Schedule

Friday, April 24th

7:30 – 8:30 a.m.
Registration, Union Wisconsin Room
Poster Set-Up (Session I), Union Wisconsin Room
Continental Breakfast, Union Ballroom

8:30 a.m.
Opening Remarks, Union Ballroom

9:00 – 10:20 a.m.
Oral Session I, Union Breakout Rooms

10:30 – 11:45 a.m.
Poster Session I, Union Wisconsin Room

11:45 – 12:45 p.m.
Lunch and Keynote Address, Union Ballroom

12:45 – 1:00 p.m.
Poster Set-Up (Session II), Union Wisconsin Room

1:00 – 2:20 p.m.
Oral Session II, Union Breakout Rooms

2:30 – 3:45 p.m.
Poster Session II, Union Wisconsin Room

4:00 p.m.
Closing Remarks, Union Wisconsin Room
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Letter of Welcome

Dear Symposium Attendees:

Welcome to the 14th Annual UW System Symposium for Undergraduate Research and Creative Activity. Close to 700 students from across the UW System are here today to share some of the results of their research and creative efforts from this last year. This is a busy season for undergraduate research across the state with students presenting at their own campus symposia and national undergraduate and disciplinary conferences. We are thrilled at the strong showing for this event: it is a testament to the strength of undergraduate research initiatives at all the UW System campuses. Beyond the students, over 200 faculty, staff, and graduate students have volunteered today to serve as judges at this event (please thank them when you see them walking around with their clipboards!).

Events like this Symposium are made possible only through the committed efforts of a great many people and organizations. On behalf of the UWM Office of Undergraduate Research, I would like to thank President Ray Cross and the UW System administration, the Provosts of the System universities, and UWM Chancellor Mark Mone for making this event possible; Dean Rodney Swain of the UWM College of Letters and Science and L&S IT Office (LSITO) for critical technology support; Caterina Sukup, John Kempken, and Patricia Kissinger of the L&S College Office for their guidance with financial matters; and UWM's Union Reservations and Event Planning Services for all their logistical help in organizing this event. Also, we want to thank the faculty and graduate students who have committed themselves to working collaboratively with undergraduates at all our universities. Too often the work of research mentors is unseen and unacknowledged. As much as this event is a celebration of the work of our undergraduate students, it is also a celebration of the Wisconsin Idea and the commitment of our universities to our students and our state. Finally, I would like to express my continued gratitude to my colleagues in the Office of Undergraduate Research – Kyla Esguerra, Tamara Long, and Scott Payne.

The first of these System-wide symposia was hosted by the University of Wisconsin-LaCrosse in 1999. Over the years, the event has also been hosted by the Eau Claire, Oshkosh, Stout, River Falls, and Parkside campuses. As this year's host, we are pleased to welcome students, faculty, staff, and, yes, parents from across Wisconsin to Milwaukee and UWM. We encourage you to take this opportunity to learn about the extraordinary research collaborations happening across our state and hope that you will continue to advocate for undergraduate research initiatives on your campuses!

Sincerely,

Nigel Rothfels, Director
Office of Undergraduate Research
Information

Registration - Outside of the Wisconsin Room, Union 2nd Floor
Registration will be open from 7:30 a.m. to 4:30 p.m. All attendees can pick up Symposium information and T-shirts at registration.

Coat Check - Fireside Lounge, Union 1st Floor
For your convenience, a complimentary coat check is located in the Fireside Lounge on the first floor of the Student Union. Bags and posters may also be checked. It will be open from 7:30 a.m. to 4:30 p.m.

Faculty/Staff/Judge’s Lounge - Union 220
For faculty, staff, alumni, retired faculty guests, and all those serving as judges, Union 220 will be available with seating, a coffee station, and outlets for charging your electronic devices.

UWM Graduate School - Union 2nd Floor Hallway
Be sure to stop by the UWM Graduate School table just outside of the Wisconsin Room to pick up information about the graduate programs available at UW-Milwaukee from 9:00 a.m. to 4:00 p.m.
Symposium Schedule—Friday, April 24th, 2015

7:30 – 8:30 a.m.
Registration, Union Wisconsin Room
Visual Art Set-Up (Union Fireside Lounge)
Poster (Session I) Set-Up, Union Wisconsin Room
Oral Presentation Set-Up (Load PowerPoints in Union Breakout Rooms)
Breakfast, Union Ballroom

8:30 a.m.
Opening Remarks, Union Ballroom

9:00 – 10:20 a.m.
Oral and Performing Arts Session I, Union Breakout Rooms

9:00 – 11:00 a.m.
Visual Art Session I, Union Fireside Lounge

10:30 – 11:45 a.m.
Poster Session I, Union Wisconsin Room

11:15 – 12:00 p.m.
Research and URSCA Administrators Meeting, Union 220

11:45 – 12:45 p.m.
Lunch and Keynote Address, Union Ballroom

12:45 – 1:00 p.m.
Poster Set-Up (Session II), Union Wisconsin Room
Oral Presentation Set-Up (Load PowerPoints in Union Breakout Rooms)

1:00 – 2:20 p.m.
Oral and Performing Arts Session II, Union Breakout Rooms

1:00 – 3:00 p.m.
Visual Art Session II, Union Fireside Lounge

2:30 – 3:45 p.m.
Poster Session II, Union Wisconsin Room

3:45 p.m.
Closing Remarks and Acknowledgment of Outstanding Presentations, Union Wisconsin Room
Keynote, 12:00 p.m., Union Ballroom

"The Impact of Undergraduate Research upon the Local and Global 'Village': Digital Craft Research in the Area of 3D Printed Adaptive Devices"

Frankie Flood is an Associate Professor at the University of Wisconsin in Milwaukee where he teaches in the Jewelry & Metalsmithing area and oversees the Digital Craft Research Lab at UWM. Flood is a graduate of the University of Illinois, Urbana-Champaign, where he received his Master of Fine Art degree in Metalsmithing.

Frankie Flood’s interest in machines and tools and the influence of his working class upbringing is a source of inspiration for the functional objects that he creates. Flood exhibits his work nationally and internationally and his work has received many awards and has been published widely. The connection between design and fabrication and how each is influenced by material and process has been the focus of Flood’s recent research.

Within the last three years Frankie has been granted $135,000 in personal and educational grant funding by the National Endowment for the Arts, the UWM Digital Future Grant, The Mary Tingley Grant (Greater Milwaukee Foundation), The UWM Graduate School Research Committee, and The Peter S. Reed Foundation for his research in digital technology for the production of art. In addition, Frankie was recently awarded a UWM Distinguished Undergraduate Teaching Award to recognize excellence in teaching.

www.frankieflood.com
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<thead>
<tr>
<th>Location</th>
<th>Time</th>
<th>First Name</th>
<th>Last Name</th>
<th>Area of Research</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>Union 179</td>
<td>9:00 AM</td>
<td>Basha Harris et al.</td>
<td>UW-Milwaukee</td>
<td>Jewelry &amp; Metals</td>
<td>Grow</td>
</tr>
<tr>
<td>Union 181</td>
<td>9:00 AM</td>
<td>Thomas Gehrman</td>
<td>UW-Oshkosh</td>
<td>Physics/Astronomy</td>
<td>RR Lyrae Stars in the Sagittarius Dwarf Galaxy Globular Cluster Arp 2</td>
</tr>
<tr>
<td>Union 183</td>
<td>9:00 AM</td>
<td>Danny Knill</td>
<td>UW-Fox Valley</td>
<td>Sociology</td>
<td>Bathrooms, Sexuality, and Marriage: An Illustration of the Sex/Gender Binary</td>
</tr>
<tr>
<td>Union 240A</td>
<td>9:00 AM</td>
<td>Zach Albert et al.</td>
<td>UW-Park Valley</td>
<td>Geosciences</td>
<td>Adsorption of Atenolol on Kaolinite</td>
</tr>
<tr>
<td>Union 240B</td>
<td>9:00 AM</td>
<td>Taylor Atkinson et al.</td>
<td>UW-Stevens Point</td>
<td>Biology</td>
<td>Got Chlorophyll? The Investigation of Two Chlorophyll-Deficient Mutants in Soybeans</td>
</tr>
<tr>
<td>Union 250</td>
<td>9:00 AM</td>
<td>Ana Breit</td>
<td>UW-Stevens Point</td>
<td>Biology</td>
<td>Herbivory and Nectar Traits in Asclepias: Effects of Leaf Damage on Pollen Movement</td>
</tr>
<tr>
<td>Union 260</td>
<td>9:00 AM</td>
<td>Helie Vazquez Valverde et al.</td>
<td>UW-Eau Claire</td>
<td>Economics</td>
<td>Assessing American and Chinese Citizen Support for Joining an International Climate Change Treaty</td>
</tr>
<tr>
<td>Union 280</td>
<td>9:00 AM</td>
<td>Karrica Andersen et al.</td>
<td>UW-Parkside</td>
<td>Sociology/Anthropology</td>
<td>Educational Outcomes or Educational Opportunities: Students and Faculty Members' Perceptions on Sense of Academic Entitlement</td>
</tr>
<tr>
<td>Union 179</td>
<td>9:20 AM</td>
<td>Allecia Kruser</td>
<td>UW-La Crosse</td>
<td>Art</td>
<td>Art and Yoga in Perspective: Applications of Historical Techniques in Contemporary Practices</td>
</tr>
<tr>
<td>Union 181</td>
<td>9:20 AM</td>
<td>Kelsey Holbert</td>
<td>UW-Milwaukee</td>
<td>Chemistry</td>
<td>A Kinetic Study of the Early Stages of the Maillard Reaction</td>
</tr>
<tr>
<td>Union 183</td>
<td>9:20 AM</td>
<td>Milan Outlaw</td>
<td>UW-Milwaukee</td>
<td>School of Architecture &amp; Urban Planning</td>
<td>Rethinking the Void</td>
</tr>
<tr>
<td>Union 240A</td>
<td>9:20 AM</td>
<td>Joseph Ripley</td>
<td>UW-Superior</td>
<td>LSNERR</td>
<td>Investigating the Causes of Low Dissolved Oxygen in the St. Louis River Estuary</td>
</tr>
<tr>
<td>Union 250</td>
<td>9:20 AM</td>
<td>Rebecca Kelble</td>
<td>UW-Stevens Point</td>
<td>Wildlife Ecology</td>
<td>Seasonal Food Habits of Bobcat (Lynx rufus) in Central Wisconsin</td>
</tr>
<tr>
<td>Union 260</td>
<td>9:20 AM</td>
<td>Brittany Flaherty et al.</td>
<td>UW-Eau Claire</td>
<td>Economics</td>
<td>A Contingent Valuation Study Comparing Public Willingness to Pay for Climate Change Mitigation in China and the United States</td>
</tr>
<tr>
<td>Union 280</td>
<td>9:20 AM</td>
<td>Abigail Hanley</td>
<td>UW-Whitewater</td>
<td>Sociology</td>
<td>The Use of Concept Mapping as a Pedagogical Tool Revisited</td>
</tr>
<tr>
<td>Union 179</td>
<td>9:40 AM</td>
<td>Juniper Yun Kruser</td>
<td>UW-Milwaukee</td>
<td>Art History</td>
<td>The Spectrum of Authenticity and Visual Culture of the Mosuo Identity in the Challenge of a Tourism Driven Economy</td>
</tr>
<tr>
<td>Union 181</td>
<td>9:40 AM</td>
<td>Katherine Jinkins</td>
<td>UW-Platteville</td>
<td>Engineering Physics</td>
<td>Examination of Humidity Effects on Measured Thickness and Interfacial Phenomena of Exfoliated Graphene on SiO2 via AC-AFM</td>
</tr>
<tr>
<td>Union 183</td>
<td>9:40 AM</td>
<td>Cory Smith</td>
<td>UW-River Falls</td>
<td>English</td>
<td>How to Deal with Problems Often Overlooked in Society</td>
</tr>
</tbody>
</table>
### Schedule of Oral Presentations by Time

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<thead>
<tr>
<th>Location</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Union 240A</td>
<td>9:40 AM</td>
<td>Thatcher Rogers</td>
<td>UW-La Crosse</td>
<td>Sociology/Archaeology</td>
<td>A Comparative Analysis of Small Scale Medio and Post-Paquime Lithic Assemblages in Casas Grandes, Chihuahua, Mexico.</td>
</tr>
<tr>
<td>Union 240B</td>
<td>9:40 AM</td>
<td>Joseph Grosskopf</td>
<td>UW-Stevens Point</td>
<td>Department of Biology</td>
<td>A New Method for Analysis of Polysaccharides in Vessel Cell Wall</td>
</tr>
<tr>
<td>Union 250</td>
<td>9:40 AM</td>
<td>Austin Noring</td>
<td>UW-Stevens Point</td>
<td>Fisheries and Water Resources</td>
<td>Factors Effecting Growth Trajectory of Walleye in Northern Wisconsin Lakes</td>
</tr>
<tr>
<td>Union 260</td>
<td>9:40 AM</td>
<td>Ryan Ruegsegger</td>
<td>UW-River Falls</td>
<td>English</td>
<td>China’s Dairyman</td>
</tr>
<tr>
<td>Union 280</td>
<td>9:40 AM</td>
<td>Whitney Mathern</td>
<td>UW-River Falls</td>
<td>TESOL</td>
<td>Combining English Education with Outdoor Education</td>
</tr>
<tr>
<td>Union 181</td>
<td>10:00 AM</td>
<td>Garrett Johnson</td>
<td>UW-Stevens Point</td>
<td>College of Natural Resources</td>
<td>Biotic and Abiotic Factors Influencing Walleye Recruitment in Escanaba Lake, Wisconsin from 1958-2013</td>
</tr>
<tr>
<td>Union 183</td>
<td>10:00 AM</td>
<td>Anna Yontz</td>
<td>UW-Milwaukee</td>
<td>Economics</td>
<td>Public Good vs. Private Gain: An Experiment in Alternatively Commuting</td>
</tr>
<tr>
<td>Union 240A</td>
<td>10:00 AM</td>
<td>Aaron Schiller</td>
<td>UW-Stevens Point</td>
<td>U.S. Geological Survey, Wisconsin Cooperative Fishery Research Unit, University</td>
<td>Smallmouth Bass Movements in the Menominee River, Wisconsin-Michigan</td>
</tr>
<tr>
<td>Union 250</td>
<td>10:00 AM</td>
<td>Ari Stone</td>
<td>UW-Milwaukee</td>
<td>Biology</td>
<td>Effects of Histone Deacetylase Inhibitors on Viability and Maturation of Tumor-Induced Myeloid-Derived Suppressor Cells</td>
</tr>
<tr>
<td>Union 280</td>
<td>10:00 AM</td>
<td>Hannah Blum et al.</td>
<td>UW-Green Bay</td>
<td>Human Development</td>
<td>Phoenix GPS: A Wholistic College Transition Approach for Underrepresented Students</td>
</tr>
<tr>
<td>Union 179</td>
<td>1:00 PM</td>
<td>Amy Donahue et al.</td>
<td>UW-Milwaukee</td>
<td>Public Health</td>
<td>Identifying Possibly Pleiotropic Comorbidities Using Genetic Variant and Phenotypic Data</td>
</tr>
<tr>
<td>Union 181</td>
<td>1:00 PM</td>
<td>Paul Grosskopf</td>
<td>UW-Stevens Point</td>
<td>English</td>
<td>“This time is ours. This world is ours. The power is ours.” The Religion of the Dark Knight</td>
</tr>
<tr>
<td>Union 183</td>
<td>1:00 PM</td>
<td>Ariel Reker</td>
<td>UW-La Crosse</td>
<td>History</td>
<td>[art]ifact: The First Phase of an Innovative Exhibit</td>
</tr>
<tr>
<td>Union 191</td>
<td>1:00 PM</td>
<td>Ellen Aboalt et al.</td>
<td>UW-Milwaukee</td>
<td>Linguistics</td>
<td>/e/ vs. /e/ in Non-Native Productions of Spanish and English</td>
</tr>
<tr>
<td>Union 240A</td>
<td>1:00 PM</td>
<td>Shawn Bost</td>
<td>UW-Milwaukee</td>
<td>History</td>
<td>Except as Punishment for a Crime: The Beleaguerd History of the 13th Amendment.</td>
</tr>
<tr>
<td>Union 240B</td>
<td>1:00 PM</td>
<td>Esme Barniskis</td>
<td>UW-Milwaukee</td>
<td>Architecture and Urban Planning</td>
<td>Student-Driven and Immersive Learning in the Buildings-Landscapes-Cultures Field School</td>
</tr>
<tr>
<td>Union 250</td>
<td>1:00 PM</td>
<td>Zachary Herriges</td>
<td>UW-Whitewater</td>
<td>Economics</td>
<td>How Mitigation Spending Affects Ex Post Disaster Damages</td>
</tr>
<tr>
<td>Union 260</td>
<td>1:00 PM</td>
<td>David Bennett</td>
<td>UW-Milwaukee</td>
<td>Psychology</td>
<td>Relations Between Emotion Regulation and Pubertal Development in Children with Williams Syndrome</td>
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<tbody>
<tr>
<td>Union 280</td>
<td>1:00 PM</td>
<td>Jisu Kim et al.</td>
<td>UW-Eau Claire</td>
<td>Economics</td>
<td>Measuring the Impact of Incentives on School Level (Aggregate) Fruit and Vegetable Consumption in Two Wisconsin Elementary Schools</td>
</tr>
<tr>
<td>Union 179</td>
<td>1:20 PM</td>
<td>Kelsey Lewien</td>
<td>UW-La Crosse</td>
<td>Nuclear Medicine Technology</td>
<td>Implementing a Modified Russell Two-Point Method to Measure Glomerular Filtration Rates (GFR)</td>
</tr>
<tr>
<td>Union 181</td>
<td>1:20 PM</td>
<td>Sara Hilliger</td>
<td>UW-La Crosse</td>
<td>English</td>
<td>The Importance of Environmental Apocalypse in Cormac McCarthy’s The Road</td>
</tr>
<tr>
<td>Union 183</td>
<td>1:20 PM</td>
<td>David Stock</td>
<td>UW-Milwaukee</td>
<td>Honors College</td>
<td>What’s the Deal with Women: Aristophanes’ Nebulous Feminism</td>
</tr>
<tr>
<td>Union 191</td>
<td>1:20 PM</td>
<td>Briana Beebe</td>
<td>UW-River Falls</td>
<td>International Student Services Coordinator/English/TESOL</td>
<td>Unconventional yet Innovative Composition Assignments</td>
</tr>
<tr>
<td>Union 240A</td>
<td>1:20 PM</td>
<td>Stephanie Holt</td>
<td>UW-La Crosse</td>
<td>Political Science</td>
<td>The Comparative Study of the Academic Effectiveness of Milwaukee College Preparatory School (MCPS) and Milwaukee Public Schools (MPS)</td>
</tr>
<tr>
<td>Union 240B</td>
<td>1:20 PM</td>
<td>Shelby Schuppe</td>
<td>UW-Stout</td>
<td>Applied Social Science</td>
<td>International Influence on the Dissolution of Yugoslavia and Displacement of Refugees</td>
</tr>
<tr>
<td>Union 250</td>
<td>1:20 PM</td>
<td>Tyler Peters et al.</td>
<td>UW-Stevens Point</td>
<td>Mathematical Sciences</td>
<td>Bivariate Mathematical Induction for N-Consecutive Game Athletic Schedules</td>
</tr>
<tr>
<td>Union 260</td>
<td>1:20 PM</td>
<td>Rachel Boraca</td>
<td>UW-Parkside</td>
<td>Psychology</td>
<td>An Examination of Auditory Experience and Change Deafness to Natural Scenes</td>
</tr>
<tr>
<td>Union 280</td>
<td>1:20 PM</td>
<td>Alex Brault et al.</td>
<td>UW-Eau Claire</td>
<td>Economics</td>
<td>Successes, Challenges and Recommendations Regarding Using Incentives to Increase School Level (Aggregate) Fruit and Vegetable Consumption in Elementary Schools</td>
</tr>
<tr>
<td>Union 179</td>
<td>1:40 PM</td>
<td>Quincy Mccarthy</td>
<td>UW-Parkside</td>
<td>Computer Science</td>
<td>A Survey of Current Advances in Quantum Computing</td>
</tr>
<tr>
<td>Union 181</td>
<td>1:40 PM</td>
<td>Kourtney Sande</td>
<td>UW-Superior</td>
<td>World Languages, Literature, &amp; Culture</td>
<td>Imagery &amp; Imagination: The Psychological Ideal of the Gothic Explored in William Faulkner's “A Rose for Emily”</td>
</tr>
<tr>
<td>Union 183</td>
<td>1:40 PM</td>
<td>Katherine Svitavsky</td>
<td>UW-La Crosse</td>
<td>English</td>
<td>Expediency Over Ethics: Rhetorical Choices and Implications in the Media of ChildFund International</td>
</tr>
<tr>
<td>Union 191</td>
<td>1:40 PM</td>
<td>Samuel Ewert</td>
<td>UW-Whitewater</td>
<td>Music Education</td>
<td>Exploring Alternative String Playing</td>
</tr>
<tr>
<td>Union 240A</td>
<td>1:40 PM</td>
<td>Natalie Kellerman</td>
<td>UW-La Crosse</td>
<td>Sociology</td>
<td>At Risk as Disrespect: The Experience of Black Male Youth in Wisconsin</td>
</tr>
<tr>
<td>Union 240B</td>
<td>1:40 PM</td>
<td>Katelyn Stienen</td>
<td>UW-Oshkosh</td>
<td>Accounting</td>
<td>Financing the American Dream: The Struggles and Possibility of Hispanic Immigrants Starting a Business in the US</td>
</tr>
<tr>
<td>Union 250</td>
<td>1:40 PM</td>
<td>Thao Tran et al.</td>
<td>UW-Eau Claire</td>
<td>Mathematics</td>
<td>Deformations of 5 Dimensional Complex Non-nilpotent Associative Algebras</td>
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<tbody>
<tr>
<td>Union 260</td>
<td>1:40 PM</td>
<td>Christopher Medina-</td>
<td>UW-Milwaukee</td>
<td>Psychology</td>
<td>The Effects of Marijuana Use on Cognition and the Impact of Current Marijuana Policy and Legislation on Society</td>
</tr>
<tr>
<td>Union 280</td>
<td>1:40 PM</td>
<td>Mieszko Brikis</td>
<td>UW-Superior</td>
<td>Social Inquiry</td>
<td>Food Consumption and Accessibility: Creating Opportunities for Student Voices to be Heard</td>
</tr>
<tr>
<td>Union 179</td>
<td>2:00 PM</td>
<td>Taylor Rydahl</td>
<td>UW-Oshkosh</td>
<td>Computer Science</td>
<td>Algorithm Visualizations for the Lambda Calculus</td>
</tr>
<tr>
<td>Union 181</td>
<td>2:00 PM</td>
<td>April Wkles</td>
<td>UW-La Crosse</td>
<td>English</td>
<td>Who Are You In Wonderland?</td>
</tr>
<tr>
<td>Union 183</td>
<td>2:00 PM</td>
<td>Devlin Grimm</td>
<td>UW-Milwaukee</td>
<td>Theatre</td>
<td>Actor to Audience and Back Again: The New Performance Dialogue</td>
</tr>
<tr>
<td>Union 191</td>
<td>2:00 PM</td>
<td>Kristen Rasmussen</td>
<td>UW-River Falls</td>
<td>English</td>
<td>Employing Innovative Composition Assignments with Mandated Literature: Infographics and The Scarlett Letter, Student-led Poetry Writing Workshops, and Student-generated Great Gatsby AP Prompts</td>
</tr>
<tr>
<td>Union 240A</td>
<td>2:00 PM</td>
<td>Melady Vue et al.</td>
<td>UW-Eau Claire</td>
<td>Social Work</td>
<td>Campus Racial Climate</td>
</tr>
<tr>
<td>Union 240B</td>
<td>2:00 PM</td>
<td>Kazoua Vang et al.</td>
<td>UW-Milwaukee</td>
<td>Department of History &amp; Hmong Diaspora Studies Program</td>
<td>Seeking Refuge: Hmong Life in Milwaukee</td>
</tr>
<tr>
<td>Union 250</td>
<td>2:00 PM</td>
<td>Alex Van Abel</td>
<td>UW-Milwaukee</td>
<td>Mathematical Sciences</td>
<td>A Probabilistic Approach to Conway's Game of Life (And Related Cellular Automata)</td>
</tr>
<tr>
<td>Union 260</td>
<td>2:00 PM</td>
<td>Pearl Wright</td>
<td>UW-Oshkosh</td>
<td>Religious Studies</td>
<td>Internet Religion: Community Formation on Wiccan Web Sites</td>
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<td>Union 280</td>
<td>2:00 PM</td>
<td>Rachel Kinzler</td>
<td>UW-Milwaukee</td>
<td>Nursing</td>
<td>A Breastfeeding Friendly Environment for African American Families</td>
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### Schedule of Visual Arts Presentations by Time

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<td>Fireside Lounge</td>
<td>9:00 AM</td>
<td>Mitchell Branscombe et al.</td>
<td>UW-Milwaukee</td>
<td>Art</td>
<td>The Sidewall Ball</td>
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<tr>
<td>Fireside Lounge</td>
<td>9:20 AM</td>
<td>Natalia Fernandes</td>
<td>UW-River Falls</td>
<td>Art</td>
<td>Geoglazing in Traditional Japanese Wood Fired Kilns</td>
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<td>Fireside Lounge</td>
<td>9:40 AM</td>
<td>Harrison Halaska</td>
<td>UW-Whitewater</td>
<td>Art &amp; Design</td>
<td>The Unexpected Results of Daily Painting</td>
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<td>Fireside Lounge</td>
<td>10:00 AM</td>
<td>Mana Rodriguez</td>
<td>UW-Whitewater</td>
<td>Art &amp; Design</td>
<td>Because I’m Not From Here, Ni Soy De Allá</td>
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<td>Fireside Lounge</td>
<td>10:20 AM</td>
<td>Zach Simonson</td>
<td>UW-Whitewater</td>
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<td>A Study in Cast Drawing</td>
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<td>Mariel Santos</td>
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<td>You Are Brave</td>
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<td>Fireside Lounge</td>
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<td>Rachel Davis et al.</td>
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<td>The Visual Crossover Between the Culture of Old Horror Movies, and Modern Marine Biology</td>
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Ellen Abolt and Samantha Wanta (UW-Milwaukee)
/eı/ vs. /e/ in Non-Native Productions of Spanish and English
Mentor: Hanyong Park, Linguistics

In this experiment we examined the extent of this native language transfer with regard to the English diphthong /eı/ and the Spanish pure vowel /e/. Of particular note, is the fact that the English vocalic inventory does not include /eı/. While Spanish does include /eı/ the distribution is distinct from that of /e/. Due to the vowel distribution in the subject's native language, we expect to see a difference in their vowel production in their second language. Specifically, native English speakers will diphthongize /eı/ in Spanish words while native Spanish speakers will monophthongize /eı/ in English words. For this experiment, consistent vowel change will be marked by at least a 50% production. Subjects were recorded in a delayed repetition task saying a series of 10 English and 10 Spanish sentences. The target words were multisyllabic and all vowels followed voiceless consonants. Data analysis was performed in Praat and involved quartile comparisons to determine whether a diphthong was produced and then F1 and F2 averages were taken of the entire vowel and each steady state where a diphthong was present. The subjects included 3 male English speakers, 2 male Spanish speakers and 2 female Spanish speakers. English speakers' diphthong production in Spanish was not significantly different from that of the Spanish speakers. However, the Spanish speakers produced English diphthongs at a much lower rate than the native speakers. The results did not support the first hypothesis although the second hypothesis regarding Spanish production was partially supported.

Steven Acker and Lizeth Ortiz (UW-Milwaukee)
Austenitic and Ferritic Stainless Steels in a High Temperature Coking Atmosphere
Mentor: Dr. Benjamin Church, Materials Science and Engineering

Applications such as power generation, chemical processing, fuel cells, and high temperature heat exchangers are exposed to a high temperature aggressive gaseous environments which limit the life expectancy. Coking is the process of carbon deposition from a gas phase that is encountered in many petrochemical and other high temperature processes that can result in corrosion attack of the metals used in those applications. Ferritic and austenitic steels are common materials used in these applications. This research will explore the performance of ferritic and austenitic stainless steels in a high temperature coking atmosphere simulated in a laboratory tube furnace. The materials are analyzed using x-ray diffraction (XRD) and scanning electron microscopy (SEM) in order to compare the effect of carbon deposition, metal dusting, and development of high temperature oxide scale of both materials. This research can help develop strategies to improve the longevity of these materials when subject to these aggressive environments.

Nicole Adamski (UW-Milwaukee)
Teachers Know Best: Preschoolers Use Sample Size and Diversity Information in Pedagogical, But Not in Non-Pedagogical Contexts.
Mentor: Christopher Lawson, Educational Psychology

Despite children's early inductive sophistication (Gelman & Coley, 1991) they struggle to evaluate the composition of samples; before 8 years of age children do not recognize that diverse and large samples provide better evidence to make a prediction than non-diverse and small samples (Gutheil & Gelman, 1997). In this study we asked whether children's awareness of the value of larger and more diverse samples is influenced by the source of the information presented to them. Preschoolers were presented samples of evidence about novel properties associated with different animals; half of items measured attention to sample size (e.g. two bears vs. five bears) and the other half measured attention to diversity (e.g. three brown bears vs. polar bear, brown bear, black bear). The samples were described as being provided by either “teachers” or “kids.” Participants were randomly assigned to one of three conditions. In the Induction condition participants were told a novel property about each of the samples (e.g. “These bears eat olin and these bears eat rooga”), and then asked to project one of the properties to a yet-to-be-seen animal (e.g., “Do you think this bear eats olin or rooga”). In two other conditions children were told that two actors presented the samples (e.g. “This person says these animals eat olin and this person says these animals eat rooga”) and then asked to decide which actor they would trust to teach them about a novel animal. In the Teacher condition actors were described as “teachers,” and in the Child condition actors were described as “kids.” Our results indicate that children paid more attention to the composition of the samples presented by teachers than kids. In the Induction condition, children were not sensitive to sample size and diversity when making judgments, consistent with prior finding. However, children did consider these features when a teacher presented the information, but not when the same information was presented by a child. These results have implications for understanding the special status of reasoning in pedagogical contexts.

Ashraf Al-Hajjeh (UW-Milwaukee)
Characteristics of a Magnetostrictive Composite Stress Sensor
Mentor: Dr. Chiu T. Law, Electrical Engineering and Computer Science
Mentor: Dr. Rani El-Hajjar, Civil Engineering and Mechanics

A magnetostrictive composite material (MCM) of a giant magnetostrictive alloy, Terfenol-D (Tb0.3Dy0.7Fe2), and epoxy resin is fabricated to demonstrate an electrically isolated mechanical stress sensing mechanism that is based on the Villari effect (inverse magnetostriction). The Villari effect is the change in the magnetic property of a material when it is placed under an external mechanical stress. To monitor the Villari effect in the MCM, we
The temperature batch study determined that adsorption of kaolinite reaches equilibrium in less than 30 minutes. Increasing the ionic strength of kaolinite follow the Langmuir adsorption isotherm under different isotherm, kinetic, ionic strength, pH, and temperature conditions. The isotherms was investigated under different conditions. The interaction of AT on kaolinite in aqueous solution is important to study its interaction with AT. In this study, the interaction of AT on kaolinite in aqueous solution was investigated under different isotherm, kinetic, ionic strength, pH, and temperature conditions. The isotherms of kaolinite follow the Langmuir adsorption isotherm model, and the maximum adsorption was determined to be 40 mmol/kg. Increasing the ionic strength of the aqueous solution decreases the amount of AT adsorbed. Kinetic batch tests determined that AT adsorption on kaolinite reaches equilibrium in less than 30 minutes. The temperature batch study determined that adsorption of AT on kaolinite is exothermic, and the free energy of adsorption was small and negative. The results of the experiment suggest that surface adsorption occurs between AT and kaolinite.

**Zach Albert and Kurt Frievalt (UW-Parkside)**

**Sediment Properties and Origin of Lake Michigan Ice Lobe Till**

Mentor: Rachel Headley, Geosciences

The sediment deposited at the end of a retreating ice sheet records both the processes at the time of deposition and links these processes to those of original erosion and sediment transport. These records can be found along the length of recessional moraines through changes in deposited sediments. The sediment of the deposited material provides accessible and easily identifiable samples to tie the source, its transport path, and the final sink together. As the Lake Michigan lobe of the Laurentide Ice Sheet retreated from its Wisconsin maximum, it deposited multiple moraines, including the Lake Border Morainic sequence in southeastern Wisconsin and northeastern Illinois. In Wisconsin, the largest and latest moraine of this sequence is commonly referred to as the Petrifying Springs Moraine. This moraine is primarily composed of the Oak Creek Formation. Like many of the Laurentide Ice Sheet tills, the sediment in the Oak Creek Formation reflects not only local bedrock sources but also those more distal. Focusing on the Petrifying Springs moraine in Kenosha County, Wisconsin, initial analysis reveals sedimentologic variation over single boreholes less than two meters deep. Examining the lithology of these samples, we investigate their possible provenance and transport using their lithology and other sedimentologic properties. The grain size data collected better our understanding of the Lake Border Morainic sequence by allowing for the correlations between sediment depositional processes and ice advances of the Lake Michigan Lobe. The differences in the material properties and grain size show spatial variations in depositional energy and highlight the variability of the processes operating on the edge of a recessional ice sheet.

**Mohammed Alchaar, Rebecca Kecku, Andres Saavedra, Nathan Schneidermann and Alejandro Quiroz (UW-Parkside)**

**Exposure to Constant Light Conditions Leads to Changes in The Intrinsic Circadian Period Length in Mice**

Mentor: Fabian Preuss, Biological Sciences

Mentor: Susan Olson, Biological Sciences

Here we show varying intrinsic circadian rhythms in a C57/B6j mouse strain exposed to varying environmental conditions. Typically, mice like humans are continuously entraining their biological clocks to environmental cues, fine-tuning their behavior in coordination with the external environment. This is achieved by following one (often light) or more so-called Zeitgebers (time cues), allowing resetting the biological clock and ensuring it stay in synchrony with...
the environment. However, when the organism is placed in constant conditions their circadian period becomes apparent. In mice, the so-called free-running behavior is typically shorter than 24 hours, resulting in a shortened day, which leads to a drift out of phase with the earth rotation. Free running behavior is typically achieved by placing mice in constant darkness. Here we show that a secondary intrinsic circadian rhythm can be displayed if the animals are placed in constant conditions which involve constant light exposure rather than constant darkness. This second period is still rather robust and circadian, however displays a different period length than the darkness induced free-running period.

Summer Aldabbeh, Wendy Monk and Donald Baird (UW-Parkside)
Size Structure And Distribution of Predatory Aquatic Insects Among Mesoscale Hydraulic Habitats
Mentor: Jessica Orlofske, Biological Sciences
This research examines how mesoscale streamflow dynamics can filter aquatic insect communities based on their trait expression. As water levels change seasonally, depth and velocity fluctuate within the channel. Invertebrates select these mesoscale habitats based in part on their physiological requirements. Therefore, the environment is a strong selective force acting on organismal traits to determine site-level taxonomic composition. We use high-resolution habitat data including, depth, average and bed velocity, shear stress, and Froude number collected in conjunction with invertebrate sampling in the Miramichi River in New Brunswick, Canada in July and September 2010 to investigate flow-environment relationships for five orders of aquatic insects (Ephemeroptera, Plecoptera, Trichoptera, Odonata, and Megaloptera). Here, we focus on the distribution of predatory invertebrates and their potential to interact with other invertebrates within mesoscale habitat patches. Predators also demonstrate the greatest magnitude of growth, which will be tracked over time. By mapping the movements and morphological characteristics of invertebrates, particularly predators, we can better understand their habitat requirements throughout their development - a necessary component for establishing connections to larger-scale hydrologic processes and environmental flow regulations.

Ryan Amann, Chaz Baum and Nate Smaglik (UW-Platteville)
Fabrication and Characterization Techniques for Investigating and Exploiting the Elastic Properties of Two-Dimensional Silicon Nanostructures
Mentor: Dr. Gokul Gopalakrishnan, Engineering Physics
Mentor: Dr. Lee Farina, Engineering Physics
Fabrication of crystalline nanomembranes provides an opportunity to develop a process to understand the fundamental physical properties of nanomaterials and how they diverge from those of macroscopic structures. We focus our attention on the elastic constants of nanoscale single crystal silicon, which are expected to vary from bulk values due to the non-negligible surface-to-volume ratio in such systems. Nanoscale membranes are produced using a combination of top-down methods including lithographic techniques in conjunction with wet and dry chemical etching processes. Fabricating ideal two-dimensional systems with small uniform biaxial strains is a challenging engineering problem requiring careful optimization of each of the processing steps. One important aspect of the fabrication is improving interfacial bonding through a controlled atmosphere thermal annealing process which preserves the crystallinity of the membrane. We discuss the steps in the fabrication process and the characteristics of the nanomembranes thus produced. In order to acquire an understanding of the membrane's mechanical properties, two complementary techniques involving atomic force microscopy are employed. The first technique generates force-deflection curves to study the effects of in-plane stresses and the elastic modulus of silicon nanomembranes. Deflection curves are generated by using the atomic force microscope's cantilever to directly apply a force to deform the membrane. Data obtained from these deflection curves allows the creation of force curve maps to be compared with theoretical models. Secondly, we utilize the photodetector of the atomic force microscope to measure thermally activated resonances of the membranes. This is a completely independent way of measuring the Young's Modulus and in-plane stresses in the membrane.

Karrica Andersen, Daisee Francour and Shi Hae Kim (UW-Parkside)
Educational Outcomes or Educational Opportunities: Students and Faculty Members’ Perceptions on Sense of Academic Entitlement
Mentor: Shi Hae Kim, Sociology/Anthropology

Rachel Anderson and Elizabeth DeRosier (UW-River Falls)
How the Odds are Never in Your Favor
Mentor: Dr. Jennifer Willis-Rivera, Communications
This research examines the work of Suzanne Collins in The Hunger Games trilogy. Our research focuses on the fictional society of Panem and how it is analogous to present-day society. The purpose of this project is to understand how our past, present and potentially future society could become similar to that of Panem in The Hunger Games. We can recognize these three viewpoints throughout the trilogy by investigating past historical economic and social issues, the current pandemic of the Ebola virus and societal adoption of technological advances. Historically, Collins tells of a totalitarian government similar to those of our past. These governmental structures and the ruling body of Panem have similar characteristics of controlling their people through force, media and events. Collin's presents the citizens of the Capitol as living in an oblivion to the reality of the individuals in the districts before the rebellion. This is currently happening in the United
States with the response to the recent Ebola outbreak. Collins warns our present-day society to become more aware of what purposes of technology our society is utilizing as a whole to have hope of thriving in the future. Currently the technology designed to improve our ability to communicate today has actually decreased our skills to effectively hold a conversation with one another. In summary these three viewpoints led to the creation of Collin's fictional society of Panem. The viewpoints are not, however, simply fictional. We can recognize and relate these viewpoints to our present-day society. These tacit lessons from The Hunger Games trilogy are significant because realistically this dystopian society could become our reality in the near future.

**Cody Andrews (UW-Milwaukee)**  
Postural Manipulation and Emotion: How Standing and Sitting Affect Emotional Response  
Mentor: Dr. Raymond Fleming, Psychology  
Specific patterns of autonomic nervous system (ANS) activity have been shown to reflect different emotional states. Physiological arousal, such as exercise, has been used in examining the effects of residual arousal on emotional response. To further test the effect of physiological arousal on emotional response, the present study uses a more subtle manipulation: posture. It is known that heart rate (HR) is higher while standing than while sitting; therefore, the present study uses both a standing (arousal) and sitting (control) condition. A total of 119 college students were randomly assigned to watch both one positive and one negative video either while sitting or while standing. In addition, nearly continuous ratings of emotion were recorded using a dial that participants adjusted to indicate how positive or negative they felt during the videos. Participants, HR, heart rate variability (HRV), and respiration were recorded throughout the experiment to assess physiological patterns associated with positive and negative emotions. It was hypothesized that participants in the standing group would show both greater positive and negative emotions than the sitting group. The findings of the study support this hypothesis. These findings may aid our understanding of the effects of non-specific arousal on emotion.

**Sara Arafeh (UW-Oshkosh)**  
Inactivation of Sucrose Synthase in the Cynobacterium Synechococcus PCC 7002 for Increased Production of Isoprenoid Hydrocarbons  
Mentor: Toivo Kallas, Biology and Microbiology  
Cyanobacteria are a group of bacteria that obtain energy from sunlight, produce large amounts of oxygen, and consume atmospheric carbon dioxide for photosynthesis. Our group has engineered Synechococcus sp. PCC 7002 cyanobacteria to produce isoprene, which is a precursor for synthetic rubber as well as biofuels for transportation. However, the production of isoprene is not yet sufficient for commercial purposes and thus our goal is to increase isoprene synthesis in these bacteria. One way to do this is by shutting down competing pathways that utilize carbon such as the pathway for sucrose synthesis. Toward this goal, we are working to inactivate a sucrose synthase gene, spsA, for an essential enzyme in the sucrose synthesis pathway and determine whether this will increase isoprene production in cyanobacteria. To date, Polymerase chain reaction (PCR) has been used to generate the DNA fragments needed to inactivate the spsA gene. A procedure called “Gibson Assembly” will be used to assemble these pieces into a genetic construct for inactivating the spsA gene, and gas chromatography, mass spectrometry will be used to measure isoprene production in the engineered cyanobacteria. If successful, the project will be important for developing cyanobacterial strains that use sunlight energy to capture CO₂ and convert this into high-value isoprenoid, hydrocarbon chemicals. This was important as a starting point to inactivate a sucrose synthase gene, spsA, for an essential enzyme in the sucrose synthesis pathway. If successful, the project will be important for developing cyanobacterial strains that can use sunlight energy to capture CO₂ and convert this into high-value isoprenoid, hydrocarbon chemicals.

**Taylor Atkinson, Sarah Przybylski, Alicia Meis, Isabela Caulkins and Brittany Erickson (UW-Stevens Point)**  
Got Chlorophyll-The Investigation of Two Chlorophyll-Deficient Mutants in Soybean  
Mentor: Dr. Devinder Sandhu, Biology  
Chlorophyll-deficient mutants have been studied in several plant species. We have identified a lethal-yellow and a viable-yellow mutant in soybean. In comparison to green plants, the lethal-yellow and viable-yellow plants showed significant reduction of Chlorophyll A and B. Photochemical conversion efficiency was reduced in the viable-yellow plants, whereas, lethal-yellow plants showed no ability to convert light energy. The three phenotypes, green, lethal-yellow, and viable-yellow were easily distinguished based on their light reflectance indices. A reduction in thylakoid stacking was apparent in the viable-yellow plants. In the lethal-yellow genotypes, proplastids did not differentiate into chloroplasts and contained very few membranes. Genetic analysis revealed recessive epistatic interaction between the lethal- and viable-yellow genes. The lethal-yellow gene was mapped to a 347 kb region on chromosome 3 that contained 45 predicted genes. The viable-yellow gene was mapped to a 227 kb region on chromosome 2. We located 24 predicted genes in the region. Of these, one candidate gene is of particular interest, as it showed homology to a translocon in the inner membrane of chloroplast (Tic110) in Arabidopsis. Tic110 is known to play critical role in plastid biogenesis and heterozygous mutants for Tic110 in Arabidopsis exhibited a pale phenotype. Characterization of lethal-yellow and viable-yellow genes may help to better understand the biosynthetic pathways involved in the development of chloroplasts.
Matthew Austiff (UW-Milwaukee)
Mentor: Katie Mosack, Psychology

Based on previous research, it has been revealed that there is an increasing need to connect individuals with HIV/AIDS with intervention or community resources to help manage their lives. The purpose of this secondary data analysis is to explore the techniques and process that are utilized within HIV positive seroconcordant dyads (i.e., dyads in which both individuals are HIV-positive) to better understand what social support systems they utilize. Interview data were quantitatively coded with respect to key sociodemographic variables. Data were then analyzed using conventional inductive content analysis with respect to key sociodemographic variables. Data were then analyzed using conventional inductive content analysis with respect to the nature of social support occurring within these dyads. Themes based on key sociodemographic variables were also examined. Dyads consisted of romantic partners (n = 8), friends (n = 17), and family members (n = 2). Some lived together (n = 7) and others did not (n = 5). Participants were primarily African American. Preliminary findings suggest that dyads support each other through encouragement to seek support systems, emotional support, transportation, and housing. The more intimate the relationship (e.g., romantic relationships), the more likely they are to describe support being emotional in nature. Those who live with one another were most likely to describe the support as being more instrumental in nature (e.g., remind each other to take medications). The results of this study will contribute to current research by analyzing how HIV-positive seroconcordant couples navigate their relationships and support each other. This will provide invaluable research about what support processes take place within dyads, based on several demographic variables, and what processes take place within the relationship that can result in one or both individuals seeking support systems.

Halie Bahr (UW-Milwaukee)
Looking at Ballet Curriculum Through Integral and Developmental Lenses
Mentor: Luc Vanier, Peck School of the Arts - Dance

As a Dancer, Ballet is a form that is often misunderstood. People identify themselves so closely with certain styles over another, and I am curious to see what actually makes up these strong opinions and divides within the dance field. I will be looking specifically at Ballet in its different schools and points in history. I have been collecting this research from traditional Ballet books from many different schools of thought within Ballet and Dance. I am looking to see if all the schools of Ballet are similar in their thinking to one another when they are compared developmentally. My method for completing this is creating a database of books from different backgrounds, and looking at the way the book is organized, what it places value on, and how language is used. Does the time period affect how the field of Ballet was approached? My Theory is that dance techniques have separated the way they can learn them in two perspectives. One is mostly about learning the steps and the other is mostly about the inner experience of dancing. I believe that previously Ballet was anchored in a balance between the outer and inner experience, placing value on both the Subjective and Objective experience. I also believe that dance used to be enjoyed as a form by a community that celebrated various events through dance. Now dance seems to have been relegated to the individual dancer. This research is anchored in Integral Theory that is promoted by Ken Wilber’s Integral Map and Developmental Waves. During the passing down of tradition in Ballet, the values shifted through various points in history. I am looking to define how the values shifted throughout history. Also, what impact has these shifts had on the field, positively and negatively. With this knowledge we can address what is missing for the future generations to come and how to best preserve the art. My goal is to place value on all perspectives of Ballet, and Dance. With this, Students and Teachers can better understand each other’s values, therefore taking part in a collaborative process in learning rather than clashing ideas on the developmental spectrum.

Sean Bannier (UW-Milwaukee)
Glucose Oxidase as an Oxygen Scrubber
Mentor: Andy Pacheco, Chemistry

Cytochrome C Nitrate Reductase is an anerobic enzyme that shows promise for study to generate raw material for fertilizers. Since the enzyme requires oxygen-free environments, hyper-anaerobic environments were sought in an anerobic glove box using glucose oxidase to remove trace oxygen. Glucose oxidase catalyses the oxidation of glucose by oxygen to yield gluconolactone and hydrogen peroxide via a ping-pong bi-bi mechanism. The glucose/glucose oxidase pair was used to exclude oxygen from solutions containing partially reduced enzymes that would be oxidized by the oxygen. However, in the absence of oxygen, glucose oxidase can begin to reduce other electron acceptors, such as (6,7-Dihydrodipyrido[1,2-a:2’,1’-c]pyrazinediium dibromide (6,7-DPD), which were used as a marker for when oxygen was thoroughly scrubbed from solution. Using steady-state kinetics and pseudo-first-order conditions, the cumulative results show that the initial rate of reaction increased linearly as concentration of 6,7-DPD increased, showing that an increase in substrate led to a first-order increase in the rate of substrate disappearance. It can be concluded from kinetic data that the rate of 6,7-DPD reduction was a significantly slower process than the rate of oxygen reduction to hydrogen peroxide. An induction period of ~430 seconds, that persisted until the concentration of oxygen diminished significantly, was shown to be independent of the concentration of 6,7-DPD. Over extended time periods glucose oxidase catalyzed reduction of 6,7-DPD by glucose proceeded via two distinctive exponential phases, showing that the rate-determining step changed over time. One proposed explanation is that as the product lactone accumulates it inhibits Gox due to tight binding at the active site (product inhibition).
Hayden Barber (UW-Stevens Point)
The Differing Effects of a Tobacco Ban Between Social and Non-Social Student Smokers at UWSP.
Mentor: Sue Bailey, Sociology

In the fall of 2014 a tobacco-free policy was implemented at the University of Wisconsin-Stevens Point. The policy is self-enforced by students and staff, and so the effectiveness of this ban relies on its social power rather than legal measures. In a 2004 study, Moran, Wechsler, & Rigotti found that over half of college-aged smokers self identify as social smokers - individuals who smoke predominately as a social activity rather than out of habit. As such, it seems that this ban may affect regular smokers and social smokers differently. To better understand how this policy will impact smokers at UWSP, this study aims to: 1) describe any changes in smoking locale after the implementation of the ban, and 2) determine any differences between social smokers’ and regular smokers in regards to their: a) support of the ban, and b) attempts to quit smoking before and after the ban. This study will assess the popularity of a given spot based on the accretion of cigarette butts. Surveys pertaining to the research questions will be given out to the smoking population via convenience sampling and then snowball sampling.

Esme Barniskis (UW-Milwaukee)
Student-Driven and Immersive Learning in the Buildings-Landscapes-Cultures Field School
Mentor: Arijit Sen, Architecture and Urban Planning

The Buildings-Landscapes-Cultures Field School offers students an unconventional mode of learning through immersion in the everyday life of a neighborhood. The 2014 BLC Field School program took place in the historic neighborhood of Washington Park, Milwaukee. The immersion of students in the neighborhood’s history and current reality gives students a unique perspective on the realities of everyday life within the neighborhood. Complex social issues, or what social theorist Horst Rittel calls “wicked problems” (160), present in Washington Park challenged students to co-create “resolutions” (160 Rittel) in partnership with neighborhood residents. Working in tandem, the BLC Field School students and neighborhood partners sought to give a voice to this Milwaukee neighborhood.

Jordan Batchelor (UW-La Crosse)
The Uncertainty of Sino-Tibetan and Altaic Languages in John Stuart Mill’s Of Names
Mentor: Dr. Mary Krizan, Philosophy

John Stuart Mill’s 1843 publication Of Names excluded certain eastern languages, for example, Chinese, Japanese, Korean, and Mongolian, of the Sino-Tibetan and Altaic families, respectively. In doing so, Mill’s notions of surnames and given names diminish his credibility. I will quote Mill to show directly these notions, and then I will show specific examples of Chinese, Japanese, Korean, and Mongolian given and surnames and how these names transcend Mill’s proposed categorical naming system. This system requires that given names or surnames cannot both denote a singular person and connote a person’s qualities or attributes. This is important because of what it could mean for Mill’s other works, and, possibly, for other philosophy of language. Could western philosophers have gotten it wrong? In other words, philosophy of language generally applies to the theory of all language, so if much or even just part of the languages in discussion thus far has been incomplete, then there is a fundamental problem with the discipline itself. Does that mean abolishing all previous or incomplete works? Should language philosophers more deeply consider the vast variety of languages in operation, or should the discipline separate between language families? These questions get at the very heart of language philosophy, and though they may never be truly answered, I would argue that a more universal philosophy of language theory should be put forth, emphasized, and utilized if the field is to reach the most important depths. This broader philosophy of language can be done relatively easily, and the first and most important step includes studying new languages, especially those most different from the philosopher’s mother tongue.

Eric Baumert and Tyler Cina (UW-Stevens Point)
Jumping Genes: Leaping Forward in Functional Characterization of Soybeans With a Transposable Element.
Mentor: Devinder Sandhu, Biology

The W4 locus in soybean encodes dihydroflavonol-4-reductase (DFR2) that regulates pigmentation patterns in flowers and hypocotyls. The w4-m allele has arisen through insertion of the Tgm9 transposon in the gene. In the mutable w4-m line, generation of purple flowers from white flowers indicates transposon’s excision, and its insertion into a second locus. We have used Tgm9 in isolating a male-sterility, female-sterility gene encoding a helicase. Sequencing revealed precise excision of the element from the helicase gene. Analysis of Tgm9-insertion sites among 142 independent Tgm9-induced mutants demonstrated that Tgm9 hops randomly to all 20 soybean chromosomes from its original location in DFR2 on chromosome 17. Although, transposition was random throughout the soybean genome, Tgm9 inserted more than once in 14 loci in the genome. Tgm9 appears to have a preference to jump into genes as observed for active transposable elements in other plant species. About 27% of the mutations induced by Tgm9 were in genes. Among the 116 unique mutants 22% contained insertions in exons or introns and are expected to cause complete loss of function. This study establishes the utility of this element for functional characterization of soybean genes.
Cody Becker (UW-Milwaukee)
Using Pontoon Boats for Plankton Sampling
Mentor: Dr. Thomas Consi, Mechanical Engineering, School of Freshwater Sciences

The Great Lakes is often hampered by limited boat access. To solve this problem we have developed a small remote controlled pontoon boat that will permit students and scientists to rapidly deploy and recover instruments, obtain water and plankton samples, recover objects in a lake, and aid in the deployment of subservable aquatic robots. The boat consists of a fisherman’s pontoon boat with deflatable pontoons enabling it to be packed up and carried in the trunk of a car for easy transport to field sites. Two Minkota electric trolling motors drive and steer the vehicle. The motors are driven by a dual DC motor driver/controller and powered by a 12 volt marine battery. The boat is controlled by an onboard microcontroller system that contains a 3-axis accelerometer, gyroscope and magnetometer along with a GPS receiver and antenna. User commands from shore are transmitted using a standard radio-control (RC) transmitter at a frequency of 2.4GHz. The signals are received by the onboard RC receiver and sent to the microcontroller. Currently the boat is operated in full manual control mode in which user commands are simply relayed to the motors by the microcontroller. We have successfully tested this vehicle in the boat slip next to the School of Freshwater Sciences, running it through a series of straight line paths and turns. The next step in this project will be to install plankton nets onto the boat for remotely-controlled zooplankton sampling. Further into the future we will develop autonomous control software that will enable the boat to maneuver to a set of GPS way points or along a pre-defined trajectory without user intervention thus enabling more complex sampling and sensing missions in Lake Michigan.

Briana Beebe (UW-River Falls)
Unconventional Yet Innovative Composition Assignments
Mentor: Conan Kmiecik, International Student Services Coordinator/English/TESOL department

As a future educator in English, I wanted to create composition assignments for a middle school classroom that were unconventional yet still effective in a variety of ways utilizing the book Sold by Patricia McCormick. Taking into consideration a range of learning styles, the diversity of my hypothetical class, and the content and theme of Sold, I developed a detailed essay discussing these assignments. To accomplish this task, I researched and read Endre Szentkiralyi and Rose Reissman’s article “Teaching Ideas”, Nancy M. Bailey and Kristen M. Carroll's article “Motivating Students Research Skills and Interests through a Multimodal”, “Multigenre Research Project”, Jessica Wertz’s article “Bitstrips and Storybird: Writing Development in a Blended Literacy Camp”, Mary E. Hocks, “Understanding Visual Rhetoric in Digital Writing Environments”, Jane Krauss, “More Than Words Can Say”, and John Trimbur’s “Delivering the Message: Typography and the Materiality of Writing.” In conjunction with these articles, I was able to create three composition assignments that would innovatively allow my students to understand and apply the theme of Sold to their personal lives. The three writing assignments were a pop-up story research project, a personal narrative using Storybird, and a literary analysis using Piktochart. From my research, I found that students can accomplish the goals of a lesson, understand the central concepts, and do so in an unconventional manner. Each assignment could be effective with a range of learning styles and subject areas.

Tessa Begay (UW-Milwaukee)
Strength and Resilience of Washington Park
Mentor: Arijit Sen, Architecture

The purpose of this research was to analysis buildings within Washington Park and to tell the stories of this neighborhood. The research methodologies used in this project were archival research, multimedia, and I organized metadata to create drawings of plans by the use of HABS (Historic Preservation of Buildings). In admits of this 5 weeklong project, to collect stories of Washington Park I interviewed 4 people. To analysis the built environment of this neighborhood I measured 2 buildings: a commercial and residential. In engaging this research I learned about the infrastructure of an urban neighborhood and how it sustains culture of its own. The cultural landscape of Washington Park is a reflection of the people who inhabit the urban space. The outcome of measuring the thresholds, observing ornamentations and openings, gave insight to the urban neighborhood and how it sustains culture of its own. The cultural landscape of Washington Park is a reflection of the people who inhabit the urban space. The outcome of measuring the thresholds, observing ornamentations and openings, gave insight to the changes done over time. The archival research inquiry gave an understanding to the history hidden in these buildings. For example, I found inquires about whom the owners of the homes and businesses were, where they came from before settling in the neighborhood and how the ownership-changed overtime.

Zindy Benavides (UW-Milwaukee)
Intrauterine and Perinatal Bisphenol-A Exposure and Neonatal Body Composition
Mentor: Teresa Johnson, Nursing

The purpose of this study is to explore the relationship of BPA in maternal and infant urine samples with infant body composition. Infant body composition was obtained via infant anthropometric measurements, Air Displacement Plethsmography (ADP). Bisphenol-A (BPA) is found in items such as plastics, can linings, baby bottles, papers, medical equipment etc and is reported to be an estrogen disruptor and environmental obesogen. Animal studies have demonstrated that BPA is associated with increased obesity and visceral fat. Although we know human exposure is common, investigation into the impact of BPA on obesity in infants and children has been limited. BPA was measured from maternal and infant urine specimens. ADP is measured with an instrument called PEAPOD, that uses infant weight and length, and air pressure to calculate fat mass (FM) and
fat free mass (FFM). The DEXA is conducted with a low dose X-Ray scan to calculate body composition (FM and FFM). The amount of radiation in the DEXA scan is low (< 1/10 of a chest x-ray). Results: Of a targeted recruitment of 45 mother-infant dyads, only 19 dyads were recruited, because of multiple issues with the reliability of the PEAPOD® during the first four months of data collection, and then issues with the state board of radiation for the infant DXEAS.

Brittany Benitez and Brittany Putnam (UW-Milwaukee)
Teaching Sighted Students to Read Braille Visually
Mentor: Jeffrey Tiger, Psychology

For many visually impaired children in public schools, braille instruction is not an educational priority included in the Individualized Education Program (IEP). This issue is likely the result of a lack of accessible and effective visual-braille training for regular and special education teachers. Prior studies have assessed the efficacy of computer software to teach sighted individuals braille-to-print relations. Although the results from these studies are promising, there are several limitations that should be addressed. The purpose of this study is to extend previous research by developing and testing a computer-based program to teach visual contracted braille to sighted individuals. We will assess the effects of this training program on promoting braille reading and the extent to which participants can produce the correct braille characters when provided a printed-English stimulus.

David Bennett (UW-Milwaukee)
Relations Between Emotion Regulation and Pubertal Development in Children with Williams Syndrome
Mentor: Bonita Klein-Tasman, Psychology

Introduction: Williams syndrome is a neurodevelopmental disorder caused by the deletion of 26 genes on Chromosome 7. Distinctive personality characteristics of children with Williams syndrome include high sociability, empathy, and anxiety (Mervis & Klein-Tasman, 2003). Prior research describes a unique set of cognitive and developmental characteristics including high levels of emotional disturbance and precocious pubertal development (Einfeld et al, 2001; Paritsch et al., 2002). Difficulties with emotion regulation, defined as the modulation of emotional arousal, have also been associated with social competence problems and impaired academic success (Walden et al., 2003; Graziano et al., 2007). The goal of the current study is to investigate the relations between parent rated emotion regulation and pubertal development in children with Williams syndrome. Methods: Parent perspectives on emotion regulation and pubertal development were collected for 93 children with Williams syndrome (41 male, 52 female), ages 8-15 (M=11.468, SD=2.479). Emotion regulation was measured using the Emotion Regulation Checklist (ERC) and the Emotion Control clinical scale of the Behavior Rating Inventory of Executive Function (BRIEF). Pubertal stage was determined using the Pubertal Development Scale (PDS). Each child was placed into one of five pubertal stage groups: prepubertal, beginning puberty, midpubertal, advanced puberty, and post-pubertal. Development was based on parent reports of menarche, pubic hair growth, and breast development for females, and pubic hair growth, facial hair growth, and voice change for males. The second edition of the Kaufman Brief Intelligence Test (KBIT-II) was also used to quantify verbal and nonverbal intelligence. Results: Data analysis has not yet been conducted. Due to expected differences in pubertal development between genders, analysis will take place between and within gender groups. A significant negative correlation between pubertal stage and emotion regulation is expected for both gender groups. No significant difference in emotion regulation between genders is anticipated. Regression analysis will be used to determine if age, gender, and intelligence are predictors of emotion regulation. Discussion: This study will provide information about the relations between emotion regulation and pubertal development in children with Williams syndrome. Understanding this relationship may allow for early prediction of social, cognitive, and behavioral difficulties based on pubertal development and could lead to earlier interventions.

Lee Bennett (UW-Milwaukee)
XCOM MKE: Drafting Your Friends to Fight Aliens.
Mentor: Stuart Moulthrop, English

The idea behind this study is to consider how audiences interact with a novel media. The specific media involved are XCOM: Enemy Within, a video game that allows individual avatars to have custom names, and Twitch.tv, a game streaming service that allows any given user to broadcast themselves playing a video game on the internet. Readers should have some background knowledge of both the game and audience end of the streaming system. The methods for this study started by recruiting people to submit names to represent them in the broadcast. The final group of participants includes both gamers and non-gamers. Then after beginning the game with a roster of game characters corresponding to the submitted names, I informed the currently “playing” participants that they are on screen. These participants, as well as any other person that wanted to watch, would then watch and comment on my performance with their avatar. The performance included live game footage as well as my personal commentary including occasional primers on the games mechanics for the non-gamer participants. The methods create a hybrid experience of observation and play that is difficult to replicate in other systems. My preliminary results show that when observing their avatar, participants were significantly more invested in the broadcast. Several times, there were comments regarding the fate of their avatar or requests to be used in the next mission. The expectation is that as the avatar representing a person gains experience and is used frequently, that person will become more invested in the performance. This leads me to believe that the participatory experience of the Twitch streaming service is a more investing experience for audiences. The unique
The ability to interact directly with the content maker and also have a presence in the content makes for a more enjoyable audience experience.

**Robert Berndt (UW-Milwaukee)**  
Structural and Functional Characterization of a Novel Aldolase-Dehydratase  
**Mentor:** Dr. Nick Silavaggi, Biochemistry

One of the primary advantages of enzymes over traditional catalysts, their extreme specificity, is also a liability. Limited substrate specificity has proven to be a significant barrier to the wide-spread application of enzymes in organic synthesis. While engineering known enzymes to alter substrate specificity has been effective in a number of cases, identifying new enzymes with unique reaction and/or substrate specificity is also an important factor in the quest for viable biocatalysts for green chemistry. To this end, we have begun characterizing enzymes from the acetoacetate decarboxylase-like superfamily (ADCSF), a large and virtually unexplored family of enzymes with members in most bacterial lineages. Bioinformatic analysis has identified seven distinct families within the ADCSF. Our structural and functional characterization of an ADCSF Family V enzyme from *Streptomyces hydrogenogenes* (SbAD) shows that its structure almost identical to that of the prototypical ADCSF enzyme, *Clostridium acetobutylicum* acetoacetate decarboxylase (ADC), despite the fact that SbAD is not a decarboxylase. The structures of SbAD in unliganded and substrate-bound forms, together with steady state kinetics studies, have revealed that SbAD is a pyruvate aldolase-dehydratase. In all, these studies suggest that there is significant diversity in the ADCSF in both reaction and substrate specificity. Thus, the ADCSF may be a rich and under-utilized source of biocatalysts.

**Taylor Bietila (UW-Milwaukee)**  
Studying the Genetic Growth of *Porphyromonas Gingivalis*  
**Mentor:** Dr. Daad Saffarini, Biological Sciences  
**Mentor:** Rini Banerjee

I have been studying *Porphyromonas gingivalis*. *P. gingivalis* is an anaerobic gram negative bacterium found in the mouth below the gingival surface and is a common pathogen in the onset of periodontitis. This bacterium was thought to grow strictly by fermentation, but recent work by a graduate student in Dr. Saffarini’s lab indicated that this bacterium can grow by respiration. One of the problems of genetically manipulating *P. gingivalis* is the low efficiency of transformation. To address this problem, I have been working on generating mutants that lack the restriction systems that digest foreign DNA. Mutants are generated by cloning DNA upstream and downstream of the restriction system genes into the suicide plasmid that was generated in our lab. Mutants are selected and confirmed by PCR. The mutants are then tested for efficiency of transformation by using the plasmid pT-Cow that replicates in *P. gingivalis*.

**Molly Bissen, Mitch Olsen, Alex Herrera and Amanda Chase (UW-Eau Claire)**  
Sharing the Classroom: Collaborative Teaching for the 21st Century  
**Mentor:** Janine Fisk, Education Studies  
**Mentor:** Pattee, Deb, Education Studies  
**Mentor:** Meier, Barb, Special Education

The theory behind this co-teaching research emphasizes the increased quality of student learning when two teachers in one classroom collaborate in planning, teaching, and assessing. Data collection from this study answers the following questions: What is the knowledge and attitude of university faculty around the concept of co-teaching? What is the knowledge and attitude of university education students around the concept of co-teaching? After training cooperating teachers what is the difference in the implementation of co-teaching strategies from those cooperating teachers who were not trained? Methods included providing a presentation to Teacher Education faculty. We gave pre and post assessments in the form of surveys to UWEC Teacher Education faculty, UWEC pre-service teachers (Secondary and SPED), and block cooperating teachers. Cooperating Teachers and teacher candidates attended a workshop on the co-teaching model (7 strategies) prior to implementing the model during the Spring semester. Quantitative data from the pre/post surveys and qualitative data from two focus groups consisting of teacher candidates and cooperating teachers will inform our conclusions. We accomplished our goal by sharing our findings and methods with educators, students, and administrators at workshops. In addition to sharing our research, we also tracked their knowledge and progress in implementing co-teaching by providing a pre/post-assessment to workshop attendees and by following the progress of the cooperating teachers and teacher candidates currently participating in the program. Additionally, based on the findings we plan to expand and continue this research with more university faculty and students involved. Preservice teachers are able to become more involved more quickly, their cooperating teachers can welcome them with fewer risks, and the students they teach learn more. The students involved in this research report positive experiences implementing co-teaching in their current placements. Conclusions: just as there is rarely a single correct solution to the needs faced by our country/world, educators must be prepared to adapt their pedagogical choices in response to what students in their classroom need to succeed. Co-teaching strategies are one way to accomplish that mission. With the demands of edTPA, teacher effectiveness and standardized tests looming, it is essential for educators to embrace new methods that affect the greatest gains in student achievement.
Jennifer Blando, Angelica Sanchez, Jenna Williams and Andrew Mielcarek (UW-Milwaukee)
SPin (Soil Productivity in) Kenya: Measuring Soil Productivity of Small-Scale Farms, Understanding the Effects of Agroforestry in the Semi-Arid Drylands of Sou
Mentor: Dr. Mai Phillips, Conservation and Environmental Science

The goals of this project were to address severe water shortages and continual loss of vegetative cover leading to food insecurity and competition for scarce natural resources such as water and fuelwood while building long-term resilience of an indigenous dryland community using sustainable agroforestry systems in Mauini Village, Makuueni County District, Kenya. We assessed the adoption of agro-ecology practices under smallholder farming in the semi-arid environment of Mauini Village, measuring soil productivity within and between three experimental farms that contained Woodlots planted in 2008, 2010 and 2012 in order to to find both qualitative and quantitative evidence supporting the work being done on soil productivity in semi-arid regions. To fulfill the quantitative goals of this project the objectives of the project were: Objective: 1) Is there a difference between the moisture content of soil of three different ecosystems: i) non-planted fallow plot used as the control, ii) traditionally cultivated plot of maize & beans, iii) agroforestry plot. Objective: 2) Is there a difference between the moisture content of soil in agroforestry plots of different ages? To answer this question, the soil moisture content of agroforestry plots of 2-6 years were measured and compared. Objective: 3) Is there a difference between one dominant timber tree species sizes in different aged (2-6 years) agroforestry plots. This question was answered by taking the diameter at breast height (DBH) of 6 different tree species across different aged (2-6 years) agroforestry plots. Our results of the ANOVA analysis yielded no significant change in soil productivity between or within plots for the years 2008, 2010 and 2012. This finding leads us to believe that more time between plots is necessary before a significant change can be measured for this region and we would want to conduct further research with more soil samples across a greater breadth of years in order to validate this hypothesis. Our research found no significant difference between the moisture content of soil in agroforestry plots of different ages for the years we focused upon. There was a difference between one dominant timber tree species sizes in different aged (1-5 years) agroforestry plots.

Grant Blaschka (UW-Whitewater)
Curating a Contemporary Music Recital
Mentor: Jeff Herriott, Music

Hannah Blum, Ashley Grant, Jordan Grapentine, Sarah Londo and Alex Wilson (UW-Green Bay)
Phoenix GPS: A Wholistic College Transition Approach for Underrepresented Students
Mentor: Denise Bartell, Human Development

The Phoenix GPS Program creates a year-long enrichment experience for historically-underrepresented first-year students at the University of Wisconsin-Green Bay. It places students into small groups of twenty-five, each with a Faculty Mentor, a Peer Mentor, and an Academic Advisor (a GPS Team). Over the course of the first-year, each GPS Team takes courses together; participates in workshops to build academic self-efficacy and skills; develops mentoring relationships with faculty, staff and peers; is monitored for academic progress; completes a service learning project; and works to develop a major and career plan. The goals of the program are to boost college success, including engagement, GPA, and retention, for students who participate and our data significantly indicates these as the outcomes. Historically underrepresented students (i.e., first generation, low income, students of color) have lower academic achievement in their first-year and are less likely to be retained (c.f., Adolfo, Mortenson, & Muraskin, 2008; Fischer, 2007). The GPS program elements were designed to address risk factors to college success identified in our student population, including low academic self-efficacy and a deficit of skills necessary for college success, lack of knowledge about and accessing of campus resources, supportive mentoring and positive peer relationships, and co-curricular engagement. In order to evaluate the effectiveness of the GPS program, we utilized multiple methods of assessment, both to track student participation and engagement and to evaluate the effectiveness of our program components. We utilized a matched comparison evaluation model, comparing first-year students in the GPS program to underrepresented first-year students who did not participate in the program, as well as to non-underrepresented first-year students. We drew from institutional data and designed new assessment tools to examine the impact of GPS participation on first-year outcomes. Results after year one found that GPS program participation resulted in a 17.9% increase in retention for students who completed the entire year of the program, as compared to underrepresented first-year students who did not participate (92.2% vs. 74.6%), and a higher percentage of credits completed (94.7% vs. 89.8%). GPS students also had higher GPAs, and participation in the program eliminated the achievement gap in a popular STEM course. Additionally, GPS students reported significantly higher levels and quality of faculty-student interactions. The GPS program eliminated the achievement gap for first-year students of color who participated. In fact, GPS students of color outperformed white students on outcomes including retention, GPA, and student-faculty interaction.
Rachel Boraca (UW-Parkside)
An Examination of Auditory Experience and Change Deafness to Natural Scenes
Mentor: Melissa Gregg, Ph.D., Psychology
Change deafness is the remarkable inability of listeners to detect changes occurring in their auditory environment. Demonstrations of change deafness imply that our experience of the world is not as detailed as our subjective impressions would suggest. The purpose of this study was to determine if specialized listening experiences affect the ability to detect auditory changes; specifically we compared change detection performance of a group of non-musicians with change detection performance of a group of musicians with specialized training in melodic, rhythmic, and harmonic dictation. Both groups made a same/different judgment on two consecutive auditory scenes that had the same sounds or one differing sound. The number of sounds in each scene was varied (2, 4, or 6), as well as the type of sound (recognizable environmental sounds, unrecognizable, scrambled versions of the environmental sounds, noise rhythms, and pure tone rhythms). We predicted that the musicians would be more likely to hear changes in the noise and tone rhythms than non-musicians and that both groups would be equally likely to miss changes in the recognizable and unrecognizable environmental sounds. These findings would indicate that although change deafness occurs in both groups, musicians with specialized rhythmic training have an increased capacity to detect and process changes in auditory scenes, and that such improvement in auditory change detection can be a learned skill.

Elizabeth Borucki (UW-Milwaukee)
Full Vector Magnetic Field Record from the Big Pine Volcanic Field, California
Mentor: Julie Bowles, Geosciences
Paleomagnetism is the study of properties of magnetic rocks. Studying magnetic rocks opens a doorway into understanding the variations of Earth's magnetic field, and the movement of Earth's tectonic plates throughout geologic history. The study of paleomagnetism recovers the direction of the Earth's field as well as the more elusive field intensity. Without field intensity, the models of global field behavior are incomplete. In an attempt to create a more comprehensive magnetic explanation of the field area in the American West, the Big Pine Volcanic Field near Bishop, California was chosen as the field area. There is little intensity data available for the region. Also, research conducted in 2008 dated the volcanoes at this field site, which complements our paleomagnetic research. We employed several methods to isolate the direction and intensity of the Earth's field as was acquired at the time that the lavas cooled and solidified. Such methods include alternating field demagnetization, thermal demagnetization, and paleointensity experiments. Through alternating field and thermal demagnetization experiments, the goal is to remove the natural magnetization in a step-by-step process, isolating the direction of the Earth's field in which they were originally magnetized. During paleointensity experiments specimens are re-magnetized to understand how magnetization intensity varies with an applied field similar to that of the Earth. The compilation of results from the alternating field, thermal demagnetization, and paleointensity experiments will provide a clearer history of how Earth's field has varied over the past 30,000 to 1 million years.

Shawn Bost (UW-Milwaukee)
Except As Punishment for a Crime: The Belaeguurd History of the 13th Amendment
Mentor: Dr. Robert Smith, History
My research examines the historic interpretation of the 13th Amendment. The 13th is known as the emancipation amendment, which ended legal slavery in the United States. The second portion of the Amendment has the controversial verbiage “Except As Punishment For A Crime.” Which duly notes the ending of slavery, but states that anyone convicted of a crime can be held in slavery. This clause is a part of our constitution and is legally binding today. The synthesis of the 13th Amendment is important because of the growing minority prison population. My methodology consist of examining 13th Amendment Supreme Court Cases and other case law pertaining to the Amendment. We examine the periodization of oppressive systems like The Black Codes; The Convict Lease System; and The War on Drugs; The role of the Prison Industrial Complex. Drug disparities and perceptions of powder vs. crack cocaine. In addition, we analyze the social ramifications of being a felon. My findings suggest there are economic benefits from controlling and restricting African Americans that have been in place since slavery and continue today.

Dakotasky Bowen (UW-Milwaukee)
Three Points of Perspective: Gustave Doré's London
Mentor: Jessica Meuninck-Ganger, Print and Narrative Forms, Area Head & Assistant Professor, Peck School of the Arts
The Summer of 2014 I was able to travel abroad to London to study the methods of the artist Gustave Doré, specifically print work in the book London: A Pilgrimage.” This traveling experience has cemented my fascination with printmaking. While traveling abroad I had collected survey data relating to Doré's print work through the means of sketching, photographs, field notes, museum archives and interviews with professionals in the print and publishing fields. Last (fall '14) semester I was able to expand my knowledge on intaglio print (as Doré has done all is prints), and create personal works based on the data and inspiration provided to me by my research and the medium itself. These works will be collaborated with the findings and creations of Matt Russell and Jessica Meuninck-Ganger. Although collaborations are works in progress, completed pieces include image archives, a documentary and individual prints of my own and collaborations are on-going with the intention.
Emerging Pharmaceutical and Personal Care Products in Our Water System

Mentor: Todd Miller, School of Public Health

The purity and quality of our water source is essential to life of almost all organisms. With the widespread usage of pharmaceutical and personal care products (PPCPs), chemicals in PPCPs are now being discovered in our rivers, lakes and ground water. Pollutants from daily modern life have managed to find their way into the environment through sewage effluents, runoffs, and leakages, developing negative effects on aquatic organisms. Chemicals have been found to cause acute and chronic toxicity in aquatic organisms like algae, crustaceans, and fish. In order to determine what chemicals had entered our water system, we collected water samples and assayed them for presence of toxins and synthetic chemicals. We collected samples in six different sites along the Milwaukee River. The water samples were then frozen, so they can be lyophilized. Samples were then sonicated, centrifuged, and dried, then subjected to Liquid Chromatography-Mass Spectrometry (LCMS) for analysis. The vials were placed in the High Pressure Liquid Chromatograph (HPLC), allowing the analytes to react with a high absorbent material (silica) in order to create differential flow rates for each particular analyte. The sample was then pumped into the Mass Spectrometer where the sample was compared to a standard preparation and the concentration was determined. The six samples were compared to 57 different compounds in the standard preparations and we were able to identify 13 different drug compounds in the Milwaukee River. We found 4 antibiotics, 3 heart disease, 3 antibacterial, 1 anticonvulsant, and 2 metabolic drugs. Five of these drugs were found in all six sites. Out of these 5 drugs, caffeine was most noticeable. The concentration of caffeine throughout the six sites was between 0.188 to 0.418 Daltons. We were able to successfully collect and quantify our samples and data. This is proof that the drugs and chemicals that we use extensively are assimilating into aquatic ecosystems. The drugs found will need to be validated, but the drugs identified provide a good starting point for the next step in discovering the effects of these drugs in our water system.

Mitchell Branscombe, Erik Schiller, Hugh Soward and Keith Hayes (UW-Milwaukee)
The Sidewall Ball
Mentor: Kim Cosier, Art
Mentor: Nikole Bouchard, Architecture

The Sidewall Ball is a study into the impact of play and material executed by a collaborative effort of three students and Milwaukee-based organization Beintw een. The shared object is an interactive installation that becomes a social activator, while bringing to question what constitutes a material as “waste.” The Sidewall Ball is a hanging sphere of tire sidewalls fastened together in a geodesic pattern, allowing for optimal strength and playability. Our first ball was hung in Beintw een's warehouse space allowing us to study its physical properties and social applications. We observed, through long hours of rigorous study, that it is, in a word, fun. The next step, we expect, will be even more fun. We intend to reproduce the ball and expose it to a larger audience in different environments. With each new environment and audience gives opportunity to experience the ball in different ways, challenging the form or function of its successor. The idea of the ball blurs the line between sculpture, object, toy, and architecture. The Sidewall Ball becomes an instant point of fascination, encouraging active and passive interaction. It promises to bring character and play to most any environment, and infuses place with a unique individuality.

Alex Brault, Alaina Culbertson, Zhi Wen Leong and Lucy Ramquist (UW-Eau Claire)
Successes, Challenges and Recommendations Regarding Using Incentives to Increase School Level (Aggregate) Fruit and Vegetable Consumption in Elementary Schools
Mentor: Eric Jamelske, Economics
Mentor: Sydney Chinchanchokchokchai, Management and Marketing

Fruit and vegetable consumption has been shown to improve health and reduce the risk of a variety of costly chronic diseases. However, children's fruit and vegetable intake in the United States is well below USDA recommended guidelines. As a result, increasing children's fruit and vegetable consumption has become an important focus among practitioners, policymakers and researchers. Given that children spend significant time in school and are exposed to a variety of foods during this time, there have been many school-based policies and interventions designed to increase children's fruit and vegetable consumption. Recent research has begun to examine the influence of incentives to motivate children to eat more fruits and vegetables. For this project we partnered with two Western Wisconsin elementary schools (N=420 and N=440) to examine the influence of a variety of incentives on aggregate school-level fruit and vegetable consumption by children during school lunch over three distinct periods of study. We observed, measured and recorded baseline consumption over an initial period (3 days) followed by an incentive period (6 days) and ended
Molly Bray (UW-Eau Claire)
Oxygen Use at the End of Life: Attitudes and Beliefs
Survey in Wisconsin
Mentor: Dr. Quinn-Lee, Social Work
Mentor: Dr. Moch, Nursing

Current research on the practice of prescribing oxygen at the end of life points to an uncertainty in whether or not oxygen use at the end of life directly affects the timeline of the dying process. Little information is available as to the benefits of oxygen use over alternative methods to relieve dyspnea at the end of life. The purpose of this research was to understand the use of oxygen at the end of life in contemporary palliative care practice. Twenty-five palliative care directors throughout Wisconsin completed a survey which asked a series of questions about attitudes, beliefs, and practices regarding oxygen use at the end of life. A mixed methods approach was utilized. Half of the respondents believe that oxygen correlates to prolonging the dying process. 96% of facilities have a standard “comfort care” protocol or order set for their patients addressing oxygen use. Only two facilities do not administer oxygen at the end of life. An important finding is that addressing quality of life of patients is often the main objective in prescribing oxygen. Emotional comfort of patients (50%) and family (63%), as well as caregiver’s need for tangible evidence that they are assisting the patient were reported as additional reasons for using oxygen at the end of life.

Ana Breit (UW-Stevens Point)
Herbivory and Nectar Traits in Asclepias: Effects of Leaf Damage on Pollen Movement
Mentor: Dr. Chris Yahnke, Biology

Pollinators place plants under selective pressures, changing variables associated with attraction such as nectar. However, herbivory may also have consequences for floral traits, which could then affect pollination services. Flowers offer nectar to pollinators as a reward for visiting the plant, so nectar is presumably under selective pressures by those pollinators. Those differences in nectar variables can impact pollinator behaviors and overall reproductive success of the plant. In this study, we examined whether simulated herbivory altered nectar traits and pollen movement in two milkweeds, Asclepias exaltata and Asclepias syriaca. Several nectar traits, such as volume produced and overall sugar concentration, were measured and we compared across species and treatments. This study found that A. syriaca had significantly more insertions than A. exaltata. Significantly more nectar was produced in plants that had been herbivorized, and the volume of nectar produced per flower differed significantly by species and by date. There were no significant differences in nectar sugar concentration. These results show little change in nectar traits and pollen movement under stressful conditions, which is contrary to what we predicted. Understanding how variation in nectar affects pollinator behavior is critical to understanding pollination, a key ecosystem process.

Matthew Breit, Jacob Richmond and Cody Hanick
(UW-Stevens Point)
Effects of Post-Workout Nutritional Intervention during Resistance Training
Mentor: Thomas Wetter, Health Promotion and Human Development
Mentor: Annie Wetter, Health Promotion and Human Development

Using finite element modeling with ANSYS we studied the mechanical response of clamped square membranes made from polycrystalline silicon and silicon nitride. We used different loading conditions, in order to study the elastic properties of the membranes. These results are compared with experimental data collected by collaborators to determine elastic constants that are used as input materials parameters in the simulations. The extremely high aspect ratio of these thin membranes makes it difficult to achieve an efficient meshing of models. We discuss these challenges and the results of our simulations as well as comparisons with experimental data.

Laura Brigman (UW-Stevens Point)
Cross National Determinants of Participation and Voting in Five Democracies Across Europe and North America
Mentor: Jennifer Collins, Political Science
Mentor: John Blakeman, Political Science

The purpose of this research project is to further the understanding of the connection between interest in politics and voter turnout. An extensive body of research
exists on voter turnout in democracies. This project seeks to contribute to this field by studying the relationship between voter views of their political systems and voter turnout. The working hypothesis I am testing is that high levels of interest in politics will be correlated with high voter turnout. While a relationship between these two things may seem obvious, the hypothesis merits empirical testing. The countries included in the study are the United States, United Kingdom, Germany, Sweden, and Mexico. I chose them because they represent variation in terms of electoral systems as well as, levels of economic development. Quantitative data for this study was obtained from the following sources: World Values Survey, International Institute for Democracy and Electoral Assistance, Transparency International, and The World Factbook. I used regression analysis to analyze the data. The independent variables measured individual motivations and interest in politics and the dependent variable was an average voter turnout of elections between 2005 and 2010. In order to control for outside influences, the following control variables were included in the analysis: type of electoral system, level of corruption, and economic development. At this time, the research is still being conducted, so the results have yet to be determined. In conclusion, these findings could be translated to larger studies surrounding voter turnout in democratic countries. Additionally, the findings of this research, pending the results, could be used to increase voter turnout through increasing political interest of voters.

Mieszko Brikis (UW-Superior)
Food Consumption and Accessibility: Creating Opportunities for Student Voices to be Heard
Mentor: Deborah Augsburger, Social Inquiry

There is growing concern in the U.S. about obesity, diabetes, and other health outcomes associated with unhealthy patterns of food consumption. One strategy for addressing the need for healthier eating is to improve K-12 students’ diets through changes to the food environment that build familiarity and appetite for healthier foods, and by teaching food literacy, cooking skills, and nutrition awareness. College students, however, have been largely neglected in these approaches, even though the college years provide fertile ground for students’ acquisition of nutrition knowledge, healthier food habits, and cooking skills. In order to inform attempts to improve college students’ eating habits, we need to understand students’ perspectives and choices. Our research project focuses on UWS college students’ perceptions of obstacles they face in obtaining nutritious and desired foods. We administered surveys to students living in the dorms, asking about where they ate and how often (including the cafeteria), demographic information, their definition of a healthy lifestyle, and the changes they would like to see in their food environment. Our findings support that students do desire healthier options in the cafeteria, such as more fruits and vegetables and more variety. Many students express frustration about not having a say in what foods are available. International students in particular tend to be quite critical of cafeteria and local offerings. On the other hand, more accessible cooking facilities in two newly-renovated dorms provide an opportunity for students to share food and cooking knowledge. Our findings make evident the necessity for students to have a voice, one that allows them to freely participate in an open dialogue with the University, the cafeteria, and the surrounding community. This project, which began as an inquiry into students’ concerns is itself part of a larger effort to empower students and allow their voices to be heard.

Cali Buchanan (UW-Whitewater)
Student Knowledge and Stigma of Suicide at the University of Wisconsin-Whitewater
Mentor: Sarah Hessenauer, Social Work

Across the nation, suicide is the second leading cause of death among college students. The Suicide Prevention Resource Center estimates that each year, 1,100 college students die by suicide. In an attempt to begin addressing incidents of suicide and treatment of students at risk of suicide on the University of Wisconsin-Whitewater campus, a concept map was completed to analyze resources and services available to students and staff. Furthermore, after gaining IRB approval, a social work student and faculty member of the University of Wisconsin-Whitewater have been assessing the knowledge, stigma, and exposure of the campus’ students regarding suicide. This was accomplished by administering the Suicide Prevention Exposure Awareness and Knowledge Survey (SPEAKS) developed by ORC Macro International Incorporated for the Garrett Lee Smith Suicide Prevention Program, which is a tool that has successfully been used on multiple college campuses across the nation. The survey was sent to just over 5,000 students through e-mail and by random selection. Following data collection and analysis of SPEAKS, a plan for educating staff members and the student body will be developed. The results will be shared to determine what the university is effectively doing to provide awareness of suicide and mental health issues and suggestions for improving support for students and staff on campus. In addition, the UW-Whitewater findings will be used to recommend best practices other campuses can follow.

Natalie Burger and Erica Hansen (UW-Superior)
Compilation of Bachelor Degree Programs in Transportation, Logistics, and Supply Chain at Undergraduate Institutions Across the United States
Mentor: Dr. Richard Stewart, Business & Economics

This collaborative National Center for Freight & Infrastructure Research & Education (C-FIRE) funded academic research is focused on compiling a best practices in transportation education. The UW-Superior research team was tasked with evaluating undergraduate education. This portion of the study developed a list of universities in the United States that offer bachelor degree programs in transportation, logistics, and/or supply chain management. An inventory of universities with relevant degrees was created using professional societies and
For the treatment of drug addiction, learning, and their regulation may constitute new avenues for extinction and impaired retrieval in the IL and PrL. The thought that PrL mediates expression of drug seeking and retrieval, and will be utilized to ascertain definitive roles in CPP learning and extinction. Future experiments are underway to discern these modalities more clearly, as it is necessary for expression of a CPP. Taken together, these results indicate that the IL and PrL possess dissociable roles in CPP learning and extinction. Future experiments aim to discern these modalities more clearly, as it is thought that PrL mediates expression of drug seeking through memory retrieval. Experiments are underway to dissociate the effects of GJ inhibition on extinction and retrieval, and will be utilized to ascertain definitive evidence regarding the dissociation between enhanced extinction and impaired retrieval in the IL and PrL. The results of these experiments will provide new insight into the functions of glial cells during drug-associated learning, and their regulation may constitute new avenues for the treatment of drug addiction.

### Jake Burkard (UW-Milwaukee)

**The Necessity of Gap Junction Communication in Extinction of a Cocaine Seeking Memory**  
**Mentor: Devin Mueller, Psychology**

Astrocytes, a type of glial cell, have a wide variety of functions such as regulation of neurotransmitters and detoxification of the central nervous system. Emerging evidence, however, has demonstrated that they also mediate neuronal communication at the synapse and are capable of cellular communication via gap junctions (GJs). GJs are specialized membrane structures between closely apposed cells that permit limited cytoplasmic continuity. GJs between astrocytes and neurons may therefore participate in the coupling of astrocyte and neuron physiology. Despite this, very little work has been done to determine how astroglial communication utilizing GJs contributes to experience-dependent neuronal plasticity. Drugs of abuse, such as cocaine, can alter the brain resulting in compulsive drug seeking. Craving and relapse are mediated by cues associated with drug use. Reducing cue reactivity through extinction, or learning that the cues no longer predict drug, could reduce relapse rates. Thus, we investigated the role of astroglial GJs during extinction of cocaine seeking. We first examined the necessity of astroglial communication in both the infralimbic (IL) and prelimbic (PrL) medial prefrontal cortex using a cocaine conditioned place preference (CPP) paradigm. In this model, rats are conditioned to associate one chamber but not another with cocaine. We found that a bilateral IL microinfusion of a non-specific GJ antagonist (Carbenoxolone; CBX) prior to the CPP test resulted in persistent CPP expression across trials. Conversely, a single bilateral PrL microinfusion of CBX persistently disrupted expression of a CPP. Thus, astroglial GJs in the IL are necessary for extinction of a CPP, whereas astroglial communication in PrL is necessary for expression of a CPP. Taken together, these results indicate that the IL and PrL possess dissociable roles in CPP learning and extinction. Future experiments aim to discern these modalities more clearly, as it is thought that PrL mediates expression of drug seeking through memory retrieval. Experiments are underway to dissociate the effects of GJ inhibition on extinction and retrieval, and will be utilized to ascertain definitive evidence regarding the dissociation between enhanced extinction and impaired retrieval in the IL and PrL. The results of these experiments will provide new insight into the functions of glial cells during drug-associated learning, and their regulation may constitute new avenues for the treatment of drug addiction.

### Nickolas Campa (UW-Superior)

**Lost in Conversation: Listening and Inattentional Blindness**  
**Mentor: Dr. Eleni Pinnow, Psychology**

While there is research examining different ways to induce Inattentional Blindness (IB) and Inattentional Deafness (ID), there is little research currently examining whether it is possible to induce IB with an auditory task. IB and ID refer to the phenomenon where one fails to see or hear something when they are distracted. Participants received one of three sets of instructions (watch the video, count the number of bags in the video, or pay attention to the audio clip playing a conversation) to follow while watching a video and completed surveys immediately following the video. There was not a significant difference between conditions in inducing IB. There was not a significant difference between conditions in the average accuracy of responses or the average confidence rating for responses. The listening task failed to be distracting enough to induce IB and thus did not support the hypothesis. Future research may involve requiring participants to engage in a conversation, rather than simply listening to one, in order to increase the level of distraction induced by the auditory task.

### Destany Cancel (UW-Milwaukee)

**Inhibitory Control in Young Children with Neurofibromatosis Type 1**  
**Mentor: Bonnie Klein-Tasman, Psychology**

Neurofibromatosis type 1 (NF1) is a neurodevelopmental genetic disorder which affects approximately 1 in 3,000 people. Children with NF1 have an elevated rates of difficulty in executive functioning, and elevated rates of ADHD. This study aims to examine patterns of change and stability in young children with NF on a measure of inhibitory control. We aim to examine the proportion of children who remained stable, improved or showed worse inhibitory control over time and to compare these groups in regards to age, gender and general cognitive ability. 20 3-6 year olds (14 boys, 6 girls) with NF1 completed two assessment visits and were administered the Tower of Patience task of the Laboratory Temperament Assessment Battery to measure inhibitory control and the Differential Ability Scales II to measure general cognitive ability. Kruskal-Wallis tests were used to test for change in the presence of inhibitory control over time. Independent group t-tests were conducted to examine differences in age, gender and IQ. We expect that a higher proportion of children will show good inhibitory control at T2 compared to T1. We do not have specific hypotheses in regards to age, gender and IQ differences. Many more children with NF1 have significant ADHD symptoms than typically developing children. Examining inhibitory control, a frequent difficulty of children with ADHD, may help determine risk factors for the development of ADHD in children with NF1. This study will further the understanding of the development of inhibitory control in children with NF1.
Tanya Cass (UW-Milwaukee)
Evolution of Pre-Health Professionals-Attributions of the Causes of Obesity During an Obesity and Weight Management Course
Mentor: Dr Lori Klos, Human Movement Sciences
This study examines the evolution of pre-health professional students’ beliefs about the causes of obesity at during a 16-week, upper level kinesiology course entitled Obesity and Weight Management. Gaining understanding of how pre-health professionals change their thinking as they gain knowledge about the causes of obesity may assist in tailoring training to help minimize anti-fat bias. Students were instructed to complete concept maps illustrating their beliefs at the beginning of the course, after a module on the complex etiology of obesity, and at the end of the course. The concepts included on the map are being analyzed using Atlas.ti qualitative data analysis software to create categories, then collapse categories into themes. Categories include concepts like nutrition education, disordered eating, and accessibility of safe outdoor spaces while themes are general, such as biology, education, and physical activity. Categories and themes are evaluated for agentic/non-agentic attributions, with agentic causes indicating personal responsibility, like choosing to spend leisure time with television rather than exercising, and non-agentic causes having an external, uncontrollable source such as genetic predispositions or foods available in local stores. It was anticipated that students would begin the course focused on themes that attributed obesity to personal agency, that non-agentic causes would be more prevalent in the second set of maps with a decline in overall belief in agency, and that, while some non-agentic themes remain apparent at the end of the semester, there would be some regression to supporting agentic themes. Preliminary analysis indicates that this was partially supported, non-agentic themes increased dramatically and agentic themes declined for the second set of concept maps, though the level of regression to personal agency at the end of the semester may not be as great as anticipated. Individuals that attribute obesity to personal agency tend to carry higher levels of anti-fat bias, which can impede fair treatment of people with obesity by health professionals. Therefore, effectively reducing anti-fat bias in pre-health professionals could create a long-term effect of creating a more inclusive medical environment for patients with obesity, which could potentially increase their overall health outcomes.

Eric Christensen, Annelise Mankowski and Kasey Fowler-Finn (UW-Milwaukee)
Host Plant Related Variation In Insect Mating Signals And Mate Preferences
Mentor: Rafael Rodriguez, Biological Sciences
Speciation in many animals involves adaptation to novel environments and divergence in mating signals and mate preferences, with the latter providing crucial reproductive isolation during the early stages of speciation. One key question, therefore, is how colonizing novel environments influences evolutionary divergence in signals and preferences. Here we ask how variation in the signals and preferences of a plant-feeding insect is influenced by inputs from the biotic environment (host plants) in interaction with the insects’ genotypes. We worked with a species that is common in the Milwaukee area, the two-spotted treehopper, Enchenopa binotata (Hemiptera: Membracidae). We present the results of a preliminary experiment, and discuss the findings in terms of impact on the dynamics of sexual selection and their consequences for speciation.

Zachary Coleman (UW-Stevens Point)
Isolating and Sequencing the Aconitase-4 Gene
Mentor: Devinder Sandhu, Biology
Isozymes are variants of the same enzyme that differ in sequence but catalyze the same chemical reaction. Aconitase isozymes catalyze the interconversion of the three tricarboxylic acids: citrate, cis-aconitate, and isocitrate in the Krebs cycle. The Aconitase-4 isozyme has been used in mapping studies in soybean and has been used to study allele switching. For this study, parent plants BSR 101 and PI 290136 were crossed. The F2 generation was scored for Aconitase-4 (Aco-4) alleles and was used to make two bulks: one displaying the BSR 101 allele pattern, and one displaying the PI 290136 allele pattern. The bulks were then used in bulked segregant analysis (BSA), and tested with 700 primers. The gene was determined to be closest to Satt509, a marker located on Molecular linkage group (MLG) B1 (Chromosome 11). All the polymorphic MLG B1 primers were used on entire F2 population and genetic linkage map was developed. Aco-4 was mapped to a ~292kb region with BARCSOYSSR_11_323 and BARCSOYSSR_11_336 flanking the gene. In this region, there are 40 predicted genes. Glyma11g080600 is the most likely candidate as it shares sequence similarity to an aconitase gene. We have designed long range PCR primers to amplify Glyma11g080600 from two variants. We are in the process of sequencing Glyma11g080600. Sequence comparison may reveal critical differences between two isozyme variants and confirm isolation of the Aco-4 gene.

Anna Conroy (UW-Milwaukee)
Correlation between Patient’s Perceived Importance of Family Health History and Physical Examination Compliance
Mentor: Dr. Sandra Millon-Underwood, Nursing

Caitlin Conroy (UW-Whitewater)
A Study of Queer Women in New Adult Fiction
Mentor: Dana Prodoehl, Letters and Sciences
Literary representation is an important resource for minority students on college campuses, especially for queer women; I wished to not only better understand the benefits of representation of queer women ages 18-25, but see what representation there is. I chose to examine several queer anthologies (preferably for queer women) to see what short stories there were with main
characters that fit into these demographics. Furthermore, I created a list of the best short stories to determine what the current writers are doing well, and what can be improved. I determined that queer women experience their intersecting identities of gender and sexuality in a unique way, and that literature serves to validate and better understand their own experiences, making queer women's literature incredibly important as a resource. Furthermore, such literature serves as a resource for non-queer/non-female readers and teachers to learn about queer women's experiences, and combat heterosexism and cissexism. Of the surveyed stories, ten were featured in the “best works” list. Their greatest contributing feature was the use of the characters’ identities to enhance, but not encompass, the plot and characterization. These stories need to improve to include more diverse representation (e.g. bisexual, pansexual, and asexual women), and better representation of college life. Ultimately, this work serves to encourage queer women to read and write about characters that reflect their own lives, and encourage non-identifying persons to explore queer women’s literature and include better representation of queer women in their writing.

William Cook (UW-Parkside)
The Utility Stomatal Pore Area as Proxy for Leaf Water-Use Efficiency
Mentor: David A Rogers, Biological Sciences
Understanding how plants can adapt to their environment is a major problem to be solved in ecology, particularly when those environments are changing rapidly in response to human activity. Scientists use these models to predict ecosystem responses to a wide variety of stimuli: a commercial development, prolonged drought conditions, and climate change. For example, the “worldwide leaf economics spectrum” describes variation in leaf allocation patterns across the globe in response to differing growing environments. However, many of these traits are either difficult to quantify or difficult to observe at the community level. One such trait is the water-use efficiency of leaves and here we propose to use plasticity of stomatal density of woody dicots as a proxy for that trait. Therefore, we ask whether the density of stomata on a lamina is a plastic trait, and how it might vary as a function of the area of each gram of photosynthetic tissue on the leaf. These values will also be used to create a stand level index of stomatal density for a stand, equalized per species weighted by abundance. These values will then be related to the environmental drivers using historic and contemporary data community level data from the Wisconsin Plant Ecology Laboratory. To achieve this goal, several sites in southeastern Wisconsin were visited and leaf samples were taken from mature woody plants during the summers (June - October, during full leaf). These specimens were then taken the lab for processing. The leaves were photographed on a scanner, and peels of the undersides were taken using fingernail polish. The polish left an imprint of the stomata rich underside of the lamina, and each was photographed using a compound microscope and camera. The stomata could then be counted using imaging software ImageJ and Photoshop. At the present, all specimens are collected and photographed and stomatal density estimates are ongoing.

Teonna Cooksey (UW-Milwaukee)
The Church And Spirituality of Landscape
Mentor: Anjit Sen, Architecture and Urban Planning

Amy Cottrell (UW-Green Bay)
Effects Of Dam Removal And Habitat Restoration On Migratory Fishes Of Green Bay With Emphasis On Northern Pike (Esox lucius)
Mentor: Patrick Forsythe, Natural and Applied Sciences
The removal of small stream barriers including perched culverts and low-head dams can have unique impacts on aquatic ecosystems. Opportunities to quantify these impacts are increasing throughout the Great Lakes basin. For example, two low-head dams on Duck Creek (west shore tributary of Green Bay, Wisconsin) were removed during the spring and summer of 2012. The dams were installed in the mid-1900s, and removal has opened several stream miles of potential spawning habitat for migratory fishes. However, the rapid conversion of riparian and stream habitat in the Duck Creek watershed to agricultural fields or urbanized areas leaves the overall impact of barrier removal in question. The objectives of this study included: 1) determining how fish species composition, abundance, and habitat use change in the first 3 years after barrier removal, 2) estimating migratory species recruitment after barrier removal and compare to pre-removal conditions and 3) comparing northern pike recruitment success between tributary and restored habitats that encompass agricultural ditches and wetlands. To meet these objectives, we used standard larval box traps to quantify the total number and body size of larval fish out-migrating from Duck Creek (downstream and upstream of the dam removal site), as well as several reference streams and ditches with direct connection to Green Bay (13 sites in total). Larval fish captured were counted daily, measured to the nearest mm, and released. Stream temperature and river discharge were also monitored at several locations. During the first two years of this study, several migratory fishes including white sucker (Catostomus commersonii) and walleye (Sander vitreus) were observed spawning upstream of the dam removal site and out-migrating larval white sucker were captured. Further, more than 30 fish species were identified within the box traps, including yellow perch, shortnose gar, and banded killfish, a WI species of concern. However, no larval northern pike were captured upstream of the dam removal site as expected given the increase in river connectivity. In contrast, northern pike larvae were observed at nearly all reference locations and larvae showed steady (but significantly different) growth rates throughout the out-migration period. This research suggests while the dam removal can have a positive effect on the fish community, some migratory fish may not realize the added benefit without concurrent habitat restoration.
Bradley Cox (UW-Milwaukee)
The Role of Ubiquitin-proteasome System in Regulation of Protein Synthesis and Memory Formation
Mentor: Dr. Fred Helmstetter, Psychology

Previous work from our lab has shown that de novo protein synthesis as well as protein degradation mediated by the ubiquitin-proteasome system (UPS) are required for memory consolidation following several types of learning. Additional work from our lab suggests that UPS-mediated protein degradation may regulate mechanisms of protein synthesis during memory consolidation. Based on this information we attempted to identify specific molecules associated with de novo protein synthesis that may be regulated by proteasome activity during consolidation. Rats were trained with delay fear conditioning, consisting of 4 pairings of an auditory conditioned stimulus (CS) with a foot shock unconditioned stimulus (US). Following training, cannulated animals were given intra-amygdala injections of the proteasome inhibitor clasto-lactacystin-b-lactone (BLAC) or vehicle (2% DMSO in aCSF). Sixty minutes following injections the rats were euthanized and their brains were removed for tissue dissection. Amygdala tissue was isolated and analyzed using western blots. We specifically evaluated the phosphorylation status of substrates within the mammalian target of rapamycin (mTOR) and extra-cellular signal regulated kinase (ERK) pathways, given their involvement in protein synthesis initiation and memory consolidation. For this reason, we expect to find a decreased level of phosphorylation in the BLAC group compared to vehicle of effectors previously known to show increased levels of phosphorylation following training. Identifying specific effectors will give information on how protease activity is related to de novo protein synthesis and formation of memories.

Erin Cox (UW-Milwaukee)
Patterns of Lure Display and Associated Behaviors in Lampsis cardium
Mentor: Todd Levine, Biology Department (Carroll University, Waukesha, WI)

A prominent aspect of unionid mussel life histories is their obligate parasitic phase, during which they attach to various fishes. Some mussels produce elaborate lures that presumably increase infestation success on hosts. We observed the behaviors associated with mantle lure display in a population of Lampsis cardium near Mukwonago, WI. We made 764 observations of 40 mussels on 9 days during summer 2014. We created categorical descriptions of lure display, which ranged from 0 (no display, closed valves) to 5 (fully open valves with an active display). Overall mean lure rank was 2.11, with the highest lure display ranks in the morning (6 am) and evening (6 pm) with a longer display period in the evening. Preliminary analysis of burrowing data suggest that mussels do not necessarily move up in the substrate during display periods. Few data have been collected to describe diel lure display cycles, though this is likely to be an important in determining infestation success.

Christopher Crumb (UW-Milwaukee)
Preparation of Fluorescent Tissue Factor Fusion Protein Constructs for Stable Transfection of Cell Lines
Mentor: Julie Oliver, Biological Sciences

Tissue factor is the biologically relevant initiator of blood coagulation. Coagulation begins when blood comes into contact with tissue factor-bearing cells when the vasculature is damaged. However, full exposure of tissue factor function, or decryption, requires a secondary cell activation event. The nature of this cell activation event is a matter of debate. One hypothesis suggests that tissue factor molecules in resting cells are dimerized, leading to encryption of activity by physical blockade of substrate binding sites. Cell activation would be expected to separate the dimers into monomers, exposing maximal substrate binding and full function. We will test the hypothesis by generating expression vectors containing full length human tissue factor cDNA fused with the sequence for either yellow fluorescent protein (YFP) or green fluorescent protein (GFP). When co-expressed in mammalian cells, the fluorescent proteins will act as a matched pair for Fluorescence energy transfer (FRET) analysis. FRET signaling can be used to analyze oligomerization of molecules. Two experimental approaches will be undertaken: (i) design and use of polymerase chain reaction (PCR) primer pairs to amplify the tissue factor sequence from an already existing plasmid, and KpnI or XbaI (or alternatively SacI and Xbal) restriction sites to be used in the cloning of tissue factor sequence into existing expression vectors containing GFP or YFP that will be in-frame with the PCR product insert, and (ii) cut the YFP and GFP sequences out of their respective plasmids at HindIII and SacI restriction sites, and ligate at those restriction sites upstream and in-frame with the tissue factor sequence in its existing expression vector. If the tissue factor dimerization hypothesis is shown to be correct and to play a significant role the initiation of coagulation, site-directed mutagenesis will be undertaken. Specific amino acid substitutions could then be used to examine the effect of modification on tissue factor function. These experiments will help more fully understand the role of tissue factor in health and disease.

Kaitlin Cullen (UW-La Crosse)
The Effects of Study Abroad on Future Student Performance
Mentor: Dr. Darlene Lake, Modern Languages

This research deals with the statistical data on students who are studying abroad and the effects of studying abroad specifically among students who studied at the University of Wisconsin-La Crosse. Studying abroad has lifelong impacts on personal, intellectual, and professional development. The international experience makes students become global citizens with worldwide experience, language capabilities and cross cultural communication skills. Despite the inevitable increasing global competition for jobs, American students lack the international experience to succeed in a global economy.
with only 2% of students studying abroad. My overall goal is to provide the Office of International Education at the University of Wisconsin-La Crosse with specific statistical data through the usage of surveys. My research takes into account the demographic population of University of Wisconsin-La Crosse students, as the information will be relevant for future University of Wisconsin-La Crosse students. My research examines the types of students who go abroad and what the long-term impact is of their experience. The benefits of studying abroad are undeniable, yet the stigmas of studying abroad have fostered a mindset where students believe it is not possible whether it is regarding academics or finances. My research looks to identify the personal, financial, and social results of studying abroad. Opinions on studying abroad vary across age groups, racial backgrounds, and income levels. Utilizing this component will provide a better project and more impartial yet specific end result. The implications of this project are powerful, in that it holds the potential to change opinions and decisions on studying abroad among students.

Rachel Davis and Michael Bernard (UW-Milwaukee)
ArtCycle Milwaukee
Mentor: Michael Bernard, Peck School of the Arts - Art & Design - Jewelry/Metals

Our current research delves into discovering the most efficient and accessible way to expose the community to the art making process. Metalworking is commonly done inside a studio. We have specialized equipment that does not do well with traveling, such as torches, anvils, and many other less publically recognizable tools. The processes with which we work are unknown to the community at large. This amount of studio exclusivity is the same for many of the art media. As artists who recognize the importance of community involvement in our ability to achieve success, we decided to get the art making process out of the studio and give fellow artists, and non-artists alike a glimpse of what it is that we do. In order to achieve this goal, we had to analyze Milwaukee, considering all aspects of the city and the way people congregate and communicate. Our city has dozens of summer events, festivals, and block parties. People arrive at these events in cars, by walking, and by bicycle. These outdoor, casual, fun events are havens for artists, who are able to display and sell their wares. Booths are paid for, set up, and taken down at the end of the day, being loaded into cars and trucks, hauled back into storage until the next event. While being able to demonstrate at a booth would achieve the community education we seek, it would not give us the most efficient way to reach the public. Having a mobile booth is of the utmost importance to our mission. Bicycles do not require fuel, are easily maneuverable, and have more access to hidden gems across the city than cars and other motorized vehicles. We designed the ArtCycle to serve as this mobile educational art tool. ArtCycle infuses the spirit of art and the way it can activate people in a community with the already strong Milwaukee bicycle culture. We are exposing and educating the Milwaukee community to creating goods by hand while drawing attention to the heightened mobility experienced while on a bicycle. By putting a creative workspace onto a bicycle, we seek to engage the public and get art making out of the exclusivity of the studio and back into people's daily lives where it belongs.

John Deckert (UW-Milwaukee)
Methods for Biomechanical Analysis of Amputee Gait and Activities of Daily Living
Mentor: Dr. Brooke Slavens, Occupational Science and Technology
Mentor: Alyssa Schnorenberg, Occupational Science and Technology

Methods for Biomechanical Analysis of Amputee Gait and Activities of Daily Living John Deckert, Omid Jahanian MS, Liana Havi, Alyssa Schnorenberg MS, and Brooke Slavens PhD. Correctly identifying the proper alignment and components of an amputee’s prosthesis is incredibly important for the prosthetist. Even slight changes in the alignment of an amputee’s prosthesis can change the person’s overall biomechanics and thus their kinematics during ambulation. While current methods are based on observation alone, we propose methods using quantitative motion analysis. Data acquisition and processing methods can be applied to calculate the amputee’s joint dynamics in order to facilitate human movement. This project will investigate the biomechanics of amputee mobility during various activities of daily living. The subjects will undergo motion analysis (with a 14 camera Vicon system; using a Plug-in-Gait model and 39 retro-reflective markers) during a variety of mobility tasks including self-selected gait, ascension and desceendation of stairs, walking with a backpack, ramp inclined and declined planes, sit-to-stand, and stand-to-sit activities. Data from the motion analysis will be processed using Vicon Nexus 2.1 software for labeling, filling gaps in the data, and filtering the kinematic trajectories. Vicon Plug-in-Gait model will be used to calculate lower and upper extremity joint angles, joint forces, and joint moments. This data will be used to identify variations in the joint parameters and spatiotemporal gait parameters (speed and cadence). Impact of this work extends to all amputees for improved rehabilitation treatment through quantitative assessment of activities of daily living. Ultimately, this work will assist prosthetists in the care of their patients.

Jessica DeGroot and Hanna Paul (UW-Milwaukee)
Functional Range of Motion of the Wrist Joint under Varied Grasping Tasks
Mentor: Ying-Chih Wang, OTR, PhD, Occupational Science and Technology
Mentor: Bhagwant Singh Sindhu, OTR, PhD, Occupational Science & Technology
Mentor: Arun Garg, PhD, Occupational Science and Technology

Currently, the reference values of normal range of motion at the wrist joint are for an open palm position with fingers extended: extension/flexion at 70/75, and
radial/ulnar at 20/35. However, functional range of motion when grasping an object is likely to be significantly different from traditional range of motion practiced today. This may have profound effect on occupational therapy practice when treating patients for improving their range of motion. The purpose of this study was to examine functional range of motion of the wrist under varied grasping tasks by position and applied force. Thus far, a convenience sample of 7 healthy participants (mean age 25 ± 6, all right-hand dominant, 4 male and 3 female) has been obtained. However, a total of 25 participants will be included in the analysis. The maximum wrist flexion, extension, radial and ulnar deviation was measured using photo and digitalization method under the following conditions: By position (1) neutral, (2) supination, and (3) pronation, and; by applied grip force (1) none, fingers are open, (2) 5% maximum voluntary contraction (MVC), (3) 25% MVC, and (4) 50% MVC. When participants were required to apply more grip force, the observed range of motion, specifically the maximum wrist flexion, extension, and ulnar deviation, decreased. The maximum radial deviation seemed to not be influenced by the applied force. Under the neutral position, the maximum wrist extension values were: 60.0 degrees (fingers are open), 59.1 (5% MVC), 54.6 (25% MVC), 53.7 (50% MVC). The maximum wrist flexion values were: 64.5 degrees (fingers are open), 32.9 (5% MVC), 30.5 (25% MVC), 20.0 (50% MVC). The maximum ulnar deviation were: 30.0 degrees (fingers are open), 28.6 (5% MVC), 24.7 (25% MVC), 21.0 (50% MVC). The maximum radial deviation were: 24.6 degrees (fingers are open), 39.2 (5% MVC), 30.5 (25% MVC), 33.3 (50% MVC). The pilot study suggested that functional range of motion of the wrist was influenced by the measurement position and applied force. Future studies should examine the values using a larger and more representative sample.

Kayla Denton, Chloe Fiedler, Brooke Flesher and Erin Oates (UW-Whitewater)
Older Adults' Participation in an Intergenerational Reading Program: Benefits and Challenges
Mentor: Simone DeVore, Special Education
Mentor: Giuliana Miolo, Communication Sciences and Disorders

Intergenerational programming provides older adults with opportunities to interact with children during planned activities. Studies have shown that older adults who volunteer with children experience positive health and cognitive outcomes. In this study, we evaluated the effects that participating in an intergenerational reading program with young children had on older adults living in a residential community. Three older adults attended a two-day workshop on how to interact with and engage preschool aged children during joint book reading. Following the training, they were invited to read books to young children, who attend an on-campus, early childhood education and care center. Weekly readings took place over a period of six to seven weeks. Prior to each reading session, the student research team met with the older adults to pre-read the selected book and develop questions to ask during the reading sessions. To evaluate the impact of their participation in this program, the older adults were interviewed before and after each reading session about their state of happiness, their perceptions of the reading session, and whether they needed any additional support in their roles as readers. In addition, the older adults were interviewed at the beginning and end of the reading program, the older adults were asked to rate how confident they felt about reading to young children, and about their expected and actual challenges and benefits of participating in the program. The adults reported that participating in this reading program had a positive effect on their happiness, confidence, and overall well-being. Upon completion of the project, it was concluded that older adults participating in intergenerational programming experienced positive health and cognitive outcomes. Results from both qualitative and quantitative analyses will be reported.

Elliot DiMilo (UW-Milwaukee)
Mentor: Joseph H. Aldstadt, Chemistry

The Maillard Reaction is a non-enzymatic process involving a series of reactions in which amino acids combine with sugars to form melanoids. This reaction's end products have medical implications ranging from hyperglycemia to late diabetic complications. In this study, the early reactions of the Maillard reaction's kinetics are studied by nuclear magnetic resonance (NMR) spectroscopy. Solutions of phenylalanine methyl ester and methylglyoxal are used as model reactants. A sequential injection (SI) method was developed using a parallel-plate dialyzer (PPD) as a means to separate and preconcentrate the products of the reaction. Development and optimization of the SI-PPD method will be described as well as its interfacing to the NMR spectrometer. Interpretation of the NMR spectra for the Maillard reaction products will be described and implications for the kinetics of the reaction discussed.

Logan Dohmeier (UW-Whitewater)
Investigating Brain Stimulation Reward (BSR) and The Matching Law
Mentor: Dr. Matthew Andrzeiwski, Psychology

Herrnstein's matching law is a theory of choice that states that allocation of time, effort, or other behavioral resources across alternative courses of action will be equivalent to, or match, the relative amount gained from those options. According to the matching law a choice is neither an internal decision nor an isolated output of internal decision process; a choice is behavior over time. The study of Brain Stimulation Reward has helped neuroscientists uncover the neural instantiation of the law of effect (the “effects” or consequences of your behavior are critical in selecting and maintaining that behavior). In the BSR paradigm, rats respond on a lever to produce electrical stimulation to an area of their brain, most commonly the medial forebrain bundle.
or associated structures. The electrical stimulation varies systematically, both in terms of its current (mA) and frequency (Hz). Using data already collected, we hypothesized that responding on a single lever for BSR would conform to a version of the matching law, known as Herrnstein’s hyperbola. That is, response rate would be a hyperbolic function of a combination of current and frequency (called “charge”). Further, the extant data came from a study using drug manipulations in specific brain areas. The implication of our research is that the matching law may inform our understanding on the change in behavior observed as a function of change in charge. Indeed, the results of our analysis are consistent with the matching law. Responding for BSR matches the relative electrical stimulation. In addition, drug injections that produce dopamine D1 and D2 receptor modulation, such as contra-lateral 23390 in the nucleus accumbens shell (NAS), contra-lateral injections of 38393, and ipsi-lateral injections of NBQX + 23390 in the sublenticular central extended amygdala (SLEAc), alter quantitative parameters of the Matching Law. These data suggest that the Matching Law has some utility in single-lever BSR experiments using a novel combinatorial function of current and frequency, and may help elucidate the roles of particular brain structures and neurotransmitters in reward-related behavior.

Amy Donahue and John Weissert (UW-Milwaukee)
Identifying Possibly Pleiotropic Comorbidities
Using Genetic Variant and Phenotypic Data
Mentor: Peter Tonellato, Public Health

For patients suffering from disease, comorbidities and multi-morbidities often complicate treatment and decrease quality of life. Comorbidities, e.g. obesity and diabetes, share known physiological links, while multi-morbidity is defined as the co-occurrence of two distinct disease states. Some multi-morbidities, however, may share hidden physiological or genetic links, and are actually also true comorbidities. It is widely recognized that a single gene can affect multiple phenotypic traits, i.e. physical manifestations. The term “pleiotropy” describes these relationships, where a single gene or gene variant can result in a widely distributed cascade of physical effects. A well-recognized example is the genetic variant linked to sickle cell anemia, which also confers malaria resistance. The identification of these pleiotropic relationships has the potential to impact patient screening and treatment strategies for multi-morbid diseases, as well as provide motivation for targeted research into their shared pathways for new therapies. In this study, we developed and tested a method for identifying possible pleiotropic relationships between diseases. The method consists of the following steps: 1) querying the National Center for Biotechnology Information (NCBI) database ClinVar for all genetic variant records indexed with a specific disease/phenotype. 2) Identifying possible comorbidities from the list of additional disease/phenotypes associated with the original query. 3) Testing for a statistical comorbidity relationship between the original disease and an associated phenotype using nationwide hospital discharge data. To test this method, we queried ClinVar using the disease phenotype “colorectal cancer.” From the list of results, we identified a potential genetic relationship between age-related macular degeneration (ARMD) and colorectal cancer. We then analyzed nationwide hospital discharge data to determine if there is a significant relative risk and odds ratio for patients suffering from both diseases when diagnosed with either ARMD or colorectal cancer. Our data source was the 2012 National Inpatient Sample (NIS) of the Health Care Utilization Project (HCUP) and all statistical analysis was performed using SAS version 9.4. The results of our initial test did not show statistical evidence of a comorbid relationship between the ARMD and colorectal cancer phenotypes. Nevertheless, we believe the method can be applied in the identification of unknown comorbidities. Further, we propose this method can prioritize further study into possible pleiotropic relationships; our first test is an example of a relationship that may not be worth prioritizing. Such a method can have direct impact on disease prevention and treatments and increase the speed of future discoveries.

Andrew Dorst, April Stern and Gavin Marsh
(UW-Washington County)
Isomeric Hydrogen Bonding: Natural Bond Orbital Study
Mentor: Dr. Mohamed Ayoub, Chemistry

We examine different hydrogen bond isomeric dimers, where Lewis base has more than lone-pair bearing atoms such as carbon monoxide (CO), hydrogen cyanide (HCN), hydrogen isocyanide (HNC), isocyanic acid and dinitrogen oxide (NNO) with different Lewis acids such as hydrogen fluoride (HF), hydrogen chloride (HCl). We employ density functional theory (DFT) with aug-cc-pVTZ basis set with natural bond orbital (NBO) and natural resonance theory (NRT) to obtain all (i) geometrical, (ii) theoretical, and (iii) experimental features for the hydrogen bond.

Emily Dunn (UW-Milwaukee)
Review and Evaluation of Measures of Self-Management Behaviors for Persons Living with Diabetes
Mentor: Rachel F. Schiffman, PhD, RN, FAAN, Nursing

Background and Rationale: Approximately 21.9 million people in the United States are living with diabetes. This number is expected to rise significantly in the coming years. Diabetes is a disease associated with substantial costs for individuals, families, and the healthcare system. Accordingly, a great deal of research is focused on improving the health outcomes of people diagnosed with diabetes. The Individual and Family Self-Management Theory (IFSMT) posits that self-management behaviors are tied to health outcomes; however, there are multiple instruments that purport to measure behaviors related to implementing the diabetic management regimen. The purpose of this project was to identify commonly used and relevant instruments from the literature, and evaluate a select number for validity, reliability, and
congruence with the IFSMT. Methods: In consultation with a research librarian, an initial search using PubMed, CINAHL, PsycINFO, and literature reviews of multiple measures returned 315 diabetes-related instruments. From this pool, suitable instruments were identified using the following inclusion criteria: tools evaluating diabetes-specific behaviors, availability of psychometric data, English language availability, and frequency of use. Results: Preliminary analysis has identified one instrument that has been extensively used and several others with less frequent use that are in the process of being fully evaluated. Conclusions: Recommendations will be made for measures with strengths and weaknesses so that investigators may make informed choices.

Jamison Ellis and Katherine Santell (UW-Milwaukee)

The Wisconsin Farming Oral History Project: Urban Gardening and its Role in Shaping Milwaukee
Mentor: Jasmine Alinder, Urban Studies

This project, spanning multiple UW campuses, focuses on constructing a historical narrative of farming in the state of Wisconsin through the method of oral history. The UW-Milwaukee project team focuses on urban agriculture and the various institutions that have arisen in an attempt to reclaim urban space through community projects such as urban gardens. My role with the project is to interview various community members in the Milwaukee area that have been involved with urban gardens. Organizations such as Growing Power, Alice's Gardens, Milwaukee Urban Gardens, and others are all locally based institutions that have had a significant impact on the developing urban agriculture movement in the city. As former industrial cities such as Milwaukee attempt to redefine themselves through such movements, it is important for academic research to chronicle this change. Continued research into the field of urban agriculture will yield significant information on how urban gardens are redefining public/private space, providing food and support to urban communities that need it the most, and most of all empowering those involved through a sense of community and productivity.

Gina Erato (UW-Milwaukee)

Thematic Elements of Parental Prevention Discussions About the Choking Game
Mentor: W. Hobart Davies, Psychology

The Choking Game (TCG) is a risk-taking behavior typically engaged in by adolescents involving forced asphyxiation to obtain a “high.” The serious risks of participation include seizures and death. Unfortunately, only 20% of parents report discussing the dangers of TCG with their child. While parents play an essential role in prevention efforts with children, there are presently no recommendations to guide parents’ prevention conversations. The current study sought to describe parent-child prevention discussions around TCG to guide future prevention efforts. Parents of children ranging from 6- to 12-years old were asked open-ended questions about whether they had ever discussed TCG with their child, what was said during the conversation, and how their child responded. The qualitative responses were categorized by the Delphi procedure and then coded into thematic categories. The common themes identified in parental conversations included eight essential components, present to varying degrees in the sample: Risks/Consequences (79%), Awareness (33%), Peer Context (27%), references to External Resources (23%), Basic Information (18%), Prevention Strategies (13%), Participation (12%), and Told Not To (12%). Children were reported to show a variety of responses to the discussion: Positive Response (67%), Promised Not to Participate (20%), Neutral/Indifferent Response (15%), Emotional Reaction (12%), Having Heard of the Game (9%), and Not Having Heard of the Game (4%). Parents were most likely to address aspects of the risk/consequences of participation, as well as assess their child’s awareness of TCG. Generally, children responded positively to this conversation. These findings indicate that helping parents address more aspects of prevention in parent-child conversations about TCG is associated with better responding on the part of the child or adolescent.

Devon Erbes (UW-Milwaukee)

Genetic Manipulation of the Fish Pathogen Flavobacterium columnare
Mentor: Mark McBride, Biological Sciences - Microbiology

Flavobacterium columnare causes columnaris disease in freshwater fish. Infections are characterized by damage to the skin, fins, gills and internal organs, resulting in death. They are especially devastating in aquaculture facilities, which provide fish worldwide as a major food source. The threat to aquaculture facilities, which rear fish in large quantities in small areas, demands that research be aimed at determining virulence factors and manipulating the complex interactions between F. columnare and its host at the genetic level. Finding new ways to combat this disease may prevent the need for antibiotic use, and help avoid the spread of antibiotic resistance. There are three groups of F. columnare, referred to as ‘genomovars’ I, II, and III. Genetic manipulation of strains of genomovars II and III have previously been demonstrated, and have resulted in identification of genes required to cause disease. Previous attempts to transfer DNA into virulent genomovar I strains have failed. This is a problem because most outbreaks of F. columnare in Wisconsin and other regions rearing cool and cold-water fish are thought to be the result of genomovar I strains. This research aimed to genetically manipulate additional strains of F. columnare especially those belonging to genomovar I. Plasmid DNA pCP23 was transferred from E. coli into F. columnare by direct cell contact (conjugation). Of thirteen virulent strains of F. columnare tested two acquired and maintained the plasmid. One of these strains belongs to genomovar I. These results open the door to genetic manipulation of this important fish pathogen. Future studies will involve construction of avirulent mutants to understand the factors important in the disease process. These mutants may also function as safe vaccines to prevent columnaris disease. With continued research it is hoped that columnaris disease can be treated in aquaculture facilities without the use of antibiotics.
Samuel Ewert (UW-Whitewater)
Exploring Alternative String Playing
Mentor: Susan Chandler, Music Education
There is an increasing interest in string players to start playing more alternative styles, such as Rock N’ Roll and heavy metal that was popular during the 1970s-1980s. This also has become a normal occurrence in string programs at the high school level. In order to be able to teach this style of playing, one needs to have an understanding of the style. To get a better understanding, I will be looking into the history of this music, how Rock N’ Roll came to be and what its roots and foundations were. As a way of showing this history, I will be compiling a list of prominent bands of this time, as well as the number of appearances on the Billboard 200 Albums (Year End) by those bands. The other part of this project will be possibly arranging a piece that is not readily available that is in the 70’s Rock and metal style for a small string ensemble. This will allow for exploration of the playing style on traditional string instruments. The purpose of this project is to compile resources that are available to public school string teachers who could share with students at the high school level. Having an understanding of how to play and demonstrate Rock N’ Roll and metal styles will also make it easier to teach in alternative styles when I am teaching.

Wesley Falk and John Williams (UW-Milwaukee)
Deformed Cellular Automata
Mentor: Jeb Willenbring, Math
Consider a large rectangular grid, like a sheet of graph paper. Next, imagine that a small computer is placed on each square box (i.e. cell). Assume that each of the computers on this grid takes its input from the computers surrounding it. This computational paradigm is called a cellular automata (CA). The most well-known example of CA is John Conway’s Game of Life in which cells evolve using simple rules in discrete time steps. The properties of this particular CA are quite well known and there are many variations of this game as well. Through our research we have constructed a new game we call a deformed cellular automata. Essentially this new game is two different games played simultaneously. The first is a standard Game of Life using the original rules proposed by Conway. In terms of a function the Conway rules produce results which are highly non-linear. The second is similar but uses continuous time steps and a different set of rules known as the voter model. We have found that this set of rules produces characteristics similar to a harmonic function. Together we blend these two games using a deformation rate, d. For example, when d=0 the game will behave entirely like the Game of Life. However, when d=1 the game will behave entirely like the voter model. Between 0 and 1 the game will exhibit new properties similar to some combination of both games.

Natalia Fernandes (UW-River Falls)
Geoglazing in Traditional Japanese Wood Fired Kilns
Mentor: Randy Johnston, Art
An experiment was conducted to explore firing techniques that use renewable resources like wood and creating glazes from locally sourced materials. Glazes were developed using rhyolite from New Mexico, feldspar from North Carolina, iron bearing granite from Minnesota, along with other materials like deer bone, and wood ash left over from past kiln firings. The stones and bone were ground into a fine powder then mixed together starting at 100% of one material and adding another in 5% increments until it is a 50-50 mix. Test tiles were dipped at each addition. Some glazes were designed to show where a mixture turns into a slip (a rougher surface but still adheres to the surface) and when it changes into a glaze. After the tiles were fired an evaluation was done to determine which mixture yields the best result. The test tiles were fired in a traditional Japanese wood-fired kiln called an Anagama kiln. This kiln can hold many pieces but takes three days to load, five days to fire, seven days to cool and one day to unload and clean. The kiln must be stoked around the clock while it is being fired so it is extremely labor intensive. Because vast amounts of wood ash are being introduced to the air in the kiln during the firing, the ash settles on the ceramic pieces adding design and color. Another set of tiles with the same glazes was fired in a salt kiln. This kiln was quite small in comparison and was fired with gas. Near the end of the firing salt was introduced to the atmosphere creating some decoration. These will be used to compare energy used (gas, wood, manpower), firing time, amount of work fired, and the quality of the glazes created and evaluate the potential of increasing the use of kilns that use a renewable energy source like wood. In the future I would like to use these tiles as a teaching tool to demonstrate the potential for color variations and show the possibility of diversity in making glazes with only a few materials.

Natalie Fettinger (UW-Milwaukee)
Modulation of IL-10 and TNF-alpha Expression Following Hippocampal Apoaequorin Administration
Mentor: James R. Moyer, Jr., Psychology
Stroke is one of the leading causes of death in the United States and is responsible for a fatality every four minutes (Go et al., 2013). During stroke, excessive calcium floods into neurons and is released from intracellular stores, leading to excitotoxicity and activation of molecules that signal cell death. Upregulation of calcium binding proteins (CaBPs) can buffer excess intracellular calcium and reduce cell death (Fan et al., 2007). Previous studies in our lab have shown that local infusion of the CaBP apoaequorin (AQ) reduces cell death within the hippocampus in an in vitro model of ischemia (Detert et al., 2013). Infusion of AQ also results in concurrent modulation of cytokine and chemokine mRNA, indicating a neuroimmunomodulatory response. In particular, IL-10 mRNA is significantly elevated at 1 h after AQ infusion and remains upregulated for at least 48 hrs following AQ infusion.
infusion. Additionally, TNF-alpha mRNA is significantly upregulated at 1 h, but downregulated by 48 hr post-infusion (Detert et al., 2013). Here we investigate the translation of these mRNAs into proteins during the same time course. In the current study, animals were unilaterally infused into the dorsal hippocampus with 4% AQ at 1 h, 1 d, or 2 d prior to tissue collection. Contralateral vehicle injection served as control. We demonstrate that IL-10 protein expression parallels mRNA expression; upregulated at 1 h post-infusion, decreasing thereafter. On the other hand, TNF-alpha protein expression does not change at 1 h, and is significantly downregulated at 2 d as compared to 1 d post-infusion. These data suggest that one possible mechanism by which AQ may protect neurons may involve a neuroimmunomodulatory response involving an upregulation of IL-10 and a downregulation of TNF-alpha.

**Virginia Finman, Kashmir Neumann and Tea Mirkovic (UW-Milwaukee)**

Use of Elementary Cognitive Tasks to Perceive Executive Functioning Ability

Mentor: David Osmon, Neuropsychology

Elementary cognitive tasks (ECTs) to assess perceptual-motor processes and executive functions (EF) offer several advantages: a precise definition of EF, a clear differentiation between non-EF and EF abilities, levels of complexity according to bits of information, and a mathematical model using a ratio level of measurement among others. This study tested the concurrent validity of four ECTs (0- & 1-bit non-EF tasks and 1-bit & 2-bit EF tasks) by examining their relationship with nine subtests from the Delis-Kaplan Executive Function System that constitute three EF factors: Switching, Updating, and Inhibition. Tasks were administered to 133 undergraduates (mean=22.08, SD=4.40), and the three EF factors were used to predict performance on the ECTs. For both the 0-bit and 1-bit non-EF tasks, only Switching was predictive (Radj²=.06 & .15, p<.005 & .01, respectively). For the 1-bit EF task, both Updating and Inhibition were predictive, although Updating predominated (Importance=.767 & .233, respectively; Radj²=.16, p<.005 & .01, respectively). Contrarily, for the 2-bit EF task, Inhibition predominated compared to Updating (Importance=.699 & .301, respectively; Radj²=.19, p<.0001 & .02, respectively). Results are discussed in terms of Miyake et al.’s (2012) unity/diversity framework of EF as well as other studies using latent variable analysis.

**Brittany Flaherty, Hunter Hermes and Joy Larson (UW-Eau Claire)**

A Contingent Valuation Study Comparing Public Willingness to Pay for Climate Change Mitigation in China and the United States

Mentor: Eric Jamelske, Economics

Mentor: James Boulter, Watershed Institute for Collaborative Environmental Studies

Mentor: Won Jang, Communication and Journalism

Climate change could be the single most important issue of our time. As the world's two largest greenhouse gas (GHG) polluters, the United States and China are of particular interest in the discussion on climate change. Because the costs/benefits of taking climate action arise in a non-market environmental setting, we employ a contingent valuation method to estimate public willingness-to-pay (WTP) as a measure of supporting policy action. Specifically, this study employs a double-bounded dichotomous choice (DBDC) framework to elicit WTP values from citizens in both China and the United States. The data used here are from surveys conducted in the United States (n=3,641) and China (n=3,717) between September and November 2013. The DBDC model consists of two WTP questions both of which can be answered yes or no. Respondents were informed that most policies to address climate change involve putting a price on GHG emissions that will likely increase household expenditures on heating, electricity, transportation, food and other goods and services. They were then asked if they would support a policy to address climate change if it increased their average monthly household expenditures by one of three initial bid amounts. Responses of no to that bid amount are followed up with a lower amount, while yes responses are followed up with a higher amount. As a validity check, bid value and acceptance rates were examined. Importantly, a declining acceptance for higher compared to lower bids was found. Specifically, a chi-square test finds a strong statistical relationship between the two variables. This is consistent with economic theory that demand (marginal WTP) is expected to decline with an increase in price. We find that on average, Chinese WTP is about one-third of United States WTP measured in US dollars. However, adjusting for income differences across countries, we find average Chinese WTP is approximately twice the level of United States WTP. Our results also
show a positive correlation between climate change and environmental awareness variables and WTP in both countries. In addition, political ideology for United States respondents is found to have a significant influence on WTP even when controlling for other covariates, such as environmental concern and climate change belief. These findings are especially important given the anticipated costs of addressing climate change by putting a price on GHG emissions. This presentation builds on our first presentation exploring American and Chinese citizens’ views on whether they think their country should join an international climate change treaty using data from the same survey.

Elizabeth Ford (UW-Milwaukee)
Relationship Between Balance and Measures of Fitness and Strength in Firefighters
Mentor: Kyle Ebersole, Physical Therapy

Purpose: Balance is a crucial aspect for firefighters as it relates to job performance and injury risk. The Y-Balance Test (YBT) is commonly used to evaluate dynamic balance. Previous research has indicated that isolated muscle strength (i.e., knee extension or hip strength), body mass index (BMI), and core strength are associated with balance ability. Prior research, however, has not examined the association between balance and commonly evaluated measures of fitness in firefighters. The purpose of this study was to determine the relationship between balance and performance on field-based measures of fitness in firefighter recruits. Methods: Seventy-eight, male firefighter recruits (age=30.9±4.93 years, height=180.7±5.74 cm, body weight=88.73±10.45 kg) volunteered to participate in the research study. All testing was completed at the Milwaukee Fire and Police Safety Academy. Each participant performed the tests for balance (YBT), flexibility (sit-and-reach), lower body strength (estimated maximal squat), core endurance (4-minute prone plank), general fitness (step-test submaximal VO2), upper extremity strength (handgrip strength), and body mass index (BMI). YBT performance was normalized to leg length. Pearson correlations were used to examine the relationship between the YBT performance and the field tests for fitness and strength. An alpha of p<0.05 determined statistical significance for all analyses. Results: Pearson correlations indicated a significant relationship between the YBT and handgrip (r=0.269, p=0.17), but non-significant relationships with all other measures (Sit-and-Reach r=-.139, p=0.23; Squat r=0.043, p=0.71; Plank r=0.148; r=0.19; Estimated VO2 max r=-0.183, p=0.11; BMI r=-.213, p=0.06). Conclusion: These results suggest that other than handgrip, commonly used measures of fitness and strength are not associated with balance ability in firefighter recruits. In this study, individuals with a stronger handgrip also performed better on the YBT. The lack of association with YBT and the other measures suggests that YBT performance may be mostly related to central nervous system control as opposed to measures of fitness or strength in the lower body. Future research should examine the relative role that the central nervous system has on YBT performance.
Andrew Foxworth and Valerie Berglind (UW-Parkside)
Kenosha Area Transit an Exercise in Community Based Learning
Mentor: Dr. Derik Riley, Computer Science

The Kenosha Area Transit app was developed, by a software engineering class using agile methods, as an exercise in problem solving using software, and community based learning. Kenosha Area Transit asked UW-Parkside in November of 2013 to collaborate on a project to help Kenosha residents find and use buses more efficiently using mobile and web technology. Our mobile application (for Android and iOS) is designed to answer the question “When is the bus coming to a stop near me?” It does this using two different methods. If the user is already at a bus stop, they scan a QR code posted on the bus stop sign to see a list the next stop times. If the user is not near a bus stop, they can use a “near me” function to find a list of stops nearby using the GPS in the phone and the bus’ arrival time. An internal database to the phone is queried to provide accurate results, and the database is kept up-to-date using a web-based management tool that allows Kenosha Area Transit to update the application with real-time schedule changes. The application was deployed in December 2014, so our project presents the development, deployment, and maintenance of a software engineering project by students. We also present analytics data on the usage of the application.

Marijam Frahmmand (UW-Milwaukee)
Cognitive Factors Affecting Spatial Performance
Mentor: Ira Driscoll, Psychology

Although previous research has focused on associations between spatial navigation performance and neuropsychological tests of visuospatial abilities or memory, effective navigation may also require considerable executive resources to select appropriate search strategies and monitor performance. The virtual Morris Water Task (vMWT) is a translational version of the classic paradigm used to investigate place learning and memory in rodents. Executive functions refer to higher-level control of cognitive processes, including cognitive flexibility, planning, and logical reasoning. The objective of this study was to assess the association between spatial navigation using the vMWT and cognitive abilities in three areas: 1) executive functioning (measured using Delis-Kaplan Executive Function System [D-KEFS] Towers, Category Switching, and Stroop subs tests); 2) verbal skills (category and lexical fluency tasks); and visuospatial ability (Mental Rotations Task). We hypothesized that higher executive functioning and visuospatial abilities, but not verbal skills, would be associated with lower latency and distance to complete vMWT learning trials. Furthermore, we predicted that associations between executive functioning and navigation performance would be strongest during the first trial of the vMWT, which requires selection and employment of effective search strategies. Participants included 46 adults (8 males, 38 females; 18-52 years old). As we predicted, higher total latency to complete vMWT learning trials was associated with lower set switching ($r = -.35$, $p = .03$) and a trend level effect of spatial planning on the Towers task ($r = -.31$, $p = .07$). Higher vMWT total distance was also associated with more errors on a visuospatial task requiring participants to mentally rotate objects ($r = .42$, $p = .007$). Regarding performance on the first trial of the vMWT, there was a significant association between latency to find the hidden platform and total items named on the Category Switching task ($r = -.33$, $p = .04$) as well as total switching accuracy ($r = .35$, $p = .03$). Our findings indicate that planning, logical reasoning and the ability to switch between mental sets are important considerations in one’s ability to spatially navigate, in addition to memory and visuospatial ability. This may inform our knowledge of factors that may contribute to age-related differences in navigation performance. The use of virtual mazes could also lead to follow up studies that train poorer performing individuals to learn more efficient spatial strategies. This sort of training paradigm could be used with younger participants, as well as older participants who tend to perform less well on some spatial tasks.

Scott Frazier (UW-Milwaukee)
Comparison of Grip Pressure between Pipe Wrench and Ergonomically Designed Wrench During Wrenching
Mentor: Dr. Naira Campbell-Kyureghyan, Industrial Engineering

A pipe wrench (PW), the standard tool for gas utility workers, is used to change gas meters in both residential and commercial settings. Gas meters fittings require a large torque to tighten or loosen, resulting in a higher task difficulty and greater grip pressure on the worker. An ergonomically improved wrench with an interchangeable handle has been designed for gas meters to be used in place of pipe wrenches. The ergonomically designed wrench (EDW) is lighter, has an improved handle shape and length (dimensions), and a larger cross sectional area than a comparable 18 inch long PW. It is hypothesized that the change in shape, weight, and cross sectional area of the EDW will reduce the pressure on the user’s hand and reduce the required task efforts. Fourteen right handed male subjects inexperienced at using wrenches volunteered to participate in this study. Subjects were asked to loosen and tighten two fittings of a gas meter. Markings on the gas meter and the fitting were aligned to ensure the fittings were at the same torque for each trial. The gas meter was attached to a modular structure in order to alter the task height. The height of the fittings was 35” from the floor to simulate a common position of gas meters in the field. Subjects loosened and tightened fittings using both wrenches. The order of wrench was randomized per each subject. A 24 pressure sensor glove (FSA, Vista Medical) was placed on the subjects’ dominant hand to measure grip pressure. Sensors rested across the subjects’ palm and fingers excluding the finger tips. After collection, the sensors were separated into 7 zones across the hand for analysis purposes. The data was statistically analyzed and a student’s t-test was
Effects of Triclocarban on Fathead Minnows

*Katherine Freese* (UW-Whitewater)

Pimephales promelas

Mentor: Dr. Elisabeth Harrahy, Biology

Pharmaceuticals and personal care products (PPCPs) are made up of a wide range of chemicals, some of which are not fully removed or broken down through regular wastewater treatment processes. Triclocarban is one such chemical. Though it helps to kill unwanted bacteria, it may also be toxic to aquatic organisms that live in waters that receive wastewater discharge. This study was designed to examine the toxicity of triclocarban to larval fathead minnows (*Pimephales promelas*). Two acute toxicity tests were conducted in which fathead minnows were exposed to six different concentrations of triclocarban ranging from 0 to 200 mg/L (1st test) and 0 to 400 mg/L (2nd test). We saw little mortality in the first test, so we increased concentrations in the second. Concentrations as low as 86.4 mg/L killed a significant percent of the minnows.

Conclusions: N/A

**Patrick Frigge** (UW-Milwaukee)

Development of a Quantitative Spasticity Measure for Routine Clinical Practice-Translating Modified Ashworth Scale into Quantitative Kinematic and Kinetic Valves

Mentor: Ying-Chih Wang, Occupational Science and Technology

Background and Rationale: Spasticity is a motor disorder characterized by a velocity-dependent increase in tonic stretch reflexes. Clinically, it presents as increased resistance during passive movement at a joint site. Occurring in approximately one out of four stroke patients, spasticity is highly detrimental to participation in activities of daily living. The Modified Ashworth Scale (MAS) is the gold standard for assessing spasticity in stroke patients, but its subjectivity limits its reliability and sensitivity. Biomechanical and electrophysiological studies have demonstrated alternative methods for quantifying spasticity; however, the methodology of these studies is impractical in the clinical setting. Development of a crosswalk between the MAS and real neurophysiological properties is needed in order to increase objectivity and validly measure spasticity in patients in order to more accurately determine efficacy of current treatment and intervention approaches for spasticity in the clinical setting.

Methods: A cross sectional study is underway wherein the level of spasticity in stroke survivors is being assessed. Surface electromyography and motion capture technology is being used to collect biomechanical data during administration of the MAS. A custom-made device will collect range of motion and resistance force simultaneously. We will then examine the association regarding scale steps in the MAS and changes in electromyography, catch angle, stretching velocity, as well as objective force measurements. With this data, we will fabricate a quantitative mechanical device to measure the muscle tone, catch angle, and resistance force due to passive stretch reflex in order to provide a clearer link between MAS ratings and neurophysiological properties.

Results: The study is still ongoing and has not produced sufficient results to make conclusive statements.

**Brett Fulleylove-Krause and Blake Hummer** (UW-Milwaukee)

Aging Changes-The Neural Circuit Underlying Extinction of Fearful Memories

Mentor: James Moyer Jr., Psychology

Over 16 million people in the United States are living with some form of aging-related cognitive impairment. Understanding changes in brain function during aging is important in finding novel ways to combat aging-related cognitive decline, including impairments in cognitive flexibility. We use extinction of fear conditioning as an example of cognitive flexibility; during extinction animals learn that a neutral tone that was previously paired with a shock is no longer predictive of a shock. We have demonstrated that fear extinction is impaired in aging rodents (Kaczorowski et al, 2012). Since fear extinction is dependent on the activity of neurons in
The wavelength measurements will be done using a power supply and a thermoelectric cooler, respectively. Control of both the current and the temperature by using and temperatures. The experimental setup allows for the lasing spectrum is measured for different bias currents and its thermal management. In this presentation, we discuss the dependence of the VCSEL’s change in temperature on the changes of its dissipated electrical power by measuring the shift in the laser’s wavelength. In this method, the peak wavelength of the VCSEL’s lasing spectrum is measured for different bias currents and temperatures. The experimental setup allows for the control of both the current and the temperature by using a power supply and a thermoelectric cooler, respectively. The wavelength measurements will be done using a spectrometer. The experimental results are expected to yield a measure of the average thermal resistance of the laser. These results will be a preliminary step towards a more in-depth characterization and analysis of the thermal effects in VCSELs. The future studies will be carried out by thermal profiling using thermoreflectance microscopy technique, from which valuable information about temperature distribution and thermal properties of VCSELs can be extracted.

Alexander Gardner (UW-Milwaukee)
Structure And Mechanism of Human Vitamin D Receptor (hVDR) With its Inhibitors
Mentor: Nicholas Silvaggi, Chemistry & Biochemistry

The human vitamin D receptor (hVDR) is a ligand-dependent transcriptional regulator that controls calcium metabolism, cell growth and differentiation, homeostasis, development, and several physiological processes. The antiproliferative effect of VDR on cancer cell growth has been demonstrated. Known inhibitors with high binding affinity exist, but induce hypercalcaemia and hypercalcinuria, which can cause psychosis, bone pain, calcification of soft tissue, and coronary artery disease. A compound developed in the Arnold laboratory, PS121912, inhibits the binding of hVDR with its coregulator, SRC-2, and induces apoptosis in cancer cells without causing hypercalcemia. We are working to determine how PS121912 inhibits the interaction between hVDR and SRC-2 using X-ray crystallography. Crystallization requires large amounts of protein, so significant work has been done to optimize the heterologous expression of hVDR in E. coli, as well as the purification method. Here we describe our optimized expression and purification methods, as well as efforts to grow diffraction-quality crystals of hVDR. Crystals have been soaked in solutions containing 1 mM PS121912 or other hVDR inhibitors, and diffraction data were collected at the Advanced Photon Source, Argonne National Laboratory. PS121912 and its analogs are thought to bind covalently to Cys, Ser, or Tyr residues due to the presence of a Michael acceptor group in the inhibitor. This group would also react with the reducing agent dithithreitol (DTT), which is present in the crystallization solution. Since DTT may affect the ligand, we tested different DTT concentrations to find the minimum amount that would still give good quality crystals. It was found that DTT is essential for hVDR-LBD to crystallize, and that the concentration must be greater than 1 mM.

Vinicius Garcia (UW-Stevens Point)
Thermal Characterization of Vertical Cavity Surface Emitting Lasers (VCSELs) by Wavelength Shift Measurements
Mentor: Maryam Farzaneh, Physics and Astronomy

Vertical Cavity Surface Emitting Lasers (VCSELs) are semiconductor laser diodes with a wide variety of applications in many areas such as fiber optic communication and laser printers. Many of the operational and optical properties of VCSELs, including gain, threshold current, polarization, and output power are affected by temperature. Therefore, it is necessary to gain an understanding of the thermal effects in VCSELs in order to improve the design of the laser and its thermal management. In this presentation, we discuss the dependence of the VCSEL’s change in temperature on the changes of its dissipated electrical power by measuring the shift in the laser’s wavelength. In this method, the peak wavelength of the VCSEL’s lasing spectrum is measured for different bias currents and temperatures. The experimental setup allows for the control of both the current and the temperature by using a power supply and a thermoelectric cooler, respectively. The wavelength measurements will be done using a
Erin Geddes, Connor Doyle and Allison Byrd
(UW-Platteville)
Evaluating A Drug to Block Cell Death in Human Pbmcs
Mentor: Chanaka Mendis, Chemistry
In this project, we are looking at Staphylococcus enterotoxin B (SEB) that induces food poisoning and how it affects cell death in the body and how you can terminate it. The first step of this project was to expose different PBMC samples to the drug SP and SB, thereby decreasing the amount of protein that is expected to cause cell death. Then, reverse transcriptase was done to get cDNA. We then ran the cDNA through polymerase chain reaction (PCR). In this step, we took the cDNA and ran each through PCR to amplify the DNA. Then, we ran the proteins through gel electrophoresis to separate them based on size and charge. Then, we quantified the information received from the gel. The ELISA kit was used to look at protein changes. We looked specifically at the Caspase protein that caused cell death in the protein.

Jordin Ann Gegare (UW-Superior)
Walk on the Wild Side: A Cultural Study of Rudyard Kipling's The Jungle Book
Mentor: Dr. Hillary Fezzey, World Languages, Literatures, and Cultures
The Jungle Book has long been an iconic children's tale, the antics of the wild boy Mowgli engaging and entertaining people around the world since Kipling first published his story in 1894. More than just the King of the Jungle, Mowgli is an astounding example of Post-Colonial writing that exemplifies inner-personal cultural distress by way of Dual Hybridity, Othering, and Mimicry (prominent Post-Colonial literary theories). The methods employed to establish this argument involve the scrutiny of the original work, The Jungle Book, and major theoretical research and comprehension. Focusing on the influence of the Post-Colonial setting and the prominence of Mowgli between the two cultures of the Jungle and Humanity, the theories of Dual Hybridity (the concept of being influenced to two opposing cultures with distinct, physical separation), Othering (the act of persecuting individuals or cultures associated with the “exotic” or “mystical”), and Mimicry (the effort of seeking cultural acceptance by way of adopting commonly accepted actions). With the oversight of a mentor, the ideas fostered by research were compiled, condensed, and finally written to create a published essay. The most significant finding of this research project was the strong impact when dual cultures are responsible in shaping a singular identity, like that of Mowgli and of many Indians during the British colonization of India. The displays of Dual Hybridity, Othering, and Mimicry involve both an internal and external cause-and-effect within a culture, its structure, and the individual's perception of the culture. Interpreting these results, broader conclusions may be made about the influence of social and cultural norms upon those experiencing colonization and the sense of loss in identity that is apparent in many of Kipling's literary characters, including Mowgli. More specifically, that the theories of Dual Hybridity, Othering, and Mimicry are foundational signs of internal and external power struggles that directly contribute to the identity structure and social acceptance of an individual with only partial inheritance of a culture, such as Mowgli was to the human species.

Thomas Gehrman (UW-Oshkosh)
RR Lyrae Stars in the Sagittarius Dwarf Galaxy Globular Cluster Arp 2
Mentor: Dr. Barton Pritzl, Physics/Astronomy
The Sagittarius Dwarf Galaxy is one of a few satellite galaxies of the Milky Way Galaxy. Due to the large gravitational field of the Milky Way, the Sagittarius Dwarf Galaxy is being ripped apart and absorbed into the Milky Way Galaxy. We are analyzing the globular cluster Arp 2, which once belonged to the Sagittarius Dwarf Galaxy. The DAOPHOT suite of programs was used to analyze the observations. The data were searched for RR Lyrae stars, which are pulsating variable stars, by looking for variations in the magnitudes of these stars. We were able to find several RR Lyrae stars in Arp 2. The light curves of the variable stars will be used to find the distance modulus, chemical composition, and the classification of the cluster Arp 2. Using the information found from the RR Lyrae stars, we will compare Arp 2 to other globular clusters found in the Milky Way Galaxy. By comparing the properties of a globular cluster that once belonged to an external galaxy with those in the Milky Way, we can examine in what way mergers with other galaxies helped to build up the Milky Way Galaxy.

Emily Gerstein and Cody Becker (UW-Milwaukee)
Using Kites in Aerial Near-Infrared Imaging of Nuisance Cladophora along Coastal Lake Michigan
Mentor: Thomas Consi, Mechanical Engineering
Cladophora alga is commonly found along coastal Lake Michigan, and washes onto the shores of Milwaukee, Wisconsin every fall. As the alga perishes it becomes problematic, producing a foul odor and several problems for the human population, such as a decrease in lakefront aesthetic conditions, clogged water intakes, and even declining property values. To assist in combating and predicting this phenomena, this project aimed to create a modified Olympus TG-3 camera able to utilize near-infrared (NIR) light in order image Cladophora along Milwaukee’s various coasts and popular beach destinations. Images taken by this piece of technology ultimately reveals the spectral signatures of light being reflected by plants, and will assist researchers in identifying Cladophora plumes as well as determine relative biomass and health. Lakefront images were obtained using kite aerial photography, wherein which a gimbal system was mounted onto a large kite capable of obtaining significant lift in a variety of weather conditions. This system was comprised of the modified NIR Olympus camera, a 7.4 volt battery, live telemetry camera feed, a polarizer mechanism and a microcontroller and GPS. Such a
configuration allows for real-time image data including geographical location, time of day, and the system altitude to be collected. Rosco #74 Night Blue and Hoya 52mm 80A camera lens filters utilized in conjunction with the modified camera allowed for only blue and red light waves to be collected by a sensitive complementary metal-oxide-semiconductor (CMOS) imager, which enhances the image of chlorophyll contained in live plants such as Cladophora. Using standard visible light imaging we obtained aerial images of coastal Lake Michigan, and unfortunately we were not able to get clear views of the submerged Cladophora due to surface light reflection. We were able to get some enhanced views of aquatic vegetation by flying our camera over a pond at the Bong Recreational Area in Kenosha, WI. In this case we used a hexacopter instead of a kite. Presented in this poster is the design of the camera and test images made in the lab. Also presented is the design of our kite-based aerial imaging system and images obtained from the field. Future work will involve reducing the reflected illumination by use of a polarizing filter as well as taking images when the sun is lower in the sky thus reducing direct reflection. Once this problem is solved our imaging system will be a useful tool for studies of the life cycle dynamics of Cladophora and other aquatic vegetation.

**Emily Gerstein** (UW-Milwaukee)

**Multi-scale Computational Model Development for Drug Delivery Kinetics and Mechanical Behavior of Drug-coated Balloon (DCB) Medical Devices**

Mentor: Changsoo Kim, Material Science and Engineering

Drug-coated balloons (DCB) are medical devices to treat narrowed diseased arteries. They have recently received tremendous attention as alternatives to drug-eluting stents (DES) for local drug delivery in percutaneous arterial interventions in light of studies suggesting that sufficient tissue concentrations of anti-restenosis drugs can be achieved through their use. As need for better functioning with reduced clinical adverse effects, nonpermanent arterial medical devices become more prevalent. In addition to the pharmaceutical kinetics from DCB medical devices, understanding the mechanical behaviors during procedure is also vital to improving upon already existing products, because the stress accumulation from DCB products is closely related to the occurrence of restenosis, i.e., abnormal tissue growth inside the vessel walls. There currently exist few studies concerning modeling of DCB devices within superficial arterial environments for such a purpose. The overall aim of this project is to develop an advanced multi-scale in silico computational model of drug release kinetics and mechanical behaviors in DCB devices mounted on balloon catheters. In particular, the mechanical aspect of DCB procedure is focused on in this poster presentation. This task was accomplished employing finite element analysis (FEA) computations, wherein which simplified geometries of the commercial Medtronic IN.PACT Admiral medical device and femoral popliteal artery are evaluated. With this computational technique, dynamic simulations of balloon-in-artery expansion were conducted, and resulting stress distributions have been systematically calculated and analyzed. Through this work, we specifically examined the effects of patient ages, coating thicknesses, and coating polymer types on the stress distributions in the DCB coating and arterial walls. These factors are important in manufacturing the commercial DCB products. The results indicate that higher stresses are accumulated as the coating thickness and the age of patient increase. Such prediction results produced using the current computational model can be applied to develop more advanced DCB medical applications with higher safety and efficacy.

**Sierra Giebel** (UW-Stevens Point)

**Modeling the Solution-Phase Acidity of Flavonoids**

Mentor: Erin Speetzen, Chemistry

Flavonoids are naturally occurring antioxidant compounds that interact with a number of biological targets such as DNA and proteins. These molecules contain a number of phenolic OH groups that confer acidity to these molecules. While computational chemistry has been used to examine the gas-phase acidity of these molecules, no systematic computational study has been done to examine their aqueous-phase structure and acidity. In this project we will be using the M06-2X/6-31+G(d,p) method to examine the structures and energetics of protonated and deprotonated flavonoids in aqueous solution in order to better understand how substitution of the flavonoid skeleton affects acidity and structure.

**Lily Gierke, John Williams, Bree Kotwitz and Lauren Engen** (UW-Milwaukee)

**Nutrient Control of Biocommunity Layers in Lake Michigan**

Mentor: Gabriella Pinter, Math

Mentor: Istvan Lauko, Math

Mentor: Russell Cuhel, Freshwater Science

Primary producers in aquatic ecosystems live in a complex and dynamic environment and to maximize their growth they compete for a consistent supply of light and nutrients. These factors are not evenly distributed in a water column, and as a result, phytoplankton form layers of varying compositions and density. Due to the presence of these layers and the availability of light and nutrients, phytoplankton have different rates of production and consumption varying throughout time and space. Primary producer’s abundance, composition and production has experienced considerable changes in the past decade. This has been in large part modulated by the dreissenid invasions. Since 2003, Lake Michigan has undergone invasions by quagga mussels (Dreissena bugensis) which had various consequences on nutrient availability to the primary producers in the lake. This resulted in a change of nutrient distribution as well as a change of phytoplankton productivity, biomass distribution and layer formation in the water column. As the life cycle of the first generations of the dreissenid population reaches an end, the impact on the lake ecosystem by their presence is further...
Nicole Ginter (UW-Milwaukee)
Working Memory and Attention and Reward Distraction
Mentor: Christine Larson, Psychology

This study strives to comprehend how well an individual can complete an attention and memory task while presented with a distractor. The participant completes two questionnaires and three tasks that include a basic change detection task that measures short term memory, a similar attention task in which they can earn money based on their progress, and a third task that incorporates both attention and memory. The first questionnaire covers basic demographic and emotional stability statistics. In the first task, the participant is presented with an array of colored bars and must determine if red or green bars changed in orientation over a brief delay. The second task requires them to determine whether the red or green bar in the array lies vertically or horizontally. In the third task, the instructions inform the participant to attend to either yellow or blue colored bars. An arrow then directs them to attend to the right or left of a centered fixation cross, then two arrays of bars flash—one on each side of the cross—and, after a brief delay, the arrays flash again. The participant must determine whether the orientation of the bars of the color and location they attended to changed or remained the same. The final questionnaire asks the participant if they noticed which bar resulted in a higher reward and what their motivation levels were for each task. First, we measure their ability to detect a change in the color of a probe square within a given time. Then, once connected to the EEG, the participant determines certain colored lines orientation and can earn money for responses that succeed the last task’s results, with one color providing a higher reward than the other. Finally, they must complete a task measuring both their attention and memory, but, in order to do well in this task, they must ignore bars of the colors from the previous task where they earned money. Currently, the experiment still remains in progress; therefore nothing can be concluded at this time. The hypothesis exists that the participant will condition certain colored bars with reward and, when presented in the last task, they will serve as a distractor so the participant struggles to control their attention. Also, we believe that individuals that have or have had depression will less likely find motivation to perform better due to a monetary reward.

Chris Goetz (UW-Milwaukee)
Development of a High Throughput Screening Campaign for the Identification of New Pepsin Inhibitors
Mentor: Alexander Arnold, Chemistry-Biochemistry

Laryngopharyngeal Reflux Disease (LPRD) is an extension of gastroesophageal reflux disease (GERD) where gastric contents are refluxed into extraesophageal tissues. Current acid suppression treatment with proton pump inhibitors (PPIs) has proven ineffective because unlike GERD, pepsin is the problem not stomach acid. When pepsin is refluxed into these tissues it digests healthy protein, damaging cells, leading to mutations and causing subsequent cancers. The objective of this research is to identify new pepsin inhibitors to completely and irreversibly inhibit pepsin’s activity when present in extraesophageal tissues. In order to find inhibitors, three different fluorescence assays were developed using labeled pepstatin, casein, and peptide probes to indicate varying levels of inhibition of the pepsin enzyme. Once optimized, these assays were used to screen the Library of Pharmacologically Active Compounds (LOPAC) for possible pepsin inhibitors. Compounds were identified as hits if they showed inhibition activity of 3 standard deviations away from the mean activity of all compounds. The assays proved to be sensitive and specific, turning up only a few hit compounds. The results of this research were encouraging and we look forward to moving these target compounds to cell based assays to test their viability as drug candidates.

Gladys Gonzalez (UW-Milwaukee)
Heritage Language Maintenance
Mentor: Sandra L. Pucci, Ph. D., Linguistics

A heritage speaker has been defined as a member of a linguistic minority community who has grown up with a language other than English in their homes, whether they were born in the majority language country, or immigrated (Baker, 2006). In recent years there have been many conversations regarding the social, political, cultural, and linguistic phenomenon of heritage language maintenance and loss. This study will examine how individuals’ background experiences, specifically of having attended a bilingual high school influenced their linguistic realities. It will measure nuanced linguistic issues of maintenance and loss in the Spanish language. The tasks will involve an oral production, and written acceptability judgment task. The oral measure will be individually administered, while the written task will be administered in small groups to leverage participant’s time and it will be triangulated in order to obtain a complete picture of Heritage Language Maintenance and competence. There will be 20-25 participants who attended all four years of Cesar Chavez High School, located in Milwaukee, Wisconsin. This is a unique population because they received formal language and literacy instruction in Spanish. It is also one of the few high schools in the country which offers this type of systematic heritage language development. Some of the current findings are that all participants understand the importance in maintaining their heritage language, all participants spoke Spanish with their family members, and in terms of who they socialized with also played a role in how they influenced their heritage language.
Jeremy Gorgas and Catherine Speech  
(UW-Milwaukee)  
Failure of Visual Attention to Recover from Threat Distracters  
Mentor: Christine Larson, Psychology  

Certain forms of distracting information necessitate the reorienting of attention, temporarily disrupting on-going behavior. This is critical for determining the biological and motivational relevance of distracting stimuli, and whether it warrants further processing. Although it may be adaptive to halt goal-directed action to attend to distracting stimuli, it is also necessary to disengage further processing once it is deemed irrelevant. However, if the distracting and task-irrelevant stimulus is potentially threatening, further attentional processing is necessary to ascertain whether a defensive response is prudent, resulting in prolonged distraction and disruption of goal-related attention. PURPOSE: The primary aim of the current study was to determine the time-course of attentional recovery from distraction and whether this depends upon the threat-level assigned to the distracters. HYPOTHESIS: We hypothesized that attention would recover when the temporal-distance between the distracter and target was long and only when the distracter was non-threatening (i.e., safe). In contrast, we predicted that if the distracter is threat-related, attention would remain fixated on the distracter. METHODS: A sample of undergraduate college students from the University of Wisconsin-Milwaukee participated in this study. To assess recovery from attentional distraction, we adapted a visual search task from Sheppes et al. (2013). In this task, a distracter stimulus (safe vs. threat) was briefly presented. Distracters associated with electric stimulation were used to assign threat significance. Following a variable stimulus-onset-asynchrony (SOA), which is the time between the distracter and the target array (50 ms vs. 350 ms), participants were required to respond accurately to a target color presented among other non-targets in a visual search array. RESULTS: Results showed that performance accuracy decreased for both safe and threat-related distracters when the SOA between the distracter and visual search array was short (50 ms). For safe distracters only, performance recovered to baseline levels when the SOA was long (350 ms). In contrast, performance failed to recover at the long SOA for threat-distracters. CONCLUSIONS: Our findings replicate a previous study showing that attention remains fixated on the threat-related distracters (Sheppes et al., 2013). Failure of attention to recover from threat-related distracters may have provided an evolutionary-important survival mechanism necessary to quickly and effectively respond to potential threats in the environment. Future research is needed to determine the neurophysiological mechanisms underlying this process and whether individual differences in anxious temperament moderate this effect.

Brian Gorman  
(UW-Stevens Point)  
Does Frequent Fire Affect Red Pine (Pinus Resinosa) Bark Thickness?  
Mentor: Jon Steigerwaldt, Forestry  

Many mechanisms may cause damage to trees. Damage from fire (natural or prescribed) can be one of these mechanisms. A common question of managers considering the use of prescribed fire in a red pine (Pinus resinosa) cover is, if reparative burning will have a damaging effect by reducing bark thickness? Damage that could facilitate woody volume loss. Helping to answer that question, this research aims to report baseline data as part of a long term study established on the Treehaven Fire Plots. This research reports current average bark thickness of red pine in order to observe long-term trends with the reintroduction of fire as well as stand thinning.

Devlin Grimm  
(UW-Milwaukee)  
Actor to Audience and Back Again: The New Performance Dialogue  
Mentor: Anne Basting, Theatre  

The week of the Symposium, the UWM theatre department will perform Slightly Bigger Women, and new play that has been developed with contributions from the greater Milwaukee community. Each performance will include a performance dialogue, a new form of devised theatre, where performers guide a discussion with the audience and incorporate the ideas from that discussion into the performance itself. Theatre is a collaborative process. The mission of this project was to broaden the scope of who is allowed into that process, from those who fill traditional roles in the theatre, to the larger community, to the audience themselves. Slightly Bigger Women is inspired by the well known novel Little Women. The beloved characters from the novel are hilariously stuck in their roles and expectations. Only once they learn about how the world has changed over the last century can they begin to realize their dreams, and themselves. Much of the text of the play was gathered through a letter writing project involving the Women’s Studies department and women from local elder care facilities. In addition to the performance dialogue, the audience is encouraged to add to the conversation via interactive displays in the lobby and social media prompts. The familiarity of the characters of Little Women and the humor of the script further inspires collaboration with the audience. I wish to present the new creative form of performance dialogue and how we developed it through working with multiple departments, the community, featured audiences, and the actors. My role as assistant director has allowed me access to each of these steps, particularly the rehearsal process with the actors, who have to be trained in improvisation in order to facilitate the performance dialogue. Performance dialogue is a new way to engage an audience and the public at large. In addition to incorporating guided forum for the purpose of education, the play is also a new form of entertainment, incorporating live theatre and human interaction with user-centric ideals from new and social media. Slightly Bigger Women runs from April 22 through April 26. Anyone curious to see Performance Dialogue in action, and to participate in it, is welcome to see the play.
Joseph Grosskopf (UW-Stevens Point)  
A New Method for Analysis of Polysaccharides in Vessel Cell Wall  
Mentor: Qiang Sun, Biology

The thin wall region separating two adjacent cells at a pit pair is called pit membrane (PM). A PM is structurally made up of two primary cell walls and one middle lamella and functionally serves to help intercellular communications. The current study deals with the PMs between a vessel and a parenchyma cell (vessel-parenchyma PMs) and between adjacent vessels (intervessel PMs) with regard to their potential role in host plant resistance to vascular system-localized pathogens. The general belief is that vessel-parenchyma PMs are modified in the formation of vascular occlusions that may limit both pathogen and water movement in infected plants, while intervessel PMs are the barriers that a xylem-limited pathogen must pass by using its cell wall degrading enzymes to enhance its systemic spread through the vessel network. Therefore, clarification of the polysaccharide compositions and distribution in these two types of PMs is crucial to a better understanding of the disease resistance/symptom development of host plants. In this presentation, we used grapevine stems to investigate pectic and hemicellulosic polysaccharides in the two types of PMs. Described here is our recently developed method for detecting the presence, relative concentration, and distribution of some major groups of pectic and hemicellulosic polysaccharides in grapevine PMs. This method combines scanning electron microscopy and immunohistochemical techniques and is effective in visualizing pectic and hemicellulosic polysaccharides in intervessel and vessel-parenchyma PMs. This method enables the high resolution visualization of PM structure while revealing the PMs’ polysaccharide compositions. Our technique has the potential to identify cell wall polysaccharides exposed at the PM surface and changes in the PM polysaccharide components and quantities during the PM modifications/degradation. Also described here are some major differences in the polysaccharide compositions found between the two types of PMs. These should provide some essential information for a better understanding of the balance of events that affect the success of vascular disease resistance mechanisms of host plants.

Paul Grosskopf (UW-Stevens Point)  
“This Time is Ours. This World is Ours. The Power is Ours.” The Religion of the Dark Knight  
Mentor: G. Christopher Williams, English

The primary focus of my presentation will be to explore the relationship between DC superheroes and mythology, religious iconography, and social structures or institutions in Frank Miller’s The Dark Knight Returns and The Dark Knight Strikes Again. Miller’s work is particularly interesting in this regard given that as opposed to Marvel comics, which has built a reputation on creating relatable human beings with super powers (Spider-Man at the end of the day is really Peter Parker) the mythology within the DC universe tends to favor the “super being,” characters who at their core are the god-like hero or extraordinary figure while their alter-ego is the disguise (Bruce Wayne at the end of the day is really Batman). In The Myth of the Superhero, Marco Arnaudo observes that authors found myth to be a rich source of inspiration, with famous gods or heroes from Greek mythology like Hercules or Athena providing the context for Wonder Woman’s origin and universe, with taglines like “as beautiful as Aphrodite” or “wifter than Hermes” being featured in every Wonder Woman issue until the 1970’s (14). This specific characterization of DC superheroes as gods or super-beings is constantly on display in both of Miller’s stories. For example, in The Dark Knight Strikes Again, Green Lantern reaches the point where he doesn’t need to wear his ring to utilize his powers with Batman saying “[h]e used to need a ring. He used to need a lantern. Now he is one. He is pure will. Sheer power.” (Miller 176). By removing the ring (the external source of power), Miller asserts that Hal Jordan is Green Lantern, that his abilities and everything about him that makes him “super” comes from an internal source (Hal’s “will”), which in turn makes his inherent identity “super.” This characterization ultimately works to set up Miller’s argument for what the superhero should be in relationship to the less than super world around them. While superheroes throughout comic book history have adamantly served and submitted themselves to systems of law or government, Miller asserts that these are systems of man and like man are prone to the forces of corruption, cruelty, and greed. Therefore like the Gods of myth and legend, Miller asserts that the superhero embodies the absolute ideals or values that we aspire to and should therefore exist above or outside of these systems of man and the inherent human weaknesses that plague them. Like Batman, only by embracing their own extraordinary nature can they face the evils of this world, god-like, and incorruptible in their resolve.

Ethan Groves (UW-Whitewater)  
Arches Oil Paper/Etching print Research  
Mentor: Max White, Arts and Communications

Oil painting and Intaglio printmaking are two traditional mediums that have existed side by side separately for many years. What I was hoping to do is bring the two together. The only problem with this is the nature of oil paint and the quality of paper required for Intaglio Print making. To make an Intaglio print the paper must first be soaked in water. This conflicts with oil painting because paper must be primed with gesso before one can apply paint. This makes the paper useless in an Intaglio print setting. Once primed the surface becomes hard and brittle making it not susceptible to the printing process. Recently however a paper made by Arches allows one to paint on it without priming the surface, which would allow for one to print on that paper and then paint over the print as well with oil paints. I have tested the soaking qualities and printing qualities of the paper, which have proven to be successful. I have determined that after the paper has been soaked and printed on I can still apply oil paint without it affecting the quality of the paper itself. With
these results I have moved forward into experimenting how the line of the print can be utilized with the stroke of the paint. This is a process that I plan to work on for the span of my artistic career and on I hope to share with others throughout the world.

Derrek Grunfelder-McCrank (UW-Whitewater)
Mines in Wisconsin: An Examination of Health and Wealth Effects
Mentor: Eylem Ersal-Kiziler, Economics
Mentor: Matthew Winden, Economics

This paper examines the effect that the presence of a mine has on a community in two regards: health and wealth levels. This is done using data from counties in Wisconsin provided by the CDC. Several types of models are used to estimate the dollar value of health costs imposed by mines as well as the probability that a mine’s presence will result in above average healthcare costs. Finally, the economic benefits of a mine on a community will be examined here using average income in the community as a measure of wealth. The methodologies used in this analysis are linear regression, a linear probability model, and a probit model. The OLS regression searches for causal relationships between the independent variables used in the model and healthcare costs in a community. The linear probability model looks to establish causality for above average healthcare expenditures. The probit model seeks to estimate the probability that an observation will fall into one of two categories. In this case whether observing a mine will result in above average health expenditures or not. Some of the independent variables in the study include an education index, expenditures on tobacco products, and insurance and pensions. Our paper found that the presence of a mine does not significantly affect healthcare costs in a community using the OLS regression, and a mine has significant, positive income effects using the OLS regression. However, the probability models fail to give us any significant results, this problem likely stems from a lack of observable data. This is important as it contributes to the research on whether a mine is or is not good for a community.

Tom Gugel and Claire Lind (UW-Eau Claire)
Investigating the Holy Cave of Nazareth, Israel: Preliminary Results
Mentor: Dr. Harry Jol, Geography

Ground penetrating radar (GPR) surveys were conducted to examine possible archeological features beneath the present day floor of the Holy Cave in Nazareth, Israel. The Holy Cave is located 7m below surface and in close proximity (100m) to the Greek Orthodox Church of the Annunciation and Mary’s Well. In order to better understand the Holy Cave we used a combination of oral and literal historical knowledge and GPR surveys. The present day floor of the Holy Cave was examined using a GPR system, pulseEKKOTM 1000, and utilizing 225,450, and 900 MHz antennae frequencies. In addition, topographical data was collected using a laser leveler TopCon H3L to geometrically correct GPR data. In this work we present two GPR lines and a rectangular grid; i) 26m GPR line with 225 MHz antennae frequency was collected along the length of the cave (south east-west direction). The eastern portion (3m-17m) of the GPR line was interpreted as a depression in the subsurface, with penetration depth of ~1.5m depth, ii) 18m GPR line with 225 MHz antennae frequency was collected along the length of the cave (north east-west direction). The western portion of this line was interpreted as a possible bedrock with sub horizontal layering in ~1.5m depth, iii) 4x6m grid was laid out on the eastern portion of the cave floor and 16 parallel lines were collected in a west-east direction with data lines separated by 0.25m. The collected data sets were put into a 3D model of the grid to better understand subsurface layering. The GPR lines show sub-horizontal layering that is interpreted as infill layers that accumulated on the cave floor. These findings strengthen the hypothesis that possible archeological features are present beneath the present day floor in the Holy Cave. Our study has laid the foundation for future work that would propose the Holy Cave as an original site for excavation, as well as exploration of the city of Nazareth in innovative ways that have never been done before. This future site will not only benefit the community of Nazareth, it will also contribute to the academic domains of science and humanities.

Joshua Gustafson (UW-River Falls)
How to Horror: The Differences Between American and Japanese Horror
Mentor: Lissa Schneider-Rebozo, English/URSCA Office

The purpose of this video is to shed some light on the fact that horror is pulled off in one particular way. Specifically, it will discuss the differences in style between American and Japanese horror media. It opens with studying some tastes that the U.S. has in its horror, highlighting on how it is best received by the American public and how horror writers make their craft. The focus will then turn to the styles of the Japanese and how their culture influences their tales; this will also be compared to the style of American horror. The video is presented through stop motion animation with splash of humor.

Quibria Guthrie (UW-Milwaukee)
Mentor: Dr. Xiaohua Peng, Chemistry Department

One of the widely used chemotherapy to treat cancer is DNA cross-linking agent. Cross-linking is when a molecule is introduced into a cell, it can link with the two strands of DNA. When the DNA cross-linking agents are released into the body, DNA interstrand cross-links occur. The interstrand cross-links can block DNA transcription and replication by preventing separation of two DNA strands due to a covalent chemical bond formed between DNA double strands. The major disadvantage of the existing anticancer agents is their poor selectivity. Tumor cells contain high levels of reactive oxygen species due
to the increased active metabolism. The reactive oxygen species include hydrogen peroxide, superoxide and hydroxyl radical. Hydrogen peroxide is stable and can be generated from nearly all sources of oxygen radicals. Taking advantage of this difference, we are developing a type of hydrogen peroxide-inducible DNA cross-linking agents which are expected to specifically kill cancer cells. In this study, we are creating hydrogen peroxide-activated quinone methide (QM) prodrugs that will be tested for its DNA cross-linking ability. The goal is to develop an optimized synthetic route for making these molecules. We use organic synthesis to create molecules that can form molecules that will create QM intermediate in the presence of starting with simple benzoic molecules. With the molecules made, we can use denaturing polyacrylamide gel electrophoresis which test the DNA cross-linking ability between the DNA and the prodrug and the rate at which it cross-links. We are examining how the introduction of different substituent groups affects the DNA cross-linking by looking cross-linking yields. The ultimate goal is to advance DNA cross-linking agents which are important for improving the selectivity of anticancer drugs by using the technique of cancer-targeting DNA cross-linking.

Derek Haag (UW-Milwaukee)  
Characterization of Novel pH Sensor  
Mentor: Woo Jin Chang, Mechanical Engineering  
The quality and status of water can be determined by various factors, such as concentration of minerals, microorganisms, heavy metals, and other chemicals. pH is the representative indicator shows quality of the water because it affects form of chemicals and biomolecules. In this project, we have characterized a solid-state pH sensor that will be used for pH testing of various environments. The novel solid-state pH sensor is prepared by surface modification of commercialized Screen Printed Electrode and treated with iridium oxide that acts as a potentiometer that will read hydrogen levels of various solutions. The prototype testing involved the sensor in conjunction with a simple sensor signaling circuit containing an operational amp for amplification of pH signals that were desired. Our future endeavors and foresight involves fabrication and commercialization of novel low-cost pH sensor, as well as more accurate monitoring of the pH in various water sources, such as Lake Michigan, waste water, and tap water. Especially, we will use developed device for long-term monitoring of pH change in Lake Michigan under the collaboration with researchers in School of Freshwater Sciences.

Harrison Halaska (UW-Whitewater)  
The Unexpected Results of Daily Painting  
Mentor: Bethann Handzlik, Art and Design  
I researched the relationship of painting each day, like exercise, and the outcome it would have on larger scale sustained projects. I thought daily painting would increase my ability to act naturally and more responsively to my larger subjects. I created 18 small exercise paintings that were accomplished in a two-week span and then began two larger scale projects. I found that the smaller studies which were less formal and not sustained, did increase my skill set and allowed me to approach the larger scale, more complex work with more confidence and freedom. I also quickly realized after about two weeks of daily painting I discovered that painting on a daily basis exhausted my will to improve my painting technique. I could not keep painting studies; day-to-day painting became more of an accomplishment in-itself rather than a tool to improve my abilities. I liken it to an athlete who strains their body, harder than is comfortable to tear their muscles, which is only possible with the proper rest time and fuel. Between the first and second large painting I created, I noticed an improvement. I will likely continue seeing improvements in the following paintings. The experience of doing this research ultimately taught me that painting...
is a relationship. It is best to paint when you want to and when you don’t feel like it too. And small studies and larger more complex works all contribute to the life of the painter.

**Alexander Hamm (UW-Milwaukee)**

**Development of a Flow Totalization System for a Buoyancy Controlled Vehicle**

Mentor: Thomas Consi, School of Freshwater Sciences

In order to properly control a buoyancy controlled vehicle, a system must be developed to monitor the amount of fluid in the device's internal and external tanks. Knowing the precise amount of fluid in each tank is crucial to prevent overfilling and damaging the vehicle. A system was developed using two commercial unidirectional flow rate sensors and an Arduino microprocessor. This research involved both the programming of the microprocessor and determining where to install the flow sensors to ensure accurate results. Initial testing revealed that the process can produce results, however the data is sporadic and subject to heavy interference. Overall this research is ongoing and we are currently investigating ways of improving the quality of the data.

**Alexander Hamm (UW-Milwaukee)**

**Development of a Vibration Monitoring System for Use in Remote Controlled Aircraft**

Mentor: Thomas Consi, School of Freshwater Sciences

When developing and modifying remote controlled aircraft, vibration is a crucial factor that must be addressed. Vibration can cause physical fatigue to the airframe resulting in structural failure while also interfering with on board electronics. A system was developed using the 3 axis accelerometer in an existing APM 2.5 flight control system to monitor these vibrations. This research involved creating custom firmware for the flight controller to enable faster sampling from the accelerometer and to increase data logging speeds for the built in SD card. After the custom firmware was completed, a Matlab program was created to perform a frequency analysis on the data using a Fast Fourier Transform. Once completed, this system will be used to collect and analyze vibration data from our Lake Michigan sturgeon tracking drone.

**Abigail Hanley (UW-Whitewater)**

**The Use of Concept Mapping as a Pedagogical Tool Revisited**

Mentor: Dr. Robert Greene, Sociology

Concept Mapping has long been an integral pedagogical approach in the hard sciences yet relatively unexplored as an effective pedagogical tool for the social sciences. To date only two articles, one sociological, one criminological has examined its efficacy in the social science classroom. This research endeavor revisits concept mapping arguing that is fosters meaningful learning in a modality that is non-threatening and highly effective. The instructor along with his research assistant administered a post-assessment survey to help the researcher determine their perceptions of concept mapping as a reliable pedagogical alternative. The results of this survey along with samples of completed concept maps will be presented as this session.

**Miles Harbury (UW-Milwaukee)**

**Determining Source of Anisotropy of Magnetic Susceptibility in the Mulajokull Glacial Till, Iceland**

Mentor: Julie Bowles, Geology

Magnetic susceptibility of an Icelandic glacial till was found to be anisotropic and may suggest a new understanding of the formation of drumlins on glacial fore-fields (Hooyer et al., 2008). Hooyer and Iverson used anisotropy of magnetic susceptibility (AMS), physical alignment of magnetic particles, to infer past deformation on the Mulajokull glacial till. This leads to an induced magnetization that is inferred to be strongest in the direction of alignment and presumed to be linked to shear forces experienced by the till. The objective of this study is to identify which physical and magnetic grain sizes make the greatest contribution to the AMS in order to determine the validity of the AMS data. It is known that titanomagnetite is the primary magnetic mineral in the Mulajokull till (Hooyer et al., 2008) Multiple, randomly-oriented magnetic grains can reside in a single grain of sand, or a single clast, and any anisotropy arising from these aggregates is not due to drumlin formation processes. By contrast, the isolated magnetite grains in the silt size fraction are more likely to be representative of glacial processes. Knowing which physical grain size is making the largest contribution to the AMS is key in understanding the efficiency of using AMS as evidence for past deformation events and may provide insight on the formation of drumlins. Till samples were separated into different grain sizes; silt (2.0 mm). Magnetic properties of each grain-size were then measured to determine their magnetic grain-size and their potential contribution to the AMS signal. AMS measurements were performed on the larger granules and pebbles in order to determine whether or not the magnetic grains in the basaltic clasts have any AMS prior to glacial deformation. It is expected that the silt-sized portion of the glacial till will yield the highest concentration of magnetic grains, and thus be responsible for the AMS in the samples. AMS for an individual pebble (or sand grain) could have developed during original lava flow/cooling but unless one or two pebbles dominate the susceptibility, the AMS of the aggregate till sample still must reflect some glacial process. Concluding which grain size holds the highest concentration of magnetic grains may determine the tenability of using AMS data in the study of drumlin formation.

**Basha Harris, Sara Shuler, and Sam Luft (UW-Milwaukee)**

**Grow**

Mentor: Yevgeniya Kaganovich (Jewelry & Metals)

In presenting the Grow project, we will first explain the motivation behind it. This includes speaking to the abundance of plastic that is covering all surfaces on Earth, and bringing a sense of urgency to the audience on this topic. Then we will explain the importance of the collective and education in this largely community-based project – providing the audience with tangible solutions to the global issue of non-biodegradable plastic. After
explaining what inspired professor and artist Yevgeniya Kaganovich to create the Grow project, we will give step-by-step demonstrations of each of the processes we go through to create the forms for the Grow. We will conclude our presentation with allowing the audience to come up and interact with the forms, try different processes if interested, and ask questions. We will also invite them to a Grow workshop that will be happening soon after the presentation.

Jordann Hartzheim (UW-Whitewater)
Environmental and Cultural Impacts of Climate Change Along the Mississippi River Corridor to the Gulf of Mexico
Mentor: Holly Denning, Sociology, Criminology & Anthropology

Environmental challenges from climate change to agricultural and industrial pollution along the Mississippi River have direct impacts on local river people whose livelihoods and identities have been tied to the water for generations. Scholarship from Environmental Sociology to Cultural Geography to Political Economy can be integrated as insights drawn across disciplinary divides point the way for innovative ways to build resilience. Paradoxically, manufactured risks have arisen from earlier policies to lessen natural hazards. While the Great Flood of 1927 lead to the expansion of the Army Corps of Engineers infrastructure projects to protect people and farms, massive flooding of the Mississippi River down to the Delta in 2011 illustrated the unintended consequences of hemming in the most powerful river in North America. While high water events continue to wreak devastation on local communities, from the Upper River Valley to the Gulf Coast, other extreme weather events such as the severe drought of 2012 illustrate the dramatic impact of climate change, well beyond challenges from dams and levee systems. This exploratory study illuminates linkages between the upper and lower river. Some examples include practices upstream which exacerbate the “dead zone,” wetlands restoration efforts, potential community relocation plans and other responses to rising seas and land loss.

Lianna Hawi (UW-Milwaukee)
Mentor: Brooke Slavens, Occupational Science and Technology
Mentor: Alyssa Schnorenberg, Occupational Science and Technology
Mentor: Omid Jahanian, Occupational Science and Technology

Approximately 3.3 million people in the U.S. use wheelchairs for everyday use [1]. This study looks to compare the wrist, elbow, and shoulder joint angles in the sagittal, coronal, and transverse planes between geared manual wheelchair (GMW) and standard manual wheelchair (SMW) propulsion on tile flooring. The GMW is similar to SMW but the simple gears in the wheels allow users to propel in a lower gear. The geared wheel, comparable to a bike gear, has a gearing ratio of 2:1 and requires less applied force by the user, making propulsion less difficult than a SMW. While previous research has shown geared wheels to be beneficial during ramp assent [2], this study looks inclusively at all manual wheelchair users to provide prescriptive guidelines for GMWs. The procedure for data collection involved an able bodied, subject propelling the Easy Push (IntelliWheels) GMW and the Breezy (Sunrise Medical) SMW. Twenty-seven reflective markers were placed on the subject and were tracked at 120 Hz using a 14-camera Vicon motion capture system. Using a custom UE inverse kinematics model developed in Matlab [3], the wrist, elbow, and shoulder joint angles of the dominate side were derived and analyzed during the wheelchair stroke cycle. The third stroke of three different trials was analyzed to avoid effects of acceleration. The geared manual wheelchair showed a statistically significant (p<0.05) decrease in wrist extension angle in the sagittal plane. The wrist was extended 38° using the SMW and 27° for the GMW, a reduction of 11°. The range of motion of the shoulder showed a statistically significant increase of 3° in the coronal plane and 8° in the transverse plane when using the GMW. External rotation of the shoulder also increased significantly when using the GMW. Because there are not many significant differences in the kinematics, the kinematic motion cannot account for the “easier” nature of the geared wheel. Therefore, the rest of the differences between the two wheels must lie in the joint kinetics. Ultimately, the comparison of wrist, elbow, and shoulder angles between the GMW and SMW will assist in providing prescription, training, and usage guidelines for GMW. The motion data can provide us with a better understanding of upper extremity kinematics during geared and standard manual wheelchair propulsion which can be applied in recommendations of new wheels or in new design processes.

Erica Hegi (UW-Whitewater)
Awakening the Muse: Music Education in Early Childhood
Mentor: Dr. Alena Holmes, Music Education

“Researchers found that in homes in which parents sang to their children, played instruments, or listened to music regularly, the majority of children had acquired singing competency by the time they reached kindergarten.” (Szabo, 1999). Music education helps shape children’s development in literacy, creativity, and communication. An informational brochure was developed to help educate parents about the importance of music education during early childhood. These five research questions are discussed throughout the brochure: (1) Why is early childhood music education important in child development? (2) What are the outcomes of good early childhood music programs? (3) What can parents do to support and enrich musical development of their children? (4) What are the resources for parents? (5) What early childhood music programs are available in Wisconsin?
The impact of music education during early childhood is a growing topic in which this brochure addresses why early childhood institutions should implement a music curriculum and how parents can help aid their child's musical development. A descriptive research design for examining research findings, outcomes, structure, and issues in preschool music education were used. Various types of literature were reviewed such as websites, books, periodicals and professional journals. These brochures were distributed to various hospitals and pre-schools in the southern Wisconsin area. Results of the study helped educate parents, early childhood administrators and teachers on how to include more meaningful music activities in their homes and programs. Parental involvement is key when it comes to their child's musical development. The more parents sing to their children and explore different types of musical play with their children the more advanced their child's musical development will be.

Liv Heidenreich (UW-Milwaukee)
Development of a Solid-Phase Microextraction Gas Chromatography for the Maillard Reaction.
Mentor: Joseph H. Aldstadt, Chemistry

The Maillard Reaction involves a series of pathways by which sugars and amino acids condense. The Maillard Reaction has implications in food processing, environmental chemistry, and human physiology. The reaction factors such as pH, temperature, and ionic strength result in broad varieties of reaction products. The intermediate mechanisms and kinetics are not well understood. Beginning with mixtures of methylglyoxal and phenylalanine methyl ester, Maillard Reactions were initiated under different experimental conditions. Trifluoroacetic anhydride and ortho-phenylenediamine were studied as derivatizing agents so that the solutes could be studied by gas-liquid chromatography (GLC). In addition, a solid-phase microextraction (SPME) method was developed optimized along for the selective isolation and preconcentration of reaction products.

Emily Hein (UW-Stevens Point)
Elongated Tongues: A Compositional Development from Classroom to Performance
Mentor: Michael Estanich, Theatre and Dance

Each fall semester at the University of Wisconsin-Stevens Point (UWSP), The Department of Theatre & Dance produces Afterimages, a student-choreographed, directed, performed, and designed dance concert. As a sophomore, junior or senior in the UWSP Dance Program, students have the opportunity to choreograph for this fall production. However, the skills learned from academic courses Dance 301: Group Composition and Dance 302: Solo Composition provided me with the foundation to create my Afterimages compositional dance piece, Elongated Tongues. In order to accomplish my goals of creating a piece for Afterimages, I decided to further develop a choreographic idea I began as an assignment for Dance 301: Group Composition. Using inspiration from frogs, I explored my understanding of the compositional devices of speed, levels, space, repetition, motifs, sound and pathway through different movement studies. Because Elongated Tongues had a cast of 8 dancers, I investigated how each of these compositional tools could be explored on different bodies at the same time as well as the impact of a single quality happening in unison. My creative process also embraced improvisation as an exploratory tool to discover a unique movement language for the dance. I would provide a piece of music and requested the dancers to follow their instincts and move as if they were frogs. This allowed my cast the opportunity to make a personal connection with the choreographic theme as well as inspire me to make new movement choices. Throughout the choreographic process, I created base phrase material and taught it to all cast members. As the process continued, I used the qualities learned in class to adjust the choreography to enhance the movement dynamics. My most significant finding is the realization that the first phrase of movement created may not be permanent. Instead, composition takes time to craft in order to achieve the movement that will precisely portray the choreographic vision. I accomplished my goal of using movement to communicate frogs on a journey in a whimsical world in search of serenity. As a dance major, Dance 301: Group Composition and Dance 302: Solo Composition are essential academic courses that allowed me to understand how my compositional ideas can impact an audience. My course work in the UWSP Dance Program not only allowed me the opportunity to choreograph for Afterimages but has provided me the skills in hopes of becoming a global citizen artist and use choreography to impact audiences.

Connor Heinlein (UW-Whitewater)
Seasonal Water Quality Changes Through the Years in the Whitewater Creek Watershed
Mentor: Dr. Dale Splinter, Geography and Geology

Understanding water quality in Southeastern Wisconsin watershed is important because it is a habitat for animals and plants, a possible source of drinking water, recreational use for humans, and irrigation for farming and crops. Within watersheds, water quality tends to vary greatly from month-to-month and season-to-season. For this research, data was collected on a monthly basis amongst 12 different selected locations within the Whitewater Creek watershed. Using an YSI 556 multi-probe unit along with past data collected since 2008 we looked into temperature, DO, pH, and conductivity, and a transparency tube for clarity. With the data collected we compared our different locations that we visited and how the data varies from season to season. The comparisons done were Bluff Creek and Whitewater Creek Headwaters, Whitewater Lake Outlet and Rice Lake Outlet, Millis Road and Willis Ray Road, and Freemont Street Bridge and Cold Spring. An example of results that were seen was the average mean pH between Whitewater Lake and Rice Lake. We saw a difference in winter with Whitewater Lake averaging 7.88 and Rice Lake averaging 8.23. Water quality is a crucial part of the...
aquatic environment, and large decider on whether or not life inside and around the watershed strives. This data can tell us about the ecosystem around the Whitewater Creek watershed and how the water quality varies from season to season, as well as help others when collecting data from the watershed in the future.

Hailey Henck (UW-Parkside)
How Preservation Techniques Effect Fin Ray Stiffness in Yellow Perch
Mentor: Natalia Taft, PhD, Biological Sciences

Fish use their fins for propulsion and maneuvering in a three-dimensional environment. In addition, many fishes use their fins for more specialized behavior like crawling or holding onto the substrate. The bony, segmented fin rays (lepidotrichia) support and control the relative shape and position of the fins, and are therefore critically important for fin function overall. The yellow perch, Perca flavescens, is a species that uses its fins for a variety of behaviors. Specifically, the pelvic fins can be used to interact with the bottom as well as for maneuvering in the open water. Our main question is, what is the relationship between fin function and fin stiffness? It is not always possible to get fresh specimens, therefore we are also interested in how preservation techniques, (freezing and preserving with formalin), affects fin stiffness. We performed three point bending tests using an Instron model 5942 testing apparatus to compare stiffness in a sample of fin rays from all soft fins (pelvic, pectoral, soft dorsal, anal and caudal) of the yellow perch. For fresh and frozen specimens, we found that the pelvic rays were significantly stiffer than the other fins and the pectoral fins the least stiff. We also found no significant difference between fresh and frozen specimens. We predict that the fixed fin rays from the preservation in formalin and storage in 95% ethanol will be stiffer than the fin rays of fish preserved by freezing. However, we also predict that the relative stiffness results will follow the same trends as we found in fresh and frozen fin rays. If there is no significant difference in stiffness due to preservation techniques, this would allow us to test the stiffness of the fin rays of museum specimens and explore more extreme functional adaptations of fins in a more diverse sample of fishes.

Zachary Herriges (UW-Whitewater)
How Mitigation Spending Affects Ex Post Disaster Damages
Mentor: Matthew Winden, Economics
Mentor: David Welsch, Economics

In this paper, effects of mitigation spending on the ex post damages (in dollars) of flood disaster incidences are analyzed using United States county-level data from the years 1989 to 2010. This topic is important because of the study of damages incurred by major natural disaster events, such as Hurricane Katrina (Masozera, et al. 2007) and also the study environmental and social benefits from undertaking mitigation projects (Kousky and Walls 2014). Previous research has shown specific examples of not only the need but also the benefits of mitigation projects.

I use a fixed effects estimation to attempt to reduce any arbitrary correlation between unobserved factors in my data. The data also determine how past incidences and spending have continuing effects on later years’ ex post damages. I expect the results to show that more mitigation spending in previous years produce large reductions in following years. Furthermore, ex ante mitigation spending on the reduction of ex post flood disaster damages appears to level off, diminishing, in following years, as one would expect, e.g building a dam one year might reduce disaster damages, until the dam wears down and no longer prevents flood damages. Results indicate current mitigation spending is sub optimal relative to expenditures on repairing ex post damages.

Kami Hessling (UW-Milwaukee)
Ergonomics Survey for Custodial and Housekeeping Service Employees
Mentor: Dr. Naira Campbell-Kyureghyan, Industrial Engineering

The purpose of this research study was to gain some insights on how the implementation of a specific brace could potentially aid custodial staff at the University of Wisconsin-Milwaukee. The brace is designed to isolate wrist movement and distribute movement to other parts of the body. The data for this study was collected through a series of questionnaires. A custom, specific to this project, questionnaire was created and implemented for the custodial workers at UWM. The participants answered the questions about self-perceived information regarding tasks they perform and the perceived difficulty and frequency for each of the tasks. After gathering the data, the tasks that appeared most physically demanding were tasks that required frequent wrist movements. The findings from this research will allow the team to make a recommendation for brace implementation as an effective intervention to reduce the level of perceived difficulty for the tasks and reducing risk of injury from the job overall.

Sara Hilliger (UW-La Crosse)
The Importance of Environmental Apocalypse in Cormac McCarthy’s The Road
Mentor: Dr. Kelly Sultzbach, English

Cormac McCarthy’s The Road tends to be lumped in with the emerging post-apocalyptic genre as a whole. However, when analyzed further, the text is shown to be much more complex. Among the more compelling questions raised in articles published on the novel are these: Is this text environmental? And if it is, is it responsibly environmental? In attempting to answer these questions, numerous peer-reviewed articles with a wide range of focuses were read. These articles contained many overlapping and contrasting opinions dealing with the portrayal of environmental issues in McCarthy’s novel. For example, in an Explicator article, Kenneth K. Brandt argues that The Road, “directs the reader’s attention toward the fragility of the natural world.” And, in response to disagreements over the origin of the
novel’s apocalypse, Terrence McSweeney advocates in Journal of Film and Video that humans receive a warning from the text no matter what the perceived cause of the disaster is. Together, these articles as well as others point to one over-arching conclusion: whether or not one agrees with McCarthy’s portrayal of environmental issues in The Road, the novel’s value lies in prompting the beginnings of ecocritical conversation for its readers. While the text may not seem moving at first glance, there are several factors that contribute to its impact. The vehicle of a fictional approach creates an accessibility in that humans, not scientific facts, are put at the center of the action. This also enables literary devices such as repetition, technical simplicity, and imagery, rather than the expected environmental statistics and percentages, to emphasize key points. Another influential aspect of The Road is the anonymity it presents in its unnamed characters, and the unnamed disaster that causes their struggles. The vagueness surrounding the main characters of man and boy allows them to take the role of anyone, the reader’s father, son, husband, brother, friend, or self. Those two characters could be anyone, and in the context of McCarthy’s text, this makes them represent everyone. The unnamed disaster likewise forces the reader to think about the impacts of his/her actions on many levels: a meteoric impact points toward improving the present quality of life on Earth, diplomatic relations are at the forefront if the disaster is perceived to be caused by nuclear fallout, and environmental impact is considered if climate change is blamed. The research conducted leads to the conclusion that Cormac McCarthy’s The Road is an essential tool in initiating environmental conversation in its readers.

Joshua Hintz (UW-Milwaukee)
Alteration of Fear and Molecular Signaling in the Amygdala Through the Use of Optogenetics
Mentor: Fred Helmstetter, Psychology

Through pharmacological and lesion studies it is widely accepted that the lateral amygdala (LA) is required for the acquisition, consolidation, and retrieval of conditional fear memory. However, a major methodological challenge with these types of studies is that inactivation of the amygdala leaves the structure either permanently damaged or inactivated for an imprecise amount of time. The creation of optogenetic techniques, which uses virally-expressed light sensitive ion channels and laser stimulation to either inhibit or excite neuronal activity, provides a more temporally precise method to study the amygdala’s role in memory. In the current study, we used the light-gated ion channel channelrhodopsin (AAV5-CaMKII_\text{hChR2(H134R)-EYFP}) to drive neuronal firing within the LA. We found that optogenetically exciting LA neurons resulted in increased immediate early gene (IEG) expression that mirrors IEG activity seen during the consolidation period following fear conditioning. We also used the light-driven proton pump ArchT (AAV9-CAG-ArchT-GFP), which when activated by light (523 nm), inhibits neuronal firing, during memory retrieval. Animals that expressed either ArchT or the control virus (expressing only GFP) were delay fear conditioned and then given a retrieval trial 24 hours following training. During retrieval, animals that expressed ArchT and were given laser stimulation during the retrieval session exhibited impaired conditioned fear expression compared to control animals. These results suggest that we are able to manipulate neuronal firing in the amygdala with precise temporal specificity to mimic behavioral impairments resulting from pharmacological manipulations to better elucidate the role of the amygdala during memory retrieval. Further, these data also demonstrate that we are able to artificially drive neuronal excitation and IEG expression within the amygdala to mirror learning induced excitation and gene activation that occurs during learning. A better understanding of the amygdala’s involvement in emotional learning can potentially lead to a better understanding of fear related disorders such as anxiety and PTSD. They also expand to help explain possible pathways for memory related disorders like Alzheimer’s.

Kassandra Hodges (UW-Whitewater)
My Wellness Manager-User Interactions with m-Health Technology
Mentor: Alana Platt, IT and Supply Chain Management

As of 2005, 133 million Americans suffer from chronic diseases, and many of those are preventable with lifestyle changes (CDC, 2014). With the increasing use of mobile technology, many people are using technology to track, monitor, and motivate life changes or disease management or prevention. This mobile health technology is referred to as m-health. Surveys were sent to students at a public university in the Midwest. Students were assessed on the following themes: prompt for user activity; reward the user for healthy behaviors; support a personalized user experience; allow users to track their behavior and symptoms; and provide positive feedback to support and encourage the user. Data from this study is vital to future research in m-health development to ascertain what users are looking for, and particularly in the iPad application, My Wellness Manager.

Kelsey Holbert (UW-Milwaukee)
A Kinetic Study of the Early Stages of the Maillard Reaction
Mentor: Joseph H. Aldstadt, Chemistry

The Maillard Reaction is a complex series of reactions between an amino acid and a reducing sugar that has important physiological implications, particularly for diabetes mellitus. The application of a sensitive and selective analytical method developed to study the kinetics of the initial stages of the Maillard Reaction will be described. The method is based upon sample pre-treatment by sequential injection (SI) with a liquid chromatography column prior to detection by low-field nuclear magnetic resonance spectroscopy (NMR). The SI-NMR method improves the sensitivity and selectivity of the 45 MHz picoSpin-NMR spectrometer by effectively pre-concentrating the sample before the sample zone
enters the flow cell. The initial steps in the reaction between alpha-dicarboxyl compounds (e.g., glyoxal and methylglyoxal) and primary amines (e.g., phenylalanine-methylester) was monitored on-line with SI-NMR. This approach allowed for detailed study of the behavior of alpha-dicarboxyls and a kinetic study of the initial stages of the Maillard Reaction.

Stephanie Holt (UW-La Crosse)
The Comparative Study of the Academic Effectiveness of Milwaukee College Preparatory School (MCPS) and Milwaukee Public Schools (MPS)
Mentor: Dr. Ray Block, Political Science

Education, a popularly agreeable unalienable right, within the United States is at stake, specifically in Milwaukee, WI. Milwaukee Public Schools had a graduation rate of 62.8% in 2013. A failure of which MPS schools are held accountable and renders question of proper action to improve academic results. Current philosophy, lead by Wisconsin governor Scott Walker, is to invest public funding in charter schools. The purpose of this study is to deduce through a sample group whether the public investments in charter schools were warranted. Through the assessment of the Wisconsin Knowledge and Concepts Examination (WKCE), MPS and MCPS grades 3rd-8th current year test scores and compound test score growth will be compared to identify academic effectiveness.

Sarah Horn (UW-Milwaukee)
The Effects of Dispersed Oil Droplets on Daphnia pulex
Mentor: J. Rudi Strickler, Freshwater Sciences

Oils and wax esters are compounds that store large amounts of energy in small volumes. However, they also store dissolved compounds that may be toxic. In aquatic environments, oil and wax esters play important roles for these reasons. For example, when we introduce crude oil from oil spills, plankton may suffer due to dissolved compounds that are toxic. Spilled crude oil is introduced to layers of plankton beneath the ocean surface by oil dispersants. Oil dispersants are widely used in oil spills, specifically the Deepwater Horizon oil spill. It is now understood that these oil dispersants deeply damage the layers of plankton by bringing oil from the surface to layers of plankton underneath. This research is studying how exactly plankton such as Daphnia pulex are affected. Methods: The effects of dispersed oil droplets on zooplankton Daphnia pulex were recorded using a high speed camera combined with laser holography. The behavior of Daphnia pulex in the presence of oil droplets was contrasted with behavior of Daphnia pulex without oil droplets. Results: The Daphnia pulex appeared eager to eat the oil droplets sent their way. Through a flicking motion, Daphnia pulex pulled the droplets towards themselves to capture their food. In eating the crude oil, they caused the droplets to be broken down into smaller particles. Implications: Understanding how the bottom of the food chain is affected by oil spills and oil dispersants is vital to understanding how the rest of the ecosystem will be affected.

Stephen Houdek (UW-Milwaukee)
A Biomimetic Robot Modeled on the Shrimpfish, Aeoliscus strigatus
Mentor: Dr. Thomas R. Consi, Mechanical Engineering, School of Freshwater Sciences

Shrimpfish, Aeoliscus strigatus, inhabit the Indo-Pacific coral reefs in coastal waters. They assume a vertical posture, with their head facing downwards, which augments their ability to quickly maneuver. Their unique posture and impressive maneuverability are possible by careful actuation of the pectoral fin pair. Observations show that the pectoral fins constantly oscillate while hovering, turning and swimming vertically or horizontally. The dorsal, caudal, and anal fins are also unusually placed in a cluster on the posterior-ventral side of the fish. The combination of the pectoral fin and the median fin motions are of high interest to develop a biomimetic robot that can match the maneuverability of the shrimpfish. It is important to know and understand the location and effect of the center of gravity and center of buoyancy. These parameters are based on the weight and volume of the shrimpfish and have a large effect on the hydrostatic stability and maneuverability of the fish. Many fish are inherently unstable, and must continuously overcome numerous perturbations from their environment to maintain their position in the water column to prevent the tendency to roll belly-up. Their dynamic response is often successfully accomplished by left and right pectoral fin oscillation which creates stabilizing forces. The static stability of the shrimpfish is currently under investigation. Once known then the positions of the center of gravity and center of buoyancy can be adjusted in the robot to match that of the real fish. A biomimetic robot displaying the basic characteristics of the pectoral fins of the shrimpfish has been built and tested. By controlling the motion of the pectoral fins with RC servo motors through a microprocessor, programming can be adapted to match the fin kinematics of the shrimpfish. The robot has demonstrated forward propulsion, backward propulsion, as well as turns of varying radii. The system will be further modified to incorporate relevant shrimpfish fluid mechanical characteristics the positions of the centers of gravity and buoyancy as mentioned above. We will then experiment with robot’s fin kinematics to better understand how the actions of the pectoral fins generate the forces necessary for stabilization in both the robot and the real shrimpfish. Such experiments would be difficult to impossible to perform on the slender and delicate shrimpfish. The biomimetic robot makes these experiments possible and shows the power of the biomimetic approach to understanding the bio-fluid mechanics of aquatic organisms.
Kayla Hucke and Katharine Bright (UW-Green Bay)  
The Impact of Phonology and Number on Children's Novel Plural Productions  
Mentor: Jennifer Lanter, Psychology 

Children utilize several factors as they acquire the English plural. Children consider the meaning of the plural, including the role of number and similarity (Zapf and Smith, 2008), and are also impacted by the production difficulty (also known as phonological complexity) of the plural forms (Ettlinger and Zapf, 2011; Berko, 1958). Considering these previously shown differences for familiar plural forms (i.e., dogs), our goal was to see whether these factors impact children's production of novel forms (i.e., wugs) in the same way. We focus on novel forms in this study because they remove the confound that exists with known forms, where some children know certain forms and other children do not. Therefore, by using novel words we control exposure to the word forms, so all children experience equal exposure to a word in its singular form and are not exposed to the word in its plural form. Thirty-two three- and four-year old children were presented a picture of a singular novel object while a prompt was read that introduced the novel word. Participants were then presented with either two or four of that same novel object and were asked what he or she saw on the screen. The plural form of the novel words, which was not introduced by the experimenter, varied in phonological complexity. It was hypothesized that the presentation of four novel objects would result in greater plural production, as would phonologically simpler novel forms, words that children have an easier time formulating. Findings show that children are less likely to produce the plural of novel words with complex phonology and when there are two items presented rather than four items. In addition, interesting findings emerged regarding children's spontaneous use of quantifiers as prefixes to the plural forms. Children were more likely to use plural quantifiers (i.e., two) when fewer objects were presented. We suggest that children may have an easier time seeing two objects as plural, rather than four objects, which may appear as a “single group” and thus require the singular label. In all, we discuss children's acquisition of the plural and production of novel plural forms as involving a system of factors where children have limited cognitive resources that are used strategically as task difficulty increases.

Samantha Humphreys (UW-Milwaukee)  
The Association Between Family History of Substance Use Disorders (SUD) and Executive Functioning in Youth  
Mentor: Dr. Krista Lisdahl, Psychology 

Background. Previous research has found that adolescents and young adults who have a family history of substance use disorders (SUD) demonstrate abnormal prefrontal cortex activation (Cservenka, Fair, & Nagel, 2014; Spadoni et al., 2013) and poorer executive functioning (Gierski et al., 2012; Dolan, Bechara, & Nathan, 2008). The goal of the current study is to examine executive functioning in adolescents and young adults with and without a family history of SUD. It is hypothesized that individuals with a family history of SUD will demonstrate poorer working memory, set-shifting, and inhibitory control compared to those without a history of SUD, after controlling for recent substance use. Method. Data were collected from 89 teens and emerging adults, including 63 who did not have a family history of a SUD, and 26 who had at least one parent with a family history of SUD. Multiple regressions will examine the impact of family history of SUD on executive functioning (Wisconsin Card Sorting Task, Letter Number Sequencing, and Stroop tasks) after controlling for age, gender, reading ability, and recent cannabis and alcohol use.
Arie Hunt (UW-Milwaukee)
The Shift of Plant Characteristics in Response to a Complex Disturbance in Temperate Deciduous Forest
Mentor: Stefan Schnitzer, Freshwater Science

Humans have caused massive compositional shifts of plant species in eastern deciduous forests by altering historic disturbance patterns. Long-term fire suppression and clear-cutting have altered light availability in the understory, which affects many understory plant species. Additionally, the elimination of top predator species has resulted in an overabundance of herbivores such as white-tailed deer. These factors may be altering the way in which plants interact with each other as well as their environment. Plant functional traits may provide insights into how plants shift strategies to adapt to changing conditions. To understand how plants adapt to complex changes in eastern deciduous forests, we measured four key plant leaf traits that are important to temperate forest plants (specific leaf area, leaf toughness, leaf ignitability, and leaf thickness). We examined 10 understory species within the context of a fully factorial experimental manipulation of controlled burns, canopy gap formation, and fences that excluded large terrestrial herbivores (mainly deer) in 64 plots in northwestern West Virginia. We found that when plants are exposed to a combination of fire and deer browsing they had significantly thicker leaves (p=0.021, t-statistic=2.303, df=1269). Leaves were significantly tougher when deer are experimentally removed (both in forest burns and when canopy gaps were added; p<0.05 for all fenced treatments). When plants were exposed to fire regularly every 10 years, the amount of time it takes for leaves to ignite increased significantly when deer were removed (p=0.0002, t =3.714, df=1269 and p=0.0328, t =2.137, df=1269). These findings suggest that deer alter plant leaf construction and thus their overabundance may have important ramifications for plant functional strategies in eastern deciduous forests.

Ruth Iradukunda (UW-Milwaukee)
The Trainers’ Assessments on Disclosure Among School-age Children
Mentor: Joan Blakey, Social Welfare

Background: Childhood sexual abuse (CSA) is very prevalent in our society and studies prove that between 5-30% of all children will be sexually abused by age 13. Various types of CSA programs have been created, intended to increase the likelihood that children will recognize abusive situations, resist abuse when possible, and report the abuse to someone who can stop the abuse. The programs were to minimize incidence of sexual abuse with school-based programs being the most effective type of prevention program. To prove the effectiveness of these types of programs, they must be evidence based, which one still yet lacks to exist. The intention of this research project was to evaluate the Play it Safe™ program, a school-based childhood physical and sexual abuse prevention program that serves tens of thousands of students annually around the nation, with the number of disclosures steadily increasing over the 30 years of operation. The purposes of this study are: 1) to help this program become evidenced based; 2) to understand how and why the program works by recognizing the role that trainers play in children’s disclosure of physical and sexual abuse. Question: What factors lead to and/or affect disclosure among children? Methods: All of the interviews were conducted and audi-taped by Dr. Blakey in a closed, private room and professionally transcribed verbatim which were then analyzed using the NVivo computer software to form pattern analysis to examine individual cases and build a conceptual explanation. This study primarily uses the Case Study Method along with a number of other methods (i.e. constant comparison, thematic analysis, pattern matching) to ensure diligence and objectivity. Results: The results showed that there were several factors that played a key role in disclosure among the Play it Safe! students. The determining factors that seemed to affect the rate of disclosures and the receptiveness of the children according to the data were: the school’s location, a trainer’s experience, and the age of the child. The school location became a factor to disclosure because some schools were located in communities that spoke Spanish primarily, making it difficult for the counselors and students to communicate freely during the presentations. A trainer’s experience proved to be significant because there was a positive correlation between experience and disclosures. Lastly, more disclosures came from younger children and decreased with older age. The teacher’s involvement in terms of cooperation and assistance during the presentation, the professionally thought-out scripts used, and length time spent during the presentation are also factors that can be considered to lead to disclosure. Conclusion: With these findings, it is possible to not only implement the results to better improve the Play it Safe! Program, but to also create a template for other non-profit agencies, school districts, and practitioners to adopt the program worldwide.

Tai Jaranson and Elysha Ortiz (UW-Parkside)
The Relationship Between Claw Morphology and Predatory Ecology in Birds Of Prey
Mentor: Chris Noto, Biological Sciences

Birds of Prey, also known as Raptors, differ in their ecology. Previous work has found relationships between claw curvature and predatory behavior, however it has not considered overall differences in claw shape between species. A sample of 167 claws from 15 species including diurnal and nocturnal raptors was collected from the Field Museum of Natural History (Chicago) and North Carolina Museum of Natural Sciences (Raleigh). X-ray images were taken in lateral view, and a series of 14 coplanar landmarks were placed on each claw using TPSdig. The relationship between shape data and ecological variables were explored using MorphoJ software. Analyses included Principle Component Analysis (PCA), Canonical Variates Analysis (CVA) and a two-block Partial Least Squares (PLS). The majority of variations in claw shape occurs in the shape of the tubercle, nail curvature, and the
proportion of nail length and body size in the claw. The PCA showed that the flexor tubercle and depth of the nail body yield the most change in claw morphology. The CVA presented a relationship between claw morphology and raptor mass, wingspan, length, and prey mass. Linear variables, such as raptor body length, were found not as significant as other variables. The results show that claw characteristics of certain species also correlate with ecological factors and hunting strategies. The correlation between claw shape and prey mass show that species with a deeper tubercle and smaller nail angle are significantly related to a larger prey mass. In addition, species that have a smaller prey mass have a different claw morphology: shallow tubercle and large nail angle. Prey mass may be more important than the actual prey identity, as there is considerable overlap among the different prey types. The PLS results suggest that particular combinations of nail and body shape covary, which is related to predatory strategy. One species, Pandion haliaetus (osprey), is significantly different from all other species in the sample. Ospreys are piscivores that have a specialized hunting strategy; however, they are also the largest species in this sample, which may affect the results. This research further elucidates the relationship between claw shape and hunting behavior in birds of prey. These results may also be used to make inferences about predatory behavior in theropod dinosaurs, which are close relatives of birds.

Marcus Jellen (UW-Milwaukee)  
Synthesis of BRL-37959 and Analogues  
Mentor: Mahmun Hossain, Chemistry

The benzofuran based compound, BRL-37959, was found to have analgesic properties with low gastric irritancy, but due to an inefficient synthesis research on it was discontinued. In Dr. Hossain’s research group, extensive time has gone into the development of benzofuran based compounds using readily available materials like salicylaldehyde and ethyldiazzoacetate. Using this reaction we have developed a novel, efficient synthesis of BRL-37959 and its analogues. With molecular modeling studies we have determined that these compounds have potential for binding the (cyclooxygenase) COX-2 enzyme selectively over the COX-1. This could make BRL-37959 a possible replacement opiate based drugs, like morphine, which are known to cause gastric distress due to interactions with the COX-1 enzyme. By synthesizing multiple analogues of BRL-37959 we will be able to test them individually for their analgesic efficacy with hopes to find a compound, which very selectively reacts with the COX-2 enzyme while completely disregarding the COX-1. We have already synthesized multiple analogues of BRL-37959 and are partnering with a COX enzyme specialist to test the various compounds for their binding potential to the pair of enzymes. With luck, we will be able to find a novel compound, which works as a potent analgesic agent with low gastric irritancy. This could open up new possibilities for patients who are undergoing treatment and are sensitive to current medications.

Brianna Jicha (UW-Whitewater)  
Demographic Assessment of Fassett’s Locoweed Populations in Central Wisconsin  
Mentor: Nicholas Tippery, Biological Sciences

Fassett’s Locoweed (Oxytropis.campestris var. chartacea) is a federally threatened and state endangered species found on the sandy shores of Wisconsin lakes with fluctuating water levels. Surveys conducted over the last five years have shown that populations in central Wisconsin periodically experience catastrophic mortality, yet they also are able to recover by drawing upon an extensive seed bank. We conducted intensive surveys along vertical shore transects at two central Wisconsin lakes to determine whether life history traits were correlated with location, i.e., relative distance from shore. We determined that several factors, including size, survival, and reproductive output, were correlated with shore location. Moreover, larger plants tended to survive better and reproduce more. Our data indicate that the Fassett’s Locoweed populations under study are strongly stratified, potentially as a result of differential mortality and reproductive success due to water level fluctuation.

Alejandro Jimenez, Taylor Keesler and Bryce Loveland (UW-Platteville)  
Modeling Elastic Behavior in Freestanding Nanomembranes Through Analytical and Finite Element Calculations  
Mentor: Dr. Gokul Gopalakrishnan, Engineering Physics

The elastic constants of crystalline solids play a critical role in determining mechanical and thermal properties. Commonly considered as material properties independent of geometric factors, the elastic parameters are expected to deviate from bulk values in nanoscale systems and display a size dependence. This dependence on length scales appears in small systems due to a non-negligible fraction of the atoms residing in the vicinity of a surface, which in turn results in effective elastic parameters that differ from the bulk. While devices with nanoscale dimensions are ubiquitous in microprocessors and micro- and nano-electromechanical systems (MEMS and NEMS), the size dependence of fundamental elastic properties in the sub-100 nm regime has seen little investigation. We present our work following two lines of inquiry: (i) modeling the effective elastic modulus of freestanding nanomembranes through finite element analysis, and (ii) calculating the dispersion of elastic waves propagating through a two-dimensional continuum modulated by a lattice of periodic boundaries.
Katherine Jinkins (UW-Platteville)
Examination of Humidity Effects on Measured Thickness and Interfacial Phenomena of Exfoliated Graphene on SiO2 via AC-AFM
Mentor: Yan Wu, Engineering Physics
Mentor: Jorge Camacho, Mechanical Engineering
Mentor: Lee Farina, Engineering Physics
Tapping (AC) mode Atomic Force Microscopy (AFM) is commonly used to determine the thickness of graphene samples. However, AFM measurements have been shown to be sensitive to environmental conditions such as adsorbed water, in turn dependent on relative humidity (RH). In the present study, AC-AFM is used to measure the thickness and loss tangent of exfoliated graphene on silicon dioxide (SiO2) as RH is increased from 10% to 80%. We show that the measured thickness of graphene is dependent on RH. Loss tangent is an AFM imaging technique that interprets the phase information as a relationship between the stored and dissipated energy in the tip-sample interaction. This study demonstrates the loss tangent of the graphene and oxide regions are both affected by humidity, with generally higher loss tangent for graphene than SiO2. As RH increases, we observe the loss tangent of both materials approaches the same value. We hypothesize that there is a layer of water trapped between the graphene and SiO2 substrate to explain this observation. Using this interpretation, the loss tangent images also indicate movement and change in this trapped water layer as RH increases, which impacts the measured thickness of graphene using AC-AFM.

Detaya Johnson (UW-Milwaukee)
Improving the efficiency of biosand filters
Mentor: Sandra Melellan, School of Freshwater Science
Mentor: Jenny Fisher, School of Freshwater Science
Access to reliable safe drinking water is a worldwide crisis; millions die every year from waterborne illness. Point of use filtration has been utilized in a half a million homes in developing countries, where other treatments are not available. The focal point of our research is bateyes (housing on cane plantations, occupied by Haitian), where biosand filters were donated to provide a source of filtration. Few studies have focused on efficiency in removing pathogenic bacteria, viruses, and protozoa while considering variables such as chlorination or composition of the biological community. The filters are designed with three layers of rocks with different grain sizes, a diffuser plate on top, and outlet tubes to supply effluent water. Inside this simple design exists an ecosystem, the biofilm and biological area is predominantly on the top 40 cm while at greater depths biochemical activities are at work. A combination of the biological, biochemical, and mechanical processes produce an environment undesirable for human pathogens. Two filters from four bateyes were sampled, both the effluent water and sand from the biofilm; water samples were screened for growth of Escherichia coli (E. Coli) and total coliform colonies present. Chlorine residual testing was done at each site, since Central La Romana Sugar Can Co. (which provides the water to the bateyes) treats only intermittently and this may affect the efficiency of biofilm formation in the filters. Plate counts showed that some filters improved the quality of the water (lower numbers of E.coli in effluent vs. source water), while other filters decreased the quality of the water (higher E.coli in effluent than source). Community sequencing of the bacteria communities present in sand and water samples will allow us to examine differences in the microorganisms associated with good and poor filtration efficiency. Replicating the microorganisms and nutrients present in the bateyes’ filters to analyze and develop a more effective biofilm. Indicator bacteria plate count was different for each filter suggesting performance of biological and biochemical processes that could be explained by user error and chlorination effects.

Garrett Johnson (UW-Stevens Point)
Biotic and Abiotic Factors Influencing Walleye Recruitment in Escanaba Lake, Wisconsin from 1958-2013
Mentor: Justin VanDeHey, Natural Resources
Mentor: Josh Raabe, Natural Resources
The relationship between adult spawning stock abundance and the number of recruits (juvenile fishes produced) is one of the most important relationships in fisheries management, yet one of the most difficult to estimate due to many other factors influencing the relationship. Walleye Sander vitreus are one of the most popular and intensively managed sportfish in North America. Therefore, understanding the stock-recruit relationship for Walleye is important to help ensure sustainability of Walleye populations. In this study we used Age-0 Walleye abundance as our index of recruitment (recruits), adult Yellow Perch Perca flavescens abundance as an index of potential competitors, Walleye spawning stock abundance (Age-5+) as our index of stock size and May water temperature data as an index of environmental conditions known to affect Walleye survival to try and determine what factors had the largest effects on recruitment. All data were collected from Escanaba Lake from 1958-2013 to develop a multiple factor (multiple predictor variables) stock-recruit model and to determine whether a Ricker stock-recruit relationship was observed. A Ricker stock-recruit relationship suggests that at high spawning stock abundances recruitment is decreased due to cannibalism and at low spawning stock abundances recruitment is reduced due to low abundances of adults. Maximum recruitment is derived from moderate spawning stock abundances. We used Statistical Analysis System (SAS) to estimate parameters for a multiple factor Ricker stock-recruit model. The interaction of May water temperature coefficient of variation (CV) and adult Yellow Perch abundance accounted for 50% of the variation in recruitment. Adult Yellow Perch abundance and spawning stock abundance increased the explained variation to 72% and 79% respectively. This suggests that through the use of three variables we were able to predict nearly 80% of the variation in Walleye recruitment in Escanaba Lake. Other possible variables that may help explain Walleye recruitment...
Rachel Johnson (UW-Milwaukee)
Characteristics of Parent-Child Academic Discussions as a Function of Gender and Ethnicity
Mentor: W. Hobart Davies, Psychology

The Decision-Making Involvement Scale (DMIS) is a 30-item scale used to assess parent-child communication patterns during family decision-making. The DMIS was initially developed to assess child decision-making involvement in the context of pediatric chronic illness (Miller & Harris, 2012). However, this scale has been shown to be reliable and valid when measuring decision-making discussions in general between parents and children. Previous work from this project has demonstrated adequate psychometric properties of the measure with community samples of both Caucasian and African-American parents. The goal of this study is to analyze the differences in response patterns between white and black parent respondents. The DMIS is completed only by parents who report a substantive discussion with their child or adolescent in the last 2 weeks. From the 2171 surveyed for the project, 1477 reported a discussion and completed the DMIS. About 1/3 of the respondents were fathers. The majority of the parents were white, but there are 129 black parents available for analyses. We are completing coding of the qualitative responses from the DMIS. Some of the emergent themes include discussions regarding risky behavior, future plans, health concerns, behavior problems, peer relationships, and school-related topics. This presentation will focus on the responses from parents whose discussions with the child focused on school-related issues. From the data collected and analyzed, approximately 285 responses have been identified as relating to school and academics (excluding college decisions). Analyses will compare the rates of reported discussions, the relative frequency of school-related discussions, and the communication patterns of these discussions as a function of parent and child gender and ethnicity.

Ross Johnson (UW-Platteville)
Investigating Microsatellites for Evidence of Natural Selection
Mentor: Ryan Haasl, Biology

A microsatellite is a repeated motif in DNA sequence found predominantly in intergenic regions. Recently, some microsatellites have been shown to be functional and therefore likely affect fitness. In particular, microsatellite variation can have grave human health impacts through disease. On the other hand, microsatellites in the promoters of genes sometimes affect gene expression and can therefore undergo adaptive selection. Using a method devised by Haasl and Payseur (2013), microsatellite data can be analyzed to determine if there is evidence for selection. If selection is supported, then more simulations will be run to produce estimates of important selective and mutational parameters.

Achele Jones (UW-Stout)
Conflict Resolution Strategies, Ethics, and Attachment: Connecting the Micro and Macro.
Mentor: Tina Lee, Applied Social Sciences
Mentor: Chris Ferguson, Applied Social Sciences

Contemporary research in peace and conflict analysis has failed to connect individual strategies for conflict management, personal ethical frameworks, and adult attachment types to perceptions of appropriate foreign policy regarding international disputes. Using the Conflict Resolution Strategies Scale (CRSS), Ethics Position Questionnaire, and the revised Experiences in Close Relationships (ECR-R) scale, this research assesses individual’s tendencies towards particular responses to conflict in both their personal life and international disputes and their relation to individuals ethical and attachment frameworks. This research is significant as it begins to understand the relationship between ethics and the use of conflict resolution strategies in both micro and macro settings.

Sara Jozefowski (UW-Parkside)
Shovel Testing at the Leet East Camp Site, Kenosha County, Wisconsin
Mentor: Robert Sasso, Sociology/Anthropology

Shovel tests were done on a site called the Leet East site; there is written record of a Potawatomi camp being here. The shovel tests were done to look for physical evidence of the camp being here. There were 54 shovel tests done, and they were done on ten by ten meters apart on a grid. When conducting shovel test people were sent off in groups of two and they dug in an area that was pre-marked with an orange flag to mark the spot on the grid. The students used a sifter to sort the soil from items. The items were placed in a bag and marked with a tag when they were done and the soil was returned to the hole. The items were then taken into the lab, cleaned, recorded, and then sorted. I have made a list with the units and the items that were found in each unit, and then another list that is sorted by the types of items. The poster will have a map showing the distribution of primary, secondary, and tertiary flakes that were found on the site during shovel testing. There will also be maps showing the distribution of bottle glass, ground stone, and burned rocks. Using these maps I will look for patterns in the location of these items that were found on the site. When the maps are finished we will see if there is any kind of pattern showing up with how the items are distributed. The maps are looking for traces of a Potawatomi camp.
Emily Karch (UW-Eau Claire)
The Effects of Secondary Task Type in Multitasking on Consumer Creativity
Mentor: Sydney Chinchanachokchai, Management and Marketing

In recent years, consumers have had a tendency to perform more than one task at a time (multitasking) due to the availability of mobile devices. Consumers sometimes encounter situations in which they need to use their creativity to alter a product to enhance its performance or appearance, or even to create a new product (Burroughs et al., 2008). The purpose of this research is to examine how multitasking behavior affects consumer creativity. The types of tasks in which consumers engage in everyday can be classified into two types, perceptual or cognitive. In this study, we examined three conditions (single task multitasking with perceptual task multitasking with cognitive task). The single-task control condition had participants perform an idea generation task, in which participants had to generate uses for a newspaper. The other two conditions had participants complete the idea generation task while simultaneously performing a secondary task (either cognitive or perceptual). Participants then answered a series of questions assessing task enjoyment. We analyzed the number of ideas generated, the average creativity score of the idea generation task, and the self-assessed task enjoyment using ANOVA. The number of ideas generated for the single-task condition (M = 7.89), the perceptual-task condition (M = 9.62), and the cognitive-task condition (M = 9) were not statistically significant across the three conditions, F (2,78) = 1.65, p F (2,78) = 5.20, p F (2,78) = 3.63, p , p .05. The findings indicate that people who were multitasking were less creative than those that were doing only one task. Moreover, those in the single-task condition seemed to enjoy the task more. From these findings, it can be inferred that multitasking can inhibit creativity. These findings have extended the research on multitasking and have many implications for further research regarding the underlying reasons as to why these specific effects are seen and crucial marketing strategy research.

Lauren Kats (UW-Whitewater)
Stimulated Wastewater Treatment of Estrone and its Kinetics
Mentor: Paul House, Chemistry

Effluent release from sewage treatment plants (STPs) into aquatic environments is of major concern because of endocrine disrupting chemicals (EDCs), pharmaceuticals, and personal care products (PPCPs). During the final stage of influent treatment, chlorine gas is used as a disinfectant to minimize harmful bacteria from entering our environment. When chlorine gas interacts with water, hypochlorous acid and hypochlorite HOCl/OCl- are formed and can react with chemical compounds, potentially creating more hazardous stable derivatives. This study focuses on the kinetic reaction of HOCl/OCl- with estrone, followed using fluorescence spectroscopy.

A concentration of 0.2 mM estrone was used in each experiment and treated with 2 mM hypochlorite solution. The hypochlorite solution was added immediately before data collection was observed. The rate of formation of derivatives was found using fluorescence spectroscopy by running time and wavelength scans. The study’s purpose was to follow the solution’s reactions by observing a decrease in estrone fluorescence through determining a wavelength that results in a good estrone signal. Previous research showed a smooth decrease in fluorescence signal, thought to be evidence of stimulated estrone reactions, but has been difficult to replicate. Each component of the solution was tested separately checking for abnormalities; none have been found as of yet. Further research will work towards determining an appropriate wavelength to show a clear estrone signal and signals of other possible products.

Michael Kaul (UW-Milwaukee)
Preparation and Thermal Analysis of Dicyclohexano-18-crown-6 Based Ternary Ionic Liquids (TILs)
Mentor: Mark Dietz, Chemistry

For more than a decade, ionic liquids (ILs) have been the object of intense interest as potential “green” replacements for the toxic and volatile organic solvents employed in a variety of electrochemical, catalytic, and separation processes. Recently a new class of ILs, known as ternary ionic liquids (TILs), has been described. Unlike “conventional” ILs, which typically comprise a bulky, asymmetric organic cation in combination with any of a wide variety of anions, TILs comprise a neutral ligand (e.g., a macrocyclic polyether), a cation bound by the ligand, and an appropriate counter anion. In an effort to develop principles to guide the design of new TILs, a systematic evaluation of the effect of the properties of the components on the characteristics of the resultant ionic liquid has been carried out. In addition, new synthetic methodology has been developed to provide TILs in higher yield and purity. In all, twelve new polyether-based ionic liquids have been prepared and their thermal properties (i.e., thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC)) determined. The results indicate that polyether stereoisomerism has a direct effect on both the melting point and the onset temperature of mass loss for the TIL. Also, as the size of the counter anion increases, the melting point of the ionic liquid decreases. In addition, the strength of metal-polyether complex formation appears to play a role in determining the thermal behavior of the TILs. These results represent an important first step toward the goal of developing predictive capabilities for ionic liquid design and eventually, tailoring the properties of an ionic liquid to its intended application.
Logan Keding (UW-La Crosse)
Medical Illustrations of Human Anatomy
Mentor: Kerrie Hoar, Biology
Mentor: Barrett Klein, Biology

Artistic interpretations of the human anatomy were composed by Logan Keding, a student of biomedical sciences at The University of Wisconsin La Crosse. Illustrations were completed over a one month period, implementing various types of media/styles. Mentoring Keding was UWL Human Anatomy Professor Kerrie Hoar and UWL Scientific Illustrator/Biology Professor Barrett Klein. Research was conducted using live models and live cadaver dissections (3 Male and 2 Female) in Cowley Hall Room 114.

Rebecca Kelble (UW-Stevens Point)
Seasonal Food Habits of Bobcat (Lynx rufus) in Central Wisconsin
Mentor: Dr. Eric Anderson, Wildlife Ecology

Bobcats (Lynx rufus) are an ecologically and economically important fur-bearing species in the state of Wisconsin. They have been legally harvested in the northern 1/3rd of the state and a statewide harvest is scheduled to open in 2014/15. During the winters of 2006 and 2008, the stomachs of 275 harvested bobcats were analyzed for their contents. Their diet was dominated by white-tailed deer (Odocoileus virginianus; 62.9% occurrence), followed by rabbits and hares (Sylvilagus and Lepus spp.; 24.4%), squirrels (Sciuridae; 7.6%), and small mammals (Microtus spp, Myodes spp., Peromyscus spp., and Tamiasciurus spp.; 6.2%). However, since the stomachs were collected primarily during the month of December, the dominance of deer in their diet might not be the result of direct predation, but incidental scavenging of hunter-wounded deer. During the summer of 2011, as part of another study of bobcat population estimation techniques, 56 scat were collected using scat detecting dogs. The samples, from 3 areas of central Wisconsin, provided an opportunity to verify the importance of deer in the diet of bobcats. Following genetic analysis to confirm species identity, bone fragments and hair were extracted from fecal samples and analyzed to determine content. The most common prey items were small mammals occurring in 59.6% of scats, followed by muskrat (Ondatra zibethicus) at 40.4%. Deer was detected in a much smaller percentage of scats (30.7%).

Natalie Kellerman (UW-La Crosse)
At Risk as Disrespect: The Experience of Black Male Youth in Wisconsin
Mentor: Peter Marina, Sociology

Chelsea Kieler (UW-Milwaukee)
They Accept Me Fully: Belongingness and College Adjustment
Mentor: Dr. Jacqueline Nguyen, Educational Psychology

Belongingness is an important indicator of academic and social integration into campus culture during the college adjustment process (Cabrera et al., 1999) and impacts stress and academic outcomes (Smedley et al., 1993; Tinto, 1993). It is particularly salient for ethnic minority students, for whom campus integration opportunities may be limited (Chavous, 2002). Despite its relationship to psychosocial outcomes, belongingness remains an ill-defined construct that merits greater examination. The aim of this multiphasic, mixed-methods study is to define the nature of belongingness and operationalize the construct to inform developmental theory of emerging adulthood and to benefit post-secondary institutions interested in issues of student retention. Phase I participants were ethnic minority graduating seniors from two institutions in the same Midwestern state: University A, a public institution in a large urban city (n=6), or University B, a small-town liberal arts college. Retrospective semi-structured, individual interviews on belongingness, inclusion, and exclusion on campus were conducted. Data were coded by domain (e.g., academic, social) and by reasons (e.g., ethnic identity, achievement/ inadequacy). A survey assessed campus membership (Goodenow, 1993), ethnic academic identity integration (Walker & Syed, 2013), and minority status stress (Smedley et al, 1993). Belongingness was described as achievement of social or academic identities and varied by institutional context. University A participants discussed a sense of belongingness derived from achievement of an academic identity. Phase II will further examine belongingness at University A. Seven months of data, from the start of the academic year, will be drawn for observation from a public Facebook page on which students anonymously post any questions/comments to peers pertaining to the University. The de-identified data will be coded using a similar coding scheme from Phase I: first for domains of belongingness (psychological/developmental, social, and academic), then for the nature of the post (positive or negative) and post engagement (how many likes, and how many comments were posted). Analyses will be conducted to determine the domains and topics most salient to the University A student body. We predict most posts will focus on social belonging which facilitates academic achievement and psychological development (Meeuwise & Severiens, 2010; Nguyen et al., 2015). The results of this study can inform campuses how students achieve a sense of belonging and how campuses to ensure better environments for students to obtain a sense of belonging, higher academic achievement and retention (Meeuwise & Severiens, 2010; Robbins, Oh, Le, & Button, 2009).

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may be limited (Chavous, 2002). Despite its relationship to psychosocial outcomes, belongingness remains an ill-defined construct that merits greater examination. The aim of this multiphasic, mixed-methods study is to define the nature of belongingness and operationalize the construct to inform developmental theory of emerging adulthood and to benefit post-secondary institutions.

**Bereket Kffee and Jesus Villalobos (UW-Parkside)**
Crowdsourcing Automobile Parking Availability Sensing Using Mobile Phones
Mentor: Derek Riley, Computer Science

Throughout the world, automobile parking space is a resource that is often scarce due to the popularity of automobiles in urban areas. One strategy to limit parking congestion uses parking permits for general lots, but a permit does not guarantee that a given spot will be available at all times. If a spot is not guaranteed, this means that the driver has to spend time in addition to fuel looking for a spot, which could lead to lateness as well as additional air pollution. Improving access to real-time parking availability information has the potential to improve lot utility, energy efficiency, and time savings. Real-time parking information is a valuable commodity in situations where alternative parking locations are available. A survey showed that out of over 480 drivers, 30% changed their intended parking destination after seeing road signs indicating open parking elsewhere. The ability to access information about the availability of spaces in parking lots can change rapidly, so it is ideal to provide this information on a mobile phone application. The increased availability of parking information could even help drivers decide whether to use their own car or find another method of transportation such as the bus or a bike. In this presentation, we introduce a prototype parking monitoring system that uses crowdsourcing and mobile phone sensors to provide more reliable parking availability information for users to find parking in a faster, more efficient manner. A mobile phone app uses GPS to determine the users' location and prompts them to vote to help determine the congestion of the lot. If the user chooses not to vote, the app will continue to track their GPS location to determine whether they are leaving or entering the lot and what specific zone of the lot they are in using vector mapping. All crowdsourced information is combined in an algorithm to provide a prediction of the fullness of each zone of the parking lot. Our app presents a color-coded live map that indicates parking lot fullness status. To reduce the influence of crowdsourcing data manipulation, expert data is also collected by an authority figure such as parking officials or the police department. These authority figures can use a hidden feature on our app to directly insert reliable data to improve the overall quality of data gathered. The expert data overrides any crowdsourced data to ensure the most reliable information is provided to the users.

**Jisu Kim, Nick Douglass, Emily Koehn and Jon Pumper (UW-Eau Claire)**
Measuring the Impact of Incentives on School Level (Aggregate) Fruit and Vegetable Consumption in Two Wisconsin Elementary Schools
Mentor: Eric Jamelske, Economics
Mentor: Sydney Chinchanachokchai, Management and Marketing

Fruit and vegetable consumption has been shown to improve health and reduce the risk of a variety of costly chronic diseases. However, children's fruit and vegetable intake in the United States is well below USDA recommended guidelines. As a result, increasing children's fruit and vegetable consumption has become an important focus among practitioners, policymakers and researchers. Given that children spend significant time in school and are exposed to a variety of foods during this time, there have been many school-based policies and interventions designed to increase children's fruit and vegetable consumption. Recent research has begun to examine the influence of incentives to motivate children to eat more fruits and vegetables. For this project we partnered with two Western Wisconsin elementary schools (N=420 and N=440) to examine the influence of a variety of incentives on aggregate school-level fruit and vegetable consumption by children during school lunch over three distinct periods of study. We observed, measured and recorded baseline consumption over an initial period (3 days) followed by an incentive period (6 days) and ended with a return to baseline period (3 days). Students in both schools were offered three different types of incentives to motivate them to eat more fruits and vegetables. If aggregate fruit and vegetable consumption increased, all students would receive free passes to a roller skating rink, two students in each grade (12 total) would be randomly selected to receive a $20 Walmart gift card and the school would receive a plaque of recognition to display in the main office. Students were informed of the benefits of eating more fruits and vegetables as well as what prizes they could win for increasing their consumption through both school-wide morning announcements and pre-lunch classroom announcements during the incentive period. Our results show that aggregate fruit and vegetable consumption increased in both schools during the incentive period, but the increase in school one was larger than in school two. We also found that only one school sustained an increase in consumption during the return to baseline period, but this increase was limited to only fruit. Our results contribute to the discussion and development of best practices that can be used by schools in collaboration with researchers and community partners to increase children's fruit and vegetable intake. Our ultimate goal is to improve both the eating habits and the health and wellness of children both locally and nationally by informing the public discourse on this important issue. This presentation leads into a second presentation from the same data outlining successes, challenges and recommendations for future research from this research experience.
Rachel Kinzler (UW-Milwaukee)
A Breastfeeding Friendly Environment for African American Families
Mentor: Teresa Johnson, Nursing

Background: Breastfeeding rates are increasing according to the 2013 Breastfeeding Report Card from the CDC, however, African American women still trail behind women of other races/ethnicities. This disparity can be further demonstrated in small urban communities in Midwestern states. For example, at a local hospital that serves an economically and racially diverse community, in 2012 the rate of African American women breastfeeding at discharge was 13% compared to 60% of white women. These rates are well below the Healthy People 2020 goal of 81.9% breastfeeding early postpartum. The purpose of this study is to evaluate the impact of a community based peer counselor intervention on increasing the knowledge about the health impact of breast milk and breastfeeding and to increase breastfeeding initiation and exclusivity rates among African American families. Methods: This is a descriptive study that will measure knowledge and perceived supports and barriers about breastfeeding by surveys administered during pregnancy for those who do and do not plan to breastfeed their infant. Additional surveys will be administered shortly after delivery, and again at 1-2 months, and when the woman stops breastfeeding. The questionnaires will include information about women’s perceptions of individual supports and barriers of their feeding decisions. Women are recruited through word of mouth, PNCC or flyers in community settings. Preliminary analyses will be conducted using descriptive statistics. Additionally content from surveys will be validated with participants for understanding and readability. Data obtained from a hospital data base will be used to measure rates of breastfeeding among all African-American women in the community. Results and Conclusions: Recruitment for surveys has been slow, but the peer counselor has been able to raise awareness of the importance of breastfeeding through multiple contacts with individuals and groups in the community. This is an essential first step in reaching women and their families to promote a more breastfeeding friendly environment. The data shows a positive relationship between women who chose to breastfeed and WIC talking with them during pregnancy about how breastfeeding is good for the baby and mother. Women who planned to breastfeed and were still breastfeeding after delivery felt they had support by their spouse/father/partner, mother, grandparents and peer counselor. These preliminary results demonstrate the initial impact of individuals who commonly influence an African-American woman’s decision to initiate and continue breastfeeding. These data will be used as pilot data for future and larger funding with community partners.

Jennifer Kirkpatrick, Maya Maric and Kelah Hatcher (UW-Milwaukee)
Assessing for Shame Using the Dot Probe Task
Mentor: Shawn Cahill, Psychology

Shame has been linked to post-traumatic stress disorder, social anxiety, depression, and a history of sexual victimization. Furthermore, shame may inhibit a patient from getting well (Baumeister & Bushman). The Awareness of Women’s Emotional Experiences (AWEE) study recently started collecting data from undergraduate women with high, medium, and low levels of shame. The study utilizes a novel dot-probe test to assess for attention vigilance or attention avoidance patterns for shame-inducing stimuli. During the dot-probe test, participants are shown negative, positive, and neutral images. A vigilant-avoidant pattern to negative stimuli is quite common in those with anxiety. This means that at first, anxious participants pay a lot of attention to the threatening stimuli and then later try to avoid it. The main goal of AWEE is to compare the performance on the dot-probe task of participants of low, medium, and high shame. We hypothesize that participants in the high shame group will exhibit this vigilant-avoidant pattern. In addition, there is a survey that consists of questions about demographics as well as participants, possible histories as sexual abuse victims. There are also multiple brief surveys collected throughout the study that ask the participants to self-report their current moods to monitor whether the participants are unintentionally becoming aggravated with the study’s procedures or if they are perhaps upset by anything that happens during their session in the lab. Gaining a better understanding of shame could help those with a range of mental health problems.

Patrick Klepp (UW-Oshkosh)
Hymenobacter Species Dominate Freshwater Biofilms
Mentor: Dr. Sabrina Mueller-Spitz, Biology and Microbiology

Freshwater biofilm formation is influenced by numerous factors such as nutrient availability, flow dynamics, and substrate type. These factors affect community succession, structure, and species diversity between nascent and mature biofilms. We are trying to understand mature biofilm composition occupying man-made structures in eutrophic freshwater. Common manmade substrates in the Fox River watershed include metal, wood, and concrete piers and docks. All three habitats shared Hymenobacter as the most dominant genera. The objective of this research was to determine if subpopulations of Hymenobacter favor different substrates. Hymenobacter sequences ranged from 4.2 to 23.3% of total bacterial community with over 80 operational taxonomic units (OTU) detected across the three substrates. Twelve OTUs inhabited all three environments showing various subpopulations are substrate generalists. The concrete substrate had the greatest total diversity and most unique OTUs. The wood and concrete substrates shared 22 OTUs whereas
there was less overlap with metal. By comparison, three populations dominated the metal habitat comprising 89% of all Hymenobacter sequences detected. This reduction in OTU richness on metal substrates leads us to consider potential adaptations that have led to this substrate being less favorable, potentially related to more competitive microorganisms that are better suited to this microenvironment. The Hymenobacter dominance in freshwater biofilms allows us to hypothesize that this group has significant contribution to ecological processes. While Hymenobacter was present on all sampled substrates, the concrete environment provides the most suitable substrate favoring diversity. The large variance in OTUs present on other substrates points to taxa divergence to niche substrates, possibly based on attachment strategies or physiological adaptations.

Katarina Klimko, Ashley Burnett and Robert Walker (UW-Milwaukee)

Limb Preferences in Firebelly Toads
Mentor: Gerlinde Hoebel, Biological Sciences

Handedness, or preferential use of a particular limb, is common in the animal kingdom. We examined whether firebelly toads Bombina orientalis show handedness, and compared whether the degree of strength required for a given task influences the degree of handedness. To do this we compared limb use during “Snout wiping,” i.e. removing an object stuck to an animal face, and “Righting,” i.e. resumption of natural upright position after having been overturned. We predicted that a task requiring more physical exertion (Righting) would show a higher degree of handedness than a task requiring little physical exertion (Wiping).

Nathan Klopmeier and Shaylee Church (UW-Stevens Point)

Temperature Effects on Gray Squirrel Capture Rates in Sandhill Wildlife Area, Babcock, WI
Mentor: Shelli Dubay, Natural Resources
Mentor: Tim Ginnnett, Natural Resources

The eastern gray squirrel (Sciurus carolinensis) is an important game species in many states. In Wisconsin, the hunting season for eastern gray squirrels is open between mid-September and late January. Since 2002, long term research in Sandhill Wildlife Area, Babcock, Wisconsin, has been focused on collecting data pertaining to the live capture of eastern gray squirrels. Data have included individual squirrel information such as sex, age, weight, trap number, and trapping instance such as open bait absent, tripped bait present, tripped bait absent, and captures of non-target species. General information such as trap times, cloud cover, precipitation events, wind speed, and temperature were also recorded. We live trap squirrels during the winter months form late January through March, until the snow melts. Traps are open between the temperature ranges of 0 F and about 35 F to reduce the risk of snow melting on a squirrel, putting it at risk for hypothermia. We will determine if gray squirrel captures are correlated with temperature using a linear regression. If we identify a temperature range where most squirrels are trapped, we may be able to optimize capture success by trapping during a narrow range of temperatures. Additionally, squirrel hunters might optimize success by hunting during a temperature range when squirrels are more active.

Lee Knudston (UW-Milwaukee)

Small-Scale Remote Sensing of Cladophora Detritus
Mentor: Thomas Consi, Freshwater Sciences

Cladophora is a filamentous benthic alga native to the Laurentian Great Lakes. The alga can become a nuisance when sloughed from benthic regions and transported to coastal recreation areas such as Bradford Beach. Cladophora detritus can become contaminated with Escherichia coli from animal excretion, presenting a concern to public health. The goal of this research is to investigate the use of low-altitude remote sensing platforms, multi-spectral cameras and spectroscopic analysis as tools in determining water characteristics. We used a modified digital camera and a hexi-copter to collect optical data of near-shore regions adjacent to Bradford beach. Optical data was post-processed to generate a 2D representation of water characteristics in the zone of interest. The method was successful in identifying Cladophora detritus.

Saraya Kohloff (UW-Parkside)

Analysis and Identification of Faunal Remains at the Vieau Site, Racine County
Mentor: Dr. Robert Sasso, Sociology and Anthropology

The Vieau Site was an important fur trading post occupied by brothers Jacques Vieau, Jr., and Louis Vieau adjacent to a local Potawatomi village located at Franksville, Wisconsin, in the early 1800s. The site was surveyed and excavated by the University of Wisconsin-Parkside and the Kenosha Public Museum between 2002 and 2012, yielding many thousands of artifacts, including, over one thousand faunal remains. Individual specimens were identified and categorized by the likelihood of conclusive specie identification. Approximately 100 specimens were proved to be identifiable to some meaningful level. Preliminary examinations and tentative identifications were conducted at UW-Parkside using available print resources. After tentative identification I transported the faunal remains in sections to UW-Milwaukee's Archaeology Laboratory. UW-Milwaukee provided a comparative osteological collection for a verification. The final identification yielded several different species including domesticated species such as cattle, pig, sheep, and goat, and wild species such as opossum, raccoon, and muskrat. While many of the domesticated species identified can be inferred to be present due to the later use of the site as a farm, other animals have the potential to be linked to the fur trading activity between the Vieau brothers and the Potawatomi.
Kolin Konjura (UW-Milwaukee)
Silicate Cycling in Wastewater Diatoms
Mentor: John Berges, Biological Sciences
Mentor: Erica Young, Biological Sciences

Algae are recognized as good sources of material for biofuel including cellulose (for ethanol production) and lipids (useful for biodiesel synthesis). In the course of a previous project aimed at growing the green alga Cladophora spp., in secondarily-treated wastewaters to remove nutrients, it was recognized that the Cladophora (rich in cellulose) accumulated large amounts of epiphytic diatoms (rich in lipids). Thus, algae grown in wastewater potentially represent superior material for biofuel. However, diatoms require the nutrient silicate in addition to nitrogen and phosphorus found in wastewater, and silicate concentrations, fluxes, and cycling have never been studied under such conditions. A mathematical model (we previously developed for benthic lake environments) based on a system of ordinary differential equations to predict the proportional growth and decay of silicate pools within a closed system, was re-parameterized for wastewater conditions and solved (using MATLAB). The pilot treatment system (at the Jones Island Wastewater Treatment Plant Milwaukee, WI), consisted of troughs (4 troughs, each approximately 0.5 x 3.0 x 1.5 m) in which secondary-treated domestic wastewater flowed over naturally-growing alga. Weekly measurements were made of the pools of silicate (i.e. dissolved and particulate biogenic silicate) by measuring water flowing into and out of troughs, and the material in the troughs. Inflow of dissolved silicate ranged from 12-111 uM, outflow of dissolved silicate ranged from 12-98 uM, inflow of particulate biogenic silicate ranged from 0.11-7.4 uM, and outflow particulate biogenic silicate ranged from 0.1-28 uM. Biomass of silica in the Cladophora/diatom assemblage- averaged 229 uM Si/g dry mass. First attempts at parameterizing the model used the proportional relationship between inflow and outflow concentrations, but large fluctuations in biomass invalidated steady-state assumptions. Currently, we are re-structuring the models into an open system and re-tuning parameter values. Ultimately our goal is to make predictions about rates of silicate cycling under different flow rates and nutrient concentrations in order to determine the optimal conditions, or algal biomass and thus-lipid and cellulose production.

Jacklyn Kostichka (UW-Milwaukee)
The Association Between Physical Activity and Mood Symptoms in Young Adult Cannabis Users
Mentor: Dr. Krista Lisdahl, Psychology

Background: Previous research has found a link between chronic cannabis use and depressive symptoms in youth (Cairns et al., 2014; Miller & Plant, 2002; Lev-Ran et al., 2014). Sedentary lifestyle, or poor exercise habits, may worsen these symptoms, as a link has been shown between moderate physical activity and improved mood (Larsson & Wichstrim 2010; Patten et al., 2009; Biddle & Asare 2011). It is hypothesized that young adult cannabis users who are physically active will demonstrate fewer depressive symptoms. Method: Data was collected from 50 teens and emerging adults with a history of cannabis use. Past year exercise habits were measured with the EPAQ and depressive symptoms were measured with the Beck Depression Inventory-2. Exclusionary criteria included independent Axis I disorders (besides SUD), prenatal health issues or significant drug exposure, and medical and neurologic disorders. Multiple regressions will examine the impact of exercise habits (rigorous activity and sedentary behavior) on depressive symptoms in young cannabis users.

Alexander Krause (UW-Milwaukee)
The Relationship Between Foot Structure and Ankle Laxity
Mentor: Stephen Cobb, Kinesiology

There is a general clinical belief that an individual’s foot structure influences, or is influenced by, his/her ankle joint laxity. However, the relationship has not been investigated using foot structure and ankle joint laxity assessment instruments that have moderate-high intra- and inter-tester reliability. The purpose of this study is to determine the relationship between foot structure and ankle joint laxity. 20 participants (Age: 18-40 years) with no history of ankle or foot injury, major lower extremity surgery, or current hip or knee injury will be recruited. Foot structure will be assessed using an iPad based Digital Photographic Measurement Method (DPMM). The DPMM consists of identifying anatomical landmarks and photographing the foot during 10% and 90% weight bearing conditions. Ankle joint laxity (anterior, posterior, inversion, eversion) will be assessed using a Hollis portable ankle arthrometer (Blue Bay Research Inc, Navarre, FL). During anterior and posterior testing, the foot will be loaded with 125 Newtons in each direction. Similarly, during the inversion and eversion testing, the foot will be loaded with four Newton Meters of torque. Four trials will be completed in each direction and the average of the three most consistent trials will be taken for subsequent data analysis. All of the foot structure and ankle laxity measurements will be performed bilaterally. Intraclass correlation coefficients (ICC) (3,1) (v. 19; SPSS Inc. Chicago, IL) will be performed to determine the relationship between foot structure during 10% and 90% weight bearing and each of the ankle joint laxity measures. The ICC threshold for a moderate relationship was defined as equal to or greater than 0.70. The results of this study will further the understanding of the relationship between foot structure and ankle joint laxity.
Lynell Kream (UW-Milwaukee)
The Genius of Charles James
Mentor: Jeffrey Lieder, Theatre - Costume Production

The intent of this project was to study the genius of Charles James, and attempt to replicate his work. Although his garment designs both exemplify and transcend the time period in which they were created, the true beauty lies in his understructure. Having begun his work as a milliner, James incorporated the sculptural techniques used in hat making in his dress design. Upon completion of this independent study, I have researched the various techniques Charles James used in bringing the designs that he created on paper to fruition; gained a greater understanding in use of fabric as a structural component, utilizing grain line, quilting, layering and the use of different textiles to achieve shape and provide support; and gained the ability to conceptualize, organize, plan and execute another designer’s pieces based on photographs, articles, x-rays and videos of his work. On the surface, this dress looks rather simple, although stunning. Upon closer examination, Charles James’ “Four Leaf Clover” dress is many, many layers of fabric, tulle and an extensive foundation of boning and stiff fabric to create the shape of the dress—which can stand on its own without even being on a dress form! I’m quite satisfied with the finished product. I think that I was successful in replicating the shape the Mr. Charles did in his gown, and have an even greater appreciation (if that is even possible) for his work, his design and his mastery of fabric as a means of creating structure.

Rachel Kresser (UW-Milwaukee)
A Brief Intervention on Thought-Action-Fusion
Mentor: Dr. Hanjoo Lee, Psychology

Obsessive-compulsive disorder (OCD) is characterized by recurrent, upsetting, and intrusive obsessions and/or compulsions (DSM-5, 2013). Obsessions are often caused by Thought-Action-Fusion (TAF), which is the belief that having a random, strange thought is as significant as an event that having a random, strange thought is as significant as carrying out the act. Those who experience TAF think that simply having a thought increases the chance of an event occurring or represents a person’s morality. Exposure to disconfirming information about these thoughts through Interpretation Training (IT) modifies a person’s negative interpretations about personal emotional information and lessens distress associated with it. There is evidence that even a single “anti-TAF” message helps reduce TAF scores, thus it is important to test if a TAF specific IT can reduce TAF strength and the distress associated with obsessive thoughts. The current study examined whether one session of computerized IT can impact TAF and potential distress. The study recruited undergraduates (N=39) who reported varying levels of TAF, as rated by the Thought-Action Fusion Scale-Revised (TAFS). Participants were randomized to either: (a) Active TAF IT (TAFMOD) that is designed to weaken the importance of TAF thoughts or (b) Control/Maintenance TAF IT (TAFMAN) that does not challenge TAF thoughts. The primary outcome measures were the TAFS and a modified version of the Revised Obsessional Intrusions Inventory called the ROII-Distress, which demonstrated very high internal consistency (α=.99). Results revealed that TAFMOD exhibited TAFS score reductions (M = 20.83, SD = 18.47) of around 29 percent, whereas TAFMAN maintained pretraining TAFS scores (M = 29.67, SD = 15.27). The interaction of group (TAFMOD vs TAFMAN) and TAFS reduction achieved during IT was significant (F(1,37) = 11.04, p = .002), ROII-Distress reductions were seen for TAFMOD (M = 153.33, SD = 79.08), whereas TAFMAN generally maintained ROII-Scores (M = 185.87, SD = 88.17). The interaction of group (TAFMOD vs TAFMAN) and ROII-Distress reduction achieved during IT was significant (F(1,33) = 4.70, p = .037). The correlation of TAFS and ROII-Distress scores was small and non-significant (r = .249, p = .149). Important implications are: (1) TAF is a modifiable cognitive process, (2) one session of IT for TAF is effective in modifying TAFS and DASS-Distress scores, (3) further research is warranted to examine the long-term training effects of TAFMOD, and if reductions in TAF lead to reductions in OCD symptoms.

Danny Krill (UW-Fox Valley)
Bathrooms, Sexuality, and Marriage: An Illustration of the Sex/Gender Binary
Mentor: Dr. Gregory Peter, Sociology

The past century has seen significant gains in civil rights such as the recognition of homosexuality as a legitimate sexual orientation, recognition of and respect for the transgendered, and increasing access to marriage. But our world is also one in which to say a person is a man and a male is to be redundant, and to discuss sexuality is to stumble over various acronym letters. Interdisciplinary scholarship has long asserted that gender and sex are social constructs, but what exactly is meant by the phrase “sex/gender binary”? Through a discussion of bathrooms, sexuality, and marriage, the present work illustrates the mutually-exclusive nature of this paradigm of opposites in which a person must be either a male-man or female-woman. Using a symbolic interactionist perspective, the author draws on both foundational and topical works in gender scholarship as well as current events to bring to light the curious and problematic way our institutions are gendered. In the arena of restrooms, for instance, an otherwise male-appearing person with long hair and a purse-like bag regularly encounters the momentary confusion of other male patrons; the conventions of sexual orientation use self/opposite descriptions (I am straight?) instead of specifics (I’m attracted to shapely/dynamic/smart men/women?); and a traditional definition of marriage as, one man and one woman, legally translates as “one person designated as having male genitals, and one person designated as having female genitals.” As part of a growing body of literature on gender diversity, this work reveals that beneath an ethic of gender equality lies a world that rigidly defines gender through largely unchanged institutions and continues to ignore the existence of intersexed and gender-diverse individuals. The value of this and related
works of academia is in their ability to both show the inequalities that remain in our world and suggest how diverse and normatively gendered people alike can value from a dismantling of restrictive sex/gender norms.

Michael Kruk (UW-Parkside)
X-Ray Fluorescence Analysis of Metal Artifacts From the Montgomery Site, Kenosha County, Wisconsin
Mentor: Dr. Robert F. Sasso, Sociology/Anthropology

In recent years, Dr. Robert Sasso has led a team of professional and student archaeologists in excavating a site near UW-Parkside, an early historic site known as the Montgomery Site. Through survey and excavations, the teams have encountered numerous artifacts consisting of ferrous and non-ferrous (iron and non-iron) metals. It will be my goal to analyze artifacts recovered from the site, using X-ray fluorescence to determine the chemical composition of the artifacts. X-ray fluorescence is a non-destructive analysis that determines the absorption rate of X-rays that the machine fires at the artifacts and, based on the absorption rate the machine, analyzes the elements present in the artifact and determines the constituent components. In the past, X-ray fluorescence (XRF) has been used to analyze the composition of building materials, ceramics, glass, and other artifacts where removing them from their current position or where the use of a standard mass spectrometer would destroy portions of the artifact. By using the hand-held, Bruker Tracer series pXRF spectrometer to analyze metal and alloy artifacts at the site, we hope our results will aid in the identification, and perhaps the origins and dating, of these artifacts. These results will add to the growing knowledge of archaeological remains recovered at the site.

Allecia Kruser (UW-La Crosse)
Art and Yoga in Perspective: Applications of Historical Techniques in Contemporary Practices
Mentor: Jennifer Terpstra, Art

While in an art history course, I became intrigued by traditional Indian miniature paintings and woodblock printed textiles. With further research, I found a residency in India that offers instruction in these arts from local artists. By travelling to India, I will be learning these age_old practices first hand. I will also be staying at a yoga ashram to supplement my art. I will learn what it means to live a yogic lifestyle by practicing meditation, chanting, and asanas (postures) and use this as a basis for my future career in art therapy. This undergraduate research project will enable me to research the production and aesthetic value of miniature paintings and woodblock printed textiles as well as holistic practices that support the development of various art forms. Engaging in both art and yoga studies in India will enrich my knowledge base as an art educator and also serve as a foundation as I move forward with my art therapy schooling. Upon completion of my research in India I will hold two workshops offering my findings to members of the community.

Aaron Kuczmasrski (UW-Milwaukee)
Reading Strategies used by Students of Russian
Mentor: Meghan Murphy-Lee, Russian

Reading in a foreign language can prove to be a difficult task. For decades, E. B. Bernhardt (1991) and other researchers have studied the various types of reading strategies that students use in order to comprehend foreign language texts. One of the methods that the SLA researchers use to do so is the Think-Aloud Protocol. A Think-Aloud Protocol asks students to read the text out loud, thereby vocalizing their questions, ideas, feelings, concerns, and any other thoughts they might have while reading. Doing so helps researchers better understand the students’ mental processes while trying to comprehend material written in a foreign language, and ultimately, to determine which reading strategies are most effective in doing so. This presentation will discuss and analyze the various reading strategies used by native English speakers while reading Russian. In the summer of 2010, Dr. Meghan Murphy-Lee gathered data at the Middlebury College Russian School, consisting of Think-Aloud Protocols created by students of Russian. The students selected for this research were each given texts selected for their proficiency levels. They were then asked to use the Think-Aloud Protocol while reading the texts. While doing so, the students used multiple reading strategies. Some of these strategies include, but are not limited to, formulating questions, applying linguistic knowledge (lexical and or grammatical), and re-reading. A test was administered afterwards to gauge how much of the material they understood. After these sessions were recorded and transcribed, it was my task as Dr. Murphy-Lee’s research assistant to verify the transcriptions. By analyzing these strategies I was not only able to record the various ones used, but also to ultimately analyze each strategy’s effectiveness. In this presentation, I will discuss the Think-Aloud Protocols, those strategies which the students used, and which of those strategies appeared most effective in comprehending the reading materials.

Shannon Kurth and James Longo (UW-Parkside)
Noordbergum Effect Demonstrated by Water Level Increases from Aquifer Drawdown Tests at the University of Wisconsin-Parkside Campus, Kenosha, WI
Mentor: John Skalbeck, Geosciences

Two pumping tests were conducted at the University of Wisconsin-Parkside on a deep confined aquifer with observation wells located in a shallower confined aquifer. The UW-Parkside campus is located on a Holocene glacial moraine overlying Silurian dolomite of the Racine Formation. The 100-foot thick moraine is composed of the Oak Creek Formation and the New Berlin Formation deposited in two separate advances. These two formations consist primarily of clay separated by a sand lens forms a shallow confined aquifer. Clay separated the shallow confined aquifer from the deep confined aquifer consisting of a sand/gravel layer above the dolomite. Well UWP-1 is screened in the deep confined aquifer from 80 to 100 feet below ground.
The Flambeau deposit is a copper rich deposit located in the Ladysmith district of Northern Wisconsin. The deposit has been extensively studied for its economic potential, but hydrothermal changes associated with sulfide mineral deposition at deeper levels of Flambeau deposit have not been studied. The goal of this research project is to study how hydrothermal fluids at Flambeau deposit concentrated Copper (Cu) and Zinc (Zn). Since the deposit contains stratabound and stratiform sulfide ore deposits, there is a high probability of finding larger concentrations of these minerals at deeper levels. I am collecting data with an XRF analyzer from selected core samples from Flambeau deposit. Preliminary results show that the moving hydrothermal fluids at Flambeau deposit does have an effect on the deposition of sulfide ores. The concentrations of Cu are high near the surface, but at deeper levels it switches to high concentrations of Zn. These results could provide insight on how changing temperatures and chemistry of hydrothermal fluids can affect distribution and deposition of metallic sulfide ores in the same deposit. This could promote future exploration of similar deposits locally, and around the world.

**Alice Lecus (UW-Milwaukee)**

Novel Microporous Materials for In-Situ Water Filtration

Mentor: Marcia Silvia, School of Freshwater Science

The development of materials for the elimination of target contaminants from our water systems is at a high demand. The purpose of this project is to find an environmentally friendly way of removing these contaminants for the application of in-situ filtration. The use of microporous media for water filtration offers a great number of benefits such as having a highly stable framework. Aside from stability, these materials also have a high BET surface area (Determined by physisorption) that when treated and coated by nanoparticles yield an even higher BET surface area. The higher the surface area is, the more area there is for the target contaminants to attach to. Other methods used for sample determination includes Fourier Transform Infrared spectroscopy (FTIR), TGA, and SEM. FTIR was used to determine the composition of the initial sample so that it could be compared to other samples, this helps prove that presence of the nanoparticles on our samples. SEM also helped in the determination of successfully coated particles. Experiments were performed with sonication, acid treatment, and coating. Adsorption experiments were performed and analyzed via spectrophotometer and found that the treatments used yielded higher removal than the particles that were untreated. The affinity to which the treated and coated particles were attracted to the pollutant was determined by measuring the zeta potential of the dyes at different concentrations and by measuring the zeta potential of the samples. Further information regarding composition of the samples and nanoparticles cannot be discussed at this time, the project is still moving forward and a confidential agreement is in place.
Mao Lee (UW-Milwaukee)
Using LabView for Data Acquisition and Synchronization from a PMSG and FPGA Wind System
Mentor: Adel Nasiri, Electrical Engineering

Wind turbines are designed to capture the wind's kinetic energy and convert it to electrical energy. The Permanent Magnet Synchronous Generator (PMSG) wind turbine located at University of Wisconsin Milwaukee is integrated into the micro-grid. In order to understand the performance of the wind system, wind speed, voltage, current, and power outputs will be analyzed over a 24-hour period. Power verses voltage and current and power verses wind speed will be analyzed. The synchronized real time data will be compared to theoretical values to for efficiency. These parameters will be logged to a computer managed by LabView. Data is transmitted to LabView via Transmission Control Protocol/Internet Protocol (TCP/IP) from the National Instrument CompactRio. The CompactRio receives data through a RS232 serial port from the Field Programmable Gate Array (FPGA) based inverter and Wind Data Logger (WDL). The data can be injected into a simulation so the system can be modeled correctly. The data will also be used in future experimental study that will help engineers gain a deeper understanding of the behavior of power generation and the impact various loads has on the source.

Amanda Leichtfuss (UW-Oshkosh)
Natural Gas Halogenation using Metal Halide Photocatalysts and Renewable Energy
Mentor: Jennifer Schuttlefield-Christus, Chemistry

Hydrocarbon fuels are the major source of energy on the market today. These fuels power everything, from the cars that people rely on to take them places to the warming of houses. In past years, there were many concerns about limited hydrocarbon resources. Now that abundant quantities of shale gas have been found in many places, the focus has shifted to natural gas. Natural gas is projected to be the major hydrocarbon source of the future. Transportation of natural gas is expensive especially in the remote places where natural gas is produced as a byproduct of oil extraction, such as off-shore drilling sites. One way to lower transportation cost is to convert natural gas from the gaseous state it is extracted in to a liquid state at the remote extraction sites. However, traditional liquefaction processes use extreme conditions, such as high temperature and pressure, which are cost intensive. A potential solution for this technique is to utilize solar energy and a solid metal halide as a photocatalyst. These catalysts will aid in the halogenation of the natural gas which can then be used for liquefaction. Proof-of-concept Gas Chromatography-Mass Spectrometry (GC-MS) experiments were performed on “dirty” natural gas. Samples were irradiated for 3 hours under broadband light above a metal halogen salt solution, such as potassium chloride, in a sealed quartz chamber. A platinum catalyst was used as an initial test case to prove halogenation was possible. A bias of 1.5 V was applied to the working electrode during the 3 hours of irradiation. These experiments showed that the halogenation of various natural gas components can be accomplished, including methane, ethane and propane. This is a critical first step in creating a sustainable system for natural gas liquefaction and understanding the halogenation of the natural gas components using a metal salt solution.

Taylor Leikness-Mierendorf (UW-Whitewater)
The Visual Crossover Between The Culture Of Old Horror Movies, And Modern Marine Biology
Mentor: Greg Porcaro, Art and Design

The ocean is a very mysterious part of our earth, we have only explored 3% of it, and have already discovered so many strange creatures, such as, the vampire squid, small spine spookfish, blackdragon fish, and also the black swallow. To make this installation mysterious and stunning, I decided to portray them as if they were old horror movie posters. I decided to pursue this research to show people these magnificent creatures, and I decided to do so with the visual arts to them in a mysterious way. To do so, I decided to use acrylic paints and paper, like how they made old horror movie posters, by hand. Using these I have created paintings that show that there are very strange and mysterious creatures on our planet right now, which people may not even know about. My goal is that my results will spark a curiosity in people, and maybe one day, humankind will try harder to discover more in our oceans.

Amanda Leisgang, Zachary Christensen, Sandi Thu, Echko Holman, Kia Chang and Matthew Phillips (UW-Stevens Point)
Map Based Cloning of Five Male-Sterility Genes in Soybean
Mentor: Dr. Devinder Sandhu, Biology Department

Sterility refers to spores and gametes that are abnormal or absent, or individuals that fail to produce functional gametes to produce offspring. Since manual cross-pollination to produce large quantities of hybrid soybean seed is difficult and time consuming, identifying a stable male-sterile system would create a breakthrough in hybrid seed production. Five male-sterile soybean mutants (ms1, ms4, ms5, ms6 and ms8) have been identified and mapped. Objectives of this investigation were to fine map and clone these five genes controlling male fertility in soybean. Genetic linkage mapping was used to locate ms1, ms4, ms5, ms6 and ms8 genes to chromosomes 13, 2, 11, 13 and 7, respectively. The comparisons of the genetic linkage maps with the sequence based physical maps helped in localizing ms1, ms4, ms5, ms6 and ms8 to 76, 216, 1988, 1142 and 160 Kb regions, respectively. Predicted genes in the corresponding regions were studied for the predicted functions and candidate genes were identified for each of the male-sterility genes. We are currently sequencing wild type and mutant alleles to identify causes of mutants. Characterization of the genes involved in male fertility may play a critical role in development of economically feasible soybean hybrids.
Henri LeMieux (UW-Oshkosh)
Massive Stellar Content of the Cygnus Superbubble
Mentor: Nadia Kaltcheva, Physics/Astronomy

The Cygnus superbubble is one of the largest bubbles known in the Milky Way galaxy so far. It has been identified by its strong X-ray emission and its angular size is approximately 18 by 13 degrees in Galactic longitude and latitude, respectively. It is still unclear whether the Cygnus superbubble is a physical unity of interstellar matter, or a projection along the line of sight of unrelated features at different distances. The superbubble has seven OB associations containing numerous young massive OB stars. Since in this direction the line of sight is along the local Orion spiral arm, the discrimination of individual stellar and interstellar structures is difficult. Thus, the available distance determinations to the OB-star groups within the boundaries of the Cygnus superbubble are uncertain, as are their spatial correlation to the features of interstellar matter in this complex field. This makes the study of the topology and energetics of the Cygnus superbubble difficult. This study is focused on the massive stellar content of Cygnus star-forming field with purpose to provide new insights on its structure. We have gathered from the literature all available photometric uvby beta data for the massive stars in Cygnus. The intermediate-band uvby beta photometry, which is our main method of investigation, allows the derivation of stellar physical parameters, such as brightness and temperature, with high precision. Knowing these parameters allow us to estimate stellar distance for all stars in our sample, map the structure of the Cygnus field, and provide homogeneous distance and age estimates to the OB-associations.

Franceszka Lesniak (UW-Whitewater)
Recreational Mathematics
Mentor: Wade Tillet, Curriculum and Instruction

Recreational Mathematics is a branch of mathematics that is done for self-education and enjoyment. Some examples of recreational mathematics are logic puzzles, chess, origami, and tic-tac-toe. Many students think of themselves as “not a math person” and dread math classes. I explored this branch of mathematics to get a better understanding of it and to speculate how it can be used in schools in favor of what is seen as a more rigorous curriculum. Students would benefit from the use of recreational mathematics in the classroom by showing them that math is more fun and approachable light.

Kelsey Lewien (UW-La Crosse)
Implementing a Modified Russell Two-Point Method to Measure Glomerular Filtration Rates (GFR)
Mentor: Aileen Staffaroni, Nuclear Medicine Technology

Objective: Glomerular filtration rates (GFR) are usually acquired using nuclear medicine imaging techniques. Our laboratory initiated an additional nonimaging GFR method (Russell two-point method) and compared the results to the established imaging method. Methods: A total of 11 standard imaging GFR patients were injected with 3.6 to 4.4 mCi Technetium-99m-Diethylenetriaminepentaacetic acid (radiochemical purities greater than 98%). Duplicate patient blood samples were obtained at 60 2 min and 180 2 min post injection and centrifuged. Separated plasma was pipetted into Merck Millipore Centrifugal Filter Units and centrifuged at high speed (6,000 rpm for 15 min) to remove radiolabeled DTPA bound protein. Duplicate aliquots of filtered and unfiltered plasma (0.1ml) were placed in test tubes, saline added (0.9 ml) and all samples counted using a sodium iodide (NaI) well detector interfaced to a multichannel analyzer. After test completion, the ratios of filtered plasma GFR to unfiltered plasma GFR values were statistically analyzed. Results: GFR values of the sample group ranged from 42.1-204.8 ml/min. The calculated mean ratio of filtered to unfiltered GFR values of 11 patient samples was 1.2 0.06 and was subsequently used as our standard correction factor. As a result, when imaging GFR values were normal (greater than 90 ml/min), the modified Russell two-point method using unfiltered plasma and the standard correction factor (1.2) was used. When imaging GFR values were abnormal, less than 90 ml/min, the Russell two-point method with filtered plasma was used. Conclusion: A modified Russell two-point method was implemented to evaluate and compare glomerular filtration rates. When imaging GFR values were greater than 90 ml/min, plasma GFR was calculated with the ratio correction factor, and when values were below 90 ml/min the plasma GFR was calculated using filtered plasma.

Ciera Lewis (UW-Milwaukee)
Someone had to Plant that Seed First: African American Emerging Adults-Experiences with Mental Health Services
Mentor: Katie Mosack, Psychology

Mental illness is prevalent within the 18-25 year old population and studies show that older adolescents and young adults tend to report less positive attitudes toward mental health help-seeking (Seiffge-Krenke, 1993; Hunt & Eisenburg, 2009) and seek mental health treatment at lower rates than older adults (Lin & Parikh, 1999; Swartz et al., 1998). Young people's perspectives on mental health are important because current beliefs are, to some extent, precursors of future beliefs and attitudes (Armstrong, Hill & Secker, 2000), and negative adult attitudes have been shown to impact service development and quality of life of people experiencing mental distress (Forrest, 1992). There is a lack of empirical studies focusing specifically on the mental health needs and service utilization of
African American emerging adults. Existing literature reveals contradictory results for how race/ethnicity relate to mental health need. However, race/ethnicity (e.g., being African American) and age (e.g., being an emerging adult) were consistently associated with lower utilization rates of mental health services compared to White young adults, older African Americans, and older Whites (Kessler et al., 2005; Snowden & Yamada, 2005). This study was conducted to contribute to research addressing mental health care utilization by emerging adults. After IRB approval, participants were recruited through snowball sampling from a large public Midwestern university. All three participants identify as African American/ Black or as having at least one Black biological parent, are between the ages of 18 and 25, and have previously participated in mental health services. Participants completed a paper survey that examined their attitudes towards help-seeking and an audiorecording of an open-ended interview where they discussed their attitudes towards and experiences with mental health services. Survey data were analyzed to describe the sample. Interviews were transcribed verbatim, uploaded to NVivo 10, and data will be coded using inductive thematic analysis techniques (Boyatzis, 1998). Preliminary analyses suggest that there are commonalities in the barriers and facilitators experienced by participants and that race/ethnicity will play a varying role of importance in how participants conceptualize their experience. A final coding structure will be presented at the UW-System Symposium. By listening to experiences of African American emerging adults who have experiences with mental health services, we can better understand the barriers and facilitators to mental help-seeking and maintenance of commitment once in services and strive to improve services for this population. Information from this study may be used to develop recommendations for a cultural adaptation of a help-seeking model.

Sarah Lloyd and Kathryn Dobbs (UW-La Crosse)
Effects of Shear Rate, Temperature, and Blood Composition on Platelet Adhesion and Aggregation in Whole Blood of Thirteen-lined Ground Squirrels
Mentor: Dr. Scott Cooper, Biology

Significant alterations in shear rate, temperature, and blood composition have been recorded in hibernating animals. These factors directly impact platelet clot formation, but it is currently unknown which factor has the greatest influence. To discover how each factor directly affects coagulation, capillary blood flow was replicated by use of a channeled microfluidic device. Flow rate was controlled with a syringe pump while temperature was controlled using stage heating and cooling techniques. Nonhibernating conditions were simulated using high flow rate at 35°C, and hibernating conditions were simulated using low flow rate at 15°C. Whole blood was run from both hibernating and non-hibernating thirteen-lined ground squirrels under both conditions. To allow for observation of blood flow and clot formation, microfluidic devices were placed on slides lined with a strip of collagen. As platelets flowed through the channels within the device, they adhered to the collagen strip. Slides were then fixed for further study of these clots. Flow of blood through the chambers was observed using an inverted phase contrast microscope and recorded on video. Clot formation over time was evaluated by use of these recordings. Platelets were also labeled with a fluorescent dye for analysis of the clots adhering to the collagen strip after flow. Clots were assessed using fluorescent microscopy to determine differences in morphology and total surface area under the different conditions. Preliminary results suggested that hibernating conditions (low shear rate and temperature) have a more prominent effect on the resistance of platelets to adhesion and aggregation than blood composition does. Further studies will investigate the effects of similar conditions on the blood of non-hibernating mammals to determine whether or not the observed response to cold temperature with low shear rate is a unique quality of hibernator blood.

Tasha Logsdon and Hogan Maguire (UW-Parkside)
Bacterial Expression and Purification of Proteins in the Met4 Transcriptional Complex
Mentor: Traci Lee, Biology

Sulfur metabolism is essential for life, producing the sulfur-containing amino acids methionine and cysteine as well as S-Adenosyl-methionine, the main methyl donor in the cell. We focus on how gene expression is controlled in response to intracellular and extracellular cues in the budding yeast, Saccharomyces cerevisiae. Met4 is a yeast protein that activates the expression of different subsets of sulfur metabolism genes so that cells may appropriately manage its sulfur metabolism in response to different intracellular and extracellular cues. To target the appropriate sulfur metabolism genes for activation, Met4 relies on interactions with DNA-binding proteins, such as Met31 and Met32. Met28 is a protein that is believed to stabilize interactions between Met4 and these proteins.

Jenna Maiorelle (UW-Whitewater)
Analysis of Bm-daf-16b Function in Brugia malayi
Mentor: Dr. Kirsten Crossgrove, Biological Sciences

Caenorhabditis elegans is a free-living nematode whose physiology and maturation closely resemble those of Brugia malayi, a parasitic nematode that causes filariasis in its host. C. elegans go through four molt stages with the potential for an intermediate stage that responds to environmental conditions. This stage of arrested development, called dauer, is similar to the L3 infective (L3i) stage of B. malayi. Both stages affect metabolism and require environmental signaling to continue to the next stage of development. In C. elegans, the insulin/IGF-1 signaling (IIS) pathway provides direction to several gene targets to continue through the stages normally. When the IIS pathway stops signaling due to environmental cues, C. elegans enters dauer. We propose that the mechanism that causes C. elegans formation of dauer is similar to B. malayi’s molt into L3i. One target of the insulin signaling pathway in C. elegans is daf-16, a transcriptional regulator.
whose resulting proteins are instrumental in initiating and maintaining dauer formation. Bm-daf-16 is negatively regulated by insulin signaling. This means that when the insulin signaling pathway is functional, Bm-DAF-16 is not activated. B. malayi has been shown to express daf-16 during L3i, which leads us to believe that Bm-daf-16 is functionally similar to Ce-daf-16, but this has yet to be proven. There are two isoforms of Bm-daf-16, Bm-daf-16a and Bm-daf-16b; my experiments deal with Bmdaf-16b. We have amplified Bm-daf-16b from cDNA, and are currently cloning it into a mammalian expression vector. Then we will transfect mammalian cells through cell culture, and observe the cells to see if Bm-DAF-16b can activate expression of a reporter gene in an insulin signaling dependent way. This would further our hypothesis that that Bm-daf-16 is functionally similar to Ce-daf-16. Such similarities, if confirmed, could be an important discovery in the battle to prevent filariasis.

Mitchell Makowski (UW-Milwaukee)
Identifying Demographics that Drive Goodwill’s Sales and Donations
Mentor: Anthony Ross, School of Business
Mentor: Mark Kosfeld, School of Business

For every retailer, an appreciable understanding of their individual market is critical to locating new stores and achieving required sales. For Goodwill Industries of Southeast Wisconsin, not only must they understand the demographics that drive sales, but also the demographics that donate goods. The goal of my research was to discover what readily available demographics information could be linked to high or low sales and donations. Using the geographical information software called ArcGIS, I gathered a multitude of demographics data—such as median age, household income, annual spending, and education level—for all individuals within a selected radius of current Goodwill locations. A comprehensive correlation analysis within Microsoft Excel revealed what of this data is linked to Goodwill's historical sales and donation volume data. There were many correlations that we expected to see; for example, we believed that higher donation volume would correlate with areas of higher income. However, no analysis strongly supported any of our expectations, even after controlling for adverse weather, stores in close proximity to each other, and immature (new) stores. In fact, all analyses that looked at surrounding populations as a whole did not reveal any strong relationships. Even still, this information is valuable to Goodwill because it demonstrates that any market analysis must use a nuanced evaluation of discrete groups of the surrounding populations. At the time that this summary was submitted, new methods of analysis were being explored, including a detailed breakdown of the populations surrounding each store.

Maurice Mananga, Allannah Crabb, and Joseph Kilmer (UW-Milwaukee)
Motivation and Distraction in Prey-Searching Behavior in Pholcid Species
Mentor: Rafael Rodriguez, Biological Sciences

When it comes to behavioral decision making, animals must weigh factors that increase their motivation to act with those that decrease their motivation to act. Here we study motivation and disturbance in the long-bodied cellar spider Pholcus phalangioides. First we gave spiders prey items to attack and wrap up. Then we disturbed the spiders until they abandoned their prey, and we continued disturbing them for a set amount of time afterwards (based on their randomly assigned treatment). Following the disturbance, we observed the spiders to see how long it would take for them to return to their prey. We expected spiders to be more motivated to return to larger, more valuable prey, and we expected spiders that experienced more disturbance to be less motivated to return. While some of these expectations were met, others were not. In this presentation, we discuss why some groups deviated from our expectations and what this can tell us about the evolution of evaluation, motivation and decision making.

Travis Manser (UW-Milwaukee)
Comparing Zooplankton Communities of Unfished Lakes In Vilas County Wisconsin
Mentor: Timothy Ehlinger, Biological Sciences

This research assessed the zooplankton communities of Wolters Lake located in Vilas County Wisconsin. These lakes have been protected from public access and in turn are populated by unaffected legacy communities. In order to assess the communities, quantitative counts of the species are done with a ward counting wheel. By comparing population data from samples collected in the summer of 2014 to ones from a previous study in 2002, shifts and variation in the communities can be analyzed. These results will conclude if the system is degrading or staying stable. Through monitoring these protected lakes, results from this study can act as a reference for lakes in northern Wisconsin affected by human activity.

Joseph Martini and Amber Peplinski
(UW-Milwaukee)
The Effects of Multifocal Lens Glasses on Stair Descent of Individuals with Parkinson's Disease
Mentor: Dennis Tomashek, Rehabilitation Research Design & Disability
Mentor: Roger Smith, Rehabilitation Research Design & Disability

This pilot study will focus on measuring the effects of multifocal lens (MFL) eyeglasses on gait and stair performance of those with Parkinson's disease. We will be comparing two groups: those who have Parkinson's disease and wear multifocal lenses and those who do not wear multifocal lenses. Past research has explored the effects of MFLs on novice and experienced MFL users' gait, but has focused on flat surface gait, obstacle avoidance, and one-step up
or down. No study of MfL has examined gait while descending a full flight of stairs. Additionally, no studies have been conducted in populations who are predisposed to gait impairments, such as those with development or acquired neurophysiological conditions. This pilot study will set the groundwork for a major study on the effects of Multifocal lens glasses on people with Parkinson's disease. Scientific and anecdotal information indicates a greater reliance on vision for people with Parkinson's disease, yet no formal study has been conducted on the effect of MfLs on this population. Currently, the study is being conducted on normal healthy young adults to test and revise the study protocol. The effects that MfLs have on gait and balance are being evaluated through four vision assessments and three gait assessments as well as a protocol developed for stair descent. The four vision assessments are being used in our research as follows: Visual Acuity, Fly Stereo Test, Howard-dohlman Depth Perception Test, and a Contrast Sensitivity test. The three balance assessments being conducted are the Berg Balance Scale, the Dynamic Gait Index, and the Timed up and Go (TUG). We will also try to explore these effects in a small number of participants using the Mobile Eye XG Tracker, which will allow us to see where participants are fixating their vision as they descend the stairs and negotiate obstacles. We expect to find significant results showing that MfLs affect people with Parkinson's disease in much the same way as normal healthy adults. This is a potentially crucial finding for clinicians, opticians, and therapists who work with people with Parkinson's disease as the negative effects may have more serious implications for people already predisposed to gait problems and falling.

Alexis Marvin and Samantha Strook (UW-Milwaukee) Exploring Internationally Where Infants Sleep and Why
Mentor: Jennifer Doering, Nursing

Background: Guidelines for safe infant sleep around the world are inconsistent. There are few similarities that can be found between the American Academy of Pediatrics (AAP) and co-sleeping guidelines. In order to explore parent’s self-management behaviors, there needs to be more research that visually depicts where infants sleep and explains how parents make decisions. The purpose of this research study was to learn where infants sleep at night around the world. Methods: This descriptive, exploratory study asked parents with infants (<12 months) to submit pictures and descriptions of where their infants sleep. Data were collected anonymously via Internet survey. Parents were recruited using Facebook, Twitter and LinkedIn. Emails, mommy bloggers, listservs and mother/parent groups were also utilized for recruitment. Parents (n=30) were primarily married/partnered with countries of origin primarily in the northern hemisphere, with babies age x=.67 months. Results: Pictures of sleep spaces varied from room sharing where infants were in cribs inside the bedroom or bed sharing to solitary spaces in cribs. Key influencing factors reported by parents to make decisions about where their infants slept were safety, infant’s comfort, parent’s case, infant proximity and space constraints. Some parents expressed having no worries about their infant’s sleep location, while others expressed concern about infant temperature, rolling on the infant, and response time. Conclusion: Parents put significant, thoughtful consideration into making their infant’s sleep environment safe. There were a wide variety of infant sleep places that reflect back to their decisions. Parents acknowledged the debate about where infants sleep most safely within their responses.

Jared Maternski (UW-Milwaukee) Representation + Critical Inquiry: The Language of Architectural Competitions
Mentor: Mo Zell, Architecture

It has been said that architects do not build buildings but instead make drawings. In the making of drawings architects craft a narrative about the project. They create representations, ideas, instructions, meanings - to support and align with the narrative. These representations are a reflective an art form; one that continuously questions the architectural work itself. The goal of this research is to create new modes of representation that investigate the critical questions relevant to the discipline of architecture through means of the architectural competition. Examination of representation techniques from contemporary practices of several prominent figures in the architectural field including those of Neil Denari, NADAAA, and Zaha Hadid is an essential component to this research. Typology research and its complementary representational strategies help frame representation inquiries and allow for the development of a representational standard to follow. Critical to the nature of research is putting theory into practice. The architectural competition is often at the cutting edge of design inquiry due to the fact that it remains theoretical. The architectural competition provides an opportunity to ask critical questions without the limitations of budget, politics, and even gravity. The competition also provides opportunities to advance new modes of representation. For example, renowned architect Rem Koolhaus revolutionized architectural diagramming after his entry into the Parc de la Villette competition. During the research cycle, we completed two architectural competitions: 1) Looking Forward: Reimagining the Athenaeum of Philadelphia 2) Chicago Architecture Biennial Lakefront Kiosk Competition. Each competition requires a unique analysis of intended outcomes to determine the appropriate style of graphic representation to apply. Every project's individual objectives require unique representation style to effectively communicate the narrative of the project. Through this research we are able contribute new modes of representation to the field of architecture.
Whitney Mathern (UW-River Falls)
Combining English Education with Outdoor Education
Mentor: Conan Kmiecik, TESOL

This research investigation was a result of interest in combining English as a second language (ESL) instruction with outdoor education. The purpose of this exploration was to determine in what ways an outdoor-focused English activity could benefit ESL learners. The focus for the outdoor education component was the hobby letterboxing, a popular pastime, which many enthusiasts enjoy across the country, that combines exploration, problem solving and art in a treasure-hunt activity. The English component involves students creating clues for classmates, reading and comprehending the clues, and completing explicit language activities. The investigation has been theoretical, based on my major field of study, TESOL, as well as my experiences in my minor field of study, Outdoor Education, and experiences working with ESL learners. In theory, an outdoor activity such as letterboxing breaks up the routine of the ESL classroom, lowering students affective filter and allowing organic, spontaneous production of English. In addition, this activity provides students with an opportunity to explore the terrain and ecology of the target language environment resulting in schema development.

Risa Matz (UW-River Falls)
A Local Awareness Campaign Connecting Wisconsin Teenagers to Permanent Families Before They “Age Out” of the Foster Care System
Mentor: Dan Paulus, Art

As a Graphic Design student at The University of Wisconsin-River Falls I am always looking for ways to create innovative solutions to problems I see around me. Design is an important medium that is used in bringing public awareness and action to issues of concern. One issue that concerns me is the amount of teenagers “aging out” of the foster care system every year without a family to support them. There are many teenagers in need of permanent placements or some sort or mentor support before they “age out” of foster care. I believe that if more people were aware of this concern there would be more people willing to help. My objective was to create awareness of the foster care needs of teenagers in the area (county and state) and convince people to take action by becoming a foster parent or supporting foster teens in another way before they “age out.” Initially, I researched the needs of the foster care community, and was overwhelmed by the statistics. What I found was astonishing: the number of teenagers aging out of the foster care system nationally in 2012 was 23,396. These young adults needed the permanency and protection of a family as they are learning how to navigate life. What was keeping them from the help they needed? In order to best answer this question I learned about misconceptions people have about foster teens and what concerns may keep people from becoming foster parents. Now my objective was to create a series of posters that would dispel any ignorance or worries people may have surrounding this topic. The demographic I decided to target with my awareness campaign were any adults ages 30-45, who were financially stable, and educated because they would be able to provide the ideal environment for any teenager. The set of posters I designed were intended to provide clear information about what foster care was, needs in the area, and the urgency to care for those “aging out” of the system. I am continuing to modify my designs and have plans for future ones on top of communicating with a local social worker to get the posters printed and distributed in the area. It is my desire that the number of foster teenagers awaiting adoption in my area would decrease as a result of this awareness campaign and would be an example to the rest of the state and country.

Quincy Mccarthy (UW-Parkside)
A Survey of Current Advances in Quantum Computing
Mentor: Dr. Susan Lincke, Computer Science

Maya McCarthy-Neal and Ryan Shanahan (UW-Milwaukee)
Racialized Campaigns in the States: New Questions and New Evidence
Mentor: Paru Shah, Political Science

We find ourselves at an important moment in American history, where candidates of color are both running and winning office in large numbers. This project is interested in examining what this shift means for political campaigns and race-based appeals in elections. Since the infamous Willie Horton ads of 1988, political scientists have investigated the role of race in campaigns, particularly in activating, or cuing, racial stereotypes and prejudices about Black criminals and brutality, white innocence and vulnerability, and liberal crime policies. More generally, political scientists became interested in the intersections of race and political communication, and the effects of these intersections on both public opinion and electoral outcomes. A large body of scholarship has examined how negative stereotypes of blacks, including perceptions they are “lazy,” “unintelligent,” “untrustworthy,” have hurt their chances of winning elected office. The Racialized Campaigns Project begins with 3,420 unique candidates running in 1,534 elections in 2012. In total, there are 370 African American, and 304 Latino/a candidates. We are interested in assessing the extent of news coverage and racialized content. First, we will count the number of articles written about each candidate, and use this data to examine the relationship between a number of election-level variables (such as size of the minority voting population, competitiveness of elections, open seat versus incumbent elections) and media coverage for minority and non-minority candidates. Second, we would code each of the articles along a number of dimensions. The first of these is racial stereotypes, such as laziness, uncering, irresponsible, untrustworthy, criminal, inexperienced, and unqualified. In addition to stereotypes, we look at two other components of the newspaper articles that may be related to racializing the campaign. The second dimension will examine racial issues: crime, affirmative action, immigration, welfare, and capital punishment.
their racialized background in public discourse, these public policy issues may used to trigger racial thinking (i.e. Barack Obama is the “food-stamp” president). The third dimension is racially coded language. Do candidates of color refer to their co-racial/ethnic groups as “we?” This content will be particularly important in understanding how racial/ethnic minority candidates use racial appeals to mobilize voters.

Kymberly McDaniel (UW-Milwaukee)
Cannabis Use and Sleep Quality in Emerging Adults
Mentor: Krista Lisdahl, Psychology
Marijuana (MJ) is the most frequently used illicit drug in the United States, with 31% of young adults (ages 19-28) endorsing use during 2012 (Johnston et al., 2012). The endogenous cannabinoid system modulates sleep (Murillo-Rodriguez et al., 2011). Therefore, chronic use of exogenous cannabis (MJ) may downregulate endocannabinoids, leading to impaired sleep. The primary purpose of this study was to determine if past year MJ use predicted past month sleep quality in adolescents and emerging adults. The secondary aim was to determine if subclinical depressive symptoms moderated this relationship. We hypothesized that greater past year MJ use would be associated with poorer reported sleep quality. Participants included 42 emerging adult MJ users (exclusion criteria included Axis I psychiatric disorders, medical and neurologic disorders, and excessive other drug use). We measured MJ use (Timeline Follow Back), sleep quality (Pittsburgh Sleep Quality Index), and depressive symptoms (Beck Depression Inventory). We statistically controlled for genotype, age, gender, ethnicity, past year nicotine use, and past year alcohol use. Results revealed a dose dependent relationship between greater past year MJ use and decreased sleep quality. Increased depressive symptoms significantly predicted more sleep problems. Additionally, we found that depressive symptoms moderated the relationship between MJ use and sleep quality, such that those with increased MJ use and more depressive symptoms reported the most sleep problems. Longitudinal studies are need to further clarify these relationships.

Christopher Medina-Kirchner (UW-Milwaukee)
The Effects of Marijuana Use on Cognition and the Impact of Current Marijuana Policy and Legislation
Mentor: Professor Krista Lisdahl, Psychology
Mentor: Professor David Pate & Professor Topitzes, Social Welfare
Mentor: Professor Tom LeBel, Criminal Justice
This presentation outlines a critical review of data from recent research examining the impact of marijuana use on human cognition. Included are findings from studies that have assessed the effects of marijuana use on multiple cognitive domains, such as IQ and driving, along with a summary of relevant neuroimaging information. Careful consideration will be taken to distinguish between the acute and long-term consequences of marijuana use as well as the dose-dependent effects. Finally, the public health impact of current marijuana policy and legislation is also investigated.

Thomas Mehner (UW-Parkside)
Measuring Fin Ray Morphology and Functional Implications in Yellow Perch
Mentor: Natalia Taft, Biological Sciences
Fins are an integral part of how fish move through their environment. The fins can be used for propulsion and maneuvering, as well as finding food, avoiding predators and finding mates. Some species have fins that are modified for interacting with substrate, defense or walking on land. The largest group of fish is Actinopterygii, which are named for the bony fin rays that support the fins. Despite their functional importance, we have much to learn about the relationship between fin ray structure and function. Yellow perch (Perca flavescens) is a species of ray-finned fish that uses most of its fins for swimming along, and pelvic fins for both swimming and substrate contact. The goal of my project is to measure the following morphologic features in the fin rays of yellow perch: overall length, number of segments, length of each segment and location of branching points. These features have been shown to affect the material properties, like stiffness and flexibility of the rays. I used clearing and staining techniques to observe these features of the fin rays for all fins, soft dorsal, anal, caudal, pectoral and pelvic. I then photographed the fins, and used the program ImageJ to measure the key characteristics. I will then perform an analysis to investigate the correlations between these morphologic features with material testing experiments being conducted separately in the lab. This project will be one of the few that investigate the direct relationship between form and function in the fin rays of yellow perch and fishes and provide a firm foundation for future work. The hypothesis is that the results of my project will follow the same patterns as previous experiments done in the lab on fin ray stiffness.

Trevor Melkonian (UW-Milwaukee)
The Structure of Streptomyces wadayamensis MppR
Mentor: Nicholas R. Silvaggi, Chemistry & Biochemistry
Antibiotic discovery has slowed dramatically, while the occurrence of antibiotic-resistant infections is increasing. The microbial world has furnished modern medicine with a remarkable array of antibiotic compounds. Many of the most important drugs in the clinic are themselves, or are derived from, chemicals naturally produced by bacteria and fungi. For every viable antibiotic, however, there are many promising compounds that ultimately fail to become drugs. One such compound is mannopeptimycin (MPP), a cyclic glycopeptide antibiotic produced by Streptomyces wadayamensis that has potent activity against problematic pathogens like methicillin-resistant Staphylococcus aureus (MRSA). Mannopeptimycin has not become a clinically-viable antibiotic because it is too toxic to mammalian cells. In theory, it might be possible to develop analogs of mannopeptimycin, but these efforts are hampered by the fact that a key part of the pharmacophore of MPP, the non-proteinogenic amino acid L-enduracididine (L-End) is not commercially available and is very difficult to produce synthetically.
Without this key building block, it is difficult to make MPP analogs. To address this problem, our lab is studying how S. wadayamensis produces L-End. The biosynthetic pathway is thought to originate from arginine and involves the action of three enzymes: MppP, MppQ, and MppR. None of these enzymes have a known biochemical function. We have determined the structure of MppR, which shows that its overall structure is very similar to that of acetoacetate decarboxylase. However, MppR does not display decarboxylase activity with acetoacetate or any alpha- or beta-keto acid we tested. Thus, more work is needed to identify the role of MppR in the production of L-End.

Samuel Melton (UW-Milwaukee)
Scaling Production of L-Vinylglycine
Mentor: Dr. Alan Schwabacher, Chemistry and Biochemistry

L-Vinylglycine is a non-protein amino acid which has several properties that make it valuable. While L-Vinylglycine had been successfully synthesized by our group in an earlier, larger scale production method was desired. The scaled production of L-Vinylglycine was developed through experimentation regarding several key factors. The synthesis was carried out under varying conditions regarding the initial mixture of reagents, the temperature at which the primary reaction occurs, the receiving solution or lack thereof, and the retrieval of product from final reaction mixture. The synthesis was carried out using a basic distillation apparatus under a nitrogen atmosphere. The rate of addition of the initial reaction mixture appears to have the largest effect on the overall yield when using this method of synthesis. The rate of hydrolysis of the silyl protecting groups on the L-Vinylglycine was dramatically increased by the presence of ethanol in the receiving flask of the basic distillation apparatus used in the synthesis. Initial findings suggest the temperature at which the elimination of the sulfenic acid occurs appears to have little effect on the purity of the product when using this method. The success of the synthesis was primarily assessed through the yield of the product and the purity according its NMR spectra. A standard set of reaction conditions was developed, giving relatively pure L-Vinylglycine at an acceptable yield. This method could be used to easily and rapidly produce large quantities of L-Vinylglycine for further research.

Andreas Meyer (UW-Parkside)
Analysis of Prehistoric Stone Artifacts Recovered at the Montgomery Cabin Site in Kenosha County, Wisconsin.
Mentor: Dr. Robert F. Sasso, Sociology/Anthropology

Built and occupied in the 1830s, the Montgomery archaeological site is reportedly the location of the oldest cabin built by Euro-Americans in Kenosha County. It is located along the Pike River in Somers. Excavation of this site began during the UW-Parkside Archaeological Field School in the summer of 2013, led by Dr. Robert F. Sasso in collaboration with Daniel Joyce of the Kenosha Public Museums. At the beginning of the excavation, there was high expectation of recovering historical material. While historical materials indeed heavily dominated this site, there were many prehistoric Native-American stone artifacts that were recovered at this site as well. Over 150 prehistoric stone artifacts were uncovered, most of which were recovered through excavation in two separate areas of the site. The rest of the prehistoric artifacts were recovered during metal detection surveys of one area of the site. My research has resulted in the identification of many artifacts from the collection, including the base of a single identifiable projectile point. I have also analyzed the distribution of these artifacts across the site. This research yielded useful information and has helped us to recognize the existence of one or more prehistoric occupations of the site. My analyses will contribute to future research planned at the Montgomery site.

Fallon Meyer-Wentland (UW-Milwaukee)
Individual and Family Factors Related to the Weight Status of a Child with Special Needs
Mentor: Dr. Michele Polfuss, Nursing

Background and Significance: The prevalence of obesity in children with Autism (30-42%) and Spina Bifida (SB) (up to 64%) is higher than their typically developing peers (31.7%). When acknowledging the higher medical priorities related to these diagnoses, weight control is often not a focus. This is reflected in the literature where there is a gap of research that focuses on the individual and family’s role in understanding the risk of obesity
and subsequently the family environment that promotes or negates a healthy weight status in the special needs population. The purpose of this study was to determine if there was a relationship between the child's gender, mobility status, grade, parent's weight status (PWS) and parent's concern regarding the child's weight (PCCW) to the child's weight status (CWS).

### Methods

This cross sectional correlational study examined responses to an anonymous online survey from 382 parents of children with Autism (191) and children with SB (191). The online survey included demographic and background questions as well as validated questionnaires including the Child Feeding Questionnaire (CFQ). The CFQ included 7 sub scales with one being Concerns about Child Overweight that had acceptable reliability ($r = .877$). Parent and child height and weight were converted to a BMI and BMI%, respectively, and subsequently weight status based on CDC tables. Data analysis included frequencies, reliabilities, correlations and hierarchical multiple regression analyses.

### Results

The results indicated that the PWS and PCCW were the only significant variables predicting CWS. When controlling for child's gender, mobility, grade and PWS, PWS was significant explaining 16.3% of the variance in Autism ($F(5,179) = 16.35$) and 9.2% in SB ($F(5,180) = 4.88$). When adding PCCW, PWS remained significant with PCCW adding an additional 15.1% variance for Autism and 2.7% for SB. Conclusions: Both PWS and PCCW are significant predictors of CWS for both populations, but PWS was a more significant predictor of CWS than PCCW. Differences noted within the diagnoses, included the parent's of children with Autism having a higher frequency for concern of the child's weight than the parents of children with SB. Health care providers need to recognize the complexity of weight management in the special needs population.

It would be beneficial for providers to include education and resources that promote healthy weight of both the child and family members, while highlighting the integral role of the family's influence on the child.

**Sophia Miranda** (UW-Milwaukee)

**Enhancing Student Learning in Preparatory Chemistry-Adapting Course Material for at Risk Students**

Mentor: Anja Blecking, Chemistry/Biochemistry

The online social learning platform, Classroom Salon (CLS) has been utilized in multiple sections of Introductory Chemistry (Che 100) at UWM since 2012. Classroom Salon was developed by researchers at Carnegie Mellon University and allows Salon members, in this case Che 100 students, to engage in online content discussion through textual annotations. The Che 100 instructors posted ten short textbook excerpts in Classroom Salon, each covering a different chemical concept, and the students were asked to read, annotate and ask questions about the text prior to covering the concept in lecture. Classroom Salon's analytical features allowed course instructors to quickly download student comments and questions and incorporate or address them in instruction. This method, which includes many critical components, such as the chosen reading material, individual student reading and comprehension skills, comment evaluation, instructor feedback, and also possible instructional changes, has been shown to increase overall student exam performance significantly in comparison to students who received the same reading assignment on paper. Unfortunately, not all students benefit equally. Data analysis revealed that students with lower incoming ACT composite scores (score of 21 and below) show only slight performance increase in exams, but this is not a consistent trend. This project focuses on improving student learning by adapting the ten reading assignments delivered through Classroom Salon to the need of lower performing students. Incorporated changes include a variety of aspects, such as more comprehensive explanations and examples, addressing common misconceptions, improved visualization tools, concept applications, and questions designed to promote critical thinking. Furthermore, this project seeks to align concept presentation with common assessment methods. Examples of all aspects will be presented. The presentation will also include preliminary data comparing student comments and exam performance of students using the adapted and old reading assignments. The focus of this analysis will be on students with lower incoming ACT composite scores. Final conclusions discussing the effect of the adapted assignments will be available in summer 2015. If successful, this project will increase student performance and possibly retention in introductory chemistry courses at UWM and deliver a model for other courses and institutions.

**Kody Mjelde** (UW-Whitewater)

**Inter-district Open Enrollment: An Examination of its Effects on Private School Enrollment in Wisconsin**

Mentor: Dr. David Welsch, Economics

Knowing what affects or does not affect private school enrollment could assist educational policy makers when making decisions regarding the allocation of funds in their respective programs. Private schools in the United States have provided an alternative to a student's traditional public school option by offering a range of different academic and extra-curricular opportunities. Prior literature has noted an existing trend of declining private school enrollment (Aud et al., 2011), but has not yet been examined in great detail. To address this question I obtained a panel dataset from the Wisconsin Department of Public Instruction, and used a fixed effect regression to estimate the effects of inter-district open enrollment on private school enrollment while controlling for a number of school-district characteristics.

Initial OLS estimates find that, on average, the number of students transferring out of a school district increase overall student exam performance significantly in comparison to students who received the same reading assignment on paper. Unfortunately, not all students benefit equally. Data analysis revealed that students with lower incoming ACT composite scores (score of 21 and below) show only slight performance increase in exams, but this is not a consistent trend. This project focuses on improving student learning by adapting the ten reading assignments delivered through Classroom Salon to the need of lower performing students. Incorporated changes include a variety of aspects, such as more comprehensive explanations and examples, addressing common misconceptions, improved visualization tools, concept applications, and questions designed to promote critical thinking. Furthermore, this project seeks to align concept presentation with common assessment methods. Examples of all aspects will be presented. The presentation will also include preliminary data comparing student comments and exam performance of students using the adapted and old reading assignments. The focus of this analysis will be on students with lower incoming ACT composite scores. Final conclusions discussing the effect of the adapted assignments will be available in summer 2015. If successful, this project will increase student performance and possibly retention in introductory chemistry courses at UWM and deliver a model for other courses and institutions.
Godson Mollel (UW-Milwaukee)
The Strength of Washington Park Neighborhood
Mentor: Arijit Sen, Architecture and Urban Planning

Our project is a manifesto of rich stories of the Washington Park neighborhood as told by its residents. Beginning with an individual home’s architectural history, we learn about past and current resident life and celebrate family and “home.” Each story is of a strength that over time facilitated successful neighborhood life. While resident reflections of neighborhood change make the past and the present distinct and separate, these stories emphasize how past and present are influenced by each other. They also provide a deeper understanding of the social, political, economic, and racial forces within and beyond the Washington Park neighborhood that literally and figuratively shape and sustain family and neighborhood life.

Ashen Morth, Octavio Santos, Blake Hummer and Huda Khokhar (UW-Milwaukee)
Implicit Self-Esteem, Explicit Self-Concept and Personality Traits Discrepancy
Mentor: David Osmon, Psychology

The present study investigated implicit self-esteem and its relationship to explicit self-concept and Big Five personality traits, using Greenwald and Farnham’s (2000) Implicit Association Test (IAT) for self-concept. Eighty undergraduate psychology students, age ranging from 18 to 55 years (M=22.53, SD=7.00), participated in the study at the University of Wisconsin-Milwaukee. Participant’s implicit self-esteem was assessed through an IAT, measuring reaction time (RT) to self-other and positive-negative words. Explicit self-concept was measured using the Rosenberg Self-Concept Scale (RSCS) and personality was assessed using the Revised NEO Personality Inventory (NEO-PI-R). RT of the pairings “self-positive” and “other-negative” as well as “self-negative” and “other-positive” were first added respectively and then subtracted to obtain an implicit self-esteem score. The latter scores were converted into Z-scores and subtracted from the RSCS scores to obtain the overall self-esteem discrepancy score between both implicit and explicit measures. The relationship between the IAT and RSCS as well as the overall self-esteem discrepancy (as measured by the IAT and RSCS) and the neuroticism factor (as measured by the NEO-PI-R) was investigated using Pearson product-moment correlation coefficient. A discrepancy between implicit and explicit aspects of self-concept were expected to show a positive relationship with NEO-PI-R Neuroticism factor and its six facets, but a negative relationship with the NEO-PI-R Extraversion factor. Correlations showed a strong positive correlation between NEO-PI-R Neuroticism and the discrepancy score (r=.51) and a positive medium-sized correlations with the NEO-PI-R Neuroticism facets: Depression (r=.48); Angry Hostility (r=.34); and Self-Consciousness (r=.44). As predicted, there was also a medium-sized negative relationship between the discrepancy score and the NEO-PI-R Extraversion factor (r=-.41). Further research is needed to replicate these results and to explore further relationships between neuroticism and implicit self-concept measures.

Keighla Mueller (UW-Milwaukee)
Geographic Access to Breast Cancer Screening Facilities Among African American Women in Southeastern Wisconsin
Mentor: Dr. Sandra Millon Underwood, Nursing

According to the National Cancer Institute SEER Program (2013), in comparison to other races, African American women have the second highest breast cancer incidence rate, yet the highest breast cancer mortality rate. The American Cancer Society (ACS, 2013) recommends that average-risk asymptomatic women 40 years of age and above receive yearly mammography and clinical breast examinations (CBE) to detect breast cancer in its earliest, most treatable stages with the goal of reducing mortality. In addition, although breast awareness is not a distinct screening modality, the ACS recommends that all women should be familiar with the normal appearance and feel of their breasts and report any changes they detect to their health care providers immediately. In the effort to reduce the burden of breast cancer borne by African American women, identifying African American women in the greatest need of breast cancer education, CBE, mammography screening, and breast care has been identified as a national priority. However, little is known about African American women’s ability to access breast care resources. Therefore, an exploratory study of the geographic location of breast cancer screening facilities and the influence of facility proximity on the screening practices of African American women was proposed. The study aimed to compare the availability of breast cancer screening facilities in different income-level zip codes in Southeastern Wisconsin and examine the relationship between breast cancer screening facility proximity to zip code of residence and the receipt of screening services among African American women 40 years of age and above in Southeastern Wisconsin. The Andersen Behavioral Model of Healthcare Utilization framework was used to guide this study. The study was undertaken using a descriptive cross-sectional design. Subjects were gathered via convenience sampling of African American women 40 years of age and older at community breast cancer awareness and screening events throughout Southeastern Wisconsin. Survey data reflective of zip code of residence and breast cancer screening practices was gathered from participants. Descriptive statistics were used to analyze the data. Findings indicated that there was limited access to breast cancer screening facilities in low-income neighborhoods in Southeastern Wisconsin. The limited availability of screening facilities was a barrier to the receipt of CBEs and mammography screening. Information gleaned from this study is being used to target programming to women with the greatest need of breast cancer screening.

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Jessica Mulligan (UW-Milwaukee)
Do Visual Cues Affect Phonotaxis in Female Gray Treefrogs?
Mentor: Gerlinde Hoebel, Biological Sciences

Although frogs are generally considered the embodiment of an acoustically communicating animal, recent research indicates that they also pay attention to visual cues. We conducted two-choice playback trials with female gray treefrogs and tested whether providing a visual cue (light-emitting diode, LED) makes a call more attractive relative to an otherwise identical call that is not joined with a visual cue. As predicted, the bimodal stimulus (sound + LED) was more attractive. We further examined whether the preference for the bimodal stimulus may be related to signal localization, which is expected to be easier towards visual than acoustic cues. To do this we conducted a detailed analysis of the speed and directionality of the female’s approach path towards unimodal (sound only) and bimodal (sound + LED) stimuli. Females did not approach the bimodal signal significantly faster or walking a shorter path, but the angular deviation at which they touched to target speaker was marginally significantly smaller when approaching the LED-combined stimulus. This suggests that female gray treefrogs take advantage of visual cues when approaching a call, thus potentially improving signal localization.

Rusty Mundorf (UW-Milwaukee)
Hydrogen Etching for Removal of Mechanical Defects from Silicon Carbide Substrates for Epitaxial Film Growth Confirmed with Atomic Force Microscopy
Mentor: Professor Lian Li, Physics

I am a physics major working in a surface physics laboratory with the primary goal of growth of thin films for producing the next generation of semiconductors to be used in the development of new electronic technologies. These films are only a few atoms thick and must be grown on extremely clean and atomically flat substrates. As delivered, the silicon carbide substrates that we use exhibit many scratches and mechanical defects on the microscopic scale from the manufacturing process, namely from polishing procedures. The hydrogen etching procedure removes mechanical defects and scratches from the surface of silicon carbide wafers, and leaves behind a chemically inert surface. This etching procedure entails using a previously established process of resistively heating the wafers to high temperatures on molybdenum sheets with hydrogen gas flowing across the surface for a period of time. After the etching process, the substrate cleanliness and flatness must be confirmed prior to growth of thin films; this is done using atomic force microscopy. In the hydrogen etching procedure, it was found that the parameters of heating must be monitored closely, and adjusted accordingly, due to changes in electrical properties of the molybdenum substrate holder with increasing temperature. Atomic force microscopy comes with its own challenges, including proper adjustment and alignment of machine parameters, as well as dampening of all vibrations due to the sensitivity of the machine. These techniques which I have studied are instrumental in the preparation of silicon carbide substrates for use in other processes, mainly molecular beam epitaxy for the growth of thin films. Based on these studies, the hydrogen etching process is hugely successful in cleaning and preparing silicon carbide substrates for thin film growth. We are currently working on a new system for heating the substrates to provide more even and consistent heating during the etching process. This will allow for a more controlled etching environment resulting in higher quality etching.

Nancy Muro and Nicole Ferrara (UW-Milwaukee)
Neural Mechanisms Supporting Differential Fear Conditioning in the Medial Geniculate Nucleus of the Thalamus
Mentor: Fred J. Helmstetter, Psychology

Phobias and anxiety related disorders interfere with daily living activities and are characterized by maladaptive fear responses. Differential fear conditioning provides a laboratory model to study these disorders while learning about auditory cues during a training session. The medial geniculate nucleus of the thalamus (MgN) important for auditory learning and is functionally divided into two different regions, the medial division (Mgm) and the ventral division (MGv). Traditionally, these divisions are thought to relay aversive auditory information to the amygdala during fear-related associative learning, and the MgN may be necessary to process both safety and danger cues during fear learning. To determine if MgN neural plasticity is required for safety and aversive coding, we used infusions of pharmacological agents and quantitative protein assays to focus on the molecular mechanisms of fear memory formation. We found that differential fear conditioning elicits more plasticity in the MgN than a standard single-tone fear conditioning procedure. Furthermore, we found that protein synthesis in the MgN is required for the acquisition of an auditory differential fear memory. Our results suggest that a more complex auditory task recruits additional neural circuitry to support a fear memory.

Holly Neuman, John Fennimore and Samantha Ratzlaff (UW-Milwaukee)
Psychosocial Needs of Nursing Home Residents with Dementia
Mentor: Professor Jung Kwak, Social Work

A rapidly growing number of people with Alzheimer’s and dementia are living in nursing homes in the U.S. The literature suggests a need for a better understanding of the life and experiences of these persons, as well as development of a more person-centered approach to dementia care. One promising non-pharmacological, person-centered dementia care approach is the Music & Memory (M&M) Program, an individualized music listening program. As a part of a larger study to evaluate the effects of the M&M program on resident mood, agitation, and quality of life, this current study explored demographic, cognitive, mood, and social characteristics...
same “big idea,” scaffolding the level of inquiry and
It is important to note that all four modules discuss the
idea for a science experiment, each component of the
observation, data collection, analysis, and results) has
be “dissected” into smaller conceptual components,
to be “dissected” into smaller conceptual components,
level of inquiry and complexity. The poster will include detailed
examples of this process. As part of the design process,
the modules will be tested in the laboratory on scientific
accuracy and quality of instruction depending on the
targeted grade level. Collaborating school districts will be
able to implement these modules into their science
classrooms with content and technical support of UWM
natural science faculty. The lab equipment, including
laptops and analytical laboratory probes will be available
for lending. This project is expected to have a significant
impact on student learning of natural science concepts in
surrounding school district.

Grace Nicora (UW-Milwaukee)
The Role of Closure in Object-based
Attentional Selection
Mentor: Adam S. Greenberg, Psychology
Object-based attention (OBA) is one way in which
we select visual information (and ignore distracting
information) for detailed examination from the
surrounding environment. During OBA, spatial locations
are prioritized based on their relations to objects in the
visual scene. Previous research has shown that OBA is
employed when target items are located within closed
object boundaries. However, it is unknown whether
OBA is capable of selecting objects that are not fully
closed. To study this, we manipulated a set of vertically
oriented rectangles by removing the two short horizontal
“connectors” that formed the top/bottom of each
rectangle, thus disrupting cues of object closure. In
Experiment 1, a vertical rectangle at screen center was
flanked by four identical rectangles, 2 to the left and 2
to the right (rectangles condition). An exogenous spatial
cue then appeared outside of either end of the central
rectangle. A set of 10 target/distracter letters were
presented, two letters in each rectangle (one on each end).
One of these letters (the target) was colored green, the
other nine (distracters) were white. Subjects performed a
letter discrimination on the target. The central distracter
was neutral, congruent, or incongruent with the target;
and the flanking distracters were either congruent or
incongruent with the target. In the lines condition, the
horizontal “connectors” were removed, forming 10
parallel vertical lines. Results showed that flanks only
have effects when the target and distracters lie on a
contiguous region. In Experiment 2, the two conditions
were no longer randomized across trials; subjects were
now shown either lines or rectangles in continuous
blocks. The data from both experiments show that object
closure is a critical component of OBA. Attention was
not “bound” to the object in the lines condition, allowing
information in the periphery to influence performance
on the central target. However, during the rectangles
condition, attention was more restricted to the closed
central object, preventing information in the periphery
from influencing performance on the central target.
These results suggest that small changes in the visual
features of an object can cause large changes in how
attention selects information, and ultimately how we
perceive our visual world.
Joseph Nimm and Ahila Na (UW-Milwaukee)

Variants of Transitive Inference Reveal the Role of Awareness in Relational Learning
Mentor: Anthony Greene, Psychology

Researchers have long asserted that the flexibility, sensitivity to context, and inference in memory require deliberative processes (e.g., Cohen, Poldrack & Eichenbaum, 2010). Successful performance on the transitive inference task (TI), requires these three attributes, flexibility, context, and inference, for the formation relational association and memories. Numerous studies are in disagreement about the necessity of deliberative processes in relational memory (e.g., Greene, Spellman, Dusek, Eichenbaum, & Levy, 2001). In a typical TI task, participants learn relations among pairs of items, A>B, B>C, C>D, D>E, which if integrated into a hierarchy, A>B>C>D=E, allows correct inferences on pairs that have never been trained such as B>D. The TI task is of particular interest because the manner in which we gather and integrate general world knowledge to make predictions and inferences is modeled by the TI task. It is possible that the subtle differences in design elicit distinct task demands, which result in variable outcomes. This is of theoretical importance because the differences in outcomes arising from design variations have obscured attempts to ascertain whether awareness is necessary for solving the TI task. To test this we conducted three versions of the TI task following methods known to yield distinctly dissimilar outcomes while using a single set of stimuli, with a single population, in the same laboratory. Results from this study suggest that different methodologies, previously assumed to be unimportant, create distinct task demands which yield distinct outcomes. Awareness in these studies appears to be related to the number of stimulus presentations rather than being related to the capacity for successful inference.

Mariana Nino de Guzman (UW-Milwaukee)

Sex Differences in Elite Indoor Rowing Times: The Potential Role of Participation
Mentor: Dr. Kevin Keenan, Kinesiology

Introduction: Sex differences in elite running and swimming performance have been reported to be due to physiological differences and unequal participation between men and women. Collegiate women's rowing programs have experienced arguably larger relative gains in participation than any other sport since Title IX was enacted in 1972. For example, since 1997 when women's rowing became an NCAA sport, the number of collegiate women's teams has increased 48% to 145 teams in 2014. In contrast, men's participation in collegiate rowing has declined by 35% to 58 teams over the same time period. The purpose of this study was to examine if the change in participation level between men and women from 1996 to 2014 was associated with a change in elite indoor rowing times. Methods: The top 10 finishing times for Open and Junior (i.e., high school) groups for men and women competing in the C.R.A.S.H.-B Sprints World Indoor Rowing Championships were obtained.

Austin Noring (UW-Stevens Point)

Factors Effecting Growth Trajectory of Walleye in Northern Wisconsin Lakes
Mentor: Justin A. VanDeHey, Fisheries and Water Resources
Mentor: Daniel A. Isermann, Wisconsin Fisheries CO-OP
Mentor: Greg A. Sass, Wisconsin DNR

Understanding population dynamics of sympatric fishes can be important for management. Walleye Sander vitreus are an important recreational species and a top predator in the systems they inhabit. Walleye growth can be highly variable among lakes suggesting that within-lake factors such as prey availability and quality are important. A statewide assessment of Cisco Coregonus artedi, an important prey species for Walleye, was recently conducted in Wisconsin lakes to better understand the status of this important species. We used data from a long-term standardized Walleye survey program (Ceded Territory of Wisconsin; CTWI) and the recent Cisco assessment to determine Walleye growth trajectories among lakes with and without Cisco. Analysis of the data from 87 populations of walleye across the CTWI revealed that female walleye reach greater asymptotic lengths in lakes where Cisco were detected, while male Walleye asymptotic length did not differ among lakes with and without Cisco detections. Common Walleye minimum length limits, 15 and 18 inches, were reached 0.6 and 0.9 years earlier in lakes with Cisco detections. Common Walleye asymptotic length did not differ among lakes with and without Cisco detections. Common Walleye minimum length limits, 15 and 18 inches, were reached 0.6 and 0.9 years earlier in lakes with Cisco detections. Yellow Perch Perca flavescens, another common prey item for Walleye, mean length was significantly lower than lakes without Cisco. This could further enhance Walleye growth as they generally select for prey.
Deonti Norris (UW-Whitewater)
The Effects of Applying Multiple Pharmaceuticals and Personal Care Products on the Model Terrestrial Plant Arabidopsis Thaliana
Mentor: Catherine Chan, Biology/Chemistry
Increased use of pharmaceuticals and personal care products (PPCPs), and subsequent excretion and disposal into sewer systems, produces high levels of PPCPs accumulation in the environment. Wastewater treatment plants can spread these PPCPs to major bodies of water through discharged effluent and soil using bio solid application. Previous research at UW-Whitewater and published literature show that when applied singularly chemicals such as caffeine, acetaminophen, and aspirin (including its derivatives) have the potential to significantly impact terrestrial plants. For example, caffeine has been documented as an allelopathy (Anaya et al. 2006). Research at UW-Whitewater showed aspirin having a significant impact on Arabidopsis thaliana, a model terrestrial plant, at levels as low as 1 ppm. The effects of acetaminophen, whose US production exceeds 24 billion doses (IMS Health & 2008), on terrestrial plants has not been explored thoroughly. All three are found together in wastewater effluent and yet no known research investigates the growth effects of these PPCPs acting in combination on terrestrial plants. Therefore, the focus of my study will be to apply caffeine, acetaminophen, and aspirin in combination to Arabidopsis and measure the effect of these PPCPs on growth parameters such as germination, root growth, and photosynthetic rate. PPCPs may accumulate within plants, I will also explore their effects on germination of seeds and growth of seedlings that are derived from plants exposed to these chemicals. My goal is to determine whether applying these PPCPs in combination will impact Arabidopsis growth using dosages lower than those applied singularly. My study will help us better understand the potential impacts of having these PPCPs in the environment.

Tyler Novotny and Daniel Krause (UW-Whitewater)
PhyloProteomic Analysis of Functional Domain Evolution in H7N9 Influenza
Mentor: Dr. Robert Kuzoff, Biology
Influenza is a swiftly evolving viral pathogen that is capable of infecting a broad range of hosts. Influenza is notorious as being one of the deadliest viruses afflicting humans annually. In recent years, H7N9, a subtype of class A influenza that is normally found only in birds, has acquired the ability to infect humans and has emerged as a source of severe respiratory illness in widespread provinces of eastern China. We employed a battery of bioinformatic methods to examine the complete proteomes of H7N9 isolates recovered from NCBI and IDB databases. Orthologous proteins were aligned and analyzed to assess phylogenetic relationships among them. Resolved clades sorted primarily by host species, but some noteworthy interspecific transmissions were detected. A survey of randomly selected avian and human isolates indicated a suite of sites in the aligned protein sequences that showed consistent differences between sampled species. A detailed review of available literature and selected databases (e.g., PDB, Pfam, and SMART) revealed that several of the variable sites coincided with functional domains or positions known to impact virulence. The locations of the variable sites in resolved structures of influenza proteins were assessed using PyMol 1.7.4. Variable sites that mapped to surface regions of surface glycoproteins, hemagglutinin and neuraminidase, or to the outer envelope’s ion channel, M2, may be immunogenic. If so, variation at these sites could enable sampled H7N9 strains to evade host defenses and propagate more efficiently in human hosts. In summary, we detected a set of positions in proteins sequences that are evolving rapidly and have either known or probable consequences for the virulence and transmissibility of H7N9 in humans.

Brendan O’Connor (UW-Milwaukee)
Effect of Benzo(a)pyrene on the Craniofacial Development of Zebrafish
Mentor: Ava Udvardia, Biological Sciences
Mentor: Juleen Dickson
Benzo(a)pyrene is a byproduct of partially combusted fossil fuels, found in urban runoff, and a known carcinogen that has been reported to cause jaw deformities in rockfish. In order to further investigate the effects of benzo(a)pyrene on development we are using zebrafish (Danio rerio) as a model organism in order to observe and quantify the development of the exposed embryos. Our hypothesis is that benzo(a)pyrene disrupts the migration of the neural crest cells which ultimately form the cartilage elements formed in the jaw. We exposed zebrafish embryos 5 hours to 5 days post fertilization at lower concentrations (5-25 nanomolar). These concentrations are environmentally relevant since benzo(a)pyrene has been found at a concentration of 13 nanomolar in a Chinese estuary. Since there were varying concentrations found in the same environment we are also testing higher concentrations (0.05-25 micromolar). All exposures also contained a control and a vehicle control. After being exposed the fish were then stained with alcian blue and their cartilage elements were measured. We found that benzo(a)pyrene has a significant effect at lower concentrations (5-25 nanomolar). This characteristic suggests that there is an anti-hormesis phenomenon present in our data. This phenomenon is defined as the lower concentrations (5-25 nanomolar) showing significance to the vehicle control and higher concentrations (0.05-25 micromolar). To continue our analysis we are running exposures using lower concentrations to observe if there is a continuation of the present phenomenon. We will also be documenting and quantifying the condition of the joint associated with the mouth. Another future goal of this project is to develop exposure windows to identify the developmental process benzo(a)pyrene is disrupting. The focus of this research is to quantify craniofacial deformities in zebrafish associated with exposure to benzo(a)pyrene.
resulting in a disruption of gene expression.

**Brendan O’Connor, Julia Zimmer, Katie Halmo and Ame Xiong** (UW-Milwaukee)

Nitrogen-Based Model of Water Quality in a Recirculating Aquaculture System

Mentor: Russell Cuhel, School of Freshwater Sciences
Mentor: Carmen Aguilar, School of Freshwater Science
Mentor: Istvan Lauko, Mathematical Sciences

The understanding of the propagation of elastic waves, or phonons, in nanoscale systems is essential to providing a full description of heat transfer at these length scales. A key element of this description is the dispersion relation that captures the physics of all the vibrational modes of the solid. We study this fundamentally through a combination that involves analytical calculations of the dispersion in two dimensional systems known as phononic bandgap materials. These calculations will be used to guide fabrication and thermal transport measurements in silicon based phononic membranes, of importance not only to the fundamental physics of heat transfer but also in applications such thermal measurement devices that operate in nanoscale systems.

**Callie O’Donnell, Quinn Wermuth and Kimberly Dembinski** (UW-Milwaukee)

The Feasibility of Quantifying Frequency and Duration of Hand Exertions Using Surface Electromyography

Mentor: Dr. Jay Kapellusch, Occupational Sciences

Surface electromyography (sEMG) has shown promise in estimating grip forces while people are performing tasks, but has not been used to predict frequency and duration of those forceful exertions. Multi video task analysis (MVTA) is a video analysis tool that can be used to reliably quantify work activities. However, video analysis is typically very time consuming. The objective of this experiment is to determine the feasibility of using sEMG to quantify frequency and duration of exertions as an alternative to video analyses. Five different hand tasks were simulated and sEMG signals and video were collected simultaneously. Hand tasks required varying forces, frequencies, and durations of hand efforts. Videos were analyzed using MVTA, and sEMG signals were analyzed using an algorithm to quantify patterns of efforts and durations of efforts. Patterns from the two techniques were then compared graphically. Preliminary results suggest that sEMG can reliably quantify force, frequency, and duration of hand efforts.

**Kacy OHaver** (UW-Parkside)

Change Deafness and Holistic Versus Piecemeal Processing of Auditory Scenes

Mentor: Dr. Melissa Gregg, Psychology

The present study examines change deafness, which is the finding that listeners are often remarkably poor at detecting changes to auditory scenes. In the current study, we determined the extent to which change deafness is due to differences in holistic versus piecemeal processing of naturalistic auditory scenes. There is a well-established body of research showing that the left hemisphere of the brain processes the details, while the right hemisphere processes the global properties of scenes. The purpose of the present study was to determine if change deafness, and perceptual errors in general, may be due to using the wrong hemisphere, i.e., relying on the right hemisphere in a change detection task would cause changes occurring in the details, i.e., individual objects, in the scenes to be missed. On each trial, listeners made a same-different judgment to four-object scenes presented consecutively. When changes occurred, the change was either to a sound from a different category (e.g., a dog changed to a piano tune) or the change was to a sound from within the same category (e.g., a small dog barking changed to a large dog barking). Sounds were presented dichotically such that two sounds were presented to the right ear (i.e., the left hemisphere) and two sounds were presented to the left ear. (i.e., the right hemisphere). The change occurred in the left ear (right hemisphere) on half of the trials and to the right ear (left hemisphere) on the other half of change trials. The results indicated more change deafness to changes from within the same category, as well as hemispheric differences in processing the auditory scenes. Implications for why perceptual errors occur in naturalistic auditory situations typical of everyday life will be discussed.

**Justin Olson** (UW-Stout)

PADlock Cryptanalysis: a Bayesian Approach to Identifying Trends in the PTM Deimination

Mentor: Jennifer Grant, Biology
Mentor: James Church, Biology

Cellular proteins are subject to the post-translational modification known as deimination in which the amino acid arginine is converted into citrulline. Deiminated proteins are widespread in disease states and thought to play a role in Rheumatoid Arthritis, Multiple Sclerosis, Alzheimer’s disease, Parkinson’s disease, and cancer. Unlike phosphorylation, substrate specificity of the peptidyl-arginine deiminase (PAD) family of enzymes, which are responsible for deimination, remains elusive and ill defined. Our objective was to identify patterns in the sequence primary and secondary structures, which may underpin this modification. We found that deiminated sequences were most likely to be categorized as having a disorganized secondary structure. We show trends in how the sequence primary structure influences the likelihood of deimination, such as a preference for nonpolar residues at position N2 in deiminated sequences. We identify regions of specificity preference within sequences, and observe similar and dissimilar preferences between the PAD enzymes.
Ashley Osteen and Olivia Boyd (UW-Stout)
The Relationship Between Gender & Perceived Life-Satisfaction in Intimate Romantic Relationships
Mentor: Dr. Susan Wolfgram, Human Development and Family Studies

College is a time for emerging adults to create and sustain lifelong relationships. Erik Erikson’s life stage of emerging adulthood pertains to individuals ages 18-25 whose principal developmental goal is to achieve intimacy within a relationship (Arnett, 2000). Considering that a romantic relationship becomes the primary relationship throughout adulthood, it is extremely important that college students are aware of how these social connections can have a lasting impact on their life. This nonrandom pilot study investigated attitudes about the effects of the intimate romantic relationship on perceived life-satisfaction by surveying 113 male and female college students at a Midwestern university. It was hypothesized that intimacy achievement would positively affect the life-satisfaction of both genders; however, we anticipated that females would be more greatly affected than males based on literature and Erik Erikson’s Psychosocial Development Theory. Survey data was statistically analyzed using frequencies, cross-tabulations, mean comparisons, independent t-tests, and a reliability analysis. Results indicated a significant gender difference in one of our variables, self-disclosure. Females reported higher levels of disclosure in their relationships than males. Therefore, both males and females responded similarly to the other variables, perceiving intimate romantic relationships in college to have a positive effect on their life-satisfaction. This research showed that college students’ perceived life-satisfaction is significantly impacted by their intimate romantic relationships. Practitioners that work with college students need to be aware that emerging adulthood is a sensitive time for college students as they navigate their way through Erikson’s stage of Intimacy versus Isolation. We would recommend sensitivity to the importance of this experience and being willing to be open about intimacy and loneliness.

Samantha Ott (UW-Milwaukee)
Food Security
Mentor: Mai Phillips, Conservation Environmental Science

The focus of my research was on food security. I had the opportunity to partner with Wellspring as an intern where the mission and focus was to promote healthy living and organic growing. Through educational programs and children taste testing activities, I was able to dig deeper into the idea of food security and what that looks like in America. One of the biggest challenges schools face is whether kids prefer the healthy organic or the unhealthy processed foods. Through Wellspring, data was collected during taste testing events at schools where children were able to independently express what organic foods they did and did not like. My project shows the importance of home grown organic food and points to a positive trend where food security can be no more.

Milan Outlaw (UW-Milwaukee)
Rethinking the Void
Mentor: Arijit Sen, School of Architecture & Urban Planning

As part of a year-long collaboration with Picturing Milwaukee: Washington Park, the question was explored, Can architecture be used as a catalyst to further engagement, empowerment, and creativity within local communities? Investigation into this question began in the spring of 2014 with the collecting and analyzing of historic and present data of Milwaukee’s Washington Park neighborhood. The following summer residents became involved as their voices and lived experiences became the main focus. During the fall the collected information along with the voices, concerns, ideas, and lives of the residents was used to direct and produce architectural design concepts specific to the community. The information collected to perform this analysis over the course of the year was through oral history interviews, architectural documentation, field measuring, archival data collection, site analysis, community design charrettes, roundtable discussions, and multi-media documentation. Upon hearing the array of voices and witnessing the diverse lived experiences that exist within Washington Park the vitality of the community becomes apparent. While the area is widely perceived as lacking, residents work to reclaim this image. The multiplicity of scales of this recovery is fascinating. The majority of this recovery, reclaiming, and rethinking is done at a community level, which focuses on the empowerment of residents instead of changing outside perceptions. This presentation seeks to explore, analyze, and build upon recovering, reclaiming, and rethinking socially perceived voids in Washington Park, voids being that which is considered empty or of no value. These voids existing at an individual, familial, neighborhood, built, and unbuilt scale. Further examining how the original Picturing Milwaukee question ties into this concept. How might architecture work to reshape and rethink perceptions of void. It is important to understand the abstract and physical approaches the community uses to empower residents. Implementing these approaches within socially engaged architecture can help further promote a distinct sense of identity and stewardship within the area. Further encouraging all members of the community to realize the power of their experiences in closing gaps, filling voids, reclaiming, cultivating, and giving meaning to their spaces.

Kingsley Ozongwu and Gabriel Dalio
(UW-La Crosse)
Effects of the Antimicrobial SK-03-92 on Growth of Yeast Mutants
Mentor: Anne Galbraith, Biology

Antibiotic overuse has led to a lack of antibiotics capable of treating some bacterial infections. Mycophyte LLC, a company founded in 2005 by four UW-L faculty members in three different science departments, has developed a library of over 200 compounds based on naturally occurring antimicrobials found in some plant species. My research at Mycophyte LLC was focused on developing novel antimicrobial compounds. I developed a library of over 200 compounds based on naturally occurring antimicrobials found in some plant species. My research focused on developing novel antimicrobial compounds. I developed a library of over 200 compounds based on naturally occurring antimicrobials found in some plant species.
species. Such work has resulted in the development of novel Intellectual Property with several patent applications being filed, including one focused on an antimicrobial named SK-03-92. In order to increase the industry attractiveness and commercialization potential of this novel drug, it is important to elucidate the compound’s mechanism of action (i.e., how it kills). Not for lack of trying, little progress has been made thus far at determining the mechanism of action using bacterial species, mostly because there is no good bacterial model system killed by the drug. Our lab has learned recently that the model yeast, Saccharomyces cerevisiae, is susceptible to the killing effects of SK-02-92. Therefore in an attempt to elucidate the drug’s mechanism of action, we are now using this well-established genetic model system and examining the effect of the drug on several mutant yeast strains versus wild-type. Results of this work will be presented.

Ashwanth Padmanabhan, Danielle Damask, Ashley Jenilek and Maria Morales (UW-Parkside)
Establishing Pathological Markers in Aging Min Mice with Progressing Intestinal Cancer
Mentor: Fabian Preuss, Biological Sciences
Mentor: Susan Olson, Biolgocial Sciences

A mutation in the Apc gene leads to early spontaneous development of intestinal cancer in mice. The ENU mutagenesis induced mutation was first characterized by Dr. Dove in Madison and the pathways and the pathological development has been under investigation since. Here we describe the establishment of non-terminal measures, which can be used to monitor the progression of the disease in aging animals. Typically, the severity of the disease is measured post euthanasia via histological evaluation of the affected intestinal tissues. A limitation of this analysis is the requirement of euthanasia (typically conducted around 84 days of age), which prevents long term studies or repeated evaluation of the same animal. We have previously presented potential beneficial measures to reduce the development of carcinomas in mutant animals, however, failed to show that any reduction actually could lead to an increase in lifespan survival rate of the affected animals. Here we are presenting preliminary measures attempting to establish markers indicating the severity of the underlying cancer which can be measured repetitively in the same animal and allow to predict its pathological state prior to euthanasia.

Nisrit Pandey (UW-Milwaukee)
Viscosity of Electrolyte Solutions in Low Temperature Environments.
Mentor: Benjamin Church, Materials Science and Engineering

Lithium ion batteries have found use in many areas from mobile phones to airplanes and the understanding of wettability of materials can prove to be of great importance. Wettability is the ability of getting wet and increased rate wetting of materials inside lithium ion batteries has been linked to increased effectiveness. A lithium ion battery is composed of a positive anode and a negative cathode, which are separated by a separator. The anodes in lithium ion batteries are composed of Carbon black, binder and an active material (copper). Cathodes are also made in a similar way, however, the binder is made of Polyvinyliden Fluoride, the active material is LiCoO2 and aluminum is a conductive additive. The cathodes and anodes are varied on the basis of properties like porosity, thickness, amount of calendaring, structural patterns, and amount of surfactants. Meanwhile electrolytes are varied on the basis of identity and viscosity. This is followed by a range of wettability tests of those anodes and cathodes with different electrolytes. Previous research showed promise that a wetting balance test might be a very economic way to check the efficiency of Lithium ion batteries in manufacturing processes. A sample material is put under a balance and the electrolyte liquid is lifted to it. The mass change of the sample is recorded in a graph of mass vs time. The slope of the graph during the diffusion of electrolyte into the sample is calculated to determine the wetting rate. Hence, the response of each sample to the electrolyte can be compared using the wetting rate values. This research aims to find a set of materials in anode lead to increased wettability such that the efficiency of lithium ion batteries can be increased.

Elizabeth Parks (UW-Stevens Point)
Barriers of Academic Achievement for Student Veterans
Mentor: Dr. Thomas Motl, Psychology

Our second study, Barriers to academic achievement for student Veterans: A qualitative study, was based on a thorough review of the literature about the challenges facing collegiate students who are also Veterans. A number of studies have found that Veterans generally engage in significantly more activities traditionally associated with student success than do their non-veteran counterparts. For example, student Veterans spend more time studying, are more likely to speak to professors, attend class more regularly, and are more involved with student groups. Though student Veterans are more likely to engage in behaviors indicative of student success, they are less likely to be successful, as reflected by lower grade point averages and lower graduation rates.

Lina Patel, Samantha Ott and Robert Walker (UW-Milwaukee)
Lateralization of Agonistic, Escape and Predatory Responses in Firebelly Toads
Mentor: Gerlinde Hoebel, BioSci

Brain lateralization (and sensory and motor asymmetries in behavior) is present in all vertebrate and some invertebrate classes. This brain regional specialization of tasks is thought to be beneficial because it allows lateralized animals to carry out several tasks simultaneously without decreasing their efficiency. We tested whether firebelly toads Bombina orientalis show evidence of lateralization by filming their behavior during (1) foraging, (2) competition with conspecifics, and (3) simulated predator attacks, and scoring whether they
Emily Paulauskas and Michele Gloede  
(UW-Parkside)  
Visual Memory is Superior to Auditory Memory Despite Extensive Auditory Training  
Mentor: Melissa Gregg, Ph.D., Psychology  
Recent studies show that recognition memory for various types of sounds is inferior to memory for pictures of visual objects (e.g., Cohen, Horowitz, & Wolfe, 2009; Cohen, Evans, Horowitz, & Wolfe, 2011). One potential reason for this difference is that typical observers have more experience attentively viewing visual objects and scenes, and this results in more finely tuned neural circuits for encoding, storing, or retrieving visual scenes. To evaluate the role of experience, we determined whether providing extensive training with the to-be-remembered sounds equated auditory and visual memory performance. All participants received an initial auditory and visual memory test. During the initial memory test, all participants completed a study block, which was immediately followed by a test block. During the study block, participants were presented with each image or sound for 1000 ms and were instructed to try to commit the picture or sound to memory as best as they could. During the test block, each participant was presented, in a random order, with 64 pictures or sounds, half of which had been presented in the study block (i.e., 32 were old and 32 were new). Participants were instructed to classify each picture or sound as “old” or “new” by pressing a corresponding key on a keyboard. Then, participants completed an auditory exposure task in which each of the original 64 sounds were presented in consecutive pairs that were either the same or different (in a subtle frequency or duration change). The task was to respond “same” or “different.” After the exposure task, participants received a second auditory memory test (that was identical to the first auditory memory test). Despite this specific auditory training, visual object memory was superior to auditory memory performance. This finding suggests that short-term auditory training is not sufficient for people to attain auditory object memory that is equivalent to visual object memory. The present study is consistent with results demonstrating that visual memory is more enduring than auditory memory.  

Kristiana Perleberg (UW-Milwaukee)  
Scientific Controversy and its Relationship to the Media  
Mentor: Scott Graham, English, Professional and Technical Writing  
Over the past several decades, there have been numerous instances of public controversies related to scientific, environmental, and health-related issues. Some examples of this phenomenon include global climate change, the effects of hydraulic fracturing (fracking) on the environment, and what fibromyalgia is exactly. While the media has traditionally played an important role in helping to keep the public informed about emerging scientific issues or in times of medical necessity, there is also the danger that the media can fuel and, in fact, manufacture these controversies. Understanding the nature and progression of public controversies about scientific and health-related issues is an essential part of addressing these dangers. However, despite the wide availability of science communication literature documenting and exploring individual controversies, there is no broadly accepted definition of public controversies about science, nor is there any systematic understanding of how they emerge. Even so, science and technology policy scholars Collins and Evans have hypothesized that such controversies emerge when the media reports on matters of scientific debate before the scientific community has reached a consensus. In order to test this hypothesis, we identified five recent public controversies about science: the link between autism and vaccines, hydraulic fracturing (fracking), Fibromyalgia, H. Pylori, and contrails. Using these controversies as case studies, we conducted bibliometric analyses of the scientific and popular press literatures. Specifically, we have identified the frequency of articles by domain per year from 1980 to the present. Using these data as a guide, we have identified when spikes in scientific and media publication occur and the temporal relationship between those spikes. Preliminary findings stemming from this research on the correlation between scientific literature and news media suggest a much more complicated relationship between scientific and popular debate than Collins and Evans predict. For example, in the case of autism being caused by vaccines, there has been a drastic increase in media coverage on this topic since the release of the first major study linking these events in 1998. While this study was very clearly rejected by the scientific community, the number of popular media articles continues to skyrocket. Using these data as a guide, we develop a more elaborate taxonomy of different types of public controversies about science and health-related issues. Further analysis of this relationship will help to better inform the public and understand these controversies.  

Tyler Peters and Craig Beer (UW-Stevens Point)  
Bivariate Mathematical Induction for N-Consecutive Game Athletic Schedules  
Mentor: Andrew Felt, Mathematical Sciences  
When creating athletic schedules a common request that is made is to limit the number of consecutive home and away games, ignoring bye dates. In many cases, this means
that a team cannot have more than the specified number of home or away games in a row, regardless of the byes between them. In the past, we solved this by creating many separate constraints in the integer linear program. Each constraint would require varying window sizes, referring to the number of games being observed, to accomplish the work of our new single constraint. Once cumbersome, this request is now easy to implement with our new single family of constraints using mathematical induction. We found that this new family of constraints could easily be adapted to any requests regardless of the number of consecutive games. We found this to be most helpful when there are an odd number of teams, because in this case byes are required. During this presentation we will walk through a proof by induction showing how this powerful constraint works. Further, we will demonstrate the effectiveness of the constraint through a sample athletic schedule in the context of the mathematical programming language AMPL.

Erika Petersen (UW-Fox Valley)
Food Choice Quality among College Students
Mentor: Caroline Geary, Chemistry
Mentor: Terri Gonya, Biological Sciences
The American diet is typically thought of as one that consists of highly processed foods with minimal nutritional value. Without adequate time to become educated about how and why the American diet is having detrimental health consequences, the general population may not know the importance of finding an alternative diet or how to begin making changes. The aim of this work was to study the diets of college students and analyze the quality of their food choices. Data on food patterns were collected from volunteers at UW-Fox Valley using the 24-hour dietary recall method. Collected information was compared to published data from students at the University of Castilla-La Mancha in Spain and analyzed in terms of the Mediterranean Diet Score. Using the Mediterranean Diet as a framework for a diet known to remediate metabolic syndrome, suggestions were formulated for how college student diets could be improved.

McKenzie Pickett and Alexis Bury (UW-Milwaukee)
Mentor: Charles, Wimpee
Mentor: Gabriella Pinter, Mathamatics
Mentor: Istvan Lauko, Mathamatics
Seasonality in Vibrio Bacteria Population Structure - a Practical Application of the Lotka-Volterra Competition Model. Departments of Biological Sciences and Mathematics, University of Wisconsin-Milwaukee, WI. The bioluminescent bacteria Vibrio harveyi and V. chagasi, are found in the Gulf Coast of Florida where their relative abundance varies between winter and summer. This study aims at examining the hypothesis that seasonal variations in the relative abundance of Vibrio harveyi and V. chagasi populations off the coast of Florida are due to changes in growth rate and competitive ability caused by seasonal variations in temperature. We conducted growth experiments with the two bacteria populations at six different temperatures to identify temperature dependent growth rates. Time series cell-count population data were also collected in competition experiments at the same temperature range. The experiments conducted qualitatively exhibit the behavior observed in nature. Experimental results are used to parameterize a Lotka-Volterra competition model to test the presence of factors influencing the competitive dynamics additional to the individual temperature dependent growth parameters.

Shad Pionek (UW-Milwaukee)
Prescription Label Factors Affecting Compliance of Antibiotic Medications Among College Students
Mentor: Scott Graham, English

Jamie Pipke (UW-Milwaukee)
Molecular Characterization of a Hybrid Zone in Mule Deer
Mentor: Emily Latch, Biology
Mule deer (Odocoileus hemionus) is comprised of two evolutionarily divergent lineages, mule deer and black-tailed deer. These lineages are morphologically, ecologically, and genetically distinct, yet hybridize readily within a zone of contact along the Cascade Mountain range (Washington/Oregon). Previous investigations have focused primarily on the western side of the contact zone. The objective of this research was to characterize patterns of hybridization within the relatively unexplored eastern side of the contact zone, and combine our data with previous work to create a clearer picture of hybridization across the region. We collected tissue samples from approximately 150 deer on the eastern side of the contact zone, extracted DNA, and used PCR to amplify 11 microsatellite loci for each individual. Genotypes revealed deer from both lineages and many hybrids across the eastern contact zone. Placed in a larger context, these data indicate widespread hybridization across the entire contact zone. These data will help us create a more accurate view of the hybrid zone, with important implications at a broad scale to gain more information about stable hybrid zones in general, and on a smaller scale to learn about the introduction, integration and stability of the species in its natural environments.

Brooke Pirkov (UW-Milwaukee)
Investigating the Connection Between Scale and Intermolecular Forces in the General Chemistry Laboratory
Mentor: Kristen Murphy, Chemistry
The American Association for the Advancement of Science (AAAS) has outlined four themes that define science literacy; these are systems, models, constancy and change, and scale. More recently, the National Research Council has released the framework for K-12 science education that includes Scale, Proportion, and Quantity.
Our research has already shown that scale literacy is a better predictor for success in a general chemistry course than traditional measures and integrating scale as a theme in the undergraduate general chemistry curriculum has been accomplished through a variety of methods. Of particular interest was developing a laboratory sequence that would help students increase their knowledge of concepts through explicit inclusion of scale concepts. One particular activity was developed based on the difficulty students have in understanding the important role of intermolecular forces in chemistry. Given that intermolecular forces exist on the particle level (far below the threshold of sight) it is not surprising that students have difficulty when asked to describe how these forces can be used to explain the observed macroscopic properties of substances. This activity gave students the opportunity to think about and explore the molecular level on which these forces exist through model building and experimentation. The preliminary data collected from this activity will show how incorporating scale concepts into this activity helped students to not only better understand intermolecular forces but also how to use this understanding to develop explanations for observed trends in the properties of chemical substances.

John Pittman (UW-Milwaukee)
Simulations Involving Spherical Collapse in Star Forming Regions of Molecular Gas Clouds
Mentor: Phil Chang, Physics

The formation of stars remains an outstanding unsolved problem in astrophysics. Central to this problem is that the rate of star formation that is observed in galaxies is much slower than one would naively expect. In addition, observation of star forming regions in our galaxy show that the rate of star formation varies wildly from environment to environment. To help understand the relation between star formation on small scales and star formation on a galactic scale, we focus on understanding how gas collapses under its own self-gravity. Recent work by Murray and Chang (2015) suggests that the collapse on small scales is driven by the competition between turbulent pressure and gravity. They showed that their analytic results match those of large-scale numerical simulations. To check some of the predictions of the Murray and Chang (2015) model, we use the adaptive mesh refinement code FLASH version 4.0.1 (Fryxell et al. 2000; Dubey et al. 2008) to model the collapse of gas on very small scales. Starting with a root grid of $128^3$, we use as many as 10 levels of refinement to achieve an effective resolution of $128000^3$, nearly three orders of magnitude better linear resolution. We find that the predictions of Murray and Chang (2015) are reproduced for some collapsing regions, but not all. In particular, the radial infall and turbulent velocities show signs of the aforementioned competition between turbulence and gravity. At very small scales, we find the emergence of Keplerian disks support by angular momentum, a result that was overlooked by Murray and Chang (2015). We discuss the implications of this work for star formation studies.

Stephanie Pommerening (UW-Madison)
Developing a Dual Luciferase Assay to Validate VSX2 Binding Sites Identified by Chromatin Immunoprecipitation Followed By High Through-Put Sequencing (ChIP-seq)
Mentor: Dr. David Gamm, Ophthalmology and Visual Sciences

During optic vesicle formation, intrinsic and extrinsic factors initiate the activation of cell fate promoters. These factors differentiate multipotent cells into neural retina (NR) and retinal pigment epithelium (RPE). Two such intrinsic factors are Microphthalmia Transcript Factor (MITF) and Visual Homeobox System 2 (VSX2). MITF expression drives RPE cell fate while VSX2 promotes NR cell fate, in part by downregulating MITF transcription. A previously performed unbiased search for VSX2 binding sites identified three sites in MITF introns. The goal of this experiment was to develop a dual luciferase reporter assay to determine whether VSX2 can bind the three identified sites in vitro. Once the correct ratio of Renilla to luciferase was determined, the assay system was used to test whether VSX2 bound to identified target sites, whether it repressed transcription of the linked reporter gene, and whether fusing the strong VP16 activator domain to VSX2 converted its activity from repression to activation. VSX2 did not repress luciferase activity but results are inconclusive because activity was not high enough to begin with. Now, there is a better understanding of the strengths and weaknesses of the dual luciferase assay system as a method to test potential transcription factor binding sites. Future experiments will resolve the technical issues and pinpoint the relationship between VSX2 and the three binding sites in MITF introns.

Quinn Porter (UW-Milwaukee)
Ergonomic Wrench's Affect on Muscle Activity Associated With Simulated Gas Meter Change Out
Mentor: Naira H Campbell-Kyureghyan, Industrial Engineering

Introduction: Pipe wrenches are commonly used in field utilities such as gas meters. However pipe wrenches have many design flaws such as, limited torque generation, wrench-head slippage which can cause injuries, and require frequent head adjustments. An ergonomically designed wrench (EDW) was developed to address these problems. This study evaluates the difference in muscle activity between a standard pipe wrench and an EDW during wrenching tasks. Methods: 8 subjects (all right handed males) ages 18 to 26 were asked to loosen then re-torque pipe fittings on a simulated gas meter. The tasks were performed at a height of 35” using both wrench types once. A video record of each wrenching task was taken with the consent of each subject. Muscle activity was collected using five wireless electromyography sensors (Delsys Trigno) attached to lateral muscle bellies in the upper arm and chest. Wrenching task duration was recorded for each subject. Results: During loosening, the
muscle activity in the bicep, tricep, and posterior deltoid were reduced 40%-45% while using the EDW. Muscle activity was reduced from 18% in the tricep up to 60% in the pectoralis during tightening. The EDW reduced muscle activity in the bicep for all 8 subjects regardless of task. Wrenching duration also decreased while using the EDW. Conclusion: The EDW outperformed the standard pipe wrench. Muscle activity and duration of task were reduced using the new wrench. This may help to increase productivity and performance among workers. Future research into the ergonomically designed wrench's affect on muscle recruitment in regard to task height should be performed.

**Katherine Potkonjak (UW-Milwaukee)**
The Effects of Musical Training on Perceived Auditory Object Musicality
Mentor: Adam Greenberg, Psychology

Previous research has shown differences between trained musicians and non-musicians on a variety of measures. Here, we asked if the perception of musicality varies as a function of the amount of formal training in music. We evaluated participants’ musical training using a detailed quantitative metric based on a questionnaire we created. The questionnaire asked about formal training, experience playing an instrument/singing, frequency of practice, when subjects began and ended training, and education in music. Certain questions were weighted more heavily, such as items that asked about the length of time subjects spent taking music classes and practicing. Subjects were then presented 100 randomly generated sequences of ten pure tone notes. They rated each sequence on perceived musicality, using a five-point Likert scale (1 = not musical; 5 = very musical). The pure tone sequences were all generated from a one octave, Major, diatonic scale, and were presented in 16 segments with 20 seconds of rest between each block. Participants presented with a wide range of formal training; however, they naturally fell into three groups that we categorized as low-, medium-, and high-training. We found a high degree of consistency across all subjects as to which melodies were rated most musical, and which melodies were rated least musical. Despite this consistency across subjects, our high-training group used a wider range of the rating scale and tended to be more extreme in their ratings, compared to the medium and low groups. This may indicate that participants with more training were more confident in judgments of musicality than the low- and medium-training subjects. While participants largely agreed on which melodies were the most musical and nonmusical, they differed in the strength/magnitude of their ratings. For instance, the average ratings within subjects for the highest rated melodies and the lowest rate melodies were higher and lower, respectively, for the high-training group, as compared to the medium and low groups. Taken together, these data suggest that long-term formal training in music may cause changes in the neural mechanisms involved in auditory perception, such that highly trained musicians perceive auditory objects differently, compared to those without training in music.

**Yazeed Qadadha (UW-Milwaukee)**
In-Plane Resolution of a Benchtop Thermoacoustic Tomography System - Effects of Electric Field Polarization
Mentor: Sarah Patch, Physics

Purpose: To investigate quantify in-plane resolution of a benchtop thermoacoustic tomography system that irradiates with very high frequency (VHF) electromagnetic pulses. A wire phantom sensitive to electric field polarization was used to determine best- and worst-case resolution. Methods: In order to determine the system’s resolution, cross-wires were used to sense the generated signal in the electric field. A wire phantom made of mutually perpendicular wires with cross wires horizontal was suspended from the stepper motor and inside a test bed where an electromagnetic field is generated. The cross-wires were attached to either end of a signal generating, 180 micron copper wire vertical. Greatest signal was generated when the wires were oriented correctly; cross-wires facing opposite directions (a view from the top would show cross with a perfect 90 degrees angle. Weakest signal, or no signal, in theory-was collected when the cross-wires were not in the right orientation relative to the electric field polarization. To determine the effect of orientation on the generated signal, each scan was done twice: X-units away from isocenter; and X-units away from isocenter, but rotated 90 degrees. To see how much the distance from isocenter impacts the collected signal, 9 different scans were done. First scan was done at isocenter, then the wire phantom was moved 4 times ~3.0 mm farther out. A scan is done after each repositioning the wire and rotating it 0 degrees, and another is done at the same distance with a 90 degrees rotation. In a full scan, the wire goes in a 360 degrees, and another is done at the same distance with a 90 degrees rotation. A TCT projection is saved after each one-step rotation resulting in 200 projections in each TCT sinogram. At one point during the rotation, the wire is perfectly aligned with the magnetic field and that is when the greatest signal is collected. At another, the orientation of the cross-wires is totally out of the magnetic field and therefore, in theory, no signal is collected.

**Joshua Raether (UW-Stevens Point)**
Revitalizing the Veterans Home at King
Mentor: Nisha A. Fernando, Interior Architecture

Serving veterans for over 125 years, the Veterans Home at King in Waupaca, WI is a vast campus overlooking the Rainbow Lake. The facility is home to several hundred retired and disabled veterans from several wars. While some buildings are relatively new, some others have significant opportunities for improvement. The Marden Center (housing admissions and activities), was constructed in 1972 on the edge of Rainbow Lake. Though it functioned well at the time, the facility is in need of many updates. The Commandant’s Residence, adjacent to the Marden Center, is a 125-year old building that was part of the original campus and now on the Historic Register, remains empty and unused, with no accessible...
entries. This design project focused on providing design solutions to both buildings to better suit the veterans and their families. Research was done to assess what was vital for the occupants of assisted living facilities. Additionally, research was conducted on universal design for the visually, audibly and physically impaired persons and was applied to the project. Based on this research, new space assignments, improved accessibility and relevant technology were implemented into the new design scheme. In the Marden Center there was an opportunity to update worn finishes, bring more natural light through the building and introduce improved way finding for the residents. Introducing a connection skywalk between the Marden Center and the Commandant’s Residence was also a major feature. This new structure enables residents of all abilities to navigate between the two buildings with ease and comfort. Bringing the Commandant’s residence into use was important for the history of the campus. As a café it serves as a communal space for residents and their families to enjoy. After conducting the research and implementing the design solutions in a digital format, the Veterans Home became more functional and efficient, as well as more aesthetically attractive.

Carolyn Rafa Todd, Madalyn Hafenbreidel, James Otis and Robert Twining (UW-Milwaukee)
Infraorbital Nr2a-Containing Nmda Receptors are Necessary for the Reconsolidation Of Cocaine Self-Administration Memory
Mentor: Dr. Devin Mueller, Psychology

Addiction is characterized by high susceptibility to relapse, which can be triggered by drug-associated cues. Cue presentation results in retrieval of the original drug-cue memory that becomes labile and must be reconsolidated back into long-term storage. Repeated unpaired cue presentation, however, induces extinction. Thus, cue-reactivity can be reduced by either blocking reconsolidation or facilitating extinction. Previous research revealed that systemic blockade of NMDA receptors (NMDArs) can disrupt reconsolidation of drug-cue associations in a modified self-administration paradigm (Milton et al., 2008) or extinction in a standard self-administration paradigm (Hafenbreidel et al., 2014). To further characterize these processes, we examined the effects of post-extinction injections of an NMDA antagonist on drug seeking following self-administration. Rats acquired cocaine self-administration (0.25 mg/inf, i.v., 90 min/day) followed by extinction. Extinction consisted of four 45-min extinction sessions in which rats were administered the NMDA antagonist CPP (10 mg/kg, i.p.) immediately after each session. Extinction retention was then tested during a subsequent 90-min session. CPP treatment decreased lever pressing during subsequent extinction sessions, suggesting either disrupted reconsolidation or facilitated extinction consolidation. We next targeted the infralimbic medial prefrontal cortex (IL-mPFC), a structure implicated in extinction (Quirk & Mueller, 2008). Using the same procedure, CPP infusions (36 g/0.3 L) before or after four brief extinction sessions resulted in a similar reduction in lever pressing across subsequent days. To determine the NMDA subtype involved, we infused either the NR2A-selective antagonist NVP (1 g/0.3 L) or the NR2B-selective antagonist Ro25 (2 g/0.3 L) after four 45-min extinction sessions. Similar to the effects of nonspecific NMDA blockade, blocking NR2A- but not NR2B-containing NMDArs reduced lever pressing across subsequent days. Finally, to dissociate if blocking NR2A-containing NMDArs disrupts reconsolidation or facilitates extinction consolidation, NVP was infused into the IL-mPFC after four 10-min reactivation trials or in the absence of behavioral testing. Memory retention was then tested during a subsequent 90-min session, revealing that blocking NR2A-containing NMDArs after memory reactivation results in reduced lever pressing. Overall, these results indicate that blocking NR2A-containing NMDArs in the IL-mPFC disrupts reconsolidation following reactivation of the original drug-cue memory rather than facilitates extinction consolidation. Support by DA027870 and the University of Wisconsin-Milwaukee Research Growth Initiative.

Ana-Maria Raicu (UW-Milwaukee)
Improving Psychosocial Functioning in Children with Williams Syndrome: The Manual Development Process
Mentor: Bonita Klein-Tasman, Psychology

Children with Williams syndrome (WS) often display strong emotional responses to varying fears or stimuli. Treatments to reduce these reactions are limited and sometimes not developmentally appropriate for children ages 3 to 8 with WS. Therefore, we are in the process of developing a manual for therapists that work with children with WS. This manual specifically targets children that exhibit strong emotional reactions to fears or stimuli and is aimed at reducing the intensity of these reactions and helping children improve psychosocial functioning. Based on the approach called Replays, developed by Dr. Karen Levine, the treatment uses an adult-child interactive play-based approach over several sessions. This poster will describe the process of developing the manual, including initial manual development, tryout with children, revision of the manual, and the process of expert review of the manual. Next steps for finishing the manual and implementing it with children with Williams syndrome will also be discussed.

Tyler Raphael (UW-Milwaukee)
Parameterization of Variable Growth in an Individual Based Model of Freshwater Phytoplankton Mortality
Mentor: Dr. John Berges, Biological Sciences and School of Freshwater Sciences

Current models of phytoplankton dynamics include terms for growth, but they rarely address mortality. In previous work, an individual-based model of phytoplankton in a pond ecosystem was created that explicitly included death triggered by environmental factors (temperature, irradiance and nutrients). However, in this model, death was triggered by somewhat arbitrary thresholds, stochastically, and without involvement of any subcellular
biochemical mechanisms. In the current project, the model has been modified (using the Netlogo modeling environment) by developing subcellular components that represent our current understanding of the biochemical mechanisms involved in cell death, specifically including production of reactive oxygen species (ROS) in response to specific metabolic events, and induction of cell death proteases (molecular caspases) that require nitrogen and energy. In correctly parameterizing the model, it is critical to understand how much variability to allow individual phytoplankton cells, e.g., given a mean population rate of growth or nutrient uptake, or sensitivity to a condition causing death, how much variation should there be among individuals? In order to begin to estimate this, we have conducted laboratory growth experiments on multiple sets of very small numbers of cultured phytoplankton cells, using a novel approach. Two representative species, a chlorophyte (Pseudokirchneriella subcapitata) and a diatom (Cyclotella), were grown in 96 well microplates, starting with dilutions that should be equivalent to 1 to 2 cells per well, and monitored for growth rate, maximum cell numbers at plateau and variable fluorescence emissions at plateau (an index of photosynthetic competence) using a fluorescence plate reader (Molecular Dynamics, model) with an excitation wavelength 460 nm and an emission wavelength of 680 nm (i.e., matching those of chlorophyll a). So far the model behavior is fairly similar to that of the previous versions, in that there is initial phase of little growth followed by an exponential growth phase which leads to the cells reaching carrying capacity of the system. At this point our culture crashes, which suggests that our current parameterization is incorrect and need to be further refined. As for the growth of the cells in the microplates we have seen that the cells grow better in the clear over the black polypropylene plates and that having the light source on the bottom of the plate works better than below the plates, as this helped to minimize the heating of the plates. Our ultimate goal in incorporating of cell death mechanisms with the associated metabolic costs into our model is to allow comparison of the competitive abilities of hypothetical models that either possess or do not possess these mechanisms. This will help us to understand how cell death may have evolved in unicellular organisms to begin with. Since multicellular life evolve from unicellular life, understanding the origins of cell death may provide insight into human diseases that result from dysfunctional cell, including Parkinson’s and certain forms of dementia.

Kristen Rasmussen (UW-River Falls)  
Employing Innovative Composition Assignments with Mandated Literature: Infographics and The Scarlett Letter, Student-led Poetry Writing Workshops, and Student-generated Great Gatsby AP Prompts  
Mentor: Conan Kmiecik, English

As a future English teacher, it is challenging to come up with or find assignments that meet the many needs of the classroom; such as meeting the state standards, covering the mandated literature, and keeping students interested in the topics. This presentation will focus on three unique writing activities that can be used with certain pieces of literature often used in an upper-level High School English classroom. The presenter will read her paper and supplement some information through the use of a PowerPoint presentation and share her process for choosing these innovative assignments that fulfill the Common Core State Standards that she will likely use in a possible future teaching situation. The first assignment addressed in this presentation has students read a widely read novel, The Scarlet Letter by Nathaniel Hawthorne, and create an infographic that compares their chosen outcast in American society to a figure within the novel. The second assignment addressed in this presentation has students create mini lessons on the forms, themes, and elements of poetry that they would present to their classmates as well as guide them through their group-led exercise utilizing their poetic theme, form, or element. The third assignment addressed in this presentation has students come up with critical questions of society regarding the novel The Great Gatsby by F. Scott Fitzgerald, similar to the prompts asked on the AP English Exam. They would come up with a statement about society related to these questions, and then write an essay using nonfiction sources, as well as the novel, to prove or disprove their statement. Overall, this presentation will focus on these three assignments, how they fit the needs of the Eleventh-Grade English classroom, and how they may be used in a possible future teaching scenario of the presenter.

Sam Reed (UW-Milwaukee)  
Microfluidic Mixing on Microstructured Leaf Surfaces  
Mentor: Dr. Woo-Jin Chang, Mechanical Engineering

Research in mechanical engineering has been conducted for many years, but as technology advances and grows ever smaller we need to develop new ways to experiment and analyze. Fluid mechanics is of high interest because of the commercial and scientific applicability in modern nanotechnologies and exceedingly relevant overlap in many fields of study such as biology, medicine, material science etc. The goals of this experiment are rooted deep in biotechnology and chemistry, however much of the research conducted extends from a source in physics and deals with vector fields and the analysis of fluid bodies. As the core of micro mixing experimentation is of a physical nature it is imperative that naturally occurring geometry is incorporated. Using several different microstructured leaf surfaces and a broad spectrum of analysis, the intent is to find a naturally occurring microsurface capable of creating turbulent flow on such a small scale. On researching microstructured leaf surfaces using microfluidic devices for essential subscale interaction. Multiple numbers of the treatments, such as pre-concentration, reaction, and separation, are essential in the detection and quantitation of specific chemicals and biomolecules. A microfluidic device, which can conduct multiple treatments in less than a nanoliter of confined volumes, enables low-cost and rapid quantitation of the target molecules. However, mixing is an important issue in this miniaturized device, because of the laminar flow in such a small dimension microchannel. In this project,
oxidizing ammonia to nitrite. To date studies of HAO ammonia oxidizing bacteria (AOB) use in the process of Hydroxylamine oxidoreductase (HAO) is an enzyme that Mentor: Arsenio Pacheco, Chemistry and Biochemistry

private and public lands. solutions to increase upland game bird survival on both Our results will help inform wildlife managers possible that nest depredation will be greater with and the proximity of the nest to an abandoned structure. Our study will determine whether or not there is a correlation between nest depredation and the proximity of the nest to an abandoned structure. We hypothesize that nest depredation will be greater with closer proximity to abandoned structures. This study will also help identify ground and avian predators that potentially decrease upland game bird nesting success. Our results will help inform wildlife managers possible solutions to increase upland game bird survival on both private and public lands.

Michelle Rehak, Courtney Wohlman, Allison Kuehn, Ian Schellhaass, Joy Gadouas and Jeremiah Ulrich (UW-Stevens Point) Effect of Proximity to Abandoned Structures on Upland Game Bird Nest Survival Mentor: Cady Etheredge, Natural Resources

Abandoned structures are used by predatory species to perch, den, and pursue prey. In Wisconsin, predation is the major cause of mortality for upland game birds; removing these abandoned structures may decrease upland game bird mortality. This study will seek to determine if abandoned structures have an influence on upland game bird nest predation. Artificial nests containing quail eggs will be placed at intervals around three abandoned structures. The nests will be monitored for predator activity using track stations and cameras. Our study will determine whether or not there is a correlation between nest predation and the proximity of the nest to an abandoned structure. We hypothesize that nest predation will be greater with closer proximity to abandoned structures. This study will also help identify ground and avian predators that potentially decrease upland game bird nesting success. Our results will help inform wildlife managers possible solutions to increase upland game bird survival on both private and public lands.

Steve Reinhardt (UW-Milwaukee) Towards a Heterologous Expression System for Hydroxylamine Oxidoreductase Mentor: Arsenio Pacheco, Chemistry and Biochemistry

Hydroxylamine oxidoreductase (HAO) is an enzyme that ammonia oxidizing bacteria (AOB) use in the process of oxidizing ammonia to nitrite. To date studies of HAO have been hampered by the scarcity of the enzyme, which in turn is due to the slow growth of AOB. To increase the availability of HAO the plan is to genetically modify a fast growing bacterial species so that it will produce HAO in large quantities. HAO is a multi-e-heme protein, a type that is not readily expressed in bacteria such as E. coli, so the long-term plan is to use Shewanella onioidensis to express the protein. Another challenge to the heterologous expression of a protein such as HAO is that it is unclear at present whether such expression requires specialized chaperone proteins. This poster will summarize the initial progress made towards designing an expression system for HAO.

Sam Reiswig and Brentton Paulus (UW-Superior) Microcontroller Based Fraction Collector Mentor: Sergei Bezrukov, Math and Computer Science

This device is designed for the UW-Superior Chemistry Lab in collaboration between the Natural Sciences and Math/Computer Science departments. It provides automatic drop counting and filling of test tubes with solution for chemical experiments. Previously, an assistant had to be physically present in the lab to manually change the tubes upon collecting the required amount of solution per tube. This was very time consuming. Our device completely automates the filling process, accomplished with a rotating drum containing up to 15 tubes and driven by a stepper motor. The filling process is controlled by a microcontroller and computer software with a friendly graphical user interface for setting up the filling schedule (amount of solution to be collected in each tube). Once a tube is filled the device automatically rotates the drum and puts another tube under the source for filling. Upon completion of the filling schedule for all tubes the device collects the remaining solution in a dispenser. This way the operator does not need to be present, saving him/her a lot of time. The device is an inexpensive alternative for very expensive commercial equipment which many small schools cannot afford. We participated in prototyping the drum and experiments with various stepper motor drivers and with the drop counter. We also learned how to interface with Texas Instruments motor driver integrated circuit DRV8033, and how to work with optical drop detectors. It was also a continuation of our experience with programming Texas Instruments MSP430 microcontrollers. The computer application communicates with the microcontroller via Silicon Labs USB to serial converter Si2112. We applied in practice knowledge gained in several programming courses, particularly threaded software and firmware design and project management, from an idea down to functional product, an entire project cycle.

Ariel Reker (UW-La Crosse) [art]ifact: The First Phase of an Innovative Exhibit Mentor: Dr. Ariel Beujoit, History

In 2013 I presented a proposal for an exhibit in my public history class. It was so well received by my peers, professor and the community members present that I
decided to bring it to fruition. Over the next year I applied for an Undergraduate Research and Creativity Grant, created a team of students to work with on the project and found a professor who would mentor the group. This year I began to meet with the two community partners to evaluate the project and see if it is feasible, we wrote a Call to Artists, commissioned a website, began to apply for local and national grants, and expanded awareness about the project statewide. We are now certain that [art] ifact is feasible and of interest to our community. We have established roles for the group I am the Public Relations officer and co-director, Callie O’Connor is the Curator, Calli Niemi is the Diversity and education coordinator, and Dr. Ariel Beaujot is the Co-Director. We have also added to our mission an education component: we will reach out to local schools as well as historically underrepresented community members. I will present about how to create an innovative exhibit, how to work with multiple community organizations and bridge the town and gown divide, and I will speak to the importance of hands on research and public history development in an undergraduate setting. This is an opportunity that will change the trajectory of my career and has been invaluable.

Alex Repsold and Steven Smith (UW-Whitewater) 3D Printed Map of the University of Whitewater Campus for the Visually Impaired Mentor: Hien Nguyen, Mathematical and Computer Sciences 3D-printing technology has just recently become streamlined for use by the general public. This has allowed ordinary people to create life-changing products using a 3D printer. In this research project, we will design 3D printed maps to aid the visually impaired in navigating specific areas around the University of Wisconsin - Whitewater campus. In designing the map, we will apply concepts commonly used in tactile maps that involve attaching symbols and braille that are raised about 1mm on a flat surface. These symbols will have their corresponding representations explained by using a map key. Furthermore, the overall structure of the map will be multiple map pieces assembled together on a backing piece so that we can achieve a larger map that may be put on display, such as inside the entrance of a building. Our approach involves designing the map based off of floor plans for buildings using 3D design software, Cubify Design. We will then print the map using 3D printing software and 3D printers provided to us by David Buggs at the Whitewater Makerspace. This process involves feeding ABS plastic filament into the printer which then heats up the plastic and prints the desired object onto a surface in layers. The printed object will then be run through a smoothing process to rid the object of the rough texture that results from printing in layers. We envision the end result to be a polished product in which the maps details are not only precise enough so that it accurately represents the given locations, but also simple enough so that it avoids a cluttered feeling. Ultimately, our aim is to help provide a practical way for visually impaired students to navigate and become familiar with the structure of buildings around campus.

Norma Reyes and Gabriela Nagy (UW-Milwaukee) Mental Health Help-Seeking Behaviors Among College Students Mentor: Dr. Shawn Cahill, Clinical Psychology Mental health of college students has become an important and growing area of concern and research in recent years. Empirical research on the mental health of college students points to high prevalence and severity of mental health problems (e.g., depression, anxiety, substance use disorders). Prevalence estimates (at that given point in time) in undergraduate students have placed depression at approximately 14% and anxiety at approximately 16% (Eisenberg, 2007). Moreover, with regards to symptom severity, campus-counseling centers across the country report increases in the number of students seeking services for severe psychological problems (e.g., suicidal thoughts, self-injurious behaviors), compared to developmental and informational needs (Gallegher, Sysko & Zhang, 2001). Proposed explanations for these findings include increasing demands and stressors placed on students in comparison to past generations (e.g., familial pressure, pressure to succeed academically, financial instability; Essau, 2004), and changing demographics of college students (i.e., college admission is now available to more individuals rather than a small elite number; Kitzrow, 2003). Despite the increasing prevalence and severity of psychological disorders among students, research indicates that there is a treatment gap to the extent that many individuals remain untreated. Approximately 11% of students with a diagnosable mental health concern seek professional services (Vogel, Wade & Hackler, 2007). To that end, the present study aims to examine mental health care-seeking attitudes (i.e., psychological openness, help-seeking propensity, indifference to stigma) among college students. Undergraduate psychology students at a large, midwestern public university are currently being recruited to participate in a 60-minute online survey, in exchange for extra credit. Relevant measures for the present study include: the Attitudes toward Seeking Mental Health Services (IASMHS; Mackenzie, Knox, Gekoski & Macaulay, 2004), the 21-item Depression Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995), the Inventory of the Multidimensional Scale of Perceived Social Support Assessment (MSOPSS; Zimet, Dahlem, Zimet, & Farley, 1988), and the Self-Stigma of Seeking Help Scale (SSOSH; Vogel et al., 2006). Data analyses will consist of exploratory analyses examining the relationships among help-seeking attitudes (i.e., psychological openness, help-seeking propensity, indifference to stigma) and (1) depression, (2), anxiety, (3) stress, (4) social support, and (5) stigma. The present study is currently in the data collection stage. Final results will be presented during the conference. We propose the following exploratory, two-step data analysis plan. First, we will utilize zero-order correlations to examine relationships between our predictors (i.e., depression, anxiety, stress, social support, stigma) and our outcome (i.e., help-seeking attitudes). Secondly, we will conduct
multivariate analyses to examine to what extent the variables which evidence significant relationships are predictive of help-seeking attitudes. The present study will examine the predictive power of depression, anxiety, stress, social support, and stigma on help-seeking attitudes in a sample of undergraduate students. Study findings will be discussed to provide recommendations for future research examining barriers to seeking care and factors that increase help seeking behaviors in college students.

Valerie Riehl (UW-Parkside)
Morphological Characterization of Exuvia from Co-Emerging Riverine Dragonflies Using Geometric Morphometrics
Mentor: Jessica Orlofski, Biological Sciences Department
Among many evolutionary pressures, the physical environment plays a significant role in the refining organism morphology. The purpose of this study is to determine whether geometric morphometrics can be used to differentiate or characterize shape variation among species and sexes of co-emerging riverine dragonflies, including two rare species in New Brunswick, Canada: Ophiogomphus howei and Gomphus ventricosus. Exuvia from 26 locations along the St. John and Miramichi Rivers were collected in June 2013. Exuvia were identified to species and landmarks were digitized on digital micrographs of the dorsal and ventral surfaces. A multivariate analysis of variance was used to test for differences in body shape between species and sexes within a species. We expect to find significant levels of variation among species in support of taxonomic diagnosis, but fewer differences between sexes with a species. A detailed analysis of shape will help to confirm the presence of rare and protected species at these sites. Furthermore, this analysis provides a necessary first step toward the examination of phenotypic variation of these species based on differences in habitat hydrology.

Valerie Riehl (UW-Parkside)
Analysis of alternatively spliced CrXrn1-GFP Reporter Gene mRNAs in the Green Alga Chlamydomonas reinhardtii
Mentor: David Higgs, Biological Sciences Department
All organisms depend on effective regulation of gene expression to coordinate growth and development. In photosynthetic eukaryotes, such as plants and algae, the regulation of chloroplast gene expression is highly controlled. Nucleus-encoded proteins help to regulate photosynthesis in the chloroplast in response to developmental cues and the environment. In the single-celled green alga Chlamydomonas reinhardtii, a 5- to 3-exonuclease activity has been shown to be part of a normal mechanism for the degradation of some chloroplast mRNAs and may help regulate photosynthesis. All eukaryotic organisms appear to have 5- to 3-exonucleases (Xrns) that are involved in regulating gene expression through the degradation of mRNAs. Using sequence analysis of the nuclear genome of C. reinhardtii we identified at least three predicted Xrn genes, CrXrn1, CrXrn2, and CrXrn3. The CrXrn1 is of particular interest as RT-PCR and sequence analysis indicate that this gene produces two mRNA splice variants: CrXrn1a and CrXrn1b, and the predicted protein sequence of CrXrn1b contains a putative N-terminal chloroplast targeting sequence. We are testing both CrXrn1a and CrXrn1b (CrXrn1a and CrXrn1b proteins, respectively) to determine the sub-cellular location of these proteins. For this, we developed a series of transgenic C. reinhardtii strains with different CrXrn1-GFP (green fluorescence protein) reporter genes. We have used confocal microscopy to determine the sub-cellular targeting of these different GFP fusion proteins, and these data suggest that CrXrn1b is targeted to the chloroplast, as predicted. The current focus of this study centers on analyses of the CrXrn1-GFP mRNAs in the transgenic strains. Using Northern Blot, RT-PCR and sequencing, we are investigating the size, sequence and relative abundance of the CrXrn1-GFP mRNAs to assess the alternative splicing and comparing the expression levels of the variants. Data and conclusions from these experiments will be presented and discussed.

Jud Riggins (UW-Milwaukee)
Pollution Tracking Buoyancy Controlled Robot
Mentor: Tom Consi, Mechanical Engineering
Whenever the city of Milwaukee receives a large rain fall its outdated sewer system combines the run off from the streets with the untreated waste its residents. This toxic mixture is then directed into Lake Michigan where it is left to disperse and dilute to safe concentrations. The Milwaukee Metro Sewage Department (M.M.S.D) knows that this is a problem; and this is why they gave the UWM- Robotics lab the task of constructing a robot that would be able to track the plume pollution and gather data on it until it dispersed to safe levels in order to learn more about the pollution plumes. The robot exploits Archimedes’ Principle (Law of Buoyancy) in order to move through the water by adjusting its volume making it more or less dense than water and therefore sinks or floats respectively. The robot has been designed and fully realized only leaving the controller, or the “brains,” of the robot to be designed. The controller is what is commonly known in robotics as a PID controller. This allows the robot to find a target depth and sit in the water at that depth. It does this by taking sensory data, in this case a pressure transducer used for calculating the depth of the robot, and calculates how far away it is from the target depth. It also accounts for the direction and speed of the robot along with what is known as “steady state error.” The design of the controller is underway using MatLab and Simulink software. The final step is to integrate the controller into the robot itself using its proprietary microcontroller software and language.
Jacob Rindfleisch (UW-Milwaukee)
The Encyclopedia of Milwaukee
Mentor: Amanda Seligman, History
Mentor: Margo Anderson, History

The Encyclopedia of Milwaukee is a massive research project designed to uncover and preserve the history of Milwaukee and the surrounding areas. When completed, it will consist of over 700 entries consisting of a wide range of topics. The Encyclopedia will include entries about Milwaukee's most famous residents, arts and culture, architecture, political history, and so much more. The Encyclopedia of Milwaukee is going to be a wonderful tool for students, researchers or anyone who just wants to know more about the colorful history of Milwaukee. One of the greatest things the Encyclopedia will do is direct attention to Milwaukee's lesser known history. The project will open doors to further, deeper research into Milwaukee's past. Upon its completion, the Encyclopedia of Milwaukee will be available online as well as in print. My work on the project consists primarily of fact-checking. Fact-checking is incredibly interesting. I have learned about countless topics such as the Musical Society of Milwaukee, the famous Emil Seidel, and even Milorganite. My job begins when I receive a highlighted entry from a graduate student Research Assistant that indicates what specifically needs to be checked. Some of these highlights may be of simple facts, but also more intricate details, names, and dates. Most of my searches can be done through a computer using digitized books and articles, while every once in a while having to pull the physical copy of a book or article. My search even takes me into the Archives, and Special Collections department in Golda Meir Library from time to time. Ultimately, my job is not to go back and read primary documents, but to confirm the information within the entry against secondary work written by other scholars. The work I do on the Encyclopedia of Milwaukee has helped my research skills immensely. I am now better equipped to handle research projects for classes, my own personal research, as well as in the future. Following completion of my undergraduate degree in History, I want to pursue a graduate degree. This project has helped make that possible by giving me the skills I need to do proper historical research.

Joseph Ripley (UW-Superior)
Investigating the Causes of Low Dissolved Oxygen in the St. Louis River Estuary
Mentor: Shon Schooier, LSNERR
Mentor: Tracey Leder, LSNERR

Dissolved oxygen (DO) is important for aquatic organisms and affects aquatic biogeochemistry. Anecdotal reports suggested that areas of low DO existed under the winter ice. In 2013 and 2014 we conducted under-ice surveys in the St. Louis River Estuary to search for areas with low DO, targeting both the main river channel and bays dissociated from the main river channel. We hypothesized the DO would be lower in these embayments because ice cover would reduce oxygen replenishment and primary productivity would be low, while decomposition would continue to reduce oxygen concentrations. We found large areas with severe oxygen depletion (10mg/L). Many of these low DO zones were near the sediment surface and associated with higher temperatures and higher specific conductivity suggesting an influence of groundwater upwelling zones. In 2014 we conducted surveys in the early and late summer in these areas. Surprisingly, we found extremely low dissolved oxygen (<0.5mg/L) over the full diurnal cycle, even when primary productivity was high and with an open air-water interface, indicating rapid removal of dissolved oxygen. Our study indicates that both groundwater upwelling and decomposition processes likely act to reduce DO concentrations in these bays both under ice and during open water.

Samantha Rissling (UW-Milwaukee)
Characterizing Tg[GT1: HGT] Line of Zebrafish
Mentor: Henry Tomasiewicz, Bioengineering Imaging and Testing Lab

The Tg[GT1: HGT] (GT1) line of zebrafish, which was created using a gene trap approach, expresses Human-tau Green Fluorescent Protein (HTG) from the promoter of an unknown. HTG serves as a rough indicator to show when the GT1 gene is normally expressed. In GT1, HTG is expressed only in the ovaries and in embryos from GT1+ females during the first 30 hours post-fertilization. During the first 4-5 hours of life, until the midblastula transition, when the paternal genes start to become active, zebrafish rely solely on maternal expressed genes. During the midblastula transition, the zygotic (embryonic) genome becomes active, and sometime after this, GT1 gene becomes inactivated and HTG expression ceases. When GT1 becomes activated again in the developing ovaries is unknown and of interest to us. Our goal was to determine when GT1 turns back on during zebrafish development. To do this, we first needed to spawn a GT1 female with a sheer male fish. The offspring were examined under a fluorescent microscope to reveal the expression of HTG. Then, these offspring were examined at weekly intervals to determine when it appears again. We also used polymerase- chain reaction (PCR) to identify GT1 gene in male fish. Present findings show that 30+ day- old zebrafish have been expressing HTG. When the time line for HTG expression is finalized and the gene is identified, a better understanding of zebrafish development and their genetic makeup will be available. Because zebrafish are largely used as models for human disease, defining what these genes are and when they impact the zebrafish will be helpful for researchers in the biomedical field.
Kenia Rivera, Michelle Helms, Christina Casnar, Natalie Brei and Gregor Schwarz (UW-Milwaukee)
Examining Psychosocial Functioning in Young Children with Neurofibromatosis Type 1 Using the BASC-II Content Scales
Mentor: Bonita P. Klein-Tasman, Psychology
Background/Rationale for the Study: Neurofibromatosis type 1 (NF1) is a common neurodevelopmental genetic disorder affecting 1 in 3,000 individuals. Children with NF1 are at elevated risk of social, emotional, executive functioning, and attention difficulties. The current study examined psychosocial difficulties in young children with NF1 on the Behavior Assessment System for Children, Second Edition (BASC-II) content scales that were not on the previous edition of this measure and have rich clinical information. Methods: Participants were 62 children with NF1 (37 boys, 25 girls), ages 3 to 8 years (M = 4.95, SD = 1.62). The Behavior Assessment System for Children, Second Edition and The Conners Parent Rating Scale Revised were completed by parents. The Differential Ability Scales, Second Edition was administered to the children to measure intellectual ability and the General Conceptual Ability (GCA) score was used. Results: Developmental Social Disorders (DSD) scale showed significant elevations compared to the normative data while Executive Functioning (EF) and Negative Emotionality (NE) trended toward elevation (t(61) = 1.80, p = 0.077; t(61) = 1.96, p = 0.055). Age was not significantly correlated with T-scores on the DSD, EF, or NE scales. Visual inspection identified one outlier on the GCA variable. When this outlier was included, cognitive functioning was significantly correlated with DSD T-scores (r (62) = -276, p r (61) = -.160, p = .22). Notably, the outlier was a participant with a diagnosed autism spectrum disorder. Cognitive functioning was not significantly correlated with EF T-score or with NE T-score, regardless of the removal of the outlier (p’s ranged from .273 to .782). Relations between DSD, EF, and NE T-scores and attention problems will be examined. Conclusion: The findings suggest that the BASC-II content scales could be a useful measure to identify psychosocial difficulties in young children with NF1, and that social difficulties are especially common. Early detection of psychosocial difficulties in young children with NF1 could help them obtain early intervention for their difficulties.

Maria Rodriguez (UW-Whitewater)
Because I’m Not From Here, Ni Soy De Alla
Mentor: Bethann Handzik, Art and Design
My research proposal is based on the co-existence of Mexican and American culture. Personal narrative, communal identity, and cultural norms are the basis for my research. I have talked with extended family members and interviewed students regarding their Hispanic backgrounds. Synthesizing this information I created 3 drawings that express a composite of Hispanic–American identity and culture. All the drawings contain objects that strongly represent Mexican and American culture. The outcome of the pieces invites the viewer to reflect on aspects of shared and diverse expressions within this cultural perspective. The drawings can be easily interpreted because of the visual symbolic language and the written text within them. I was inspired by the painter Frida Kahlo (1907-1954), and contemporary artist Shepard Fairey (1970- ). These artists have created works that are vibrant and rich in personal identity and cultural expressions. I chose these artists due to their diverse and symbolic works. My aspiration is to increase awareness of Mexican culture through art. Growing up in a Latino environment is difficult for many reasons: language barriers, discrimination, and adaption to the American culture. This work celebrates the Latino culture and encourages all audiences to be aware of the cultural expressions and contributions of Mexican Americans. The content of the project can be interpreted many ways; it depends who the viewer is and their openness to the message. Art is a form a research that is unique and gives the mind the ability to think critically and creatively and expresses that thinking through visual language that informs, and moves audiences.

Haley Roenneburg, Lily Molik, Emily Lindberg, Rebecca Pletka and Jena Vander Logt (UW-Stevens Point)
Effects of Caregiving Experience on Perception of Infant Vocalizations
Mentor: Rachel Albert, Psychology
Caregivers’ responses to infant babbling have long-term effects on infant language learning. However, the factors that influence caregivers, responses are not well understood. We hypothesize that caregiving experience impacts responses to and perceptions of infant vocalizations. To explore this hypothesis, we compared the responses of inexperienced non-mothers with non-mothers who had experience working with infants under two (e.g. childcare workers). Participants viewed a series of prerecorded audio-visual examples of infants vocalizing and were asked to provide an immediate response. Then, they were asked to rate each vocalization on a seven-point scale, which denoted how speech-like the babble sounded. Preliminary results suggest caregiving experience did influence perception of infant vocalizations as experienced and inexperience non-mothers significantly differed in their ratings of the quality of the vocalizations. We also compared the speech-ratings to previously collected data on mothers. Experienced non-mothers rated the vocalizations more similarly to mothers than inexperienced non-mothers. Analyses of differences in participant responses to the vocalizations are still ongoing. Determining how experienced and inexperienced caregivers respond to infant vocalizations clarifies our knowledge of the factors that influence infant language acquisition. Since most childcare providers in the U.S. are non-mothers, understanding the impact of caregiving experience on responding has potential implications for shaping infant language learning.
Thatcher Rogers (UW-La Crosse)
A Comparative Analysis of Small Scale Medio and Post-Paquime Lithic Assemblages in Casas Grandes, Chihuahua, Mexico.
Mentor: Jessi Halligan, Sociology/Archaeology

The archaeological record of northwestern Mexico directly prior to the arrival of the Spanish is poorly understood. Investigations at sites have historically been limited and infrequently published on. In particular, examinations of small scale settlements have not occurred. The time period between AD 1450-1550 in northwestern Chihuahua is often characterized by major and sudden settlement abandonment, although there have been few archaeological investigations to support this claim. As part of my research, I collected both quantitative and qualitative data from lithic assemblages recovered from multiple sites excavated in 2013-2014 located in northern Chihuahua, Mexico and dating between AD 1350-1650 to examine changes that occurred during this period. Through statistical comparisons between the different assemblages, I was able to discern trends in site use over time. The greatest difference is representative of a change in the frequency of agave processing and raw material use. The implications of this study are that it is one of the first investigations into this period of time in the region and provides evidence for site-level changes from the pre-Spanish into the Spanish Contact period. Additionally, this study provides an example for how archaeological investigations can be used to explore the broader anthropological topic of culture contact between European and indigenous peoples.

Michelle Rohde and Sarah Zupek (UW-Milwaukee)
Pulling Styles and Impulse Control in Youth with Trichotillomania
Mentor: Dr. Hanjoo Lee, Psychology

Trichotillomania (TTM) is considered a heterogeneous disorder consisting of both automatic and focused styles of pulling. Automatic pulling (AP) occurs outside one's awareness while engaging in other (mostly sedentary) activities (e.g. reading, watching TV) and realization occurs after the pulling session has ended. Focused pulling (FP) is conceptualized as intentional action and may represent a behavioral attempt to down-regulate negative emotions. Response inhibition (RI) is a cognitive process that is required to cancel an intended movement or suppress previously learned stimulus-response associations. Individuals with TTM tend to display impaired inhibition of motor responses, and display increased perseveration on an object alternation task, which suggests difficulties with response flexibility. This suggests TTM may be maintained by individual's lessened ability to inhibit undesirable but dominant behavior, and/or to shift their attention flexibly among different response sets. The current study aimed to examine these previous findings within each pulling type (AP vs FP) using an online Go/No-Go RI task among youth with a primary TTM diagnosis. Study participants were children (age 8 to 17) diagnosed with trichotillomania (N=28) based on the Trichotillomania Diagnostic Interview (TDI). Participants were administered the NIMH TTM interview, the Milwaukee Inventory for Styles of Trichotillomania-Children (MIST-C), and an online RI Go/No-Go task. Results indicate that in general higher pulling symptoms (NIMH total score) result in shorter reaction times on the Go/No-Go task (r = -.50, p = .021), greater omission errors (r = -.53, p = .013), and fewer commission errors (r = -.32, p = .154). Specifically, FP is associated with greater overall accuracy (r = .46, p = .039), and fewer commission errors (r = -.39, p = .087), while AP is positively associated with increased commission errors (r = .37, p = .109) and slower reaction time (r = .332, p = .152). As TTM is an impulse control disorder it is not surprising that reaction times are shorter as symptoms become more severe, suggesting more trouble restraining urges and actions. In the contrast between FP and AP, findings indicate there may be a tendency for those with higher FP scores to focus on their immediate environment and self-regulation; while higher AP scores may indicate a tendency to lose focus, increasing reaction time and the number false positive identifications. Theoretical and clinical implications will be discussed.

Kathryn Rotsch (UW-Milwaukee)
Mentor: Dr. Underwood, Nursing

Several initiatives have been undertaken over the past decade to encourage breast cancer screening and follow-up. In spite of these efforts data reveal that many women do not receive the recommended breast cancer screening. Studies have been published in the scientific literature that explored barriers faced by women relative to breast cancer screening. Yet few reports have been published of efforts undertaken to delimit the characteristics of women who have and women who have not been screened.

Ryan Ruegsegger (UW-River Falls)
China’s Dairyman
Mentor: Dr. Lissa Schneider-Rebozo, English

China’s Dairyman is an original magazine written, and edited by myself. The project required extensive research into the dairy industry of China, the U.S., and around the world. Some background information was also provided by my education as a third year Dairy Science Major. The magazine is meant to mimic dairy research magazines in the U.S. like Hoard’s Dairyman. It is eight pages long with six articles, all of which are presented with visual aids and formatted to look professional. These articles discuss: China’s dairy industry in the past and present, how China compares to the U.S., how China influences the global market, and some issues in China related to the dairy industry. While working on this project I was astounded at how each country affects the other countries of the world. China’s high importation of milk powder is a large part of what has brought the U.S. milk prices to an all-time high. This in turn helps our
Taylor Rydahl (UW-Oshkosh)
Algorithm Visualizations for the Lambda Calculus
Mentor: Thomas Naps, Computer Science

Algorithm visualization is a subset of computer science in which educators build visual representations of various abstract concepts and algorithms that are seen in the field. Lambda calculus is an abstract programming language used in programming theory to teach the functional programming paradigm. As such, my project was to create visualizations for the lambda calculus in order to help new computing students better understand the fundamental concepts of the language. I designed these visualizations as part of the OpenDSA Project, a collaboration of computer scientists working to form an electronic book that can be used to teach students all of the core concepts that would be covered in a computer science data structures and algorithms course. To meet their specifications, I worked primarily with the JavaScript programming language, utilizing both the Khan Academy Framework and the JavaScript Algorithm Visualization (JSAV) libraries. In the end I was able to create a series of animations and accompanying exercises to both teach the core concepts of lambda calculus as well as to test for student comprehension. These visualizations are currently being used at the University of Wisconsin - Oshkosh in two sections of the Programming Languages course this spring. This will hopefully give me insight into their effectiveness and provide me with information needed to work on and improve what I have done thus far. I am hoping to use the information gathered from this to gain a better understanding of how visualizations can help students learn and what are effective methods for teaching through this medium. If proven to be effective, these visualizations can one day become commonplace in education, both inside and outside the field of computer science.

Kendall Saeed (UW-Whitewater)
Integrated Management Strategy to Combat the Spread of Purple Loosestrife (Lythrum salicaria) on North Lake, Walworth County
Mentor: Jonathan Burlham, Geography & Geology
Mentor: Nadine Kriska, Biology

Wetlands are the most biologically diverse and productive component of our ecosystem. However, purple loosestrife (PL), an invasive wetland perennial, is an increasing threat to the wetland environment in Wisconsin and throughout North America. The actual and potential impacts of an infestation are alarming given that an estimated 190,000 hectares of wetlands, marshes, pastures and riparian meadows are affected by PL in North America each year, with an economic impact in the millions of dollars (Hewitt, 2012). To combat the spread of PL in the North Lake conservation easement, Walworth County, a project integrating biological control-based efforts was conducted. During the first year of the study, Cella beetles (Galerucella spp.), an environmentally sound and DNR-endorsed biological control agent (WI DNR, 2014), were reared and released into the environment. The initial effectiveness of Cella beetles at controlling the PL in the study site were measured by calculating the herbivory rate on a small sample of PL leaves. The average percent feeding damage for each plant showed an average of 11.81% herbivory on the site over 3-months. In addition to this integrated pest management strategy, community-based research was conducted to familiarize the community with the potential threats to their backyard of PL and garner long-term support for a healthy wetland. I hosted the first annual educational wetland clean-up day to bring the community, Kettle Moraine Land Trust, and Wisconsin DNR together to combat the spread of PL. Eight percent of the member's contacted via (2) direct mails attended the event. Other marketing channels, such as (2) press releases in the local newspaper, announcements on Kettle Moraine Land Trust website, social media posts, and road signs, were also used to advertise the event. In summer 2015 I will train a peer to assess the long-term effectiveness of Cella beetles at controlling PL on North Lake. As a continuation of the summer 2014 findings, we will collect feeding damage data every week. After 3-months, an average herbivory rate will be calculated for year-2 of the study. In year-3 of the study during summer 2016, we will collect data weekly and extrapolate a trend of Cella beetle long-term effectiveness at controlling PL.

Michael Salm (UW-Whitewater)
Novel Methylmercury Reducing Marinade (MRM) Optimization
Mentor: John Ejinik, Chemistry

Mercury is a well-documented neurotoxin that bio-accumulates in fish, causing significant neurological problems when it's a major component of peoples diet. Methylmercury exposure impacts over 316,000 children each year in the United States, leading to loss of IQ[1]. The resulting loss of intelligence causes diminished economic productivity that persists over the lifetime of these children. This is estimated to have economic costs reaching in excess of 8.7 billion dollars USD annually [1]. Globally 1 billion people rely on methylmercury contaminated fish [2] as their main source of dietary protein. By preemptively marinating fish fillets in a solution of MSM (Methylsulfonylmethane), NaCl, citric acid, and cysteine in Marinade Express vacuum tumblers by Creative Culinary Solutions, Inc. (719 Wexford Way, Hartland, WI 53029), up to 70% reduction of methylmercury has been shown in this proactive and novel solution. Further inquiry into how pH and hyper/hypotonic solutions effect methylmercury removal will also be included in the final presentation. Citations: [1] L.

**Luis Sanchez** (UW-Milwaukee)
Lithocholic Acid Analogs as Possible Co-activator Inhibitors for the Vitamin D Receptor
Mentor: Dr. Alexander Arnold (Leggy), Chemistry/Biochemistry

**Kourtney Sande** (UW-Superior)
Imagery & Imagination: The Psychological Ideal of the Gothic Explored in William Faulkner’s *A Rose for Emily*
Mentor: Nicholas Sloboda, Department Chair, World Languages, Literature, & Culture

I will be exploring William Faulkner's use of the gothic genre to show the development of characteristics in the story of *A Rose for Emily*. In doing so, I will also be examining elements of gothic literature that Faulkner explores within the story. During my research of the story, I explored three gothic elements that are in the story: reality vs. illusion, grotesque imagery, and themes of darkness. When analyzing the text, I noticed the different characterizations of dark themes between the setting of Faulkner's fictional city and of the character's depth within the story. There are many perspectives to look at in gothic literature, such as how imagery can appear grotesque, but are truly figments of the imagination; and how reality and illusion make distinct comparisons throughout Faulkner's story. *A Rose for Emily* brings out ironic characteristics within the protagonist within the story, which in turn gives the audience a sense of illusion, and making out the reality within the illusion. The story has all the defining characteristics of a typical gothic story, which is the concept of irony in the character, the difference between light and dark (reality vs. illusion), and the exaggerated (grotesque) imagery that lurks within the story. *A Rose for Emily* makes the audience question the protagonist because of how in her mind she wants a certain reality, but to the other characters in the story, she is creating an illusion which may seem to be reality to the main protagonist; which captures the essence of the gothic that Faulkner portrays so well in the story.

**Mariel Santos** (UW-Superior)
You Are Brave
Mentor: Tim Cleary, Visual Arts

The sculpture I built, with the help of Tim Cleary, is a large flower sculpture. The sculpture is an interactive piece, in which the viewer can open and close the flower petals. The flower is a symbol of overcoming a hard trial in one's life. The title, *You Are Brave*, is meant to encourage individuals who have overcome trials, as an honor for their courage. My main goal and inspiration for wanting to do this sculpture is to do the impossible. Tim Cleary once told me, "If you can think it, you can do it." I believed him and trusted him as my teacher. The result was that I completed a sculpture, in a course taught by him, that I literally thought could not be made. I have never learned more about art than when I was challenged to create a complex art piece. Art should encourage students to learn and explore, and in that process the student makes sense of themselves, art, and the world.

The flower sculpture is another impossible piece that gave me the opportunity to work with a wonderful art educator and problem-solver, Tim Cleary, and to accomplish my goal. The research conducted by Tim Cleary and myself was the process of art through problem-solving. The methodology of the sculpture included multiple sculptural processes with an emphasis on metal work. I would like to present my sculpture at the Symposium because it is meant to be interactive. When I came up with the idea, I wanted to present a message and a piece the viewer could connect with. The Symposium would be an ideal opportunity for people to come in contact with the sculpture. I hope to be able to share my work with others and to gain more exposure. I hope that viewers would view the sculpture and gain from interacting with it. I want to share with people the idea of problem-solving through the process of art.
Initial tests were encouraging, but chromatograms show peaks for only a few compounds and their mass spectra have not been assigned. Work continues on creating a more sensitive method for seeing and determining the volatile compounds. However, only four of the thirty eight total dog urine samples have been tested.

**Mallary Schenian (UW-Manitowoc)**

**Impacts of Rain and Snowmelt on Water Quality of Five Streams in Manitowoc County, Wisconsin**

Mentor: Rebecca Ahler, Biological Sciences
Mentor: Richard Hein, Biological Sciences

Since 2012, University of Wisconsin-Manitowoc has conducted water quality research on Centerville, Point, Fischer, Pine, and Calvin Creeks which flow through Southern Manitowoc County into Lake Michigan. The main focus of the research was to understand the effect of land use on water quality, and how this impacts Lake Michigan. In addition, we investigated the impact of rain events and snowmelt on the level of runoff pollution in the streams. Specifically, our objectives were to collect water quality data by taking weekly samples of physical, nutrient, and biological parameters of the creeks throughout summer. Physical data collected included: temperature, turbidity, pH, conductivity and dissolved oxygen. Nutrient data collected included: total phosphate, dissolved phosphate and ammonia nitrogen (NH₃, NH₄). Finally, *E. coli* levels were monitored as a biological indicator of stream health. In addition to weekly sampling, when rain events occurred (accumulating one half inch or more of rain), samples were taken 24 and 48 hour post-rainfall to examine the effect on water quality. Snow melt samples were taken in the spring of 2014. Throughout summer, all five creeks showed unacceptably high levels of *E. coli* and phosphate, which are key runoff indicators and represent potential health concerns in the watershed. The highest levels of these indicators appear to correlate with higher overall rainfall in 2014 compared to 2012 and 2013, as well as spikes in levels after rain events. Spring 2014 data indicated that snowmelt contributions of *E. coli* and phosphates were relatively low compared to summer levels. However, both of these indicators remained unacceptably high during snow melt sampling. Data indicate that multiple sources of runoff exist along all five creeks. As all sampled creeks flow into Lake Michigan, they are likely contributors to bacterial contamination and algal blooms along the shoreline. The relatively higher rainfall contributions suggest that management of land use around rain events is key to preserving water quality in the creeks as well as Lake Michigan.
Aaron Schiller (UW-Stevens Point)
Smallmouth Bass Movements in the Menominee River, Wisconsin-Michigan
Mentor: Daniel Isermann, U.S. Geological Survey, Wisconsin Cooperative Fishery Research Unit, University

Several segments of the Menominee River that borders the states of Wisconsin and Michigan support exceptional fisheries for smallmouth bass. Fisheries managers would like to know more about the seasonal movements of these populations in order to make more informed management decisions. Specifically, there is some concern that smallmouth bass congregate in relatively small areas during fall and winter months, making them easier to catch compared to other portions of the open-water fishing season. We used acoustic telemetry to determine if smallmouth bass in the Menominee River between Grand Rapids and Park Mill dams all moved to the lower, deeper portion of the river during fall or if bass generally remained in the segment of river where they were tagged. During May 2014, smallmouth bass 15 inches were collected by electrofishing and implanted with acoustic transmitters and their movements were monitored using both active tracking and fixed receivers. Preliminary results indicate wide variation in smallmouth bass movement, but our preliminary analysis suggests that smallmouth bass may be congregating in deep holes.

Ross Schloegel (UW-Milwaukee)
Structural Health Monitoring Systems with Integrated Sensors and Actuators to Detect Structural Flaws
Mentor: Nathan Salowitz, Mechanical Engineering

Structural health monitoring systems, which use embedded sensors to detect damage and evaluate structural health in real time, have the potential to vastly improve the safety and performance of engineered systems. Acoustic ultrasonic based structural health monitoring systems use piezoelectric sensors and actuators to generate and detect waves that propagate through a structure to detect cracks and other potential flaws, thereby identifying them before a sudden catastrophic failure occurs. This interests fields ranging from civil and structural to aerospace engineering. Detecting damage in real time allows us to understand the capabilities of structures improving safety and allowing operation with reduced margins of safety, reducing structural weight and increasing performance. This field of research is relatively new and a multitude of challenges have been encountered. The complex signals are extremely hard to interpret, with many reflections, wave propagation modes that travel at different speeds, and EM cross talk between the actuation and data acquisition systems. This is aggravated by the fact these systems are typically actuated with high voltages (100 V) while the sensors produce signals in the 10s of millivolts. By looking to make this sensing more accurate through the understanding of the wave propagation, reduction of reflections, and overall operation of the system, improvements will create more of an in-depth understanding of these systems. The initial goal is to create a working control sample providing baseline data. Based on prior work, designing and assembling a control sample from which data can be acquired and signals can begin to be analyzed, is the current objective. Once there is a control sample, innovative approaches to develop a system that can better detect and potentially alert us to flaws in a structure. By the end of this semester, testing of a control sample that has been created and able to detect simulated damage would allow for the experimentation for innovative solutions to some of the mentioned problems. This would allow for obtain data that can be use for further experimentation to support any findings. If successful, application could include structures ranging from bridges and buildings, to spacecraft and airplanes. Some ideas for innovations include, methods to reduce internal wave reflections, and actuating different waveforms. Creating a system that could accurately detect flaws would make for a safer world.

Ally Schmidt, Kimberlee Neubauer and Lauren Bersie (UW-Milwaukee)
Evaluation and Analysis of a Novel Automated Assay for Quantifying Visual Startle Response in Zebrafish Exposed to Methylmercury
Mentor: Gabriella Pinter, Istvan Lauko, Michael Carvan, Rebekah Klingler, Mathematics, School of Freshwater Science

Methylmercury pollutes bodies of water and bioaccumulates in food chains and is a well-documented and serious risk to environmental and human health. Small doses of methylmercury during gestation can have adverse effects on development, resulting in congenital diseases and behavioral problems. This study examines the effects of methylmercury exposure using zebrafish as an experimental model as they exhibit similar teratological and toxicological effects as humans. Prior studies have shown that methylmercury treated zebrafish show a dose-dependent decrease in response to visual stimuli, as well as abnormal retinal electrophysiology. However, determination of this startle response was not automated and required visual analysis and human interpretation of the response. These disadvantages left the possibility for inaccurate interpretation of responses, as well as bias and variability between observers. We aim to improve upon this previous assay through the use of a novel observation setup, motion tracking software and specialized analysis algorithms. Our automated approach produces locomotion data, including velocity and angular velocity data, which can be used to quantitatively identify the startle response. We present these findings and examine the validity of the new experimental design by comparing the results of this new assay to the gold standard of the previous assay.
Optical Microspectrometry
Mentor: Valeriu Raicu, Physics

Förster (or fluorescence) resonance energy transfer (FRET) is a nonradiative process of energy transfer from an optically excited donor molecule (D) to an unexcited acceptor molecule (A) within close proximity. FRET can be used to detect protein-protein interactions, wherein proteins of interest are fluorescently tagged with FRET constructs and imaged in vivo with a spectrally resolved two-photon microscope. Determination of relative dispositions within protein complexes is possible using pixel-level spectral data and the kinetic theory of FRET. In this study, the interaction between D_3 and D_2 Dopamine receptors to form an oligomer was assessed using FRET as a tool. Many G protein-coupled receptors (GPCRs) including the D_2/D_3 pairing have been shown to assemble into heterodimers which often demonstrate differing pharmacological profiles compared to their corresponding monomers. These two receptors were fluorescently tagged with spectral variants of the Green fluorescent protein (GFP) and imaged within human embryonic kidney (HEK) cells. Using specialized software, spectral unmixing was performed on the images in order to separate donor emission from acceptor emission. Averages of FRET efficiencies (E_{app}) throughout the cell were calculated from these values for each pixel in the cellular images and compared to theoretical models through application of the kinetic theory of FRET. The results of this study showed a low amount of detected FRET activity (E_{app} = 5-10%), more consistent with the existence of background noise than with functional FRET, as a result, we could not confirm the hetero-oligomerization of D_2 and D_3 receptors as past studies have. To confirm that background noise alone could lead to spurious contributions to FRET, we imaged yeast cells (S. cerevisiae) containing only donor molecules (D) and computed the FRET efficiency. An average E_{app} of 4-5% was obtained, demonstrating systematic detection of a small amount of false FRET. Nevertheless, lack of detected FRET between D_2 and D_3 receptors does not necessarily indicate lack of hetero-oligomerization, as FRET may have been impaired due unfavorable positioning of and distance between D and A tags. Future studies will explore D_2/D_2 and D_3/D_3 homo-oligomerization, wherein receptors of the same type may form homodimers. Studies of oligomerization in GPCRs help us to understand the complete role of these protein assemblies in biological systems and aids in the understanding of pharmacological action at receptor sites. D_2 and D_3 Dopamine receptors are implicated in various diseases, and understanding their related functions and structures aids in the study of their treatment.
natural source. The purpose of this research project is to synthesize ample quantities of furanokurzin in the laboratory so that more testing can be done on the compound. A proposed synthetic scheme was devised for the synthesis of furanokurzin using information from an online database and theory of synthetic chemistry. A four step pathway was eventually resolved and all the steps attempted so far were successful. The first two steps are verified and the third step is currently being researched. The first step was a protection reaction followed by a reduction to produce a substituted benzofuran in the second step. The substituted benzofuran that was produced is a new compound that is uncategorized. Now that it is known that the substituted benzofuran can be synthesized, it can now be Brominated via a benzylic Bromination. It was discovered that the protecting agent in the first step is required for all of the proceeding steps so if the substituted benzofuran can be Brominated in the correct position, a Wittig reaction can be performed on the Brominated benzofuran along with deprotection to ultimately yield Furanokurzin; the target molecule.

Shelby Schuppe (UW-Stout)
International Influence on the Dissolution of Yugoslavia and Displacement of Refugees
Mentor: Nels Paulson, Applied Social Science

Two million refugees were displaced from their homes in Bosnia Herzegovina alone throughout the Yugoslav Wars. The lack of international assistance during a war that crossed borders leads to the questioning of why refugees were more likely to be displaced to certain countries over others. Exploring previous influence on Yugoslavia gives way to a better understanding as to where and why refugees were displaced in particular areas of the world. Data was gathered through the United Nations High Commissioner for Refugees (UNHCR) statistics and recoded into five groups based on the years that refugees left Yugoslavia. There are two types of refugees: those assisted by UNHCR and those not assisted by UNHCR. Multinominal regression was run comparing whether refugees were internally displaced, stayed in Europe, or left Europe. Yugoslavia consisted of seven main ethnic backgrounds from Bosnia Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia, and Slovenia. Depending on whether refugees were assisted by the UNHCR influenced whether or not they were internally displaced versus leaving Yugoslavia. The question that remains unanswered is the historical influence of the main countries that Yugoslav refugees were more likely to be displaced in. This information is gathered based on the quantitative data informing the location of refugees in order to effectively analyze the why part of the research question. The three main countries include Germany, Sweden, and the United States of America as the refugee displacement was largest in these three countries outside of Yugoslavia.

Andrew Schuster (UW-Milwaukee)
Exploring the Affective Domain in Introductory Chemistry Courses - A Cluster Analyses Study
Mentor: Kristen Murphy, Chemistry

Over the past decade or so, persistence in STEM has become a widely discussed issue among educators and policy makers alike. Given that fewer than fifty percent of students who enter college to major in a STEM field actually complete a STEM degree and that these numbers become even less optimistic when studying underrepresented gender subgroups, it is crucial to examine the factors that contribute to declining persistence in STEM. While much of the research in STEM persistence has focused on math and engineering domains, with an emphasis on understanding cognitive factors, investigating and understanding persistence in STEM is no longer a purely academic question. Regardless of ability, students’ interests, motivations and beliefs about themselves have a far reaching impact on whether they “persist,” “switch” fields or leave STEM entirely. This study aims to explore the affective domain in introductory chemistry courses using Social Cognitive Career Theory (SCCT) as the framework. Emerging from this model are two key building blocks (constructs) of academic career choice and development, self-efficacy and outcome expectations. Using data collected from administering the Chemistry Self-Efficacy and Chemistry Outcome Expectations surveys (CSES and COES respectively) to students in introductory chemistry, this study aims to explore these constructs using a new research method, cluster analysis. The results of these analyses will not only help establish the validity of both surveys, but also aid in creating academic and affective profiles of students in introductory chemistry. Ultimately, these profiles will play a role in the predictive STEM persistence model and help us understand the unique role of introductory chemistry in a student’s academic path towards a STEM degree.

Alec Schweiger (UW-Whitewater)
Increased Quality of Functional Pottery Through Surface Embellishment and Treatments
Mentor: Jared Janovec, Art

The creation of objects is a practice that I have always been drawn to. Whether in my artistic pursuits throughout my studies, or as simple as my childhood Legos, creating things has always been exciting to me. Now, as I am pursuing a Bachelor of Fine Arts degree with an emphasis in ceramics, the synthesis of objects is at the forefront of my efforts. I create functional ceramic items rooted in design, and executed through intense surface treatments and embellishments. It is very important to me that each piece I make is a complete composition and can be a confident conclusion by itself. This research will give me the opportunity to expand and explore the infinite realm of surface treatments. The grant allows me to purchase items for the advancement and refinement of surface altering techniques, such as, trimming tools, carving tools, precision banding wheels, and underglazes in addition to
other useful items. The new tools and materials will allow me to broaden the techniques that I already implement in my work, as well as unexplored avenues. I look forward to highlighting my pure white porcelain clay-body with the utilization of the intensely colorful underglazes. The research I conduct with these tools and materials will be used to increase the quality of my forms, textured surfaces, and finished surfaces; increasing the quality of my work as a whole.

**Gino Scuncio (UW-Milwaukee)**

Developing a Novel Therapeutic for Laryngopharyngeal Reflux Disease

Mentor: Alexander Arnold, Chemistry

Laryngopharyngeal Reflux Disease (LPRD), an extension of gastroesophageal reflux disease (GERD) occurs when gastric contents are refluxed past the esophagus into the larynx, pharynx, and even the middle ear. Current acid suppression therapy with proton pump inhibitors (PPIs) has proven ineffective because unlike GERD, pepsin is the mechanism behind damaging of healthy tissues, not stomach acid. When pepsin is refluxed extraesophageally it can actively digest healthy tissues, damaging cells, leading to mutations and causing subsequent cancers.

The objective of this research is to identify new pepsin inhibitors to completely and irreversibly inhibit pepsin’s activity when present in these tissues. Previous work in the project includes three different fluorescence assays, which were developed using labeled pepstatin, cascin, and peptide probes to indicate varying levels of inhibition of the pepsin enzyme. These assays were then used to screen the Library of Pharmacologically Active Compounds (LOPAC) to determine if any compounds inhibited pepsin. Fortunately, each assay turned up only a few hit compounds, allowing our research to focus in on these specific hits. In order to verify that these hits were specific and selective to pepsin, an additional fluorescence assay was designed using a different aspartic protease, Cathepsin-D. The Cathepsin-D assay will be used to again screen the LOPAC library for hit compounds to determine if the previous hits were in fact specific to pepsin. Once target compounds have been identified, they will be subjected to cell based assays to assess their viability as drug candidates in vivo.

**Yuqi She (UW-Oshkosh)**

Quaternary Metal Oxide Investigation for Water Splitting

Mentor: Jennifer Schuttlefield-Christus, Chemistry

The quaternary metal oxide semiconductors were investigated as potential catalysts for water splitting. Specifically, the efficiency of a known three metal oxide combination composed of aluminum, nickel, and iron was examined as a catalyst for water oxidation when a fourth metal was added to the combination. To detect the oxygen evolution of the various combinations, the Heterogeneous Anodes Rapidly Purused for Oxygen (O2) Overpotential Neutralization (HARPOON) kit was used. The HARPOON kit uses a stainless steel mesh coated with paint that contains two fluorophores, one of which is sensitive to O2 and the other insensitive to O2. The ratio of response to the two fluorophores is plotted on a false color map, where the brightest spots correspond to the high concentration of oxygen evolved. Spots that correlate to the catalysts where the highest concentration of oxygen evolved are of the most interest. To date, the addition of the metals molybdenum and cobalt enriched oxygen generation in the aluminum, nickel, iron combination. Further tests are underway to determine the long term response of the materials to simulated solar irradiation.

**Lindsey Shuler (UW-Milwaukee)**

Effects of Autotomy on Locomotion in Cellar Spiders

Mentor: Kerri Wrinn, Biology

There is variation among spider species in their abilities to perform autotomy of appendages and subsequent regeneration, both of which are processes widespread across the animal kingdom. Therefore, spiders provide an excellent model system to study the evolution of these processes. We hypothesized that the costs and benefits of autotomy and regeneration reflect variation in the ecology of the species. Our short-term research goal was to test this by examining the effects of these processes on locomotion across species tested in an ecologically relevant way. We began to study this by working with the species, *Pholcus phalangiodes*, (family Pholcidae, cellar spiders) which are capable of autotomy, but not regeneration.

We conducted a general survey of this species in homes in the Janesville area and recorded how many spiders were missing legs, number and position of missing legs, and the spider’s sex. Our survey showed that 22% of the spiders we found were missing a leg. In our following experiment we only used spiders that had all of their legs intact. In our experiment we focused on the effects of autotomy on locomotion. We measured the speed of males and females traveling on horizontal and vertical surfaces both before and after autotomy of a front leg. These spiders tend to build webs on walls in buildings and thus spend a considerable amount of time climbing, making this an ecologically relevant measure.

Data were analyzed after the trials using analysis of variance (ANOVAS) to compare change in average speed between horizontal and vertical trials for each spider and between the initial trials (intact) and second trials (autotomized for experimental subjects). Most importantly, we found that autotomy of the leg did not affect the speed of locomotion on a flat surface. However, autotomy did affect the speed of both sexes by slowing them down on the vertical surface. Therefore, we can conclude that, for locomotion, there is a cost to losing a leg. However, ecologically, perhaps for this species, this cost doesn’t outweigh the energy required to regenerate their legs. Further studies and comparisons need to be made between spiders that can and cannot regenerate their legs in order to validate our hypothesis. Our long-term goal is to map out the autotomy and regeneration abilities and their effects onto an evolutionary phylogeny across Araneae, the order of spiders.
Dana Sickinger, Hannah Olson, Hallie Cuomo and Jared Phillips (UW-Fox Valley)
“Nontraditional Students in the Writing Center: Identity, Challenges, and Strategies”
Mentor: Christina Marty

During the Fall 2014 semester in the UW Fox Valley Writing Center, we noticed a large number of nontraditional student visits. Through the first few weeks, we observed three occurrences that beckoned our attention: a larger-than-typical number of nontraditional students were visiting our center, the nontraditional students displayed signs of anxiety associated with their academic work, and they began to form their own community of support. Due to our observation of these occurrences, we decided to conduct research to determine whether what we were observing was typical and to determine the best methods for assisting these students. We asked a group of the nontraditional students to fill out surveys, we conducted interviews, and we read scholarship. We learned that there is no one set way to define the nontraditional student concept. We learned that many of these students bring with them all types of anxieties from personal life and from past academic experiences. We learned that they tend to be serious about learning and can often learn more effectively than traditional students, but retention rates are higher due to their (often) inability to move past the anxieties that challenge them with their academic work. The rate of retention is a serious problem in higher education, and if nontraditional students are a population at risk, attention must be paid. We learned that there are ways that these students can be assisted, and a writing center can be their gateway to academic success. In her article “The Writing Center: An Opportunity in Democracy,” Ellen Mohr states, “we who work in writing centers believe that the centers do much more than pass on knowledge: they provide a haven for the disenfranchised, the disenchanted, and the oppressed.”

Writing centers can serve as a safe place for these (often) anxiety ridden students who need an academic home and a place to work through the anxieties that hinder success. Based on her 2008 study at CUNY, Michelle Navarre Cleary reports that “nontraditional students…ranked writing terms papers as the most stressful of twenty-seven tasks” listed in her survey. While we are not trained counselors, we are able to help nontraditional students with their writing. It is often that the feeling of control over this one important task provides the self-esteem and encouragement that they need to move forward with the entirety of their academic work and find success.

Rebecca Sidman and Katy DeZellar (UW-Milwaukee)
From Silver Crystals to Landscape Pixels
Mentor: Joseph Mougel, Photography

For this study, we used a positive photographic process to create new pictorial imagery. Through research and our understanding of darkroom practices, we began to find an alternative way to create imagery. Through this process, we realized that technology is not replacing antiquated photographic methods that came before, but rather, building upon them and helping us achieve what we want; we were able to bring the world into the darkroom. To create these photographic images, called ambrotypes, we needed glass plates of various sizes, darkroom chemicals, an iPad, and an 8x10 photographic enlarger. By referencing historical landscape images, we were able to identify their locations utilizing google maps, street view and google earth. After surveying the landscape, and finding a momentous site, we took a screenshot of the image using an iPad, edited it in photoshop, projected it through the enlarger onto the light-sensitive glass plate, and finally, developed and fixed the latent image. Through this research, we, as photographers, were able to confirm our understanding of the world and our relationship to the landscape. By learning how to hybridize and strategize an antiquated photographic process, we were able to create new, topographical imagery. The result gave us a sustainable way to create images without taking the camera outside, and only bringing minimal equipment into our darkroom environment.

Kimberly Siegler (UW-Milwaukee)
Longitudinal Data Analysis of GI Mortality Rates
Mentor: Peter Tonellato, Zilber School of Public Health

Previous work was done to analyze a possible recessionary effect on emergency department use for gastrointestinal patients from 2006-2010. Results show that the recession affected both the frequency of emergent GI disease diagnoses and the frequency of selected GI procedures, along with related healthcare costs (p<0.03). We worked to build off those results to further analyze the severity of GI diseases during that time. The objective was to investigate the following: How did the reduction in healthcare use during the recession affect mortality rates for GI diseases when patients presented for treatment at the Emergency Department (ED)? The methodology consisted of data-mining within the Nationwide Emergency Department Sample (NEDS) and the Nationwide Inpatient Sample (NIS) derived from HCUP. Specifically, we used data mining techniques to conduct a longitudinal analysis of several relevant attributes. The data mining was performed in SAS. Preliminary results show a decrease in number of GI patients that died in the emergency department, which may be attributed to an overall lower proportion of patients who died in the emergency room from any ailment. Current work is being done to analyze the distribution of deaths relating to age, sex and socioeconomic status. These results, combined with the overall mortality results, will help give a better picture of a possible recessionary effect on subgroups of the population and will also highlight any potential racial and demographic disparities in healthcare use during the recession. These results can help GI physicians to further understand the effect of the recession, which is important for health policy and public health.
Problem-oriented policing (POP) is an approach that focuses on policing interventions that are specific to a crime problem in a particular area. POP programs often include entities outside of the criminal justice system in an effort to develop a multidimensional solution to a problem. In partnership with the Milwaukee Police Department (MPD), the current study examined the effectiveness of POP on crime rates in the city of Milwaukee. The study utilizing a blocked randomized design in which hotspot crime areas were matched on crime rates, geographical size, and qualitative characteristics of the areas. For the matching official crime data and interviews with patrol officers in each area were used to create pairs of hotspots. After the matching was completed, one hot spot in each pair was randomly assigned to the control group and received problem-oriented policing strategies. The other hot spot in the pair was assigned to the control group and only received routine traditional policing strategies during the assessment period. To assess the effectiveness of the POP interventions, two outcomes were examined. The first was physical disorder and was assessed through systematic observations of the areas before and after the POP interventions in both areas. The second outcome examined was crime rates. For this outcome, official crime data was analyzed before and after the strategies and compared in the treatment and control groups. The results indicate the ability of POP to affect crime rates and rates of physical disorder in Milwaukee, WI. They also provide insight into the implementation of POP in the seven districts across the city.

Bryan Sinkovec and Michael Stefik (UW-Milwaukee)
Study of Solid Rocket Motor Liquid Breakup Process
Mentor: Ryoichi Amano, Mechanical Engineering
This project will present research which attempts to characterize the average droplet size of a two-phase flow of water and air. This two-phase flow simulates how liquid aluminum propellant will behave during combustion. During combustion, the aluminum is oxidized into alumina (AlO₃). Under particular flow conditions this alumina can solidify and attach to the inside of the rocket nozzle, which can cause a decrease in performance and fuel efficiency. Computational fluid dynamics (CFD) data will be obtained using the commercial software package STAR CCM+ to help predict how the simulated water and air flow will behave. Experimental data is gathered by taking high quality images of the two-phase air and water flow enclosed by a physical horizontal test chamber. These images are taken at speeds of 2000 and 5000 frames per second (fps) with a Photron UX-50 high-speed camera. CFD data is performed under the same conditions, and images from the simulations are selected for theoretical analysis. The experimental and CFD data sets will be processed using a MATLAB program to determine the diameter of each particle within the test chamber, and this information is used to calculate the average droplet size. This experimental average droplet sizes can then be compared to the CFD average droplet sizes to see if the CFD models are an accurate representation of how the two-phase flow behaves under real world conditions. A valid comparison will ultimately lead to an accurate way of predicting how a two-phase flow will behave during engine combustion.

Alexandra Slay (UW-Milwaukee)
Development and Characterization of Carbon-Fiber/Epoxy Woven Wave Spring Fabrication
Mentor: Rani El-Hajjar, Civil Engineering
Multi-turn wave springs have many advantages over traditional coiled springs. The load in the axial direction is 100% transferable, a higher thrust load can be achieved with a smaller axial height, and the weight can be significantly reduced because the axial height is reduced. Metals, most commonly steels, are used to produce multi-
Chad Smies (UW-Milwaukee)
Neutralizing bFGF (FGF2) in the Infralimbic Medial Prefrontal Cortex Facilitates Extinction of Cocaine Self-Administration.
Mentor: Devin Mueller, Psychology
Prolonged exposure to drugs, such as cocaine, results in numerous structural and functional changes in brain regions found to regulate reward. These changes may underlie specific characteristics of drug addiction such as compulsive drug seeking and chronic relapse. Expression of the neurotrophic factor basic fibroblast growth factor (bFGF or FGF2) has been shown to increase after acute and chronic cocaine exposure in brain regions implicated in addiction, such as the prefrontal cortex (Fumagalli et al., 2006). Our lab has shown that cocaine seeking in the conditioned place preference paradigm upregulates bFGF expression in nucleus accumbens (NAc) and medial prefrontal cortex (mPFC), an effect which was normalized by extinction training. The infralimbic medial prefrontal cortex (IL-mPFC) has been shown to be responsible for inhibiting drug seeking after extinction (Peters et al., 2008). Therefore, we first infused a neutralizing bFGF antibody into IL-mPFC to determine if reduced bFGF levels would alter extinction of cocaine self-administration. Rats self-administered cocaine in 90-minute daily sessions before undergoing four daily shortened extinction sessions of 30 minutes. Prior to these sessions, rats received microinusions of a neutralizing bFGF antibody or vehicle into the IL-mPFC. Short extinction trials of 30 minutes were used to ensure the antibody remained active throughout the entirety of the extinction trial (LaLumiere et al., 2010). Rats then underwent 90-minute drug-free extinction sessions to assess extinction retention from the previous shortened sessions. During the shortened 30-minute sessions, there were no differences in lever pressing between groups. When given the 90-minute drug-free session, however, vehicle-infused rats significantly increased lever pressing while neutralizing bFGF antibody-infused rats did not. These results indicate that neutralizing bFGF in IL-mPFC can facilitate extinction learning. We next wanted to determine if neutralizing bFGF alone was sufficient to facilitate extinction learning. Rats acquired self-administration as stated above, followed by four days of IL-mPFC microinusions of the neutralizing bFGF antibody or vehicle without extinction training. Rats then underwent 90-minute drug-free extinction sessions. Both groups demonstrated normal extinction learning, indicating that neutralizing bFGF alone was not sufficient to facilitate extinction. Finally, we sought to determine the effects of extinction training on bFGF expression in the ventral medial PFC (vmPFC) and NAc following cocaine self-administration. Using Western Blot analysis, animals that underwent extinction training showed decreased expression of bFGF in the vmPFC and NAc compared to rats that did not undergo extinction. Taken together, our results indicate that extinction learning can reduce bFGF expression, and neutralizing bFGF in the IL-mPFC, in combination with extinction training, can facilitate extinction of cocaine self-administration. Thus, targeting bFGF could enhance therapeutic interventions for addictive disorders. Supported by DA027870 and a grant from the University of Wisconsin-Milwaukee Research Growth Initiative.

Cory Smith (UW-River Falls)
How to Deal with Problems Often Overlooked in Society
Mentor: Dr. Joseph Rein, English
My goal is to help others have a better understanding of mental illness and addiction. With the media often misinterpreting these aspects and showing the common population these often false ideologies, many have a misunderstanding of what it means to deal with these problems. Through extensive research and personal experiences I would like to help others better understand the difficulties presented by these problems. While media is the main source for material, there are many documentaries and pamphlets on the subjects. While documentaries and pamphlets are a main source of education for these issues, many don’t have ready access to them. And if they do, many will not take the time to grab a pamphlet and read up on a condition that does not affect them personally. These issues touch home with me as they have passed through my family, affecting my relatives and myself. While we have a mutual understanding, outsiders more then often do not. Through the creative flash fiction works I have created on these problems (alcoholism, OCD, depression, and anxiety) I hope to produce work that will make the reader think about the issues at hand, while being entertained by the creative writing aspect. With fictional pieces combined with research the reader will want to continue to read to find out what is happening story wise, all while absorbing information on overlooked problems in society that would otherwise be disregarded. The final product will hopefully touch the reader, giving them a better look at what it means to deal with these issues and how to handle them with others.
Kelvin Smith (UW-Stout)
Social Network Analysis of Student Activism at UW-Stout
Mentor: Dr. Nels Paulson, Social Science

University of Wisconsin-Stout is a polytechnic university with a focus on applied learning. This differs from the more common liberal arts learning structures seen at other institutions. Although, UW-Stout has an active student body that participates in campus student organizations. In this study, the social justice clubs were put into the foreground to assess the culture of student activism on UW-Stout’s campus. The perspective in which the culture was analyze was through a social networking lens. This enable the researcher to map the social ties between the social justice organizations and the effect those relationships have on the overall structure of student activism on campus. Data collection was done through online Qualtrics surveys. Data representation was done through quantitative statistical methods, such as correlation and descriptive statistics, and sociograms creation. The results of this study show that student leadership is an important piece to the overall structure of activism on UW-Stout campus. There was significant positive correlation seen between the leaders of the social justice organizations and their connectedness with other activist on campus. This shows how important leadership is to the functionality of student activism.

Lee Smith (UW-Whitewater)
Analysis of Bm-daf-16a Function in Brugia malayi
Mentor: Kirsten Crossgrove, Biological Sciences

We hypothesize that the Bm-daf-16a gene plays an important role in the developmental transition of the infective L3 stage to L4 of the parasitic nematode Brugia malayi. DAF-16 is a transcriptional regulator that is modulated by the insulin/IGF-1 signaling (IIS) pathway. In the model organism Caenorhabditis elegans, DAF-16 is required for dauer formation, an alternate stage of development induced by stressful conditions. Dauer larvae of C. elegans are analogous to L3 infective larvae of B. malayi, suggesting that Bm-DAF-16 is important for development and infection of the parasite. To test whether Bm-DAF-16 is regulated by insulin signaling, we cloned Bm-daf-16a into a mammalian expression vector. We are transfecting mammalian cells with Bm-daf-16a and treating the cells to both high and low levels of serum (contains insulin). We predict that transfected cells treated with low serum levels (low insulin signaling) will report higher Bm-DAF-16 activity. We will monitor Bm-DAF-16 activity using luciferase reporter genes with DAF-16 response elements upstream. If Bm-daf-16a is shown to be negatively regulated by insulin signaling, we will try to find its subcellular location by tagging the expressed DAF-16 protein with fluorescent ligands that can be visualized under a fluorescent microscope. We expect to find DAF-16 in the cytoplasm in the high serum levels and in the nucleus when the cells are put in low serum levels. These findings will lead to a greater understanding of the filarial nematode life cycle and could lead to new treatment options for people infected with Brugia malayi.

Nastacia Smith (UW-Milwaukee)
Hippocampal Protein Degradation is Required for the Consolidation of Context Memories
Mentor: Dr. Helmstetter, Neuroscience
Mentor: Patrick Cullen, Neuroscience

When animals are put into a novel context they form a memory of that environment. Animals that have formed this context memory do not show the deficits in context fear conditioning that usually follow immediate shock administration. This phenomenon is known as the context pre-exposure facilitation effect (CPFE). This paradigm provides a convenient method for examining how the hippocampus acquires, consolidates, and retrieves contextual information in the absence aversive stimuli (i.e. footshock). Forming a representation of a context following context exposure requires de novo protein synthesis in both the dorsal hippocampus (dHPC) and ventral hippocampus (vHPC). However, it remains unclear whether hippocampal activity-dependent protein degradation, which has been shown to underlie the consolidation and retrieval of aversive context memories, is required for the formation of context memory following exposure to a novel context. Using in vitro proteasome assays, we investigated the activity of the 20S proteasome by measuring three types of proteolytic activity (chymotrypsin-, trypsin-, and peptidylglutamyl-like) and the proteasome regulatory subunit Rpt6 in synaptosomal fractions from the dHPC and vHPC. We found that exposure to the context resulted in different changes in proteasome activity at different time points between the dHPC and vHPC. We then verified the functional role of protein degradation in the hippocampus by blocking proteolytic activity following exposure to a novel context. Animals received a 5 minute exposure to the context followed by an immediate infusion of the proteasome inhibitor clasto-lactacystin beta lactone (βLac) (32ng/µl), anisomycin (ANI) (125 mg/ ml), or vehicle into either the dHPC or vHPC. Twenty-four hours later, animals were returned to the context and administered 5 immediate footshocks. Fear conditioning was assessed 24 hours following training. Animals that received either ANI or βLac after context exposure showed impaired context conditioning compared to vehicle controls. These data suggest that both protein synthesis and protein degradation are required for the formation of a context representation in both the dorsal and ventral hippocampus. Taken together, the data from the current study suggest that protein degradation is required in the hippocampus to successfully consolidate a contextual memory and that the dHPC and vHPC undergo biochemically distinct degradation processes.
**Steven Smith and Alex Repsold (UW-Whitewater)**  
*Application of 3D-Printing in Tactile Maps for the Visually Impaired*  
Mentor: Hien Nguyen, Mathematical & Computer Science

3D-printing technology has just recently become streamlined for use by the general public. This has allowed ordinary people to create life-changing products using a 3D printer. In this research project, we will design 3D printed maps to aid the visually impaired in navigating specific areas around the University of Wisconsin - Whitewater campus. In designing the map, we will apply concepts commonly used in tactile maps that involve attaching symbols and braille that are raised about 1mm on a flat surface. These symbols will have their corresponding representations explained by using a map key. Furthermore, the overall structure of the map will be multiple map pieces assembled together on a backing piece so that we can achieve a larger map that may be put on display, such as inside the entrance of a building. Our approach involves designing the map based off of floor plans for buildings using 3D design software, Cubify Design. We will then print the map using 3D printing software and 3D printers provided to us by David Buggs at the Whitewater Makerspace. This process involves feeding ABS plastic filament into the printer which then heats up the plastic and prints the desired object onto a surface in layers. The printed object will then be run through a smoothing process to rid the object of the rough texture that results from printing in layers. We envision the end result to be a polished product in which the maps details are not only precise enough so that it accurately represents the given locations, but also simple enough so that it avoids a cluttered feeling. Ultimately, our aim is to help provide a practical way for visually impaired students to navigate and become familiar with the structure of buildings around campus.

**John Sokolik (UW-Whitewater)**  
*A Phylogenetic Study of African Nymphoides*  
Mentor: Dr. Nicholas Tippery, University of Wisconsin-Whitewater Biological Sciences

Plant species diversity contributes to overall organismal diversity worldwide, and by understanding the identities and interrelationships of plant species we are better able to understand the natural environment. The aquatic plant genus Nymphoides contains approximately 50 species, which are found worldwide in a variety of habitats. Although the taxonomy of Australian and North American species is fairly well understood, Nymphoides species in other parts of the world are still in need of study. One such location is Africa, where 12 species are native. Although it is not always feasible to study live species, preserved herbarium specimens can provide traits that are useful for study. In particular, seeds from herbarium specimens tend to preserve well and can be used for identification. In a previous study, seeds from African Nymphoides were analyzed, and it was determined that five out of the 12 species native to Africa can be identified by seed morphology alone. Although morphological studies can be useful for describing species, they are not definitive indicators of relatedness. In order to gain more evidence for inferring phylogenetic relationships, we used DNA sequence data to investigate the species identifications that were made using seed morphology. Specifically, we sequenced portions of the nuclear ITS and plastid matK regions and conducted phylogenetic inference. The results of the phylogenetic inference revealed that differences in seed morphology do indeed correlate with phylogenetically discernable species.

**Melanie Sorman (UW-Whitewater)**  
*Comparison of Carboniferous and Cretaceous Oceanic Anoxic Event (OAE) Geochemistry and Relation to Paleoecology*  
Mentor: Rex Hanger, Geology

Oceanic Anoxic Events (OAE) are time periods when oxygen levels of ancient oceans dropped to levels that were lethal to marine organisms. Occurring throughout the fossil record, OAE are recognized by distinctive geochemical signatures (high ratios of Th/U, Ni/Co, Ce anomaly), and their effects on ancient organisms (size reduction, decreased relative abundance, unique preservation types, and extinction or complete extinction.) My research will focus on regional scale OAE from two time periods at two localities, the Upper Carboniferous (~307-304 million years ago) in southeastern Nebraska and the Middle Cretaceous (~113-100 million years ago) in central Texas, studying and comparing the geochemistry and paleoecology as indicators of oxygen levels during pre-, during- and post-OAE. With this data a simple model can be created for a regional OAE and expand this to a larger model. This model would be useful because it will be able to predict what these Oceanic Anoxic Events can do during global mass extinction events during other geologic time periods.

**Samikqua Spencer (UW-Milwaukee)**  
*Investigation of Attention Bias to Cigarette-Related Cues among Cigarette Smokers*  
Mentor: Hanjoo Lee, Psychology

A wide body of literature has demonstrated a robust relationship between attentional bias (AB) to emotionally-valence stimuli (e.g., words, faces) and psychological outcome (e.g., anxiety reduction). As such, novel interventions were developed with the aim of reducing negative psychological outcome through the mechanism of AB. The results have been promising, as a number of randomized clinical trials have demonstrated positive results (e.g., reductions in AB were related to reductions in anxiety-related symptoms). While much is known about the relationship between AB and anxiety-related disorders and depression, less is known about the relationship between AB and cigarette smoking. To our knowledge, only one study has examined this relationship using a single-session AB modification program. They demonstrated that AB to cigarette-related cues could be increased or decreased depending on training condition.
Two subscales which measured behaviors performed to manage independent living and behaviors to manage the CHC. Frequencies, reliabilities, and paired t-test were used to analyze the data. Results: The expectation scales (condition and independent living) had Cronbach alphas from .73 – .88. The mean age for adolescents’ expectation to manage their CHC was 14.5 years of age (SD= 1.8) and the parent mean was 15.2 (SD=1.7). The mean age for adolescents’ expectation for managing independent living was 15.4 years of age (SD=1.2) and the parent mean was 16.1 (SD=1.4). The paired t-test revealed a significant difference between the adolescent and parent expectation of condition management (t= -2.1; p = .050) with parents expecting a later age than their adolescents. However, there was no significant difference between adolescent and parent expectations for managing independent living.

Conclusions: In the future we would like to analyze the impact of parental and adolescent expectations on self-management behaviors.

Renee Spiewak, Kaleb Maraccini, William Fiore, Steve Hawkins, Nicole Hawkins and Chifu Moua (UW-Milwaukee)

ARCC@UWM: The Search for Pulsars
Mentor: Xavier Siemens, Physics
Mentor: David Kaplan, Physics
Mentor: Dawn Erb, Physics

Pulsars are dense, evolved stars, called neutron stars, that rotate with an extremely reliable period and emit an intense beam of radiation that can be seen from Earth in radio frequencies, appearing similar to a lighthouse pulse. This unique signal allows for novel ways to observe the universe, the most exciting of which is the potential to detect previously undiscovered gravitational waves, giving further evidence to Einstein’s theory of relativity. We currently know of over 2000 pulsars, of which around 10% have frequencies of ~500 Hz and are known as millisecond pulsars. However, methods for using pulsars to detect gravitational waves become more sensitive with every additional millisecond pulsar, so active searches for new pulsars are very important. By remotely observing from UWM with two of the world’s largest radio telescopes, the Arecibo telescope in Puerto Rico and the Green Bank telescope in West Virginia, students discover, confirm, and study these incredible neutron stars while collaborating with scientists around the globe.

Renee Spiewak (UW-Milwaukee)

Bizarre Nearby Galaxies from the Sloan Digital Sky Survey
Mentor: Dawn Erb, Physics

The Sloan Digital Sky Survey (SDSS) has been collecting data for more than 15 years, mapping the sky and revolutionizing our understanding of the structure of the Universe, galaxies beyond the Milky Way, and our own Solar system. By looking at images and spectra of nearby galaxies, we can learn about the evolution and morphology of galaxies in general. In this project, we use the latest data release from SDSS to find rare nearby galaxies with characteristics similar to...
Michael Sportiello (UW-Milwaukee)
Fluorescent Quinolones for Sheet Interception
Mentor: Alan Schwabacher, Chemistry

Methicillin-resistant Staphylococcus aureus (MRSA) infections are responsible for 19,000 deaths per year in the US. The purpose of this research is to design a molecule that selectively binds and inhibits the bacterial protein which is responsible for mechanism of drug resistance. The target molecule of this synthesis [shown below hydrogen-bonded to a protein in the ßbarrel assembly machine (BAM)] is proposed to inhibit BAM, the protein complex that folds ßbarrels of membrane proteins called efflux pumps. These pumps excrete many antibiotics that are otherwise deadly to bacteria, but are removed before they can be effective. We propose a quinolone-based structure as a possible inhibitor molecule for the BAM. Quinolones are planar molecules that can be derivatized to create a rigid scaffold with a pattern of hydrogen bond donors and acceptors complementary to the hydrogen bonding in a ß-sheet. This inhibitory quinolone is being pursued from the starting material dimethyl succinyl succinate. Methods of synthesis include enamine formation and cyclization to form the quinolone. Techniques such as chromatography and crystallization have been employed to purify compounds, and analysis is performed using NMR, IR, and mass spectrometry to characterize new compounds. Once the product is synthesized, binding studies of the product with the BAM will commence in collaboration with a research group that has better methods of binding studies than we currently have. This research is significant because bacteria are becoming more resistant to known antibiotics; our goal is to inhibit BAM thus preventing the folding of ßbarrel efflux proteins and stop the active transport of drug molecules out of the bacterial cell before the organism is killed. So far, three synthetic intermediates have been prepared following our synthetic route to the target. Future work includes continuing the synthesis and further increasing yields for the steps thus far.

Katelyn Stienen (UW-Oshkosh)
Financing the American Dream: The Struggles and Possibility of Hispanic Immigrants Starting a Business in the US
Mentor: Wendy Potratz, Accounting

The American Dream is a notion that US citizens and foreigners alike have opportunity at achieving success and living prominent lives while living in the USA. This impression brings in many immigrants each year to attain these opportunities. They come with the perception that they are able to start with nothing and secure financial prosperity. This analysis will define the American Dream as the idea that those that come to the USA with hopes of starting a successful business. Further, the analysis will compare personal income and business data of varying ethnicities to see the potential for equal prosperity in the USA. Personal income will portray financial position before starting a business. To determine success of a business, an analysis compares startup capital and average income in different industries that vary by ethnicity of business ownership. The data comes from surveys completed by the US Census Bureau. Overall, this analysis focuses on the likelihood of a Hispanic immigrant attaining their interpretation of the American Dream as it relates to creating a successful business.

David Stock (UW-Milwaukee)
What’s the Deal with Women: Aristophanes’ Nebulous Feminism
Mentor: Dr. Tyson Hausdoerffer, Honors College

Gender reversal in Aristophanes’ plays of 411 BCE (Women at the Thesmophoria Festival (Thesmophoriazusae) and Lysistrata) plays a significant role in understanding the extent to which Aristophanes was or was not in support of female social mobility. While at first it appears as though Aristophanes is in favour of improving the power and flexibility of women outside of the domestic sphere, there are critics of this claim who suggest that Aristophanes really wasn’t supporting women’s rights. Others, such as Martha Nussbaum, suggest that the very nature of comedy is feminine and that Aristophanes is promoting a feminine approach to an intensely masculine political trend that dominated 5th C. Athenian politics. Returning to the text of Aristophanes’ preference for returning to a “golden-age” (as suggested in many of his plays, including Peace) which would have placed women in a domestic role, women in Aristophanes’ plays (specifically Lysistrata and Thesmophoriazusae), regardless of their actions or roles, serve as more of a tool, than the subject of focus. Further analyses of Aristophanes’ plays and academic literature regarding Aristophanes, his comedy, and women in his comedy will continue to reveal more about Aristophanes the playwright, Greek comic theatre, and, on a broader level, Greek society in 5th Century Athens. Plays, as well as synthesizing and examining current academic analyses, this project evaluates the extent to which Aristophanes’ personal opinion of gender roles influenced his plays of 411 BCE. This project’s analysis has revealed that Aristophanes did not appear to take any particular interest in the roles of women in Greek society, and that while he may harbor a personal preference for or against increase female social mobility in Greek society, women in his plays serve more as plot devices for political commentary than as representatives of proposed gender shifts.
Stephanie Stoltzmann and John Frye  
(UW-Whitewater)  
Comprehensive Analysis of Tornadoic Daily Cycles from 1979 to 2013.  
Mentor: John Frye, Geography and Geology  

Tornadoes can occur at any time throughout the diurnal cycle; however, the probability of them occurring is not constant throughout that cycle. Historically, tornado occurrences peak in the United States during the mid-afternoon between noon and sunset. The first stages of this research were 1) to verify the exact timing of the diurnal peak for tornadoes from 1979-2013 and 2) to analyze the variations in the spatial patterns of tornado occurrences throughout the diurnal cycle. Once that stage was completed additional research questions emerged and further investigation was needed. The primary question that emerged was whether a significant change in the timing and diurnal distribution of tornadoes across the United States had occurred. To analyze this question the tornado events were divided into three temporal groups (1979-1989, 1990-2000, and 2001-2013). The Kruskal-Wallis and Mood’s Median tests were then employed to determine the changes in the diurnal pattern across space and time. When examining all tornado events, it was found that the afternoon (noon through 6 pm local time) and evening (6 pm to midnight) showed a statistically significant increase in tornado frequency since 1979. However, when limiting the occurrences by region, season, or damage-scale rating, the changes in the frequency did not follow the same statistically significant pattern.

Ari Stone  
(UW-Milwaukee)  
Effects of Histone Deacetylase Inhibitors on Viability and Maturation of Tumor-Induced Myeloid-Derived Suppressor Cells  
Mentor: Douglas A. Steeber, Biology  

An evolving field of anti-tumor therapy is the use of drugs that alter the expression of important regulatory genes in cells, such as tumor suppressor genes. One such approach is by use of histone deacetylase (HDAC) inhibitors. Only a few of these inhibitors are currently FDA-approved for use in patients, primarily for the treatment of leukemia. While these inhibitors have shown effectiveness against blood tumors (e.g., leukemia) they have been surprisingly ineffective for the treatment of solid tumors, such as in breast cancer. Interestingly, treatment with one HDAC inhibitor was reported to increase the production of myeloid lineage cells. One such myeloid cell is the myeloid-derived suppressor cell (MDSC). These cells are immature, diverse, and rapidly expand during inflammation and pathological conditions, including cancer. In cancer patients, these cells inhibit the individual’s anti-tumor immune response, favoring the growth and spread of the tumor. Therefore, the direct anti-tumor beneficial effects of treating cancer patients with HDAC inhibitors may be masked by an increase in immunosuppressive MDSCs. Our research seeks to identify the effects of a particular HDAC inhibitor, Cpd5 (previously synthesized by the Hossain lab, Department of Chemistry, UWM) on MDSC function. Experiments will be carried out using the 4T1 mouse breast cancer model. MDSCs will be harvested from mice bearing three to four-week-old tumors. Initial in vitro experiments determined the effective dose of Cpd5 against the 4T1 tumor cells to be 10_6 M. Future experiments will examine the effects of Cpd5 treatment on isolated MDSCs. Specifically, changes in activation, maturation, proliferation or immunosuppressive activity will be determined using both flow cytometry and fluorescence microscopy. The results of these experiments will provide a better understanding of the effects of HDAC inhibitors on MDSCs and may allow for development of HDAC inhibitors that do not have the undesirable effect of increasing MDSCs during cancer treatment.

Elaine Mary Stone, Catie Smiley, Alyssa Casey, Emily Hein, Alyx Johnson and Sarah Fenander  
(UW-Stevens Point)  

Mé Féin  
Mentor: Michael Estanich, Theatre and Dance  

The background to this research is based off my own journey from Ireland to America. Also, it is about my personal journey and experience of a transitional period of my life. I come from a University in Ireland that was primarily based in minimalistic ideas and experimentalism. It was a multidisciplinary education that encouraged personal artistic development. The work I created was based off of the self-reflective process of a personal life journey. I was inspired by my favorite poem by Robert Frost, The Road Not Taken. The premise of this poem deals with the process of decision making. Frost, reveals through his work, how one can learn to be content with the choices that they make. The metaphorical journey found within the poem connected with me on a personal level for it reflected my own experience. I used a previous movement study I had created and extracted gestures from it. These movements, I felt, connected on many levels with the words of the poem. Breath initiation was the underlying support that motivated the journey and the dancer’s experience. Initially, I started with recorded traditional Irish music, and after a while, I realized that the journey was not complete unless I played my bagpipes. Without the live performance, I felt personally disconnected to the work. Furthermore, once I got into production, I realized the essentiality of my presence on stage with the dancers. My physical presence on stage was the final piece that ultimately completed my self-reflective journey. Each dancer transcended within the journey as an individual, and as a member of the larger group. I desired for my work to be focused on the personal embodiment of movement rather than the physical approach of making shapes and lines. That minimalistic movement, through a series of gestures, allowed each individual to transcend through a simplistic form. Minimalistic movements are essential to what makes us human and it has the unique ability to transcend the body, mind, and spirit. The Minimalistic approach to dance is critical for artistic exploration because of the limitless possibilities it possesses.
Dominic Strangman (UW-Whitewater)
The Development of Vision for Action in Toddlers: The Posting Task
Mentor: Sandra Street, Psychology

Visual information related to perception of objects and action on objects is processed along two neural pathways known as the dorsal and ventral streams. The dorsal stream works as the “how” or “what” system, processing information related to action. The ventral works as the “what” system, processing information relevant to perception. A task previously used in neuropsychology to assess dorsal and ventral stream functioning is known as the posting task and involves inserting a flat, rectangular object into a slot. Recent research used a modified version of the posting paradigm to examine dorsal stream development in toddlers. Street and colleagues (2011) found significant changes in the ability to align a disc with a slot between 18- and 24-months. The younger children failed while the older group easily succeeded. The current study examines the developmental trajectory throughout this time period. Sixteen children were recruited for a longitudinal study. Each child participated in a posting task experiment once a month from 16-months to 24-months of age. The resulting data enabled examination of both the group trajectory and individual differences. Results revealed a linear pathway toward mastery of this task. As in the previous study, the younger children experienced difficulty in aligning the disc with the slot. However, performance improved gradually throughout the 8-month study. The majority of the children were successful by 22-months of age. The developmental changes seen in this study suggest underlying changes in dorsal stream functioning. These results provide insight into a critical developmental stage in a child’s life.

Jacob Strohm (UW-Whitewater)
Analysis of Conditions That Produce QLCSs and Supercells
Mentor: John Frye, Geography

This research focuses on storms known as quasi-linear convective systems, or QLCSs, which are long lines of thunderstorms. They are capable of producing high winds, hail, and tornadoes. The goal of this project was to investigate differences between various events, so that potential impacts can be forecasted with greater accuracy. To do this, four cases from 2003 to 2013 were chosen: one storm that produced mainly high winds, one that produced mainly hail, one which produced tornadoes in supercells, and one which produced tornadoes without supercells. The storms all occurred between the months of April and September, and all impacted Wisconsin. This provided geographic consistency, and limited the storms to the months in which they most commonly form. Conditions such as convective available potential energy, wind shear, and atmospheric pressure were analyzed, in order to visualize the differences between storms. Radar data was also scrutinized for signatures such as hook echoes and bow echoes, which can indicate tornadoes or high winds, respectively. Results of the project indicate that there are differences between these types of storms. However, to truly determine what differentiates these storms, many more cases must be analyzed.

Shawn Strong and Jie Guo (UW-Milwaukee)
Development of Novel Self-Healing for Use in Wind Turbine Blades
Mentor: Ryo Amano, Mechanical Engineering

Wind turbine blades undergo fatigue and their performance depletes as time progresses due to the formation of internal cracks. Self-healing materials are a type of smart materials which have controlled ability to mend thermal and fatigue damages. Cracks in a material generally start off at a microscopic level, and subsequently propagate and connect together causing further damage. A structural material, after regular surface macroscopic maintenance, does not show the same performance standards as the virgin material due to the permanence of internal distortions. The ability to internally fill the crack delays failure of the material and allows prolonged high performance standards with low costs in future damage detection and maintenance. Self-healing in polymers is a unique characteristic used to heal the cracks inherently as they form. In this study, a new method is to be demonstrated for supplying the monomer (that is quintessential for the healing process) uniformly throughout a fiber reinforced polymer composite. The new method to be demonstrated is the use of 1 mm metal wires coated with release film. Each wire will be pulled out after the vacuum assisted resin transfer method (VARTM) and once the resin is completely cured. After pulling the wires out, a vascular network would be left to increase the accessibility of the healing agent. The creation of a vascular network has been attempted in past studies using commercial borosilicate tubing, but proved insufficient due to the microcracking being unable to penetrate the glass tubing. Manufacturing and testing of the wire samples will be systematically the same as the glass tubing samples: the wire layouts will be varied and their effect on the composite structure will be observed. Testing, such as Dynamic Mode Analysis (DMA), will be conducted on the samples to determine the mechanical properties. For making the polymer matrix composites, Volan finish glass fiber material was used. The molding procedure employed the VARTM process, which is an industry standard in manufacturing wind turbine blades. Six layers of glass fiber provided the required thickness for DMA testing. Commercial grade Marine epoxy resin and medium cure hardener were also used. The resin and the hardener were mixed in a 3:1 ratio by volume. Using a vacuum pump, a suction pressure of about 550 kPa was generated to infuse the resin into the glass fiber layers. The sample is then left to cure at room temperature for 24 hours. Once the sample is cured, it is ready to be cut and tested according to ASTM standards.
Kirsten Stuck (UW-Milwaukee)
Of the Iron Range
Mentor: Steve Wetzel, Film

Of the Iron Range is a single-channel video documenting a cultural event in the small Midwestern town of Cuyuna, Minnesota, an area that once held the nation's supply of iron ore. Each year, people from across the region gather as hundreds of wood ticks are collected and raced. I joined this project during the post-production stage, meaning most of the material had already been recorded. Documenting the idiosyncratic moments of human culture has been an ongoing pursuit of the faculty member I was working with, and although I was familiar with the technical and formal aspects of this style of filmmaking, the conceptual and methodological features and the subject matter itself were all new to me. The methods of this research project were informed by and grounded in the history and practice of observational documentary, a style of documentary that gathers materials and forms questions and arguments about the world through a distanced looking. This form of inquiry is of course part of the history of the sciences, and remains foundational to many art forms. Our most significant observations were made while looking at the raw, recorded video material. We witnessed a complete transformation of a site, and learned how geography can become animated through a collective gathering of people. The participants of this social engagement revived and breathed life back into an abandoned space and a forgotten history. Wherever you find humans, you'll find interesting and peculiar creations of shared culture. Within these social events, there is much at stake that transcends everyday life. We know that it is human nature to create reasons for coming together and spending time in close proximity of one another. It's our job as the artist to take the known, shape it into something that's engaging and new and then present it.

Erin Sullivan (UW-Stevens Point)
An Ultrasensitive Laser Interferometer for Detecting Motion with Picometer Resolution
Mentor: Palash Banerjee, Physics

I present an ultrasensitive laser interferometer and its applications to study the vibrations of miniature mechanical systems. This instrument has been integrated into an ultrahigh vacuum setup to detect minute changes in the frequency of magnetic cantilevers, which are about 225 microns long, as they are subject to a changing magnetic field. The interferometer itself consists of an infrared laser, focusing lens, and photo receiver along with various controls. We are able to detect changes in position as small as two picometers (1 pm=10^-12 m). We will continue using this device in our experiments as we study other mechanical setups.

Paige Sutherland (UW-Milwaukee)
Self-Management Strategies of HIV-Positive Mothers in Kenya: Identifying Opportunities for Sustained Wellbeing of HIV+ Mothers and Their Children
Mentor: Dr. Peninnah Kako, Nursing

Background: HIV continues to be a major global health problem. Kenya, located in east Africa, is now ranked 4th in the world in HIV burden where women are the most infected. In Kenya, there is an urgent need to gain understanding of how HIV+ mothers care for themselves and their children to identify areas of intervention and programming for long-term HIV-related self-management. Methods: The purpose of this study was to develop an in-depth understanding of HIV+ mother's self-management. The study employed longitudinal qualitative data analysis using narrative inquiry and self-management theory to determine how Kenyan mothers' self-managed their HIV infection over time. To accomplish the aims of this study, we reviewed the interviews of forty-four HIV+ Kenyan mothers (23 rural and 21 urban) from the longitudinal study titled HIV Transmission Risk, Access to Treatment, and Self Management of Illness Over Time: An In-Depth Longitudinal Study of HIV-Infected Women in Kenya (2010). The data was coded and organized into themes from the self-management theory. From the coded data, we identified common HIV-related self-management techniques. Results: Using narrative inquiry to segment women narratives, common themes on self-management process emerged: Having trust in the doctor or health care clinic; having a strong spiritual connection; Using peer group social support; Having familial support for medication adherence, and Seeking financial support using small scale businesses. Conclusions: HIV+ mothers voices can inform HIV-related interventions and programming in resource-limited areas. Engaging women, who are the most affected by HIV in Kenya, is likely to yield gender and culturally sensitive interventions that could be scaled to similar areas in sub-Saharan Africa. Expected Outcomes: From the findings of this study, we expect to develop a manuscript that documents the social-cultural and family processes of HIV-related self-management strategies for HIV+ mothers and their families in Kenya. From this understanding we expect to inform future HIV interventions and policy on self-management strategies that are culturally relevant and gender sensitive for HIV+ mothers in Kenya.

Katherine Svitavsky (UW-La Crosse)
Expediency Over Ethics: Rhetorical Choices and Implications in the Media of Childfund International
Mentor: Dr. Marie Moeller, English

This research examines rhetoric used by the nonprofit ChildFund International to describe their clientele and the need for the organization. We have all seen ChildFund advertisements on television-- typically, an older, kindly-speaking white man describes the struggle of the child standing next to him, who is portrayed as desperate and often malnourished and crying. These advertisements
as well as other constructed media, found through the ChildFund web presence, are vital to understanding the goals of the nonprofit as well as organizational values. In his groundbreaking article about use of rhetoric to manipulate framing of issues and justify certain actions, Stephen B. Katz articulates an “ethic of expediency,” suggesting that writers undergo a negotiation between what is moral and what is effective when writing about sensitive topics. My research analyzes ChildFund’s rhetorical choices in various mediums and put them in context of what goals the organization is attempting to achieve, identifying and explaining an ethic of expediency within ChildFund, discussing the implications of this ethic and some of the byproducts of this ethic, and suggesting alternatives to ChildFund’s current rhetorical choices. I begin by discussing rhetorical choices of ChildFund International and then explain their purposes and implications, arguing that rhetorical devices serve to support donors’ sense of self and contributing to systems of oppression by enabling donors to distance themselves from responsibility for poverty across the globe.

**Dan Swanson (UW-Milwaukee)**  
Cellular Automata Operations on Penrose Tiling  
Mentor: Suzanne Boyd, Mathematics  
Mentor: Jeb Willenbring, Mathematics

A cellular automaton (CA) is a collection of “colored” cells on a “grid” of specified shape that evolves through a number of discrete time steps according to a set of rules based on the states (i.e. colors) of neighboring cells. The rules are then applied iteratively for as many time steps as desired (see [Wolfram Mathworld]). The general case is a regular periodic grid, and my interest is in how the system behaves on a non-periodic, irregular one. When analyzing a CA, it is convenient for a grid to fill the space that it occupies. Penrose Tiling is an irregular, non-periodic, space-filling tiling. This tiling is closely related to the study of quasi-crystals, for which the 2011 Nobel Prize in Chemistry was awarded. The goal of this research has been to discover interesting differences between the evolution of CA on an aperiodic grid as compared to evolution on a periodic one. Applications of this research are broad in scope and include Material Science and Biotechnology.

**Brett Sweeney (UW-Milwaukee)**  
Magneetostrictive Electric Current Sensor  
Mentor: Chiu Tai Law, Electrical Engineering and Computer Science  
Mentor: Rani El-Hajjar, Civil and Environmental Engineering

Using Terfenol-D as a material for a fiber optical current sensor (FOCS) is a technology that has just been gaining attention of researchers. Coupling Terfenol-D with a fiber Bragg grating (FBG) is an excellent method of magnetic field sensing. However, Terfenol-D is a very brittle material and is difficult to handle. Here, a magnetostriction-based FOCS using a Terfenol-D/epoxy composite is investigated. It consists of an FBG embedded in the composite that converts magnetostrictive strain into frequency chirp of optical signal proportional to a magnetic field. This sensor would be applicable in any situation that requires closely monitoring of an electric current, e.g. the detection of fault current in power systems. The FOCS is based on applying magnetostrictive composite as a transducer that transform a magnetic field into a corresponding mechanical strain caused by the deformation of the composite under the magnetic field. Since Terfenol-D is a giant magnetostrictive material, it can maximize the FOCS response. Its composite is incorporated in the FOCS for increased durability, flexibility in shape, extended frequency response, and tensile strength compared to monolithic materials. For electromagnetic interference mitigation and optimal signal condition, an FBG, which can be easily integrated with an optical fiber network and reflect certain wavelengths based on grating periods, is used to encode strain information onto optical signal. Particularly, the return optical spectrum reflects the strain distribution. A magnetostrictive composite with certain engineered Terfenol-D particle distribution can exert various strain distributions according to different values of magnetic field. Here, the FBG is epoxied between two identical composites in rectangular shape with triangular distribution of Terfenol-D particles that produce an approximately linear strain distribution along the FBG. As a result, the optical signal reflected by the FBG has a spectral width proportional to the magnetic field. The two identical composites are constructed in piece-meal using Terfenol-D particles with sizes ranging from 250-300 _μm_ and a two part epoxy. The mixture of Terfenol-D and epoxy is poured into two identical right angle triangular molds to produce two triangular magnetostrictive composites under a magnetic field that aligns particles along the longer leg of the right angle triangle. Two more pure epoxy triangular pieces are fabricated with the same molds. Each rectangular composite is composed of two right angle triangular pieces with only one of them being magnetostrictive. This setup can potentially allow greater flexibility in tailoring the sensitivity and dynamic range of the sensor.

**Matthew Swiatnicki (UW-Stevens Point)**  
Use of Genetic Markers to Determine Change in Population Structure of Borrelia and its Tick Vector in Wisconsin  
Mentor: Dr. Diane Caporale, Biology

Ten years ago in Central Wisconsin, less than 20% of black-legged ticks, *Ixodes scapularis*, harbored *Borrelia burgdorferi*, the Lyme disease pathogen, while none were detected with *Anaplasma phagocytophilium*, the agent of *Anaplasmosis*. At that time, *B. burgdorferi* and *I. scapularis* populations were both found distinct among Northwest WI, Central WI, and Northeast WI, with very little gene flow between them.
Matthew Teachout (UW-Steves Point)
The Living Environments of the Elderly in Wisconsin: Evidence from the 2008-2012 American Community Survey 5-year PUMS Data
Mentor: David Chunyu, Sociology and Social Work
This study examines the elderly people living in Wisconsin age 60 or greater and their living environments. As people age they live in variety of living environments. This study aims at looking at the different types of living environments the elderly are living in and how that's affected by an array of socio-demographic factors. Using the 2008-2012 American Community Survey 5-year PUMS data, I looked into variables including age, gender, race, homeownership status, marital status, family size, total family income and self-care difficulty. The analysis was conducted using the SPSS software, and the preliminary findings suggest that older aged people are less likely to be homeowners, more likely to live alone, and are also more likely to have self-care difficulty. Regarding the living arrangements of the elderly, I found that generally women are more likely than men to live alone, which is probably because women live longer than men and are more likely to be widowed. But once the marital status is controlled for, such gender difference actually tends to be reserved, with men more likely to live alone sometimes. In addition, I found that people who have self-care difficulties tend to live alone more frequently than those without self-care difficulties. Regarding the homeownership of the elderly, I found that men are more likely than women to own a home. There is also a race effect: whites' homeownership rates tend to decrease with age while blacks' homeownership rates vary in a quite different way and the racial gap tends to close at advanced ages. Homeownership rates are also higher among those who are married and who have higher family income, but once the total family income reaches $60,000 the income effect becomes insignificant. A potential policy implication from this study is that policy makers might consider providing additional support for those who have self-care difficulty because they are actually more likely to live alone.

Robert Teal (UW-Milwaukee)
Transcription Factor Complex Formation in CNS Regeneration
Mentor: Dr. Ava Udvadia, Biological Sciences
In fish, central nervous system (CNS) neurons are able to regenerate after injury. Previous work has identified a neuronal protein, growth associated protein-43 or GAP43, which is involved in developmental and regenerative growth. Using zebrafish as a model organism, our work has focused on the elucidation of molecular pathways involved in the re-expression of GAP43 in response to CNS injury. GAP43 is expressed in both CNS and peripheral nervous system (PNS) neurons until the animal reaches adulthood. Afterwards, the re-expression of GAP43 is induced by neuronal injury, which then contributes to the ability of the damaged tissue to grow through the injured site leading to a full functional recovery. Previously we identified three regions within the larger gene regulatory region of the GAP43 gene that contain possible binding sites for five specific transcription factors, P53, ATF3, MASH1, STAT3, and c-Jun. More recently we verified that three of these five (c-Jun, MASH1, and ATF3) function as major factors in the functional regeneration of CNS axons. c-Jun and ATF3 both contain leucine-zipper dimerization domains, and have been shown to form heterodimers with each other in other contexts. Based on previous results in our lab, we have observed that knock-down (KD) of c-Jun and atf3 expression in regenerating neurons prevents the re-expression of GAP43 in response to optic nerve injury. Our hypothesis is that these proteins, once activated after injury, form heterodimers within the regenerating retinal ganglion cells (RGC), to activate the transcription of GAP-43. In order to test this hypothesis we will use co-immuno-precipitation assays, to test for the physical interaction of these proteins in the regenerating RGCs of zebrafish. We anticipate finding the presence of c-Jun/ATF3 dimers in regenerating RGCs within the regenerative time-frame, post injury. Currently we are optimizing protocols for using the antibodies against mammalian c-Jun and ATF3 in immunoprecipitation and Western blot assays using zebrafish tissues.

Madeline Tetzke and Gayana Wanniarachchi (UW-Milwaukee)
The Influence of Various Psychological Variables on Patient-Reported Versus Clinician-Reported Global Rate of Change Among Individuals with Lumbar Spine Impairment
Mentor: Dr. Bhagwant Sindhu, Occupational Sciences and Technology
Mentor: Dr. Leigh Lehman, Occupational Therapy (University of Florida)
Mentor: Ying-Chih Wang, Occupational Therapy and Technology
Background: Various psychological factors, such as depression, anxiety, somatization, and fear-of-pain, have been found to negatively affect estimates of functional change among people with lumbar spine disorders. However, it is not known how psychological factors influence patient-reported vs. clinician-reported rehabilitation outcomes. The purpose of this study is to determine how depression, somatization, and fear-of-pain impact patient-reported vs. clinician-reported global rating of change, which is commonly used measure of functional change. Methods: A sample of 737 individuals with musculoskeletal conditions of the lumbar spine, who attended outpatient rehabilitation clinics, was used in a secondary data analysis. Data were collected using the Focus On Therapeutic Outcomes (FOTO), Inc. system called Patient Inquiry®. Using global ratings of change (GROC), patients and clinicians rated the perceived amount they have changed since admission on a scale frequently ranging from -7 to +7. A negative number indicates that the condition has worsened, zero indicates no change, and a positive number indicates varying degrees of improvement since

number indicates varying degrees of improvement since
admission. Numerous studies provide evidence for the validity of patient and clinician global ratings. At intake and discharge, function was measured using the lumbar computerized adaptive test (CAT), and pain-intensity was measured using a numeric rating scale (NRS). At intake, a single-item screen was used to classify patients into low versus elevated fear-of-pain, and the Symptom Checklist 90 Revised (SCL-90-R), a self-report clinical rating scale, was used to determine the presence of somatization, and depression symptoms Hierarchical regression analysis determined the predictability of clinician and patient GROCs. The independent variables were entered as three blocks: block one included age and gender, block two included intake pain-intensity, intake functional status, change in functional status, and change in pain-intensity; block three included fear-of-pain level, intake depression score, and intake somatization score. Model R-squared change values were used to determine the amount of variance explained by each block. Significance level was set as \( p = 0.05 \). Statistical analyses were conducted using the software SPSS version 22. Results: For Patient-Reported GROC, Model R-squared change increased significantly when block two variables were added \( (R^2 = 0.119, F_{\text{change}} = 13.100, p < 0.001) \) as well as when block three variables were added \( (R^2 = 0.129, F_{\text{change}} = 3.358, p = 0.018) \). For Clinician-Reported GROC, Model R-squared change increased significantly when block two variables were added \( (R^2 = 0.540, F_{\text{change}} = 97.487, p = 0.000) \). When block three variables were added, there was no significant Model R-squared change \( (R^2 = 0.543, F_{\text{change}} = 1.466, p = 0.223) \). Conclusion: Psychological factors seem to impact patient perception of recovery with rehabilitation. However, psychological factors do not seem to impact clinician perception of recovery with rehabilitation.

**Jordan Thill (UW-Eau Claire)**

**Using Linear Discriminant Analysis to Determine Ancestral Proportions of Admixed Individuals**

Mentor: Dr. Abra Brisbin, Mathematics

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

**Keona Thompson and Kelsey Helm (UW-Parkside)**

Characterization of *Escherichia coli* Gene Mutations that Affect Growth During Metabolic Stress

Mentor: Gregory Richards, Biological Sciences

Glucose-phosphate stress, a metabolic condition that affects bacteria such as *Escherichia coli*, occurs when too much glucose-6-phosphate (G6P) or other related sugar-phosphates accumulate in the cell and inhibit growth. The small regulatory RNA (sRNA) SgrS and the transcriptional regulator SgrR have been identified in *E. coli* as important regulators that help the cell recover from this stress. SgrR activates transcription of the *sgrG* gene, and SgrS works by blocking mRNA translation of genes associated with sugar metabolism and transport like *ptsG*, which encodes the major glucose transporter. While regulation by SgrS has been extensively characterized, very few regulatory targets of SgrR are currently known. The goal of our research is to identify additional genes regulated by SgrR and characterize their role during glucose-phosphate stress. Our lab has previously identified putative gene targets of SgrR by using high-throughput RNA sequencing analysis (RNA-seq) to compare whole-genome expression in wild-type *E. coli* and an *sgrG* deletion mutant grown under stress conditions. To begin to characterize the relevance of these putative SgrR targets to stress, we introduced several target gene insertion-deletion mutations into wild-type and *sgrG* mutant backgrounds using P1 phage transduction and screened the strains for changes in growth during glucose-phosphate stress. Genes encoding functions related to sugar transport and metabolism that showed at least a 2-fold expression difference between wild-type and the *sgrG* mutant were prioritized. Several mutants tested to date did not exhibit significant growth changes during stress. However, preliminary results indicate that mutating *fbp*, which encodes a fructose-1,6-bisphosphatase required to synthesize glucose, results in a slight increase in growth compared to the wild-type parent during stress. Current directions include characterizing stress response induction in the *fbp* mutant, as well as constructing additional mutations in metabolism-related genes and analyzing the mutants for stress-related phenotypes.
Luke Thomson (UW-Milwaukee)
Increasing Thermal Comfort in Buildings Through Optimization of Interior Surface Geometries
Mentor: Filip Tejchman, Architecture

The interior comfort level of a building, defined by ASHRAE as the “condition of mind that expresses satisfaction with the thermal environment” is the primary role of environmental control systems in Architecture. In the majority of buildings, the occupants and equipment produce enough heat that even in northern climates mechanical systems are necessary to cool the interior. My SURF research is focused on reducing the complexity and demand of these systems by optimizing interior surface geometries leading to a more effective flow of air and thus lowering a building’s total energy usage. My method utilizes the UWM School of Architecture building as a case study for evaluating the effect on airflow caused by the shape of the building interior. Using the 3-Dimensional modeling program Rhino3D and testing the pressure and temperature difference across a space using Autodesk Simulation CFD (computational fluid dynamics), we can identify methods of increasing the level of circulation that are beneficial in different building situations. Further developing the results of the latter through iteration, reveals solutions that are permutations of a basic geometrical premise, yielding a precise tool for the refined manipulation of the interior of the building. Results could range from the discovery of significantly different results in testing due to spatial depth of the forms, discovering whether or not the air can be pushed without a mechanical system to move the air in a specific direction, and whether or not there is a uniform geometry that is equally effective in Winter and Summer conditions. The question is not if this is possible, but whether the size of the geometry, the number of geometric instances, or if it is uniform or spaced randomly affects the results the most. Though these individual characteristics could be beneficial on their own, there will be a form that takes advantage of best aspect of each, and that they can be combined in such a way to create the best solution.

Katherine Tindell (UW-River Falls)
Wisconsin Unions
Mentor: Dr. Paige Miller, Sociology, Anthropology and Criminal Justice

Since the 1980s, unions have declined in number and strength in the United States at the same time that the gap between the richest and poorest has continued to increase. In spite of this, public support for unions is ambiguous at best, with some studies finding that such support is dwindling. Is Wisconsin a microcosm of these larger trends, having had a strong historical support for labor movements, and specifically unions? If so, how has the media influenced, or at least reflected, these views? This study seeks to answer these questions through a content analysis of the Wisconsin State Journal over the period stretching from January of 2011 through April of 2011. This period marks the time from when Governor Scott Walker of Wisconsin was first inaugurated to the approximate point at which the Wisconsin Budget Repair Bill was passed, which, among other changes, took away rights of collective bargaining for many public workers.

By analyzing the Wisconsin State Journal, I hope to determine what role, if any, the media plays in shaping and reflecting the public’s views on unions.

Wyatt Tinder (UW-Milwaukee)
Ecological Aesthetics: Potential, Politics, and Movement
Mentor: Nathaniel Stern, Ph.D, Peck School of the Arts - Digital Studio Practice

Introduction: Ecological Aesthetics: potential, politics, and movement is a new book project currently in progress with Dr. Nathaniel Stern, which explores contemporary artworks that manifest a politics of movement, potential and composition outside standard human perception. The book project, for which I am acting as the core researcher, is art-centric, and it exercises a thinking-with specific works across a broad range of disciplines and media, from print to installation to bio-art. Each of the sections narrativizes, through a single artwork or series of works, our experience and practice of complex systems and forces. Methods: In the process of writing Ecological Aesthetics: potential, politics, and movement, we are studying, thinking-with, and weaving together research regarding process ontology and the more-than human (Brian Massumi and Erin Manning), aesthetics (Jacques Ranciere and John Dewey), spatial practices (Michel de Certeau), materialism and vibrant matter (Jane Bennett), anthropology (Eduardo Kohn), and political and environmental ecologies (Gregory Bateson and Félix Guattari), among others. The goal is to present an “ecological aesthetics” that focuses on implementation and impact. Each short section of the book examines one work or series of works by an artist in depth. The first chapter explores Sean Slemon’s tree-based artwork Goods for Me and introduces several of the concepts that will be woven throughout the book. Jennifer Dalton, William Powhida, and Edward Winkleman’s art events #class and #rank are discussed, which show the art world as a complex ecology of people, places, things and concepts, where anyone can influence change. Other projects to be examined include Yevgeniya Kaganovich’s communal work Grow, Malcolm Levy’s other-frames series, Doung Anwar Jahangeer’s performative City Walks, and Kathy High’s bio-art project Blood Wars, among others. A glossary at the end of the book will start to cultivate a common vocabulary for discussing ecological art. We have conducted interviews and done site visits with several of the artists to learn more about their work and their practice. Our goal is to have a draft of the book submitted to editors by early 2016. Results: This research argues that an “ecological aesthetics” is surfacing in contemporary art. The best of art frames and amplifies who and how we are, matter, people, things, ideas, all together, and more importantly how we could be in and with and as those relations. This work can and should be experienced, practiced, and studied through the ecologies at play in and around that frame,
be they material, conceptual, environmental, personal, social, economic, and/or otherwise. Conclusion: While the everyday notion of ecology refers either to the relationships between biological organisms, or political movements that seek to protect the environment, its contemporary philosophical meanings are much richer. Here people and peoples are continuously emergent with their conceptual and material environments, are part of intricate, complex and ongoing assemblages. Art can intensify and frame this experience. The artists and projects examined in Ecological Aesthetics ultimately ask us to take more accountability in how we engage with the habitats we are always already a part of.

Jennifer Tito and Mary Montanye (UW-Whitewater)
Urine Marking, Social Status and Stress in Domestic Dogs
Mentor: Anneke Lisberg, Biological Sciences

The purpose of this research is to determine whether urine marks in domestic dogs convey social status and, if so, whether baseline cortisol levels may contribute to the formation of such signals. Baseline levels of Glucocorticoids (GCS, including Cortisol), sometimes varies in accordance with social status, however the status-GCS relationship is highly variable among social mammals (Creel et al. 2013). In dogs, social status and the correlated tail-base position are associated with changes in urinary marking rates and responses (Lisberg 2009, 2011, Cafazzo 2012) but it was not known 1) whether dogs could distinguish urine marks of high vs. low status individuals nor 2) whether baseline cortisol differences between high and low status individuals exist and might therefore contribute to status signals in urine marks. We added to a previous dataset to compare the response of dogs to urine from high vs. low-tailed conspecific males. This was done to determine whether status might be assessed via olfactory investigation of urine and compared urinary cortisol:creatinine ratios of high vs. low-tailed dogs. These were looked at to determine whether baseline cortisol levels correlate to status in dogs and may therefore warrant further investigation as contributors to urinary status signals and/or marking patterns.

Marion Titze, Jacob Bogenschuetz and Willard D. Robbins III (UW-Whitewater)
The Development of a Cold Atmospheric Pressure Pulsed Plasma Reactor; To Achieve Surface Modification Using the Plasma Immersion Ion Implantation Method
Mentor: Dr. Jalal Nawash, Physics

Background and Rationale: Our research dealt with the design and development of a plasma reactor capable of producing cold atmospheric pressure pulsed plasma for the use of modifying the surface of polymer materials. The purpose of the research behind the development of the reactor is to look at improving the biocompatibility of medical implants, with plasma immersion ion implantation, with a view toward its broad implications. Methods: This project is physically based, but it encompasses more than one scientific field (e.g. medical).

Our research emphasized the broad potential of the project methodically and remained scientifically adherent to allow for successful results and strength in direction. Results: The importance of our research lies primarily in its potential for increasing the biocompatibility of a surface substrate for use in medical implantation devices. Our main result was creating a plasma cloud using high voltage currents and Argon gas within our reactor chamber and providing the ground work for the successful continuation of this, and related, research. Conclusions: Our research for this project is just starting. While we were able to build a working reactor, this was only the first step of the process. The next stage will be to actually measure tangible results based upon how the plasma affects the surface of the substrate used. The potential of our research delves not only into its use in biocompatibility but also into the entire aspect of plasma physics and related sciences.

Angelina Torbica and Rachel Spek (UW-Milwaukee)
SoundForm
Mentor: Karl Wallick, Architecture
Mentor: Kyle Renolds, Architecture

The issue of sound quality has been studied in architecture for centuries. Formal qualities of concert halls are especially known for their advancements in acoustical technologies. Through comparative studies of historical concert halls and studies of form, the research was shaped into graphic diagrams explicating relevant formal and technical information. The study of spatial voids revealed information about the architects design strategies. The research suggested that the most important factor towards this is the formal structure which often relied on materials and secondary solutions. We wanted to relate the study to the human scale; in particular, the consideration of the “Human Conversation.” How can we create architecture that allows and celebrates concept?

Matthew Torrez (UW-Whitewater)
Green Approaches in Photoinitiator Synthesis and Utilization
Mentor: Steven Anderson, Chemistry

The goal of our research is to investigate the use of green solvents and greener methods to synthesize and evaluate photoinitiators that absorb light in the deep UV region. Previous researchers in our lab have synthesized precursor compounds and various sulphonium salt photoinitiators in conventional solvents (e.g., benzene and toluene), which now pose health hazards. Some syntheses have been accomplished in somewhat safer solvents, (e.g., acetone); however, these were not entirely successful because a higher temperature was needed for complete reaction. Due to these concerns we are looking at using ionic liquids, polyethylene glycol, and other potential green solvents. One of the starting materials for our synthesis, 2-bromo-1,3-phenylidendione (BPI), has previously been prepared using liquid bromine in a mixture of toluene and acetic acid. A green approach will use hydrogen peroxide and hydrobromic acid in water. This
research will look at using 1-hexyl-3-methylimidazolium hexafluorophosphate, tetrabutylphosphonium tetrafluoroborate and polyethylene glycol 400. Our syntheses will focus on 2-dimethyl(2-phenyl-1,3-indandionesulfonium)triflate (DIPST) and 2-phenyl-1,3-indane-3,8-phenoxyanthrinium triflate (PIPT). The salts will be evaluated for their efficiency as photo initiators through kinetic studies. While we have data for studies in conventional solvents, to our knowledge, no studies have been done in ionic liquids or PEG 400. Therefore we want to explore the use of these green solvents to not only carry out the synthesis of photo initiators but to use this medium for testing their efficiencies as well as conducting polymerization reactions. Our results, if required shall give us more efficient photoinitiators and greener methods for their synthesis.

Thao Tran, Zachary Forster, Austin Riedl and Heng Zhou Liu (UW-Eau Claire)
Deformations of 5 Dimensional Complex Non-nilpotent Associative Algebras
Mentor: Michael Penkava, Mathematics

Algebraic structures are common objects of study for undergraduates in physics and mathematics. In our research, we look at the deformations of algebras in a given moduli space. Deformations of an algebra are made by introducing a new parameter to the existing set of rules and examining what the resulting algebra is isomorphic to. The moduli space in our research comprises all complex 5-dimensional non nilpotent associative algebras. According to our findings, there are 285 isomorphism classes of algebras, including 16 one-parameter families. Each of these families is parametrized by a 1-dimensional projective orbifold. With the help of the computer algebra system Maple, we have computed versal deformations for nearly all of these algebras, and have completed the study of these deformations for almost all of the algebras. By computing the miniversal deformation of an algebra, we can determine precisely which algebras it deforms to. With this information, we will be able to understand how the moduli space of such algebras is naturally glued together.

Vania Trejo (UW-Milwaukee)
The Economic Impact of Mexican Immigrants on the Greater Milwaukee Area
Mentor: Dr. Swarnjit Arora, Economics

Immigration affects regions of the U.S. in varying ways due to industrial, historical, and demographic differences (Paral, 2009). The focus has been especially strong on Mexican immigrants, considering that they comprise 30% of all U.S. immigrants, but very little research has been conducted on their economic impact on the Midwestern U.S or on their experiences immigrating to the region (U.S. Census, Bureau 2012). The present study estimates the economic impact of Mexican immigrants on the Greater Milwaukee Area in the Midwestern state of Wisconsin. Specifically, the study estimates the direct impact of the Mexican labor force on output, earnings, and full-time jobs using a “multiplier” provided by the Regional Input/Output Modeling System (RIMS II) developed by the Bureau of Labor Statistics. Additionally, the study identifies the immigration and integration experiences of Mexican immigrants to the Greater Milwaukee Area by conducting a thematic analysis of face-to-face interviews. Interview participants consisted of 15 Mexican immigrants from the Milwaukee community that were recruited through purposive sampling. Direct impact results show that the direct impact of the Mexican labor force on the Greater Milwaukee Area is $3.90 billion on output, $1.22 billion on earnings, and 74,796 on full-time jobs created. Preliminary interview results show emerging themes of safety as a benefit to migration, discrimination, and access to community resources as a barrier to integration. Overall, results suggest that Mexican immigrants have a very significant economic impact on the Greater Milwaukee Area and thus, any policy decisions affecting the Mexican immigrant population in this area should be considered carefully due to potential large-scale economic impacts.

Cassandra Turinske and Michael Pauers (UW-Waukesha)
Geographic Variation in Morphology Among Wisconsin Populations of the Orangespotted Sunfish, Lepomis humilis
Mentor: Michael Pauers, Biology

The fishes of the Family Centrarchidae are common throughout North America, and many species are popular food and game fishes. Despite the general prevalence and popularity of the family, little is known about many of the non-game species, including the Orangespotted Sunfish (Lepomis humilis). As a first step towards increasing what is known about this species, we measured morphological and meristic traits among nine populations throughout its range in Wisconsin. Using specimens from the collections of the Milwaukee Public Museum, we measured sixteen distances between various structures or landmarks and counted six meristic characteristics on each specimen. We then subjected these data to two separate principal components analyses (PCA): a sheared PCA for the morphological data, which removed the effect of size from the measurements, leaving only shape; and a standard PCA on the meristic data. Among all populations, there is very little morphological divergence; indeed, all populations are virtually morphologically identical. Interestingly, one population, from Lake Belle View in Dane County, has significantly fewer, yet larger, pored lateral line scales. While the scales of the Lake Belle View population certainly warrant further investigation, especially because Lake Belle View is a manmade lake and has only existed for 102 years, our results also suggest that since such variation can occur over a relatively small geographical scale, an analysis of morphometric and meristic variation should be performed for populations of the Orangespotted Sunfish throughout its range.
Keaton Unrein (UW-La Crosse)
Followers: Effect of Sleep Deprived Bees’ Waggle Dances on the Behaviors of the Surrounding Follower Bees
Mentor: Barrett Klein, Biology

Sleep envelops a large amount of organism’s lives, yet is a field that is full of many mysteries. How sleep has developed evolutionarily given the very vulnerable position it puts the organism in, is something of major interest in the scientific world. In the European Honey Bee (Apis mellifera) sleep has been shown to influence the precision of a dance that individual bees in the hive use to direct others bees of the hive to a food source. Bees that have not been sleep-deprived were shown to have dances that were more precise and sleep-deprived bees have dances that deviate further from the center of the axis of the dance (Klein et al. 2015). A remaining variable to explore in this beehive environment is the effect that these sleep-deprived bees’ dances have on the communication of the food environment to the bees of the rest of the hive. How does the sleep-deprivation and imprecision of the dances affect the ways in which the bees of the hive react? Do these less precise dances impact the direction the follower bee believes the food source is? Do these follower bees sense the fact that this dancer is sleep deprived? Using videos taken of bees that had been sleep deprived and others with a normal amount of sleep, the behaviors of the “follower” bees were analyzed. Dancing bees were followed along their dancing circuit and the followers of these bees, recorded. These followers were then watched and their behaviors logged. This data was then statistically compared to determine the differences in the followers’ behaviors due to a lack of sleep in the dancing bees. The behavior of this follower, dancer relationship provides a vital method of obtaining resources for the hive. Any ways that this behavior is affected, such as this imprecise dance of sleep-restricted dancers, can have vast effects, leading to a need for there to exist a balancing-out behavior. The behaviors of these dancers to discern imprecise and precise dances could lead to an extremely important energy saving mechanism for the hive, allowing it to prosper.

Rhiannon Urbanowski (UW-Milwaukee)
“Ni de Aquí ni de Allá/ From neither Here Nor There”
Mentor: Raoul Deal, Peck School of the Arts

This project, “Ni de Aquí ni de Allá/ From neither Here nor There,” is a project that attempts to bring a voice to Latinos living in Milwaukee and to better understand the variety of experiences that both immigrants and their families go through here in the US. The study is done through interviews with primarily Mexican immigrants, although this is not a specified requirement, and the interviews are then translated and transcribed for record in the UWM Archives. This allows for the future generations to see how the experiences of Latinos has or has not changed many years from now. The interviews were edited into videos for a website so that this information is more easily accessible to the general population. This project was a collaboration between the artist, Raoul Deal, and the participants, thereby allowing for the individual voice of these immigrants to be heard. The struggles of Latino immigrants in Milwaukee varies widely depending on the individual and the ability for these people to collaborate gives justice to their personal stories and the issues that they feel are most pertinent to their community. This project is inspiring, thought-provoking, and eye-opening. The motivation of these individuals comes out in their stories of their personal struggles and the documentation of these experiences is important not only to provide them with recognition, but to demonstrate the Latino civil rights movement happening in Milwaukee in 2015. Without proper documentation, these experiences will never be known or recognized and history will be forgotten. The manner in which this project is facilitated, through art, allows the stories to come to life. The use of art allows people to more easily connect and provides outsiders the ability to relate actual people to these stories. The human connection created by seeing a face transforms these stories into impactful and tangible pieces of history, adding strength to this movement in a manner that does justice to the experience of these individuals. The ability for future generations to connect history with images, with real people, means that these individuals’ stories will never truly die and this movement, how it is at this moment, will forever be recognized for what it was and for what it will become.

Faviola Valadez and Alma Navarro (UW-Milwaukee)
The Impact Low and High Alliance Has on Dropout Rate in The Latino Community
Mentor: Klein-Tasman, Bonita, Psychology
Mentor: Maria Santos, Psychology

Alex Van Abel (UW-Milwaukee)
A Probabilistic Approach To Conway’s Game of Life (And Related Cellular Automata)
Mentor: Jeb Willenbring, Mathematical Sciences

Conway’s Game of Life is the most well-known instance of a class of computational structures known as cellular automata. Conway’s Game of Life, and other “life-like” cellular automata, are “played” on an infinite/arbitrarily large square lattice. At the beginning of the game every square (known as a “cell”) is either “alive” or “dead,” and at each stage of the game (“generation”), every cell changes its state or not based on the number of alive cells around it. Locally, the game is very simple, but globally, surprisingly complex and chaotic patterns emerge from these rules. The central question in our investigation is: given a starting “density,” what can we say about the eventual or long-term behavior of our board? In particular, what can we say about the long-term density? We attempted to tackle this question theoretically and experimentally. We collected large amounts of data running finite boards in Mathematica that seems to converge to likely behavior for the idealized infinite case. In addition to that we used a combination of algebraic, probabilistic and combinatorial reasoning to develop
a polynomial that both accurately predicts short-term behavior and, in a looser way, reflects the behavior of various automata rules.

**Dawn Van Dyke (UW-Milwaukee)**
Ceramics from the Jeremiah Curtin House: Irish Immigrant Consumer Choice in 19th Century Rural Wisconsin
Mentor: John Richards, Archaeology/Anthropology
Mentor: Alexis Jordan, Archaeology/Anthropology

During field seasons that spanned 1976 to 1978, archaeological excavations were conducted at the Jeremiah Curtin house in what is now Greendale, Wisconsin. David Curtin built the side-gabled fieldstone structure in 1846. Curtin and his wife were Irish immigrant farmers who moved to Wisconsin from Detroit with their infant son, Jeremiah in 1836. Jeremiah Curtin worked on the family farm until David died in 1856. Jeremiah sold his half of the farm to his mother and used the proceeds to finance an education at Harvard University. Subsequently, Curtin became a well-known scholar and author who traveled widely and spent little if any time at the Greendale homestead. Currently, the Curtin house is owned by the Milwaukee County Historical Society and is maintained as part of the Trimborn Farm estate owned by Milwaukee County. Archaeological collections from the Curtin house excavations are housed at the UWM Archaeological Research Laboratory (ARL) and currently undergoing conservation and inventory. The project is part of a larger effort to produce a digital record of the ARL collections. The ARL houses archaeological and osteological materials collected over a span of 40 years. The inventory includes significant collections from the Midwest and Mexico representing over 1300 archaeological sites curated in 3000+ standard size (1.1 cu ft) archive boxes. The ARL does not curate ethnographic materials but collections are supported by an extensive archive of paper records, positive and negative films, photographic prints, maps, charts, and video and voice recordings. In order to manage these collections and facilitate research, ARL collections are being entered into a PastPerfect museum software database. The inventory of the Curtin House collections has provided an opportunity to investigate the changing nature of the Curtin household by examining the kinds of ceramic items used during the period of the home's occupation. The analysis has allowed the development of inferences concerning the Curtin's connection to their Irish heritage, the degree to which the family shared in the pioneer experience, and the shifting socioeconomic fortunes of the Curtin household.

**Kazoua Vang, Lao Vue, Wendy Vue and Tujntsuj Yang (UW-Milwaukee)**
Seeking Refuge: Hmong Life in Milwaukee
Mentor: Dr. Chia Youyee Yang, History & Hmong Diaspora Studies Program

Much of the literature about Hmong refugees and immigrants focus on their experiences in California and Minnesota. Wisconsin is home to the third largest Hmong population in the United States and the Milwaukee area is the fourth largest concentration in the country. In addition to analyzing statistical data from the U.S. Census, we conducted oral history interviews with community members and administered a short survey to gather community members' opinions and perceptions about the overall health and well-being of Hmong in Milwaukee. Issues included in this study are education, health, socioeconomic status, religion, race and gender. Overall we interviewed 67 individuals and obtained completed surveys from 155 people. We found that Hmong community members in Milwaukee have made significant gains in terms of socioeconomic status compared to when they first began settling in the city as refugees in the late 1970s. However, national data show that Hmong Americans remain one of the poorest Asian groups in the U.S. The majority of survey respondents and interviewees find the Milwaukee area a welcoming environment for Hmong people and they feel that they have the freedom to practice the religion they prefer. Because of the areas in which they live, the vast majority worry about their family's safety. Additionally, Hmong remain culturally isolated as illustrated by the majority of survey respondents and oral history interviewees that their close friends are mostly other Hmong people. Hmong girls and women have made significant gains in education attainment. The majority of interviewees and survey respondents agree that today Hmong families place equal value on boys and girls. Overall, our research suggests that Milwaukee is a good place for immigrants and refugees. After 40 years, the Hmong are integrating despite some important challenges they face. Given the continued arrival of refugees in Milwaukee from other countries, such as Myanmar (Burma), our findings can help shed light on refugee and immigration policies and practices at the local level. We also think that our study can help community organizations, schools, and government agencies find ways to assist new Americans better adjust to life in the U.S.

**Helue Vazquez Valverde, Shawn Peterson and Greg Sikowski (UW-Eau Claire)**
Assessing American and Chinese Citizen Support for Joining an International Climate Change Treaty
Mentor: Eric Jamelske, Economics
Mentor: James Boulter, Watershed Institute for Collaborative Environmental Studies
Mentor: Won Jang, Communication and Journalism

Climate change could be the single most important issue of our time. China and the United States share the highest importance related to potential climate change mitigation policies because they are the world's two largest greenhouse gas (GHG) polluters and the two largest economies. Efforts to address climate change through international cooperation have largely taken place through the United Nation Framework Convention on Climate Change (UNFCCC). These negotiations have been highlighted by tensions between developed and developing countries regarding what actions to take and who should bear the costs. The Kyoto Protocol, passed in
The rapid growth of global energy consumption demands a long-term sustainable solution. Research over the past several decades has been focused on meeting this demand with solar production of hydrogen fuel via a process called photoelectrochemical water splitting. Recently, much of the focus has been on bismuth vanadate (BiVO$_4$), which has been shown to improve solar-to-hydrogen conversion efficiency and to be stable against corrosion. Efforts at UW-Stevens Point have successfully deposited a BiVO$_4$ film on a fluorine-doped tin oxide electrode. Attempts to synthesize a similar film on a GaInP$_2$ electrode are ongoing. Future efforts will explore alternative deposition methods and intermediary layers to increase adhesion between the BiVO$_4$ and GaInP$_2$ layers of the electrode.

Melady Yue, Tristen Back and Jessica Valdespino (UW-Eau Claire)
Campus Racial Climate
Mentor: Elena Izaksonas, Social Work

The purpose of this research project is to understand students’ perceptions, especially students of color, on racial climate at the University of Wisconsin-Eau Claire. Campus racial climate is broadly defined as the extent to which students of color feel safe and valued on campus. The climate includes attitudes, experiences, and behaviors that affect the campus and surrounding community. In this research project, we highlight the stories and experiences from the students’ view on racial climate as recent events on campus against Hmong and the Eau Claire community have demonstrated a need to have solutions that will reduce race-related issues on a continual basis. Using aversive racism and intergroup conflict theories as the theoretical framework, we analyzed data from interviews conducted during the 2013-2014 academic year using a series content analyses. In addition, we collected data through focus groups during the 2014-2015 academic year form a similar sample to compare and contrast our initial findings. Results suggest there were significant differences in responses of whites and students of color. Common themes of white privilege and oppression emerged. These findings offer clues on ways to improve campus racial climate.

Aaron Vesey (UW-La Crosse)
Warp Drive Space-times in the Weak Field Limit
Mentor: Dr. Mary Krizan, Philosophy

Einstein’s seminal 1916 manuscript “The Foundation of the General Theory of Relativity” constitutes one of the two pillars of modern physics, envisioning a curved space-time manifold which prescribes free fall trajectories, and an equivalence between gravitation and acceleration. As typically conducted by General Relativity physicists, Practitioners of the theory first specify a stress-energy tensor, a rigorous mathematical description of a local matter-energy distribution and its dynamics—the stress-energy tensor serves as the basis for the Einstein Field Equations which, when solved, precisely describe the resulting space-time curvature. In 1994, Miguel Alcubierre reversed this methodology and first described a space-time curvature independent of the stress-energy tensor. He related a space-time geometry which, though it violated several energy conditions endemic to General Relativity physics, appeared to exhibit superluminal (i.e. faster than light) characteristics. We first survey existing literature concerning the physics of warp drive space-times, including a brief historical retrospective and a summary of drawbacks. We then propose a modification to the Alcubierre space-time in order to circumvent these energy condition violations, approximating the geometry in the weak field limit as Fourier and Fourier-Bessel Series compositions of gravitational wave solutions. The weak field warp drive space-time is then analyzed for its physical properties, with a discussion of implications for General Relativity research and the actual engineering of warp drive space-times.

Mae Voeun (UW-Stevens Point)
Bismuth Vanadate-Coated Electrodes for Photoelectrochemical Water Splitting
Mentor: Prof. Kenneth L. Menningen, Physics

The rapid growth of global energy consumption demands a long-term sustainable solution. Research over the past several decades has been focused on meeting this demand with solar production of hydrogen fuel via a process called photoelectrochemical water splitting. Recently, much of the focus has been on bismuth vanadate (BiVO$_4$), which has been shown to improve solar-to-hydrogen conversion efficiency and to be stable against corrosion. Efforts at UW-Stevens Point have successfully deposited a BiVO$_4$ film on a fluorine-doped tin oxide electrode. Attempts to synthesize a similar film on a GaInP$_2$ electrode are ongoing. Future efforts will explore alternative deposition methods and intermediary layers to increase adhesion between the BiVO$_4$ and GaInP$_2$ layers of the electrode.
Leah Warder (UW-Milwaukee)
Microstructural Analysis of Shear Zone Development in Gneiss. Rainy Lake Region Ontario, Canada
Mentor: Dyanna Czech, Geosciences

Ductile shear zones are planar structures that accommodate deformation in rocks deep within tectonic belts. Similar to faults that form closer to the earth’s surface, shear zones allow rocks to slide past one another. Unlike faults, shear zones allow rocks to deform while maintaining cohesion. Typically, the rocks in the centers of the shear zones are deformed the most and deformation decreases to either side, forming a strain gradient. Analyzing microstructures present in shear zones can yield vital information about what small scale mechanisms were at play during deformation and which were responsible for the formation of shear zones in a given rock unit. To be able to analyze and identify microstructures within a rock, thin sections must be made. This is a tedious process in which the end result is a very thin sheet of rock (~30 microns thick) mounted on a glass slide that can be analyzed under a microscope. In this case, the area of interest is an example of small shear zones in gneiss collected from the Rice Bay Gneiss Dome in Ontario, Canada. The rocks in this region were deformed during tectonic plate collisions approximately 2.7 billion years ago, and the shear zones within these rocks formed as part of a sequence of structures that accommodated these collisions on the small scale. The shear zones are small bands within the gneiss, approximately 1 cm wide with reduced grain size and well-developed mineral alignments. Shear zone samples were collected and the rocks were cut so that a series of thin sections across the strain gradient could be analyzed. This microstructural analysis of shear zone development in the Rice Bay Gneiss Dome is part of ongoing research being conducted in the Rainy Lake Region of Ontario. All results of the analysis will be used to better understand shear zone development in this area and to learn how deformation was distributed between the different rock types of the Rainy Lake Region.

Rachel Weier (UW-La Crosse)
Online Homework in Introductory Chemistry
Mentor: Anna George, Chemistry and Biochemistry

Homework is a very important aspect of instruction. Instructors have a variety of instructional tools available including traditional and online homework. This research project is developing a method for determining what topics in chemistry are best reinforced through online homework and which topics are more conducive to traditional homework. Sections of introductory chemistry utilized online homework as part of their courses. Students’ performance (n=402) was measured using a pretest and posttest of the 2003 California Diagnostic Exam. Academic gains of students who completed a minimum amount of online assignments were compared to those demonstrated by the students who completed less than the minimum amount of the online assignments. The methodology and any emerging patterns for the comparison of the two groups will be outlined.

Melissa Whyte (UW-Milwaukee)
Lateral Replacement of the Lux Operon in a Vibrio Isolated from the Intestine of a Coral Reef Fish
Mentor: Dr. Charles Wimpee, Biological Sciences

In a screening of bioluminescent bacteria isolated from the intestines of coral reef fish, two strains (designated D6 and M1) were identified that have a luxA gene sequence significantly different from those of other Vibrio species. Phylogenetic analysis of several housekeeping genes, as well as toxR, shows that D6 and M1 branch within a bioluminescent clade (designated the D1 group, isolated at the same time and place as D6 and M1) that is a close sister group to Vibrio harveyi. However, whereas the luxA genes of the D1 group are >98% identical to V. harveyi luxA, the luxA genes of D6 and M1 have a surprisingly low identity (86%) to the D1 group and to V. harveyi. Strain D6 and strain D1 (a representative of the D1 group) were chosen for further investigation. The lux operons (luxCDABEGH) and flanking regions of both strains were cloned into E. coli and sequenced by primer walking. Although distinguishable from Vibrio harveyi, and possibly representing a new species, strain D1 is clearly a close relative, and has the same genes flanking the lux operon as V. harveyi. However, in addition to a highly divergent lux operon, the flanking regions of D6 are completely different from those of D1 and V. harveyi. Based on differences in luxCDABEGH sequence and chromosomal context, we conclude that the lux operon of D6 was acquired by lateral gene transfer. PCR and Southern hybridizations show that D6 contains a single lux operon, so we conclude that this operon represents not simply a lateral transfer, but a lateral replacement of the original operon. We also show, in an E. coli expression system, that the lux operons of both D1 and D6 are up-regulated by the Vibrio harveyi LuxR protein, indicating evolutionary conservation of lux gene regulation, despite the high degree of sequence dissimilarity between the two. These results show that we have not exhausted the diversity of bioluminescence genes in bacteria.

Alexander Wickstrom (UW-Milwaukee)
Spectral Domain Optical Coherence Tomography for the Assessment of Cerebrovascular Plasticity
Mentor: Rodney Swain, Neuroscience

Vascular pathologies represent the leading cause of fatality worldwide, killing 17.5 million people in 2012 and accounting for 3 in every 10 deaths. Hypoxia is a disease state that frequently manifests as a result of these medical conditions, neurologic or otherwise. Underlying mechanisms are common in the neuronal degeneration resulting from acute injury (e.g., stroke, trauma) and during progressive, adult-onset diseases (e.g., ALS, Alzheimer’s disease, vascular dementia). Recent evidence has demonstrated that exercise is a powerful activator of compensatory mechanisms for the lack of oxygen and glucose supply following a significant reduction or cessation of local vascular circulation. Traditional methods of analysis (e.g., histology, immunohistochemistry, etc.) have enabled researchers to successfully examine changes
in cerebrovascular architecture in response to exercise; however, these techniques typically require the sacrifice of the animal, which inhibits longitudinal data and prevents translation to human medicine. More advanced techniques, such as functional MRI, have allowed researchers to investigate exercise-induced changes in brain anatomy and function at multiple time points over long periods of time. While these technologies are generally non-invasive, they are prohibitive in terms of cost and image resolution. The present study introduces spectral domain optical coherence tomography (SD-OCT) as a means to fill the respective gaps in both traditional analyses and established brain imaging techniques. SD-OCT produces high resolution, three-dimensional angiograms, and allows for non-invasive imaging within the same animal at multiple time points. This enables us to map the temporal sequence of cerebrovascular growth in addition to real-time changes in blood vessel dilation. Despite advancements in the field, the independent effect of exercise training on cerebrovascular structure and function has not been fully explored. Thus, the primary goal of this study is to examine long-term cerebrovascular changes in the forelimb region of the primary motor cortex of the adult rat in response to voluntary exercise. Using SD-OCT to analyze blood vessel density between exercised and non-exercised animals will allow us to investigate the cerebrovascular system and the effects of exercise with high precision. An additional goal of this study is to examine real-time capillary dilation in response to a laboratory-induced condition of hypoxia (i.e., 10% oxygen). Utilizing SD-OCT to examine changes in blood vessel diameter between exercised and non-exercised animals will allow us to draw conclusions on exercise-induced cerebrovascular plasticity.

Keaton Wigg (UW-Oshkosh)
The Connection Between The Presence of Woodland Voles and Recovering Oak Openings Connection Between the Presence of Woodland Voles and Recovering Oak Openings
Mentor: Donna Charley-Johnson, Biology
Mentor: Dr. Gregory Adler, Biology

The hypothesis to be tested was that Woodland Voles (Microtus pinetorum) are found in higher abundance in Bur Oak Openings that are fully reestablished (recovered from a disturbance and closely resembles its pristine condition). When Wisconsin was first settled there were millions of acres of Bur Oak Openings, and by the 1980’s 99.98% were gone. A strong association is known between the Woodland Voles and Bur Oak Openings. These findings have larger implications for the degradation of our landscape. The absence of Woodland Voles is just one species missing from a complicated ecological system. Biodiversity loss is a critical issue in restoring ecosystems. As ecosystems become less diverse they become less resilient to degradation. A positive feedback loop is established where the loss of species causes the ecosystem to become more damaged, thereby creating a less fit habitat. This loop continues on and on. This conclusion further supports the connection between animals and plants in their ecosystem.

April Wildes (UW-La Crosse)
Who Are You in Wonderland?
Mentor: Kelly Sulzbach, English

Lewis Carroll’s Alice in Wonderland is a prominent text to study when analyzing the issues of identity. Carroll, alter ego of Charles Dodgson, creates a world of illogicalness, while Dodgson’s actual life was stable and cautious. Connecting the instability in his writing to his logical career as a mathematician, the case of identity is questioned due to shifting attributes that satirically correlate to Victorian society as you fall deeper down the rabbit hole into a world as far from reality as you can get. By having the Queen, a political figure, make implausible notions, which can be seen in the crocket and trail scenes, assists in Carroll’s view of the era. This could be seen as a satire for Queen Victoria and his true feelings about her in power. Being that since, in this time period, his inappropriate fascination with a child was seen as culturally improper, he took to his writing to caricaturize and criticize the Victorian society. Carroll writing down his imagination sparked an oasis where there are “gently smiling jaws,” where one person can be a juror, jury, and witness all in one trial, and when a cat has “very long claws and great many teeth” it should be treated with respect; allowing for the issue of identity to flourish and remain constant. Is that the reason Wonderland was created, to allow for one’s self to be both sides of himself? The only stable constant throughout his novel is instability. Alice is the epitome of a character with identity issues due to constantly shifting size and how she feels she has changed several times since entering Wonderland. Wonderland is a symbol of the illogical and counteracts the stability of reality. This then points to another question about Wonderland, does Wonderland represent a world outside of reality that is meant for the uncertainty or does each of us have our own type of Wonderland within us that we must eventually come to face because identity is a topic each of us has to confront. This then finally leads us into the ever demanding question that Wonderland holds, “who are you?”
Ashley Williams (UW-Milwaukee)
A District-wide Assessment on Improving School Environment and Discipline
Mentor: Elizabeth Drame, Exceptional Education

This study looks into non-school factors, such as student engagement in extracurricular activities, discipline disparities and communication and their impact on a students’ likelihood to succeed in school. Bower hypothesizes that “non-school factors” can influence a student’s performance in academics and behavior (Bower 2011). This study conducts a district-wide analysis of a high school’s climate and discipline data in a school district in Wisconsin to address the lack of involvement and engagement of Black students in the overall school community. Some questions explored include: What cultural behaviors and expectations are in place that may impact this? High school is a landmark time for adolescents so the general atmosphere, or climate, of the high school is crucial. Through surveys, focus groups, and data retreats this study is informing the high school’s efforts to improve the overall climate. Initial findings include disproportionate experiences by race including but not limited to: different punishment for the same or similar offense, extracurricular opportunities not being translated properly to other languages or at all, low morale of staff on sympathizing or aiding minority students with issues, and excessive equity initiatives being put in place to increase equity. These initiatives are in effect to aid the current disparities that exist between students of color and white students and increase the participation of minorities in the school community. The effectiveness of previous equity initiatives has been inconsistent. This research is still in its early stages in its second year and is ongoing.

Michelle Willis (UW-Stevens Point)
Differences in Parental Care Behavior Between Whooping Cranes (Grus americana) and Greater Sandhill Cranes (Grus canadensis tabida) at Necedah Wildlife Refuge
Mentor: Shelli Dubay, Wildlife Department Professor
Mentor: Lindsey McKinney, UWSP Graduate Student and Co-advisor

The endangered Whooping Crane was reintroduced into Wisconsin in 2001. Whooping and Greater Sandhill Cranes breed in Necedah National Wildlife Refuge in central Wisconsin. The ground nests of these birds are fairly large and each breeding pair usually lays one or two eggs between April and June. After about a month of incubation the colts hatch and eventually fledge from the nest. The first year of life is shown to be the most vulnerable time period for these birds. The wild population of Whooping Cranes, which breeds in Wood Buffalo National Park, Canada, has an annual chick survival rate of 0.42 while the annual adult survival is 0.87. In spring 2014, data from trail cameras were collected at nine Whooping Crane and seven Sandhill Crane nests. Cameras took one photo every 5 minutes. Pictures were sorted and then individually tagged with behaviors exhibited by the birds at the nest. I compared behavior indicative of parental care (average time spent tending, brooding, both tending and brooding, and time spent away from colt) at each nest between Sandhill (n=4) and Whooping (n=5) crane nests. Differences between the two species were then analyzed using a two-way factorial ANOVA with subsampling. Results show that Sandhill Cranes spent more time brooding (F0.003,7=13.33, P=0.0082) and caring for the colt (F0.003,7=14.27, P=0.0069). Whooping and Sandhill Cranes spent similar amounts of time tending the colt and away from the nest (F0.003,7=0.3, P=0.6017 and F0.003,7=0.68, P=0.4374 respectively). Our results indicate a difference in parental care behavior between these two crane species. More research is needed to determine if a difference in parental care results in a difference in fledging success.

Amy Wilson, Kenia Rivera and Kristin Basche
(UW-Milwaukee)
Pilot Study of Response Inhibition in Adolescents with Williams Syndrome using a Go/No-Go Task
Mentor: Bonita P. Klein-Tasman, Psychology

Introduction: Williams syndrome (WS) arises from a 7q11.23 deletion and is associated with well-established physical and psychosocial characteristics including aortic stenosis, facial dysmorphism, hypersociability, and poor spatial function with relatively spared verbal function. Individuals with WS have difficulty inhibiting responses and very often have comorbid attention deficit hyperactivity disorder (ADHD). Examples of everyday behavior that may arise from poor inhibition include repetitive question asking, failing to break prolonged eye contact, and the high social drive often noted in WS (Porter et. al, 2007). The current analysis seeks to describe correlations between performance on an inhibitory non-emotional Go/No-Go (GNG) task and intellectual functioning, gender, and severity of comorbid ADHD symptomatology in an adolescent WS sample. Method: Participants ages 12-17 and their families were recruited. To date, 11 participants were assessed (4 males, 7 females). The Kaufman Brief Intelligence Test II (KBIT-II) was administered to assess verbal, nonverbal, and overall intellectual functioning. The Mini International Neuropsychiatric Interview (MINI) and Conners-3 Parent Report Short Form (Conners) were administered to assess attention problems. A computerized GNG task was administered online to individuals in their homes. This task measures response inhibition by prompting participants to respond to “go” stimuli by pressing the space bar and to withhold their response for a “no-go” stimulus. Comission errors, Omission errors, and Reaction Time will be examined. Results: Independent t-tests will be used to explore possible gender differences in CE, OE, and RT. Bivariate correlations will be used to evaluate whether CE, OE, or RT are significantly related to intellectual functioning, age, and severity of attention problems. Comission errors (CE; false positives) indicate a failed inhibitory response and were predicted to negatively correlate with intellectual functioning but positively correlate with attention problems. Amount of omission errors (OE; missed responses) were predicted
to negatively correlate with intellectual functioning (Capitao et. al, 2011) and lower parent endorsement of ADHD symptomatology. Reaction time (RT) indicates the amount of time a participant waited to respond to a go stimulus. RT was predicted to be negatively correlated with intellectual functioning but positively correlated with attention problems. Discussion: The results of this analysis will be used to better describe multiple aspects of response inhibition in the rarely-studied demographic of adolescents with WS. Due to the limited sample size, results are intended to be interpreted as a pilot exploratory analysis; follow up with a larger sample will be needed.

**Danny Wilson** (UW-Parkside)
The Use of Land-Use Histories to Compare Vegetative Types Between Old Growth and Secondary Forest Communities
Mentor: David A. Rogers, Biological Sciences

Restoring and managing ecological communities to maintain diversity is a fundamental application of ecology. Forest development and ecological succession of abandoned agricultural land should reflect both habitat loss and fragmentation in the surrounding landscape that filter the types of species able to colonize these habitats. Comparing land-use histories of remnant old-growth and newly developing secondary forest communities could be used to understand which species are able to regenerate naturally and which cannot and should allow us to identify which species are most in conservation need. Within the University of Wisconsin Parkside campus, several forest communities of different ages and land-use histories exist, including both old-growth remnants and secondary forest communities that previously existed as agricultural fields. Within these communities, we quantified colonization success through ecological surveys of tree, shrub and herbaceous species using a modified Whittaker design to compare differences and similarities between these forest communities with differing land-use histories. Our results show a clear differences between old-growth and secondary forests in terms of diversity and species composition. Forest development on former agricultural land showed little to no recruitment of the oak and hickory species that still dominate old-growth forests, but tended to be richer in herbaceous species, though of lower floristic quality. However, those secondary forests physically closer to old-growth forest did have some oak regeneration and better recruitment of higher quality herbs. These results suggest that dispersal limitation is a key driver of understory diversity and that assisted dispersal could be a strategy for the conservation of forest and understory diversity. Assisted dispersal within these forest communities could help the regenerative process of species with limited dispersal abilities or no nearby source population. Our next step is to repeat this study over a larger landscape and to start seed addition experiments on UW Parkside’s secondary forests to help facilitate the restoration of oak-hickory forests.

**Donielle Witynski** (UW-Parkside)
Paws and Claws: Ecomorphological Differences of Felid Unguals
Mentor: Christopher Noto, Biology

All living cats are members of the family Felidae. Felids have evolved a range of adaptations to their mainly carnivorous lifestyle including retractable unguis (claws). While felids are similar in overall anatomy, each species possess specialized morphology according to prey preference, predatory methods, habitat, and locomotion. Compared to studies of limb and skull anatomy, little is known about the range of ungual morphology present in extant felids. The purpose of this study is to quantify differences in ungual shape and test their relationship to selected ecological variables. A geometric morphometric analysis was performed on over 180 individual claws spanning 18 extant felid species from the Field Museum of Natural History (Chicago) and the American Museum of Natural History (New York). A series of 14 coplanar landmarks were placed on photos of claws in lateral view using the software tpsDig. Shape data were analyzed with MorphoJ. Results of principal components analysis (PCA) show that the majority of variation between species is explained by changes in the bony portion of the ungual with respect to the length and degree of curvature of the keratinous sheath. Canonical variates analysis (CVA) found that large and small prey specialists’ unguis are significantly different in shape. Furthermore, morphological differences are strongly influenced by whether or not species lived in an open or closed habitat. A linear regression showed a significant positive relationship between body size and prey preference, where a change in claw shape corresponds to body size over 22kg, confirming that prey preference is dependent on body size. These results also confirm the uniqueness of the cheetah claw, which is unlike any other felid. The margay is also an outlier, possibly due to its arboreal lifestyle. Studies like this provide an opportunity to identify ecomorphological traits common to other extant tetrapod unguals, while creating a basis for determining ecological traits of extinct felids and other fossil carnivores.

**Anastasia Wolf-Flasch and Claire Hillmeyer** (UW-Stevens Point)
Upland Influence on Wetland Restoration in Lost Creek
Mentor: Dr. James Cook, Natural Resources: Forestry

Ecotones are defined as areas of transition between two different plant communities. The restoration of Lost Creek included an upland ridge seeded with prairie species and a lowland with wetland species. This study focuses on how the prairie component of the restoration site influences the sedge meadow wetland. Because the restoration site is young, one objective of this study was to set a baseline of the Lost Creek vegetation along the ecotone for future reference. In total, 42 point intercept transect surveys were inventoried in 4 different zones selected by change in slope, vegetation, and location. Percent wetland cover and richness were calculated for
each transect. It was expected that the percent cover of wetland (OBL and FACW) species would increase moving further from the ecotone into the wetland. It was hypothesized that the prairie species would invade the wetland portion of the site. We expected these values to vary between the 4 different zones based on observations of plant composition. Results indicated that the 4 zones were not equal in percent cover of wetland species or richness. Further monitoring of Lost Creek may reveal implications on future restoration designs and how prairie-wetland ecotones may affect development of a restored area.

Jasmine Woodley (UW-Milwaukee)
The Effects of Fly Ash on The Mechanical Properties of Recycled PVC
Mentor: Dr. Nidal Abu-Zahra, Material Science and Engineering
Fly ash is a by-product of coal combustion power generation. For the past thirty years it has been used as a filler in concrete manufacturing. The issue is that the amount produced far outweighs the demand. This study will be looking at the viability of adding varying amounts of fly ash to poly vinyl chloride (PVC) for use in construction material such as decking board. Coal power plants often pay large sums to companies for disposal of their excess fly ash. This means that fly ash can be acquired at low cost and could drastically reduce the cost of PVC. If the study shows that the addition of fly ash can maintain at the very least the physical properties of the PVC product, it will have reduce the cost of the product along with finding an additional use for the fly ash waste stream. Samples must first be prepared and created via extrusion. Next, samples are ground to a powder to produce regrind that is then mixed with regrind free PVC to test the recyclability of the samples. Finally both the extruded samples and the pre extruded mixture must be tested. The tests will include mixing (to test viscosity) tensile tests, Impact tests, dynamic mechanical analysis (DMA), and density tests. These results will be compared side by side with fly ash free PVC for analysis of their feasibility. Feasibility will be judged based on process ability, performance, and recyclability.

Jasmine Woodley (UW-Milwaukee)
Cultural Diversity and the Impact on Attitudes Toward Acculturation
Mentor: Dr. Sarah Morgan, Nursing
Wisconsin Immigration continues to have an influence on the U.S. population by significantly increasing diversity. As immigrants continue to migrate to the United States, providing culturally competent healthcare will be a challenge. Healthcare professionals and providers must work to identify and uncover biases they may hold when caring for people different from themselves. In the United States, immigrants are expected to go through the process of acculturation, in which they adapt to the dominant culture. This expectation of acculturation can have a negative impact on immigrants and other minority groups. Becoming a culturally competent healthcare professional begins with education. The focus of this study was to see if a cultural diversity in healthcare course could have a positive impact on student's views of acculturation. I analyzed 435 matched pre and posttest questionnaires given to undergraduate students in a cultural diversity in healthcare course. My analysis was focused on 32 questions that were part of a larger study. Initial results indicate that a positive change occurred in student attitudes towards acculturation after completing the course. Some differences were found between white students and students of color and require further study.

Pearl Wright (UW-Oshkosh)
Internet Religion: Community Formation on Wiccan Web Sites
Mentor: Dr. Michael Balturis, Religious Studies
A common element of religion is the act of gathering for worship and study as a community. Sociologists have long considered close human interaction to be fundamental to community; and Durkheim wrote that the presence of collective effervescence was fundamental to religion. However, research has shown that an increasing number of people are turning to the Internet for their religious and spiritual experiences. Could cyberspace become a new sacred space not unlike that which churches and temples have provided for thousands of years? This freedom from the brick and mortar locations has also sparked an increase in new religions. One such religion is Wicca, an Earth-based Neo-Pagan practice that has experienced explosive growth on the Web. With relatively few offline groups, the majority of Wiccans experience most of their contact with each other online. This paper explored how people might experience collective effervescence when they only know each other as an avatar and words exchanged on the computer screen and factors such as active discussion threads and chat room rituals are replacing the face-to-face experiences of offline communities. By examining interactive Wiccan Websites, this research identified the factors that members consider important to an online religious community.

Raven Wright (UW-Milwaukee)
Influence of Quality of Life and Reasons for Nondisclosure on HIV Stress Among Urban HIV-Infected African American Men
Mentor: Aaron Buseh PhD, MPH, Nursing
Background: Although antiretroviral medications are prolonging the lives of individuals with HIV/AIDS, many individuals still have to contend with the day-to-day stressors for living with the disease which affects their quality of life. People living with HIV/AIDS also must contend with social stigma balancing who to tell and when to disclose their sero-positive status leading to greater burden of stress. Limited information exists on the path of disclosure, relationship to quality of life (QOL) and HIV stress among urban African American men. Purpose: The purpose of this study is to examine the influence of quality of life and reasons for
Raven Wright (UW-Milwaukee)
Assessing How Cultural Competence Could Identify Color Blind Racial Attitudes Contributing to Health Disparities
Mentor: Dr. Sarah Morgan, Nursing

Background: Although health care advancements have knowingly changed the way health care providers deliver care and have considerably improved patient provider relationships, health disparities among ethnic minority groups continue. These continued disparities result in cyclical inequalities among lower socioeconomic minority families thus contributing to generations of health related issues. Even though current studies are examining methods for eliminating health disparities and barriers to health care access among minority groups, limited information is available on addressing health disparity issues related to providers’ hampered cultural competencies. These uncultivated abilities sustain certain color-blind racial attitudes because when providers overlook the importance of race and culture, while providing care, they discount the importance of effectively interacting with people from diverse cultures and socioeconomic backgrounds. Feasibly these limitations could weaken efforts for bridging health disparity gaps. Purpose: Thus, the purpose of this study is to examine how cultural competency efforts could impact color-blind racial attitudes that may contribute to health disparities among ethnic minorities. Methods: Following IRB approval matched per post questionnaires were distributed to undergraduate students before and after completing a cultural diversity in health care course. Questions included the Color Blind Racial Attitudes Scale as well as questions adapted from a study completed at the University of California Los Angeles. This particular study focused on specific questions selected for their relevance to attitudes that may impact cultural competence. Comparisons were made between white students and students of color. Results: The final sample consisted of 435 matched pre and post questionnaires. Participants’ ages ranged from 18-54 (M=21.56). 69.2% of the participants self-identified as white and 30.8% self-identified as students of color. Compared to students of color, means revealed that white students were significantly more unaware of color-blind racial attitudes related to racial privilege and institutionalized discrimination. There was no statistical difference related to the awareness of blatant racial issues among the two student groups. For questions selected for relevance, means also revealed significant differences on racial and social attitudes that could impact cultural competency between students of color and white students. Conclusion: Findings suggest that there are significant differences in beliefs between white students and students of color. Understanding these differences could positively impact cultural competency and potentially weaken color blind racial attitudes.

Tommy Yang (UW-Milwaukee)
Discovering Cultural Landscapes: Washington Park
Mentor: Arijit Sen, Architecture

After World War II, many technological advancements and economic progress occurred in the United States. The wealth of the nation was experiencing an exponential growth, enabling many people to afford homes and transportation. At the same time government borrowing regulations, redlining, and upward mobility urged many of those residents who had the wealth to move out of the cities to the outer suburbs. This movement reproduced racially segregated urban neighborhoods. With this crisis of urban sprawl, the once thriving, middle class, Washington Park Neighborhood of Milwaukee showed signs of decline. Social divisions, governmental disinvestment, disappearing jobs and industry, and socioeconomic and racial segregations devastated the neighborhood during the late 1990s. Considerable separation between the socioeconomic and racial groups compounded by poverty and crime made the local media see Washington Park as an example of urban problem and blight. All that has changed and today Washington Park is a thriving neighborhood with a growing diverse population, neighborhood grass-roots organizations, and politically aware residents. Washington Park’s new residents, a growing population of Hmong American immigrants has joined Somalis, Burmese, Anglo and African American residents to call this neighborhood their home. The Picturing Milwaukee Project has been documenting the histories, voices, and contributions of old and new residents of this neighborhood since 2014. In Spring 2015 I began collecting stories of the Hmong residents of this neighborhood. Interviews were conducted with Hmong immigrants residing in the Washington Park area are allowed for information such as 1) how these new immigrants use neighborhood spaces, 2) use and describe their homes, 3) how they remember and reproduce their
domestic world in the new setting, and 4) how they assimilate into this new environment to surface into the city of Milwaukee. In addition to conducting detailed oral history interviews, I began documentation of the physical and cultural landscapes of Hmong immigrants in the Washington Park neighborhood will be produced and used to further research on the redevelopment of such cultural landscape. These “storyscape,” a term I borrow from Ned Kaufman, will provide a venue for Hmong residents to voice their experiences and opinions of their neighborhood. I expect that the results of my research will influence and inform city policies, neighborhood narratives and architectural and planning processes. In Fall 2015 a collaborative studio will engage local architects, planners, city officials and UW-M students in rethinking development and growth of Washington Park. This studio, already in this second annual iteration, seeks intervention in architecture that promote physical, mental, and social well-being for everyone while sustaining the environment of the neighborhood. I expect my research results to inform this process.

Aleksey Yermakov (UW-Milwaukee)
Magnetostriective Properties of Nanocellulose Terfenol-D Film Composite
Mentor: Dr. Chiu Tai Law, Electrical Engineering
Mentor: Dr. Rani Elhajjar, Civil Engineering and Mechanics

In this study, we present the results of the preliminary experimental evaluation of the magnetomechanical properties of a novel magnetostriective composite material. The composite is comprised of particles of Terfenol-D, a giant magnetostriective alloy, interspersed within a cellulose nanofibril (CNF) reinforced phenol formaldehyde (PF) film matrix. Due to the magnetostriective properties of Terfenol-D, the composite is able to couple magnetic and mechanical energies in a reversible process. In its monolithic form, Terfenol-D faces several limitations. Namely, it is brittle with a relatively low tensile strength, and experiences significant energy losses at operating frequencies over 1 kHz due to hysteresis and eddy currents induced within the material. When integrated into a composite such as the one presented, both the tensile strength and operating bandwidth of the material are significantly enhanced due to the mechanical and dielectric properties of the matrix. In the case of the CNF composite, there are additional benefits of the natural abundance of the CNF material, and tunable mechanical properties via control of the CNF component of the composite. The work presented encompasses a preliminary analysis of both the magnetostriective and Villari (inverse magnetostriective) responses of the composite, as well as some optimization work. First, the actuation behavior of a unimorph structure was explored. The test sample consisted of two discrete layers of nanocellulose, with one active layer containing Terfenol-D. Upon the application of an external magnetic field axial to the sample, an angular deflection of the sample was observed due to magnetostriective strain in the active layer. As expected, the direction of the deflection was reversed when the sample was reoriented such that the active layer was on the opposite side. Then an attempt to optimize the magnetostriective response of the composite was made. The magnetostriective effect is based on the rotation of magnetic domains of a ferromagnetic material from their equilibrium positions to the direction of the applied magnetic field. Therefore, the change in strain can be maximized by biasing these domains initially to a direction orthogonal to the applied field. To achieve this, the composite films were exposed to a DC biasing magnetic field during their fabrication, aligning Terfenol-D particles along the direction of the biasing field.

Jessica Yester (UW-Milwaukee)
Washington Park Stories
Mentor: Arijit Sen, Architecture and Urban Planning

In the Spring, 2014 semester upwards of 100 students enrolled in Architecture and Human Behavior collected and expanded on stories from the Washington Park neighborhood of Milwaukee. These stories ranged from telling of the neighborhood’s past and present to demonstrating the potential its spaces hold for revitalization. Following the completion of the semester these stories were compiled into a website that is easily accessed by the public and is intended to be used as a resource for projects in Milwaukee Public Schools classroom settings. Each story collected during the semester was carefully read, revised, and linked with others sharing similar themes. This linking led to the realization that the past, present, and future conditions of the Washington Park neighborhood are very much connected, and a web of ideas expanding across the entire neighborhood was created in the process. The work done by the students of Architecture and Human Behavior highlights the underlying community that reveals itself when looked at in-depth, and it emphasizes that neighborhoods like Washington Park cannot go unnoticed in the grand scheme of things.

Anna Yontz (UW-Milwaukee)
Public Good vs. Private Gain: An Experiment in Alternatively Commuting
Mentor: Laura Grant, Economics

Partnering with a company based in Southern California, we were able to study the effects of emails on workers’ willingness to alternatively commute. A group of eighty workers were randomly and evenly split amongst the four sections. In one group, we reminded workers of how they help the environment while gaining $2 a day, $1 each way they alternatively commute. Next, we reminded workers of their harm on the environment when driving alone, while losing a dollar if they do not alternatively commute, in the group named public loss. The next group, labeled private gain, was reminded of their personal benefit, through extra sleep and saving money on gas, while gaining a dollar for alternatively commuting each way. The last group of workers were reminded of missing out on sleep and spending money on gas, while losing a dollar each time they rode alone. This group was labeled private loss. For both groups where workers lost money, we gave them a gift card that started with a set amount, and would subtract from it each day they rode alone. The groups
who gained a dollar were rewarded with increases to a gift card. The messages we sent were analyzed with the real data of the workers alternatively commuting. Self-interest and altruism were the main focuses in this study, with several variables affecting the data. We also wanted to investigate how congestion data and the distance of workers affected their willingness to commute. To obtain data on their distance and other worker characteristics, a survey was given to the workers at the beginning and the end of the study, collecting their opinions and reasons for alternatively commuting and for not alternatively commuting. After the initial three months of the study, we stopped sending emails for the next four months, implementing the reward for everyone. We were able to find that the further workers lived away, the less they rode alone, making carpooling an easy option. The closest workers also alternatively commuted more, taking buses and biking. The workers in the middle of these two groups did not alternatively commute as much. During the most effective, first month of the program, we saw the private loss group to alternatively commute the most. When reminded of the money workers are not saving and the sleep they are not getting, they are most likely to act in favor of the experiment. We are currently still testing the conclusion of the four groups in the final months of the study.

**Juniper Yun Kruser (UW-Milwaukee)**

The Spectrum of Authenticity and Visual Culture of the Mosuo Identity in the Challenge of a Tourism Driven Economy

Mentor: Ying Wang, Art History

In southwestern China exists the land “South of the Clouds”: Yunnan Province. With over 20 reported populations of ethnic minorities, Yunnan has become the subject of many years of cross-cultural studies due to its diversity. One such ethnic minority is known as the Mosuo (Na) people. Primarily residing in villages surrounding Lugu Lake, this minority’s unique quasi-matriarchal family order and “walking-marriage” system exist as a distinctive example of contrast of cultural identity to Han common culture. Due to globalization’s pervasion and the fiscal flow from a tourism driven economy, one sees this culture adapting through performative and preservative actions. The response of the shifting cultural identities of this ethnic group to the flux of global contemporaneity pushes itself to the forefront of studies that deal with tradition, ritual, and ethnicity. Through reading, collecting, and formulating several dossier on the subject, it became imperative to the study for further primary information to be attained. This pressed the need to travel to the location of Lugu Lake and its surrounding villages, where several interviews were held with the local Mosuo population as well as the tourists who bring in the flow of outside culture. Because of the preliminary research and the newly collected information, one sees the shift of the Mosuo identity being accelerated. Mosuo culture is one that is teetering on its own borderline between changing with the contemporary world and enacting multiple levels of cultural preservation. In studies of cultures born from diversity, one connects back and reflects through this case study.

**Nicolas Zahn (UW-Milwaukee)**

Analysis of Metabolism in Benzodiazepine-like Structured Molecules

Mentor: Margaret Guthrie, Chemistry & Biochemistry

More commonly known under the prescription name as valium, benzodiazepines are a class of psycho-active drugs that have been found to treat a variety of symptoms including anxiety, insomnia, asthma, muscle spasms and seizures, alcohol withdrawal, and as a premedication. Structurally, the fusion of a benzene ring and a diazepine ring contribute to the formation of a benzodiazepine. Variances in formations of the drug can be identified by the side-chains attached to the central structure. The overall orientation of these side-chains in a benzodiazepine structure contribute to the highly selective interactions observed with the GABA$_\text{A}$ neurotransmitter. With consideration of the many pathways that form the many types of benzodiazepines, it is understood that some of the structural interactions with the GABA$_\text{A}$ receptor may yield desirable results, such as anxiolytic and sedative pharmacological properties. Chemistry & Biochemistry at UWM, has allocated research towards molecules with structural similarities to benzodiazepines, in hopes of discovering a cheaper, more readily available molecule that can biochemically function like an ordinary benzodiazepine. Currently, active molecules of interest include an Xhe74 Ethyl Ester, an Xhe Carboxylic Acid, an Xhe-III-74 compound, and an HZ-166 complex as the primary standard. Differing amounts of the aforementioned compounds are injected into lab mice, and concentrations of active component are observed in different tissues over several time intervals to identify the metabolic processing of the compound throughout the body. The information provided yields not only hints of the site of biological interaction, but also clues towards the rate and order at which the compound is being metabolized. In conclusion, our current and future research aims to provide further insight to our understanding of different benzodiazepines, and how structural changes to these molecules can impede or enhance a variety of known and unknown biochemical functions within our body. It is of our best interest to continue to identify the unknown possibilities yet to be discovered regarding the structural conformation of these molecules, and to utilize their unique selectivity to develop a novel therapeutic to improve the lives of others.
states that have not implemented such laws.

and outpatient visit rates and compare this effect with property crime, violent crime, inpatient admission rates, states and the District of Columbia to analyze the effect regression model on panel data from 1995-2012 for all 50 population as well. Specifically, we use a fixed effects of legalizing medical marijuana on the health of the 2012. In addition, we also examine the potential effects on crime from 1995-1990-2006. This project builds on this previous research research has focused on potential effects on crime during marijuana legalization. There is much debate as to the benefits and risks of legalizing medical marijuana. Previous research on potential effects on crime during 1990-2006. This project builds on this previous research by examining the potential effects on crime from 1995-2012. In addition, we also examine the potential effects of legalizing medical marijuana on the health of the population as well. Specifically, we use a fixed effects regression model on panel data from 1995-2012 for all 50 states and the District of Columbia to analyze the effect that implementing medical marijuana laws has had on property crime, violent crime, inpatient admission rates, and outpatient visit rates and compare this effect with states that have not implemented such laws.

Mentor: Daniel Gervini, Mathematics

Justin Zellmer (UW-Milwaukee)

Design and Experimentation of Biomass Fuel Conversion
Mentor: Ryoichi Amano, Mechanical Engineering

The state of earth’s depleting fossil fuels has increased the exploration for consistent, dependable alternative energy sources. Biomass, chicken manure specifically, is a suitable substitute that would alleviate the dependency on fossil fuels. According to the United States Census bureau in July 2012 the population of USA is estimated to be 313.9 Million. If we know that the average consumption of chicken per capita is 85 lb/year and the average chicken weight is 3.5 lb., it can be estimated that the USA consumes about 7,623 million chickens/year. The average chicken produces 2.5 lb. of dry manure throughout the course of a year. This data estimates that 19,058 million lb. (8,644 million kg) of chicken manure is produced per year. Knowing the average calorific value of the chicken manure is 14 MJ/kg, we can conclude that the energy in the chicken manure is equivalent to the energy in 30,386,792 barrels of oil. However, the process of getting energy from chicken manure isn’t as easy as burning it. Due to the high rate of pollutants when chicken manure is burned and the low quality of the fuel in its solid state, other ways of harnessing the energy have been investigated. Pyrolysis is a process in which organic based materials are broken down at high temperatures in the absence of any oxidizer. The produced gases and liquids usually have a higher calorific value and can be used as fuel. This work has been devoted to designing and building a Thermo-gravimetric analyzer, or TGA, in order to analyze the pyrolysis of chicken manure with the use of Carbon Dioxide. Previously collected data shows the conversion rate of the chicken manure changes with time. This confirms that pyrolysis is occurring due to the initially slow conversion rate that increases in the middle of the test. Improving the method of collecting data will propel this project to be a reliable test apparatus for future semesters.

Mentor: Nicholas Tippery, Biology

Mentor: Kristen Crossgrove, Biology

Autumn Zentner (UW-Whitewater)

Gene Silencing via microRNA: Developing Tools for Use in an Aquatic Plant Species
Mentor: Nicholas Tippery, Biology

Gene silencing via microRNA interference (Carbonell et al. (2014)) is a powerful method for investigating gene function. This technique can be used as a way of revealing a function of a gene, and this can help us better understand how to fix a problem such as a disease caused by gene malfunction. Since this technique has been successful in many species, the objective of this experiment is to find out if gene silencing using microRNA interference will work in our species of interest, Nymphoides peltata, an aquatic plant in the family Menyanthaceae. In microRNA inference the gene sequence must be inserted into a plasmid, and transformed into Agrobacterium. This bacteria would then be injected into a plant, and the results would be observed. This technique has already been successful in other species, so I predict that it will be successful in silencing the gene PDS. Turning this gene off would result in loss of pigment (white plant), and its success would mean moving on to other genes of interest in Nymphoides peltata. Results from this experiment would include successfully inserting the gene construct into a plasmid, and being able to transform this into Agrobacterium.

Hailey Zieglar, Brandi Greeno and Amanda Habermann (UW-Whitewater)

Reconstructions of Three Cretaceous Marine Paleocommunities, Central Texas.
Mentor: Rex Hanger, Geography & Geology

The Early Cretaceous (Albian) Walnut Formation crops out in the low, wide valleys of the Lampasas Cut Plain of central Texas. The fauna is extremely fossiliferous, with faunas dominated by Bivalves, Gastropods, Cephalopods and Echinoids. New sampling localities are regularly revealed by home/business construction, due to the fact that the Killeen-Temple-Fort Hood Metropolitan Statistical Area (MSA) is one of the fastest growing MSAs in the entire United States. Previous large collections of fossils from the Walnut Fm. were recently supplemented by newly discovered localities within the K-T-FH MSA, and three distinct paleocommunities were reconstructed from these data. Shallowest marine faunas at the base of the formation are low evenness, low richness, and dominated by the large gastropod, Peruvianella dolum. These are replaced upwards in composite section by highest evenness, lowest richness biostromes of the bivalve oyster, Texigryphaea mucronata. The biostromes are highly resistant to weathering and form prominent exposed benches throughout the Walnut valleys. These biostromes are then replaced by the high evenness, highest richness fauna dominated by the oyster bivalves Exogyra texana and T. mucronata; many species of gastropods; the echinoid Enallaster texanum; and the ammonites Engonoceras pierdenale and Oxytropidoceras salasi. Diversity characteristics of the three faunas are then used to create graphic reconstructions of the once-living organisms.

Mentor: Kristen Crossgrove, Biology

Mentor: Nicholas Tippery, Biology

Jason Zellmer (UW-Milwaukee)

Effect of Medical Marijuana Laws on Crime and Patient Visits using a Fixed Effects Model
Mentor: Daniel Gervini, Mathematics

The legalization of medical marijuana has been controversial since its inception in California in 1996. Since that time, over 23 states and the District of Columbia have passed laws to implement various forms of medical marijuana legalization. There is much debate as to the benefits and risks of legalizing medical marijuana. Previous research has focused on potential effects on crime during 1990-2006. This project builds on this previous research by examining the potential effects on crime from 1995-2012. In addition, we also examine the potential effects of legalizing medical marijuana on the health of the population as well. Specifically, we use a fixed effects regression model on panel data from 1995-2012 for all 50 states and the District of Columbia to analyze the effect that implementing medical marijuana laws has had on property crime, violent crime, inpatient admission rates, and outpatient visit rates and compare this effect with states that have not implemented such laws.