, Anna, 68
Flotttemesch, Emma, 29
Fogarty, Jared, 15, 108
Foltz, Maggie, 18
Forrest, Madeline, 102
Fossum, Carl, 2, 82
Francis, John, 1, 114
Frandsen, Elyse, 12
Freiberg, Ryley, 45
Fruit, Nicholas, 123
Fuerstenberg, Madeline, 82, 83, 86, 87
Fuhrman, Brandon, 17
Furman, Brandon, 17
Galloway, Madison, 32
Giler, Nathan, 15, 108
Glaeser, Kyle, 6
Glaeser, Megan, 115
Glover, Geoffrey, 60
Gmeiner-Anderson, Aleah, 51
Goettl, Martin, 32
Gonzales, Tyler, 62
Goodrich, Corey, 31
Gorg, Madelynn, 89
Gravrok, Ruby, 68
Green, Carley, 34
Grogan-Ripp, Lucy, 106
Grunzke, Peyton, 37
Gu, Jerry, 6
Guenther, Kaitlyn, 24
Guenthner, August, 32, 85, 111
Guyer, Daniel, 61
Hall Jefferson, 20
Halls, Jacob, 54
Halverson, Emma, 15, 108
Hammer, Anna, 22
Hammick, Madisyn, 69, 71, 72
Hanke, Natasha, 39
Hanson, Paige, 32
Hanson, Skyler, 63
Harris, Sara, 38
Hartke, Hunter, 61
Hartnett, Nate, 97
Haschke, Cole, 44
Hassemer, Allison, 103
He, Xiaofan, 2, 36
Hedberg, Caitlin, 56, 76
Heffel, Jessica, 45
Helmuth, Shawna, 4, 48
Henrich, Isabelle, 73
Her, Chue Tu, 54
Herzberg, Caitlin, 123
Hessburg, Jeffrey, 89
Hessler, Daniel, 64
Hietpas, Rachyl, 56
Hite, Emily, 120, 124
Hoeksema, Stephanie, 5
Hoenisch, Grace, 34
Hoepner, Hallee, 12, 28
Hook, Glen, 3, 86, 89, 90
Hottmann, Megan, 69, 73
Huang, Siyuan, 2, 35
Hunger, Andrea, 3, 95
Huther, Holly, 79
Idarraga, Katrina, 26
Jacobson, Megan, 47
Jacobson, Regan, 90
Jaeb, Michael, 10
Jaeger, Emily, 27
Jagodinski, Madeline, 14
Jahnke, Hannah, 69, 73
Janicki, Garrett, 46
Javoroski, Hannah, 23
Jeffries, Tyler, 79
Jehn, Julia, 69, 71, 72
Jerviss, Kelly, 86
Jiao, Tianqi, 2, 34
Jilek, Logan, 14
Johnson, Abigail, 22
Johnson, Anneka, 70
Johnson, Benjamin, 77, 81
Johnson, Kyla, 22
Johnson, Leo, 17, 41
Jones, Jacie, 7, 21
Jones, Jessica, 54
Jorgensen, Keith, 69, 71, 72, 122, 128
Jozwiak, Alison, 29
Kabelitz, Hanah, 102
Karn, Amber, 103
Kastner, Abigail, 51
Keane, Grant, 62
Kent, Sophie, 8
Kephart, Madisyn, 4, 48
Kha, Carter, 21
Khan, Anna, 5
Khang, Lue, 112
Kiander, Gabrielle, 104
Knochenmus, Adam, 34
Knoke, Karen, 95
Knuth, Madigan, 124
Kocen, Julia, 98
Kociuba, Skyler, 127
Koeksema, Stephanie, 10
Kofman, Chloe, 82, 83, 86, 87, 113, 114
Kolar, Krista, 11
Kosmer, Brianna, 12
Kostreva, Mckenzie, 125
Kough, Kaisa, 33
Kramer, April, 42
Krekelberg, Maris, 31
Kremsreiter, Zoe, 52
Krueger, Rebecca, 58
Kruswicki, Elaine, 58
Kulinich, Anastassiya, 2, 35
Kysely, Taylor, 69, 73
La Favor, Connor, 14
Laehn, Connor, 59
Lahti, Hannah, 23, 54
Lambrecht, Cade, 6, 23, 54
Langfield, Katherine, 92, 93
Langley, Camryn, 124
Laporte, Theresa, 8, 9
Lara, Skylee, 29
Larson, Alexandra, 51
Larson, Anna, 8
Larson, Callie, 27
Larson, Megan, 31
Larson, Molly, 1, 114
Lazowski, John, 62
Lee, Gaoyer, 128
Lehman, Emma, 45
Lehmann, Emily, 4
Lemke, Kelly, 69, 71, 72
LeMoine, Hannah, 63
Lewis, Hannah, 62
Lewis, Michael, 114
Ley, Anna, 79
Li, Yifan, 2, 34
Libera, Rachel, 132
Liebau, Jessica, 81
Lim, Joey, 29
Limberg, Taylor, 32, 33
Lind, Dana, 69, 70, 72
Lindberg, David, 77
Loh, Kola, 62
Lohman, Jennifer, 17
Lortie, Margot, 124
Lucas, Madison, 70
Lui, Timothy, 3, 97
Lundeen, Evan, 94
Lydeen, Nicholas, 98
Ma, Yuting, 2, 36
Mades, Hannah, 49
Majeski, Samantha, 31
Maksymkiw, Sophie, 71, 72
Malin, Chloe, 91
Mallman, Eric, 62, 111
Mangin, Matthew, 32, 33
Manthey, Megan, 117
Marcus, Kathleen, 69, 72
Marek, Morgan, 123
Mares, Eryn, 73
Marquardt, Levi, 125
Marx, Aimee, 10
Mason, Abigail, 38
Matthias, Jena, 102
Mattson, Cassidy, 126
Mayer, Madeleine, 109
McCarver, Calli, 101
McCaughin, Patrick, 99
McCloud, Collis, 101
McClun, Conor, 5
McCracken, Cailin, 78
McFadzen, Tyler, 45
McFarlane, Talyn, 14
McGillick, Regan, 9
Mckern, Abigail, 22
McMahon, Nicole, 59
Mcmannon, Mary, 5
McQuay, Miles, 107
Medenwald, Kallie, 29
Meier, Anna, 4, 80
Meier, Joel, 1, 115
Melvin, Mallory, 47
Menard, Lawton, 70, 72
Metko, Muriel, 71, 78
Meyer, Samantha, 78
Miller, Benjamin, 16, 109
Miller, Caitlin, 130
Mo, Sicheng, 63
Moeller, Madison, 120, 124
Moen, Hannah, 102
Monson, Caitlin, 70
Mooney, Rachel, 79
Moran, Andrew, 31, 111
Morgan, James, 5, 18
Morris, Carly, 111
Morris, Caroline, 132
Mottishaw, Whitney, 79
Munos, Jordan, 79
Murray, Kayla, 8
Mutka, Amber, 71
Myers, Josie, 113
Narkiewicz-Jodko, Alexander, 2, 82
Nelson, Elizabeth, 22
Nelson, Trevor, 3, 91
Neuman, Victoria, 72
Neupert, Clara, 102
Nguyen, Trung, 112
Niesen, Katelyn, 33
Noel, Jillanne, 46
Noffke, Tyson, 3, 91
Norman, Madeline, 10, 47
Nuck, Grace, 128
Oawster, Erica, 104
Ocwieja, Stephanie, 24
O’Keefe, Kerry, 69, 72, 73
Olsen, Ceana, 68
Olson, Colleen, 99
Olson, Kristina, 122, 126
Omweno, Mellie, 73
Onken, Emily, 127
Orlavsky, Mitchel, 14
Oswald, Gabriella, 12, 28
Ott, Isabella, 30
Overeem, Heidi, 30
Owens, Carley, 122, 125, 127
Pagel, Courtney, 5
Pajtash, Wyatt, 107
Panos, Sam, 1, 115
Parsons, Katie, 28
Paukner, Dawn, 63
Paulich, Katie, 3, 74, 119, 122, 123, 128
Peirchel, Sarah, 116
Peoples, Summer, 4, 48
Perinchery, Rivin, 15, 108
Peterson, Benjamin, 48
Peterson, Elizabeth, 14, 54
Peterson, Hannah, 22
Peterson, Leslie, 6, 8, 106
Peterson, Zachary, 19
Petrey, Alex, 123
Petrovich, Shaun, 107
Phillips, Benjamin, 17
Plachetka, Cassandra, 48
Plack, Naomi, 72
Plano, Alyssa, 21
Wagener, Emily, 129
Wagner, Jena, 124
Wait, Karina, 47
Walbrun, Zachary, 78
Walker, Ashley, 68
Walker, Whitney, 32
Walkowiak, Nicholas, 26, 130
Walstead, Dana, 27
Walther, Craig, 50
Walz, Caroline, 106
Wang, Suyu, 35
Waters, Claudia, 80
Webb, Caleb, 105
Weber, Daniel, 93
Weeks, Katelyn, 81
Wei, Han, 2, 35
Weinzel, Murphi, 2, 81, 82
Weise, Janessa, 100
Wellnitz, Todd, 70
Wendel, Hannah, 45
Wenzel, Michael, 3, 82
Westerland, Sarah, 120, 124
White, Cole, 106
White, Frankie, 6
White, Gabrielle, 21
Wichert, Kristin, 4, 11, 43
Wickler, Rebecca, 49
Wiemer, Courtne, 107
Willet, Paul, 101
Williamson, Zachary, 45
Wilson, Joel, 75
Winkler, Eric, 1, 110
Wiswell, Ashley, 105
Witt, Emily, 75

Witzgall, Sebastia, 4
Wong, Foong, Min, 53, 60, 64
Wood, Hunter, 32
Wozniak, Mitchell, 54
Wozniak, Noelle, 38, 39
Wu, Shanggian, 1, 110
Xia, Yinxing, 2, 36
Xiong, Thomas, 106
Xu, Xue, 2, 35
Yan, Ruifeng, 2
Yang, Xinyan, 2, 36
Yang, Yuchen, 1, 36
Yang, Yufan, 2, 35
Zajac, Jonathan, 123
Zaleski, Marissa, 79
Zehner, Britanny, 79
Zember, Brendan, 44
Zens, Melanie, 13
Zenzen, Emma, 7
Zhang, Chi, 2, 35
Zhang, Shuaijie, 2, 36
Zhang, TianYi, 2, 36
Zhao, Zhen, 2, 35
Zhou, Luolu, 1, 36
Zhou, Si, 1, 31
Zhou, Sisi, 110
Ziehme, Vanessa, 31
Ziepke, Alexandra, 121
Zigler, Erin, 30
Zilm, Zachary, 101
Zimbaue, Loralei, 104
Zine, Brittany, 37
Zimhelt, Zachary, 52
Zoellner, Monica, 69
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