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Letter of Welcome

Dear Symposium Attendees:

Welcome to the 9th Annual UWM Undergraduate Research Symposium!

This event celebrates the research collaborations of UWM undergraduate students with our faculty and staff. Over the course of this afternoon, over 250 students from across UWM will present some of the results of their research from this last year. This is a busy season for undergraduate research across the university with students presenting at departmental and school/college events and also participating in national and state-wide undergraduate research conferences, lobbying efforts, and an increasing number of national disciplinary conferences. The work being presented today is not all of the mentored research work being done by undergraduates at UWM. Every year, over 900 UWM students work directly with faculty in research. About half of these students either volunteer or receive academic credit for their work; the other are paid through external and internal grants, including the SURF (Support for Undergraduate Research Fellows) grants awarded by the Office of Undergraduate Research.

We want to thank the faculty and graduate students who have committed themselves to working collaboratively with UWM undergraduates. Too often the work of research mentors is unseen and unacknowledged, and as much as this event is a celebration of the work of our undergraduate students, it is also a celebration of the very idea of research and the long traditions of mentoring the next generation of researchers. We encourage you to take this opportunity to learn more about the extraordinary research collaborations happening across our campus and hope that you will continue to advocate for the participation of undergraduates in research at UWM. And, as always, please thank the people walking around with clipboards today. Over 100 UWM faculty, staff, and graduate students are serving today as judges.

Sincerely,

Nigel Rothfels, Director
Office of Undergraduate Research
**Information**

**Presenter Registration - Outside of the Wisconsin Room, Union 2nd Floor**

Presenter Registration will be open from 10:30 a.m. to 1:30 p.m. All participants can pick up Symposium information and T-shirts at registration. Presentation set-up should occur from 10:30 a.m. to 11:45 a.m.

**Coat Check - Union 220**

For your convenience, a complimentary coat check is located in Union 220. Bags and posters may also be checked. It will be open from 10:30 a.m. to 4:30 p.m.

**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.

**UWM Libraries, Digital Commons - Union 2nd Floor Hallway**

The UWM Libraries encourages all student researchers to publish their research presentations (Power Point, Posters, Videos, Audio, etc.) to the Digital Commons. Please note you will need to have your faculty mentor approve publication of research materials to the site. Publication of your research in the UWM Digital Commons will help build a record of your research work and will be available to a wide audience! If you wish to upload your work, please send it to open-access@uwm.edu. We will contact your mentor(s) for their approval. The deadline for your submission is June 1, 2017. The deadline for your mentor(s) approval is July 1, 2017.
Symposium Schedule - Friday, April 28, 2017

10:30 – 11:45 a.m.
Registration & Presentation Set-Up, Union Wisconsin Room
Oral Presentation Set-Up (Load PowerPoints in Union Breakout Rooms)

11:45 a.m.
Welcome, Union Wisconsin Room

12:00 - 1:20 pm
Oral Presentations, Union Breakout Rooms (see schedule on page 8)

2:00 p.m.
Special Performing Arts Presentation: Our Orphan Train: Devising and Communicating History through Theatre, Union Cinema

1:30 - 3:30 p.m.
Poster and Visual Arts Presentations, Union Wisconsin Room

3:30 p.m.
Closing Remarks, Announcement of Mentor of the Year, and Acknowledgment of Outstanding Presentations, Union Wisconsin Room
Special Performing Arts Presentation, Union Cinema, 2 p.m.

Our Orphan Train: Devising and Communicating History through Theatre

Connor Finnegan, Cory Fitzsimmons, Amanda Houchens, Elisabeth Markman, Parker Munoz, Erik Peppey, Izaiah Ramirez, William Thiemann & Eleanor Wenker
Mentor: Robin Mello, Theatre

This is a collaborative theatre research project exploring best practices of devising new works of historical theatre with social activism at its core. We discuss how we have created a team-based ‘company’ approach to theatre-inquiry. Our research question is: How the history of the Orphan Train Movement, 1853-1929, might best be dramatized, performed, and presented in order to educate the general public about this hidden piece of American history. We based our current research on our pilot project, Orphan Train (Spring 2016), which required us to work as a theatre company and learn research already published on the topic. We were charged with crafting an original and collaborative theatre piece focusing on the social issues and lived experience of the Orphan Train Movement. This work-in-progress was presented to the public in April 2016. We built on this foundation and used the outcomes from the project (nascent script, radio interview on Lake Effect, post-show discussions and lectures, dramaturgical and historical research from archives and other primary and secondary sources, and music pertaining to Orphan Train history) to pursue new research on the subject. In the Fall 2016 we developed and implemented workshops that engage new learners in both the history and the craft of devising new work. We have strengthened our collaborative by sharing leadership roles, working as a supportive team, and finding ways to explore new ideas while developing a shared vision. In February we began new archive research and are in the midst of rewriting and expanding the Pilot script. Our presentation will briefly present the workshop content, engagement with archival materials, and examples from the evolving script. We will also review lessons learned, processes that support our collaborative, audience feedback, and what we view our next steps to be.
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<thead>
<tr>
<th>Location</th>
<th>Time</th>
<th>Presenter</th>
<th>Presentation Title</th>
<th>Research Mentor</th>
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</thead>
<tbody>
<tr>
<td>Union 240</td>
<td>12:00PM</td>
<td>Ravil Ashirov</td>
<td>Media and State-Building in Modern Russia</td>
<td>Christine Evans, History</td>
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<tr>
<td>Union 240</td>
<td>12:20PM</td>
<td>Karin Barnes</td>
<td>The Importance of Objectivity in Research</td>
<td>Tina Freiburger, Criminal Justice</td>
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<tr>
<td>Union 240</td>
<td>12:40PM</td>
<td>Katrina Hightower</td>
<td>Welcome to Greenwood</td>
<td>Lyndsay Smanz, Information Studies, Laretta Henderson, Information Studies</td>
</tr>
<tr>
<td>Union 240</td>
<td>1:00PM</td>
<td>Carl Greer</td>
<td>African American Males Perception of High School Teacher Efficacy</td>
<td>Gary Williams, Educational Policy &amp; Community Studies</td>
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<tr>
<td>Union 250</td>
<td>12:00PM</td>
<td>Jessye Hale</td>
<td>MDSC Proliferation in the 4T1 Breast Cancer Tumor Model</td>
<td>Douglas Steeber, Biological Sciences</td>
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<tr>
<td>Union 250</td>
<td>12:20PM</td>
<td>Jacob Koepp</td>
<td>What Environmental Factors Influence Hatching Success of Tree Swallows?</td>
<td>Peter Dunn, Biological Sciences</td>
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<tr>
<td>Union 250</td>
<td>12:40PM</td>
<td>Megan Grosse</td>
<td>Studying Rheology Using Cleavage Refraction in Quartz-rich Layered Rocks from Baraboo Wisconsin</td>
<td>Dyanna Czeck, Geosciences</td>
</tr>
<tr>
<td>Union 250</td>
<td>1:00PM</td>
<td>Kayla Olson</td>
<td>Comparative Material of the Malloura eCatalogue and the Next Stage in Cypriot Cultural Preservation and Accessibility</td>
<td>Derek Counts, Art History</td>
</tr>
<tr>
<td>Union 260</td>
<td>12:00PM</td>
<td>Michael Ballo &amp; Shawn Strong</td>
<td>Hand-held Bacteria Detector</td>
<td>Marcia Silva, Freshwater Sciences</td>
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<tr>
<td>Union 260</td>
<td>12:20PM</td>
<td>Anne Barlas</td>
<td>Development of a Novel Macroporous Material for Phosphorus Removal from Water</td>
<td>Marcia Silva, Freshwater Sciences</td>
</tr>
<tr>
<td>Union 260</td>
<td>12:40PM</td>
<td>Byron Edwards &amp; Anne Barlas</td>
<td>Influence of Deposition of a Zeolite Layer on Mechanical Properties of Reverse Osmosis (RO) Membrane by Using a Tissue Tester</td>
<td>Marcia Silva, Freshwater Sciences</td>
</tr>
<tr>
<td>Union 260</td>
<td>1:00PM</td>
<td>Kirill Shmilovich</td>
<td>Force Clamp Measurements and Dynamic Modeling of Protein Hydrogels</td>
<td>Ionel Popa, Physics</td>
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<tr>
<td>Union 280</td>
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<td>Anthony Schaeve</td>
<td>Flow Cytometry &amp; Optical Imaging</td>
<td>Yongjin Sung, Mechanical Engineering</td>
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<tr>
<td>Union 280</td>
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<td>Ameralys Correa</td>
<td>Integrating Self Healing Materials and Structural Health Monitoring</td>
<td>Nathan Salowitz, Mechanical Engineering</td>
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<td>Union 280</td>
<td>12:40PM</td>
<td>Trevor Georgeson</td>
<td>Reconfigurable Flexibility in Pneumatic Architecture - &quot;The Worlds Most Flexible Inflatable&quot;</td>
<td>Whitney Moon, Architecture</td>
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<tr>
<td>Union 280</td>
<td>1:00PM</td>
<td>Jared Schmitz</td>
<td>Architecture and Neighborliness: Defining Spaces of Social Interaction and Hierarchy</td>
<td>Arijit Sen, Architecture</td>
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### Schedule of Oral & Performing Arts Presentations by Location

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<tr>
<th>Location</th>
<th>Time</th>
<th>Presenters</th>
<th>Presentation Title</th>
<th>Research Mentor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union Cinema</td>
<td>12:00PM</td>
<td>Joseph Moore</td>
<td>Queer Film Now: a LGBT+ Curatorial Project</td>
<td>Carl Bogner, Film</td>
</tr>
<tr>
<td>Union Cinema</td>
<td>12:20PM</td>
<td>Audra Cashman</td>
<td>Theatre for the Community</td>
<td>Alvaro Rios, Theatre</td>
</tr>
<tr>
<td>Union Cinema</td>
<td>12:40PM</td>
<td>Gabriella Cisneros</td>
<td>Documentary by the Community, for the Community</td>
<td>Jennifer Plevin, Film</td>
</tr>
<tr>
<td>Union Cinema</td>
<td>1:00PM</td>
<td>Emily Bartsch, et al.</td>
<td>Migration of Invisible Narratives</td>
<td>Maria Gillespie, Dance</td>
</tr>
<tr>
<td>Union Cinema</td>
<td>2:00 PM</td>
<td>Connor Finnegan, et al.</td>
<td>Our Orphan Train: Devising and Communicating History Through Theatre</td>
<td>Robin Mello, Theatre</td>
</tr>
<tr>
<td>Union 340</td>
<td>12:00PM</td>
<td>Elena Olsen-Valdez &amp; Stefanie Valverde</td>
<td>City as Canvas: Student Artist in Residence Embedded in Shorewood Government and Identity, Race, Ethnicity and Diversity Conversations</td>
<td>Anne Basting, Theatre</td>
</tr>
<tr>
<td>Union 344</td>
<td>12:00PM</td>
<td>Esmé Barniskis</td>
<td>The Breakdown of Conversation: Historical Building Records as Forms of Speech</td>
<td>Arijit Sen, Architecture</td>
</tr>
<tr>
<td>Union 344</td>
<td>12:40PM</td>
<td>Ever Clinton</td>
<td>Sustainable Neighborhoods: Ethnographic Equations</td>
<td>Arijit Sen, Architecture</td>
</tr>
<tr>
<td>Union 344</td>
<td>1:00PM</td>
<td>Teonna Cooksey</td>
<td>The Invisible Substance of Home: Architecture, Eviction and Foreclosure</td>
<td>Arijit Sen, Architecture</td>
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</table>
Presentation Abstracts
Julia Alba
Consistency of Weight and Height Measurement in Clinics from the National Spina Bifida Patient Registry (NSBPR)
Mentor: Michele Polfuss, Nursing
Poster Presentation, Easel 108
Accurately measuring height and weight or estimating body fat in children with spina bifida (SB) is complicated, which ultimately impacts the ability to prevent or treat obesity in this population. Weight and height serve to calculate body mass index (BMI) to indicate a child's weight status by age and gender. Currently, there is no policy or recommendation on how to properly measure height and/or estimate body fat in children with SB. We interviewed staff members of the NSBPR clinic sites to determine: (a) methods of height and weight measurements currently used for individuals with SB and (b) potential variations by clinic, mobility status and/or age group. This descriptive quality improvement project included two staff members from each of the 19 NSBPR clinic sites (n=38). For each clinic, the goal was to include a NSBPR principal investigator/co-investigator and a staff member who performs anthropometric measures for individuals with SB. Individual phone interviews based on a structured interview guide were conducted. Descriptive and thematic analysis were used. Sites appear to be highly consistent in measuring height and weight for individuals able to walk, although there are inconsistencies in the inclusion of braces when measuring weight. Inconsistencies are more pronounced in measuring those who use wheelchairs, often due to scoliosis, contractures, or limited mobility. The results will be fully discussed at the conference. Understanding the consistency of measurement of height and weight is fundamental to using these measures in analyses of the NSBPR data. Accurate measures will be even more important in the future in developing an algorithm to estimate fat mass in individuals with SB.

Lydia Albright
Bivalve Taxonomy and Paleoecology Following the Permo-Triassic Mass Extinction
Mentor: Margaret Fraiser, Geosciences
Poster Presentation, Easel 113
The earth experienced the largest known drop in biodiversity at the end of the Permian period, with the elimination of ~78% of marine invertebrate genera. Some evidence suggests that at least 5 million years elapsed before life on Earth returned to pre-extinction diversity in the Middle Triassic. However, the nature of the biotic recovery is still poorly known, even though the end-Permian mass extinction and the Early Triassic aftermath have been extensively studied and their significance is widely acknowledged. The main objective of this research is to determine the taxonomy and paleoecology of bivalves that lived in the marine environments during the Middle Triassic. By employing standard paleoecological techniques and statistical tests, this research will determine the important aspects of post-extinction ecological structure and will lead to an understanding of the spatial and temporal nature of ecosystem renewal after major biotic crises in deep time. The methodology is studying skeletonized fossil specimens collected from the Middle Triassic strata in Nevada to identify and take inventory. The objective is to determine which organisms were taxonomically and numerically abundant, mean rank-order, breadth of distribution, the Simpson's index (D), the Shannon Index (H'), evenness, and dominance, which are being calculated for each of the fossil evenness, and dominance, which are being calculated for each of the fossil accumulations. The fossil data is used to construct time-environment diagrams by stage to visualize the paleoenvironmental context of biotic patterns. The primary research outcome is the first quantitative analysis of these Middle Triassic paleocommunities from Nevada. This represents an important first step in more fully understanding how ecosystems bounce back from environmental disaster, and the results may allow scientists to better predict future effects of climate change on modern ecosystems.

Alana Alderson
Social Influences in the Construction of Latino Self-Identification
Mentor: Celeste Campos Castillo, Sociology
Poster Presentation, Easel 17
Sociological scholarship is increasingly recognizing the fluidity of race, but there remain important gaps in knowledge about the processes by which individuals come to identify themselves with a specific race. Self-identification more generally is formed through associations and influences that an individual has with others in their social groups. Elements of a situation, such as its setting and the social roles involved, shape how individuals self-identify. By understanding these situational experiences, this will improve understanding of racial fluidity. This study will recruit Latino and multiracial undergraduate students and ask them to complete an online survey through Qualtrics in addition to an in-person interview. The survey and interview questions will gauge how respondents assess themselves and others in work, school, and family-related situations. Questions are adapted from prior studies of cultural assimilation, ethnic identity, and role identity. The findings will be used to advance understanding about how situations and exposure to culture shape racial self-identification.

Adam Aleiou
Synthesis of Diketopiperazine and its Analogs
Mentor: Mahmun M. Hossain, Chemistry & Biochemistry
Poster Presentation, Easel 100
Anticancer drug synthesis is a lengthy and expensive process with a numerous number of steps. Currently, most synthetic procedures for these drugs are hugely expensive and low yielding. The goal of this project is to develop new organic reactions and create the most cost and time effective synthetic routes. I have been working
on synthesizing the first three steps of Tryprostatin. Tryprostatin is an inhibitor of microtubule assembly which is a process that all cancers must undergo to receive blood and nutrients from their host. This is an essential process for cancer growth and using Tryprostatin in conjunction with other drugs could make for an effective treatment. Our synthesis starts out with an amino acid salt (glycine ethyl ester hydrochloride), a readily available and cheap compound which is converted by various transformations to Tryprostatin. My task was to synthesize the three initial steps in the synthesis of Tryprostatin which are: the coupling reaction of F-moc Proline-OH with an amino acid salt, deprotection of F-moc and cyclization to get hexahydropyrrolo [1,2-a] pyrazine-1,4-dione, and the Boc protection of hexahydropyrrolo [1,2-a] pyrazine-1,4-dione. After completing each reaction, I identified my compounds with various techniques such as thin-layer chromatography, NMR spectroscopy, and mass spectrometry. I also used various purification techniques such as extraction, column chromatography, and recrystallization. I have been able to successfully synthesize the initially two steps of our synthetic route of producing Tryprostatin. This result is a stepping stone and encouragement in further pursuing our goal of producing a cost and time effective synthetic route.

Jacob Alward
Large Thermopower, Crystalline Cd₃As₂ by Low-Temperature Vapor Deposition for Room Temperature Heat Waste Recovery
Mentor: Nikolai Kouklin, Electrical Engineering
Poster Presentation, Easel 128

Cadmium Arsenide (Cd₃As₂) is a topological Dirac semimetal which is known as the 3D analogue of graphene and exhibits one of the largest electron mobilities in crystalline materials. The backscattering of carriers remains suppressed and the electrical transport is dominated by high-energy carriers that favorably affect the thermopower of Cd₃As₂. Thermoelectric generators convert thermal energy into electric energy and are prime candidates for recovering lost thermal energy back into usable electric energy. In this experiment, thermoelectric generators were built using crystalline Cd₃As₂ platelets grown by low temperature vapor deposition. The Cd₃As₂ platelets were examined by scanning electron microscopy to obtain images, energy dispersive X-ray spectroscopy to confirm the stoichiometry of the sample, and Raman spectroscopy to determine the sample quality. The thermoelectric generators were then built using the platelets across two electrodes and temperature dependent current voltage characteristics were measured resulting in an Ohmic-like transport behavior. The Seebeck coefficient was then measured under temperature dependence to assess the thermopower of the platelets. The measured high room-temperature thermopowers of up to 613 uVK⁻¹ identify Cd₃As₂ as a promising thermoelectric material for low temperature thermoelectric generators.

Salvador Arroyo
Determination of Permeability of Engineering Textiles Mentor: Krishna M. Pillai, Mechanical Engineering
Poster Presentation, Easel 93

Polymer Composites are the new-age materials that are light weight, strong, corrosion resistant and very stiff, and because of these extraordinary properties are used in several industries including automobiles, aerospace, military hardware, boat and ship building, and sports goods. Liquid composite molding (LCM) technology is an important technology to manufacture polymer composites. Mold composite molding simulations are used regularly to help engineers with the design of LCM molds in virtual space without the wastage of time and money associated with the trial-and-error approach applied to mold design. Estimation of the permeability of glass or carbon fabrics (used as reinforcement in polymer composites) through experiments is crucial to the simulation of the resin flow using PORE-FLOW, a LCM mold-filling program created by Dr. Pillai's group at UW-Milwaukee. The objective of this research is to study changes in permeability as well as changes in the unsaturated flow with the orientation of anisotropic fiber mats/fabrics. The fiber mats and fabrics are composed of fiber bundles that are knitted/woven in different spatial patterns. We inject oil through a stack of fabrics/fiber mats and such a flow mimics resin flow in an LCM mold due to similarity in viscosity. Both inlet pressure and flow rate are measured as the oil passes through. We use this data to calculate the permeability as well as study the unsaturated flow. We plan to use these permeability values to simulate the unsaturated flow through fiber mats/fabrics in LCM mold and validate these predictions by comparing them with experiments.

Ravil Ashirov
Media and State-Building in Modern Russia
Mentor: Christine Evans, History
Oral Presentation, 12:00 pm, Union 240

This research project was carried with the intent of developing an understanding on how the role of media within the Russian Federation assists in the project of state building. The specific form of media which was analyzed was the annual broadcast Priamaia Linia. The broadcast, lasting roughly 4 hours, is run as a Q&A talk show in which Vladimir Putin answers questions on matters of policy given to him by the Russian citizens. A sophisticated media team takes these questions through calls, online-messages, a live studio audience, as well as live broadcasts from cities all over the Russian Federation. Citizens enquire on matters of state as well as make their complaints directly to the president himself, creating a sense of representation among the citizens and efficacy in the political system. These questions fulfill two functions: They help the state gather information and they project lived experiences back to the audience. By answering these questions, Vladimir Putin is able to solidify his own authority as president, as the central figure to which the qualms of Russians are directed. Questions on the economy dominate, with certain topics
never being mentioned at all. The relevance of this study lies in the attainment of a greater understanding of the functioning of Russian politics as an end in itself. It reveals the functioning of Russia’s hybrid regime and the role of media in facilitating that structure by cementing the authority of the government. Research was carried out by categorizing the questions asked, responses of Putin, interactions of journalists, as well as other factors. The annual broadcasts were then dissected along these lines and the patterns that emerged were the bases for the project’s conclusions.

Lada Avrunina
A Comparison Study of Natural and Engineered Porous Material Ability for Bacteria Retention and Removal From Water
Mentor: Marcia Silva, Freshwater Sciences
Poster Presentation, Easel 103
The most common of waterborne pathogens are bacteria which enter water with waste: from untreated raw sewage, large scale animal operations, seagulls and pet waste. People can become ill from swimming in or drinking contaminated water. Drinking water filtration, aside from billions of dollars in upfront cost, can expense a city upwards of $400 million per year to operate. This research seeks to examine an innovative method for removing bacteria from water to lower expense of pretreating drinking water. Engineered porous material has shown high affinity for removing various pollutants. Natural and engineered porous material will be evaluated through column experiments. Different loads of bacteria E. coli will be added to the column to examine the ability of the media for bacterial retention. We expect engineered porous material to have a higher ability to retain and remove bacteria from water.

Christian Balistreri
Metadata Collection and the Archiving of Analogue and Digital Films
Mentor: Tami Williams, English
Poster Presentation, Easel 163
While film archiving, collecting and preservation practices go back to the origins of cinema in the 1890s, approaches to film annotation and metadata collection have changed dramatically and continue to transform exponentially in the digital age. The purpose of the Media Ecology Project-Domitor Library of Congress Paper Print Pilot (MEP-LOC-PPP) is to start from the beginning of film history while also taking advantage of technological advances. The MEP is currently in its beginning stages, holding a small digital collection of films (currently at 150, set for a total of 3000) from the early 1900s, including movies directed by D.W. Griffith and starring the first recognized actress, the “Biograph Girl”, Florence Lawrence. Each film that is within the collection is being closely examined frame by frame and second by second. Through the work conducted on the MEP, I have been able to collect and analyze metadata pertaining to actor movements, editing, mise-en-scène and shot sequencing. This collection of metadata allows for the MEP to use this comparable data throughout the archive of early cinema films to examine and study the similarities and differences and to garner a greater understanding of film in our ever changing digital world. In contrast, through my work on the University of Wisconsin-Milwaukee Mellencamp 16mm film collection, I have been able to gain hands on experience in preservation and archiving that has a more physical application in the study of classic film prints. By conducting these comparative examinations we intend to show how annotating and analyzing film in its multitude of formats can provide a greater understanding of film in a historical context, as well as aid in efforts to preserve these prints and their history for future generations.

Michael Ballo & Shawn Strong
Hand-held Bacteria Detector
Mentor: Marcia Silva, Freshwater Sciences
Oral Presentation, 12:00 pm, Union 260
A novel hand-held bacteria detector sensor has been developed utilizing Digital Inline Holographic Microscopy (DIHM). The main objective is to be able to take and process holographic images from water samples at a much faster rate than current methods; 1~4 hours to be specific. This will not only be an efficient alternative, but also a cheaper alternative to current methods. This device has been capable of detecting Escherichia coli (E.coli) concentrations from $1.2 \times 10^{-3}$ CFU/mL to 1.2 x $10^{-7}$ CFU/mL. The device is capable of detecting this range of concentrations by uploading images over the internet where they are processed by means of fourier transform and other algorithms. The life and heart of the system is the Raspberry Pi 2 Model B. There is additional control circuitry that controls the pump and LED. The power consumption rate is held minimal making the device has been capable of detecting Escherichia coli (E.coli) concentrations from $1.2 \times 10^{-3}$ CFU/mL to 1.2 x $10^{-7}$ CFU/mL. The device is capable of detecting this range of concentrations by uploading images over the internet where they are processed by means of fourier transform and other algorithms. The life and heart of the system is the Raspberry Pi 2 Model B. There is additional control circuitry that controls the pump and LED. The power consumption rate is held minimal making the device potentially be utilized at wastewater treatment facilities, public beaches, have medical applications, and under-developed countries. An LED as the light source replaced lasers because they are cheaper and produce less noise which can have ramifications on image reconstruction. A custom designed 3D-printed coupling cap was designed too to couple the LED and fiber optic cable allowing for more light to be contained and transferred. The development of this device will provide a cheap, efficient, and portable method to test for pathogens and can potentially be utilized at wastewater treatment facilities, public beaches, have medical applications, and under-developed countries.

Anne Barlas
Development of a Novel Macroporous Material for Phosphorus Removal from Water
Mentor: Marcia Silva, Freshwater Sciences
Oral Presentation, 12:20pm, Union 260
As one of the most common nutrient pollutants, phosphorus enters the Great Lakes via municipal and industrial wastewaters, agricultural runoff, and air pollution. The cause for concern is due to the role phosphorus plays as an aquatic plant nutrient. Overloads
of nutrients have negative impacts on a water body, causing algae blooms. In some cases, the decomposition of algae can deplete a water body of oxygen to the point where aquatic life cannot be sustained. A material engineered to retain phosphorus more effectively and at a lower cost than current filtration technology was fabricated. The material’s efficiency of phosphorus retention was analyzed using a column experiment which simulated fixed bed filtration in a municipal wastewater treatment. Various concentrations of phosphorus were added to the column and the retention efficiency was found as approximately 94%. The results also indicate that soluble phosphorus is rapidly removed, at high flow rates such as 5 seconds per column volume. These factors enable high rate passive filtration of storm water to remove phosphorus as part of by-pass or partial treatment option, and a prototype system for this mode of filtration was developed. During a major rain event, storm water is collected into holding tanks, as wastewater treatment plants can be overwhelmed. This prototype serves to filter this water with engineered material, effectively retaining phosphorus before it reaches the Great Lakes.

Karin Barnes
The Importance of Objectivity in Research
Mentor: Tina Freiburger, Criminal Justice
Oral Presentation, 12:20pm, Union 240

Working as a research assistant since June 2016, I have done data entry for a number of studies. Objectivity is always an important principle in research, but it really hit home for me while working on these projects. I took this opportunity to understand what it is like to work in research, and I currently have realized that being objective is something that can be difficult, but can be learned and makes it easier to see results you never would have considered before. In this discussion, I will specifically be talking about a project I worked on in October to December 2016. With a few graduate students, I conducted surveys in criminal justice classes. Once all of the classes were covered, I took all of the surveys and entered the data into SPSS. Although all I was doing was data entry, the project still required me to be objective when poring over student opinions and entering the data. Each survey offered different insights into the questions. Even if I did not agree with the opinion itself, the ability to be objective made it easier to correctly enter the data. Additionally, it gave me the chance to learn from other perspectives, as well as what it really meant to be a researcher. While working on this study, I can conclude that objectivity is integral to research work. This may seem like a redundant point, especially to those who have worked in research for years, but to me doing this opened my eyes to how important it really is. If we can take the time to really stress why it’s so important, we can help combat possible ethical issues and help young students avoid these blunders as they learn to navigate the world of research.

Esmé Barniskis
The Breakdown of Conversation: Historical Building Records as Forms of Speech
Mentor: Arijit Sen, Architecture
Oral Presentation, 12:00pm, Union 344

On August 14th, 1978, a rear porch collapsed at 1304-1306 North 37th Place, injuring three people. While the documentation of this event tells a narrative of legal exchanges between involved parties and the city government of Milwaukee, what these records constitute is a form of discourse that structures the homeowner-city relationship and the relationships between homeowners and their neighbors. A cycle of code violations and the permits to rectify those issues stretches back to the 1910s, when buildings in the 1300 block of North 37th Place were first built. For some buildings, the violations and penalties outweigh the incentives to maintain these properties, and several buildings have been demolished as a response to pressures from the city. In this paper, I use city documentation as a form of speech, one that can be impersonal, emotional, subversive, resistant, or wholly compliant. Though primarily a back-and-forth responsive conversation of violations and permits, the conversation also extends to lawyers, tenants, and neighbors of the homeowners. Taken as a case study for a wider urban discourse analysis, the six addresses I use here reveal that, contrary to popular themes of disinvestment, poverty, and crime, demolished or poorly maintained buildings function as breakdowns in the conversation between property-owners and the city government. I utilize permit applications, inspection logs, orders to correct conditions of premises, and other city-maintained historical records to chart the conversations that property-owners and the city of Milwaukee have with each other. In having this form of conversation, property-owners and the city government are engaging in a legal discourse that sometimes fails to accommodate the very homeowners that it claims to work for; reading historical records as a form of speech allows for a retelling of urban neighborhood depreciation and recasts the physical decline as a complex response to institutional legal discourse.

Emily Bartsch, Kayla Flentje, Chantée Kelly, Nicole Lagenfeld & Countess Olivia Valenza
Migration of Invisible Narratives
Mentor: Maria Gillespie, Dance
Performing Arts Presentation, 1:00pm, Union Cinema

Migration of Invisible Narratives is a collaborative project engaging multiple disciplines, including dance, music, interactive digital media, sound design, and video. Five undergraduate students, Emily Bartsch (dance), Kayla Flentje (dance), Chantee Kelly (dance), Nicole Lagenfeld (film and digital studio practices) and Olivia Valenza (music) contribute to this project through their respective mediums. We explore the topic of invisible narratives through the interactions between the time based mediums of movement, sound and video. Our research has centered around the creation of scores to
Thomas Bate
Thickness Measurement of Thin Films in Thermal Evaporation
Mentor: Jorg Woehl
Poster Presentation, Easel 89

Metal evaporation is an important technique in several areas of science. It is frequently used in biology to prepare samples for electron microscopy, and can also be used for a diverse array of processes such as silvering telescope mirrors or different micro fabrications. While it is important to be able to deposit a layer of metal onto a surface. It is also useful to be able to block off a part of the substrate, allowing metal to be deposited into a smaller area. This masking can be used from the macro scale, down into the micrometer scale. While being able to control the locations of the deposited metal is important, it is also important to determine how thick a deposited layer is. This can be determined by using a quartz crystal vibrating at a known frequency. While this method of determining thickness is well known, we are interested in how precisely and accurately it measures thickness in our setup. The actual thickness measurements will be determined using Atomic Force Microscopy. These will be compared with the sensor readings and allow the sensor to be calibrated.

Chelsey Becher & Carly Broutman
History of a Home: Foreclosure in the Washington Park Neighborhood
Mentor: Simone Ferro, Dance
Poster Presentation, Easel 5

For this research, we started with the overall idea of foreclosure in the Washington Park Neighborhood of Milwaukee, Wisconsin. The risks of foreclosed houses affects the people living in it, the people owning it, and the neighborhood that holds it. With this idea in mind, we hunted down a home that was foreclosed in Washington Park. We used this home as a case study to delve into the history of a specific home in order to raise awareness of the importance of each and every house in a neighborhood. Throughout the year, we spent numerous days at the Milwaukee Public Library looking through small microfiches of tax information to obtain a list of owners since the house was built in 1904. We then looked through City Directory after City Directory to make a list of every resident year by year. Just with a simple list of names, the impact of one home on so many lives was revealed. With this information we were able to find small details about some of the residents lives. Although we could not find everyone’s story that lived in the house, it is the lack of this knowledge that makes the house so important because we will never be able to find the hidden secrets the walls hold. Only the home itself can hold that, making the house irreplaceable. However, with a single decision a neglected foreclosed home like this one can easily become a pile of wood, a plot of land. Once the home is destroyed the stories it holds will be destroyed as well. This is just a single home that occupies a single neighborhood, in a single city of the United States.

Evan Becker
HTML5 Audio Language Learning Tool for the Blind
Mentor: Jacques Du Plessis, Information Studies
Poster Presentation, Easel 162

Ubiquitous access and cloud-centric designs have fundamentally impacted the way we communicate and learn. Sadly, those who are blind are not as well served. Their technologies are expensive and addresses reading and writing, but audio interactive tools to focus on learning is lacking – greatly due to weak profit making prospects. With a focus on the international blind community, our research focuses on the development of an open web-based audio interactive fact-learning environment. This flash card system is designed to automate the recall of facts, such as foreign language vocabulary. To best address the needs of economically underserved communities, we develop with HTML5, avoiding proprietary technologies, and our data formats are open. The design makes it easy for non-technical subject matter experts to contribute. We accommodate both recorded audio and text2speech to generate audio. We have spent much time in the development of the interface to maximize the design for both blind and sighted students. Here are some of the key design features: User can control the speed of presentation of the cards in the stack, as well as the speed of the two audio prompts for each card. Known cards can be eliminated, an update is always available for the number of cards left to do, and the stack can be randomized. Although the tool is fully functional for sighted learners as well, including the use of text and images, having sighted learners use the blind mode shows research promise of enhanced concentration and effective learning.

Mitchell Behnke
Quantifying Capillary Action in a Variety of Clay Materials
Mentor: Shangping Xu, Geosciences
Poster Presentation, Easel 147

Ceramic materials with a spectrum of pore sizes can be used to retain and release water under various soil moisture conditions. The use of carefully designed ceramic materials can thus help plants survive and grow...
During a drought. In our experiments, we create ceramic materials with a wide range of pore sizes and examine their water retention/release capabilities. The ceramic materials are made from clays such as kaolin, red art clay, bentonite, dolomite and feldspar. These clays will be mixed with organics including starch, coffee grounds, and paper. We begin by mixing organic substances with our clays in pre-selected ratios. Once mixed and dried we fire the samples in a kiln to disintegrate the mixed organics leaving only a clay sample containing our desired pore size. Firstly the samples are saturated with water and then a negative pressure is applied to simulate a scenario in which water would be released from the sample in nature. Creating a clay/organic combination with water retention rates exceeding that of soils currently used in agriculture operations may benefit during drought conditions by prolonging field capacity.

Angela Beling
Daphnia Magna Survival Shows Toxicity of Varying Positively Charged SMAMP-Covered Gold Nanoparticles
Mentor: Rebecca Klaper, Freshwater Sciences
Poster Presentation, Easel 81

With the increasing prevalence of engineered nanoparticles in industry, it is important to study the nature of these particles. In previous experiments, the charge of particles has shown an effect on toxicity. Our project looks to identify any changes in toxicity due to increasingly positive particle charges. The particles used in this experiment are engineered gold nanoparticles covered with Synthetic Mimics of Antimicrobial Peptides (SMAMPS), with varying coverage densities of 0%, 50%, 55%, 70%, 75%, and 100%. The toxicity was tested by exposing Daphnia magna neonates to the nanoparticles in acute, 48 hour exposures and measuring he survival rates. Between the 50% and 75% coverage densities, there is a clear increase in toxicity levels. Further analysis is required to explain why charge effects nanoparticle toxicity, and to identify the mechanisms through which these particles are acting on a chemical and biological basis to cause toxicity.

Steven Bertelsen, Hanna Fowler & Brianna Ortiz
Generating Constitutional Consciousness in Milwaukee
Mentor: Robert S. Smith, History
Mentor: Will Tchakirides, History
Poster Presentation, Easel 67

In 2017, American public discourse has explored a number of highly-charged political issues that hold constitutional relevance. These include correlated matters of naturalization, immigration, security, espionage, criminal justice, civil rights, land-use, health care, and the role of the press in a free society. Each raises significant questions about the United States—its history, purpose, and administration— and bears legal dimensions enumerated in the nation’s founding documents. Often, however, these dimensions are either obscured or poorly articulated in conventional media, leaving people wondering what recourse they have when their citizenship, franchise, or equal protection of law comes under threat. With so many consequential issues at stake, it is critical that people residing within America’s borders draw meaningful connections between their experiences and the core legal framework governing their lives. But are they making the requisite connections? Are people aware of the legal powers conferred upon them? Do they know their rights and how to effectively articulate them before legal authorities? As a poster session, the UWM Social Justice Research Collaborative (SJRC) will posit that most people living in America do not fully understand their constitutional rights. Therefore, SJRC proposes developing a digitally and physically accessible “Pocket Constitution” designed to raise awareness about the nation’s core legal document and the juridical protections enumerated therein. The primary objective is to better equip people to stand up for their rights, as well as the rights of others. With its large socio-economically and culturally diverse population, Milwaukee signifies an ideal testing-ground for implementing the Pocket Constitution. The project targets use by individuals attending the city’s three major public learning institutions: MPS, UWM, and MATC. It amplifies the UW-System’s shared learning goals of developing critical and creative thinking skills; effective communication skills; intercultural knowledge and competence; and social and environmental responsibility.

Trista Bessey
Analysis of Liquid Film Migration in Aluminum Silicon Alloys
Mentor: Benjamin Church, Materials Science & Engineering
Poster Presentation, Easel 40

Aluminum-silicon alloys are used for brazing of aluminum heat exchangers such as automotive radiators, air conditioning condensers, and fuel/oil coolers. The Al-Si alloys are typically roll-bonded to the surface of other aluminum alloy sheets that have a higher melting temperature. The sheet in between them (core alloy and braze alloy on the surfaces) are then stamped to a desired shape, assembled, and processed through a high-temperature furnace for brazing. In the brazing stage, the Al-Si alloy will melt and join adjacent sheets together. A processing defect called liquid film migration (LFM) can occur where excessive grain growth during brazing will create a microstructure that is prone to corrosion attack and early degradation. LFM happens only in certain alloys and in cases where the material was cold worked to a certain extent prior to the brazing operation. The objective of this project is to use differential scanning calorimetry (DSC) and optical microscopy to investigate the LFM phenomena in an industrial Al-Si alloy system. Sheets of material pre-stresses to certain levels are available as initial samples. From those samples, DSC specimens were cut and tested to measure the caloriometric behavior of the alloy during simulated brazing cycles. The same samples were then mounted and polished after DSC testing so that the brazed microstructure can be analyzed via optical...
microscopy to measure degree of LFM. The final goal is to determine if a relationship exists between cold work prior to brazing and liquid film migration.

Robert Bhatia & Elaine Mahoney
Affectively Neutral Faces Acquire Aversive Value by Association with Negatively Valenced Scenes
Mentor: Deborah Hannula, Psychology
Poster Presentation, Easel 28

Emotional items are prioritized by attention, particularly among individuals who report high levels of anxiety. This investigation seeks to understand the consequence of the association of neutral stimuli with emotionally arousing stimuli and whether these items are then prioritized by attention. We also examined the influence that exposure to emotionally arousing materials during encoding has on memory retrieval. Finally, we examined whether these effects are greater in individuals that report high anxiety or high worry. Eighteen UWM undergraduate students participated in this three phase eye tracking experiment. First, during an incidental encoding phase, participants were instructed to view a set of scene-face pairs. Half of the scenes were negative and half of the scenes were neutral. Next, in an attention phase, participants passively viewed three-face displays that included previously seen faces and new faces. Lastly, a test phase required subjects to identify the face that was previously paired with each scene in the encoding phase. Following the test phase, the State-Trait Anxiety Inventory (STAI) and Penn State Worry Questionnaire (PSWQ) were administered to each participant. Results indicated that there were early viewing time differences for faces that were encoded with negative scenes as compared to neutral scenes, but only for participants who reported “high worry” on the post-experimental questionnaires. No memory differences were observed between neutral and negative scene-face pairs in either explicit recognition responses or eye movement behavior. In conclusion, neutral items that have been paired with emotionally arousing materials seem to be prioritized by attention, which suggests that they may acquire aversive emotional value as a consequence of the pairing, at least among the subset of participants who report high worry. This outcome may have implications for psychiatric disorders that are characterized by excessive levels of worry.

Bella Biwer
A Case Study of Home Boundaries in Washington Park and Thurston Woods
Mentor: Arijit Sen, Architecture
Oral Presentation, 12:20pm, Union 344

The home is a domain of private space for a resident. A well-marked boundary divides interior private space of a resident from outer public spaces. All homes have boundaries that separate the two domains. While this boundary is different in each household, the types of activities that occur in each domain have commonalities. The interior domain, or Defensible or sacred space, is a space where intimate conversations and interactions or time for one’s self occur, while interactions with outsiders are made in the outside world, or profane space. Constructed boundaries can be literal (visual or material) such as the exterior walls of a home, a division between the front and back of a home, a fence or the outer border of a yard. They can also be symbolic or cultural. For example, the front/back, public/private division of a home is assumed in some cultures and can therefore be socially obeyed. This essay argues that there are certain similarities between how homeowners in different neighborhoods construct boundaries and domains in their spaces to form home. My analysis will compare the construction of these domains in the Washington Park and Thurston Woods neighborhoods by using home floor plans and homeowner oral histories collected through the BLC Field School. The Spatial Performance theory of architecture states that we, as humans, create places, but those places make and shape us. Evaluating characteristics of home, such as boundary and domain formation, in the context of the space provides insight into how homeowners act, think and participate in daily activities.

Leah Bohl, Sarah Farhan, & Theresa Mayland
An Experimental Analysis of Verbal Behavior: The Effects of Auditory Stimuli and Competing Verbal Behavior on the Completion of Math Problems
Mentor: Tiffany Kodak, Mike Harman, Psychology
Poster Presentation, Easel 138

The purpose of this study is to evaluate the role of attending to one’s own verbal behavior while solving addition problems. If a final target response is dependent on attending to covert behavior, introducing tasks that (a) disrupt, or (b) block these responses should significantly affect responding. Participants were asked to solve math problems (such as 24+12+36), within one minute, while overtly vocalizing what they were thinking. This allowed researchers the capacity to directly measure behavior that is typically observable. The math problem is either presented exclusively as an auditory stimulus or as both an auditory and visual stimulus. Within each of these conditions, there were also sub-conditions including the playing of an audio recording containing the ABC’s, the participant reciting the ABC’s, and a control where no experimental stimuli was presented. Participants’ latency to respond and number of attempts were measured as main dependent variables along with the measurement of different types of responses emitted during the response interval. The data indicate that both the auditory and verbal stimuli affected response latency. Specifically, auditory stimuli during the Hear ABC trials seemed to control faulty listener behavior indicated by slight increases in latency and decreases in accuracy. Competing verbal behavior during the say ABC trials blocked listener behavior, indicated by large increases in latency and decreases in accuracy. Future research may investigate how other behaviors are affected by different types of auditory or verbal stimuli during a response interval (e.g., reading out loud for comprehension).
Sid Brod
Developing Models of the Bicycle and the Tire
Mentor: Andrew Dressel, Mechanical Engineering
Poster Presentation, Easel 6

Our research intends to further develop the model of the bicycle. Specifically, to understand how changing tire properties will affect the stability and handling of the bicycle as a whole. Some of the operating parameters of the tire include: inflation pressure and load; while properties to be varied are tire width and tire composition. Data will be collected of forces exerted between the tire and the pavement. In the future, the goal is to also develop a model of the tire. A model will allow properties of tire design to be predicted through a mathematical simulation rather than physical testing. Input of construction coefficients into a successful model will yield behavioral trends. This will ultimately allow for design property optimization and lower associated development costs.

Liam Brodie
Nitrosifying Properties of Differing Amounts of Bacteria
Mentor: Russell Cuhel, Freshwater Sciences
Poster Presentation, Easel 24

Along the bottom of Lake Michigan are bacteria that use differing states of nitrogen to obtain energy. Nitrifying bacteria convert ammonia to nitrite and nitrosifying bacteria convert nitrite to nitrate. Nitrite is an intermediate step, however too high of nitrite or ammonium water can have harmful consequences. Nitrite causes blue blood disease, where nitrite fixes to hemoglobin irreversibly in fish, irreversibly choking the fish of oxygen. By setting bottles on a roller table with differing amounts of bacteria and additives, it was possible to detect the nitrifying and nitrosifying properties of the bacteria. The next step would be to use geometric sampling to determine the rate of reaction for either bacteria. Extrapolating this controlled experiment, determining the ability for bacteria to alter the composition of a lake in conjunction with the carbon and nitrogen cycle would be critical to know what an invasive species could do.

Kyle Brown
The Effect of Different Cooling Rates on Grain Size, Second Phase Morphology, Microstructure, Wetting Angle and Corrosion of Aluminum-Silicon Alloys
Mentor: Pradeep Rohatgi, Materials Science & Engineering
Poster Presentation, Easel 130

Every year corrosion causes millions of dollars’ worth of damage in the form of both the destruction of property and lost productivity. Aluminum silicon alloys represent an interesting solution to these challenges due to it being both corrosion resistant as well as light weight. The aim of this study is to determine the effect of alloy composition and surface roughness on the corrosion properties of cast aluminum-silicon alloys, the effect of water droplet size on contact angle measurements of these alloys was also investigated. The alloys used in this study included common cast aluminum alloys such as A356, A360 and A368 as well as prepared Al-Si alloys with a silicon content ranging from 5% to 50%. Samples were prepared by grinding the surface of the alloy samples to a roughness of 240 grit, 800 grit and 1 micron polish. The samples then underwent water droplet testing using a goniometer to determine hydrophilicity, before undergoing corrosion current testing to determine corrosion resistance. For samples roughened with 240 grit and 800 grit sand paper the measured contact angle showed a clear trend of decreasing with increasing silicon content. Samples prepared using 1 micron polish showed no clear trend relative to silicon content. Corrosion current tests were performed on all alloy compositions at all levels of surface roughness. Results show no clear trends of corrosion resistance relative to either surface roughness or silicon content. However, a peak in corrosion resistance was found for all degrees of surface roughness in cast aluminum alloys with a silicon content of 22%. These results show that corrosion resistance of aluminum silicon alloys can be effected by altering the amount of silicon in the alloy, further validating the usefulness of aluminum in applications where corrosion resistance and light weight are necessary.

Audra Cashman
Theatre for the Community
Mentor: Alvaro Rios, Theatre Performance Arts Presentation, 12:20pm, Union Cinema

This study aimed to show through theatre a form of music that represented the voice of a community, as well as showcase new theatre in PECK School of the Arts. The goal of this research was to focus on developing songs for the docudrama play This is Washington Park. This is Milwaukee. The second project was developing a musical currently titled The Color Green, and will be composed in preparation for submission to the Theatre Department’s New Directions committee. A second goal of this research was to showcase UWM student developed and created works in the art community of Milwaukee, and educate others through theatre on important topics occurring in every day life. As part of my research, I have researched the Washington Park area in depth, read the manuscript, and spoken with several residents. I have visited the Milwaukee Urban Ecology center and I have been developing new songs and transcribed these works for Ecology center and I have been developing new songs and transcribed these works for reproduction. Using a computer program I have used music theory to correctly note sheet music and lyrics. For The Color Green, I have continued my work developing the script and composing new songs.
Gabriella Cisneros
Documentary by the Community, for the Community
Mentor: Jennifer Plevin, Film
Film Presentation, 12:40pm, Union Cinema
Milwaukee is often known as a small big city. However, gentrification among other issues prevents these community members from connecting with each other. Despite physically close proximity, different races, genders, and ages of people have very different experiences within Milwaukee. As a part of docUWM, I help young community members tell their stories so that others can recognize where change is needed in our city. We do this through the Youth Video Collective, which is a long-running documentary project that involves various young people speaking on camera about their experiences with segregation, targeted criminalization, policing, and racism in Milwaukee. I’ve edited and gathered footage for this project, which has familiarized me with issues outside that exist outside of the East Side of Milwaukee. For example, one young black man described police officers forcing him against a police car just because he “fit the description.” He also describes being held up at a bus stop by a criminal with a gun while on the way home from school. It is events like these that need to be known so people can be aware of what others endure in what they may think is a “safe” community. From the creation of these videos, I hope to inform Milwaukee’s citizens of the less desirable truths of their city but do it in an engaging way that doesn’t alienate its subjects. Using the medium of film gives those that are often silenced a space to voice their experiences and provides a door to deeper discussions among youth, adults, and elders in Milwaukee.

Alexander Cleaveland
Developing a Competitive Recovery and Regeneration Method for a Novel Adsorbent
Mentor: Marcia Silva, Freshwater Sciences
Poster Presentation, Easel 107
Adsorption is a very effective method for removal of various organic pollutants from water. Adsorbents with low cost, simplicity of operation and high removal efficiency are desirable. To make an adsorbent commercially attractive and environmentally friendly, regeneration of adsorbent is generally very important. Our research group has developed a novel graphene based adsorbent for organic compounds with potentially competitive recovery and regeneration of the adsorbent. In this work, we present an evaluation of methods for recovering and regenerating this material. Disperse blue 26 and methylene blue were used as model adsorption organics to test the recovery. To evaluate loss of adsorption capacity after each regeneration step, the material was successively loaded and regenerated. The mass loss during regeneration, correlating to the detachment of contaminants from the surface of the adsorbent, was analyzed through the use of Differential Thermogravimetric Analysis (DTG) and adsorption properties, such as surface area and pore diameter, were determined through BET analysis. The number of re-use and regeneration cycles that can be effectively utilized for this material is assessed as when the adsorption capacity falls below 75% of the virgin material. Our preliminary research indicated that heating the porous material to 550 for 5 hours enables high levels of regeneration and potential re-use. Our target of five adsorption/desorption cycles will be evaluated.

Ever Clinton
Sustainable Neighborhoods: Ethnographic Equations
Mentor: Arijit Sen, Architecture
Oral Presentation, 12:40pm, Union 344
This study analyzed what it meant to build for actual people who experience life within their residential communities - the Washington Park Community on the North-side of Milwaukee, WI. Ethnographic methods shaped the design of this research through conversation and architectural measurements. Ethnography is the anthropological branch that deals with scientific descriptions of an individual’s culture. Through people and place, we explored how one defined a sustainable neighborhood. In order to dissect this conversational study, we gained the trust of the Washington Park residents-the people. Through knowledge as a former resident and with connections afforded by Arijit Sen, I gardened with 2 of 6 participants- Angela Pruitt and Phoua Vang. After gaining trust, 6 participants comfortably conversed about their experiences within and without their community. With permission from other residents, we navigated through their built environments - the place. We measured two vacant homes because the participants talked about the effects of vacancies within their neighborhoods. The connected current information and historical records told the story of the space itself. Through overarching principles specific to the participants’ definitions, equations - principle 1 + principle 2 + principle 3 = sustainable community-surfaced. One participant expressed, “I’d really like to see the Washington Park Community self-sufficient...a place to live, work and play and raise a family.” The need for adequate housing, closer employment opportunities, and an array of entertainment was desired for families within the area, however, vacant homes did not support a sustainable neighborhood because as a product of an eviction and city foreclosure, families disappeared from the neighborhood; this forfeited the equation that live + work + play + family = sustainable community. These insights were solutions to epidemics facing under-served communities because it captured what was needed and desired.

Teonna Cooksey
The Invisible Substance of Home: Architecture, Eviction and Foreclosure
Mentor: Arijit Sen, Architecture
Oral Presentation, 1:00pm, Union 344
Housing policies implemented in the past, such as redlining, have created areas within American cities where poverty is highly concentrated. The low-income rates and high housing cost that have resulted from redlining has
greatly contributed to the vast amount of foreclosures and evictions within impoverished communities like Washington Park. Consequently, these communities are exposed to the negative impacts associated with living in areas that contain large amounts of vacant homes and homeless residents. This research presents a vivid century long pictorial, structural and economic transformation of two foreclosed homes that were used as a case study. These houses are located in the Washington Park Neighborhood in Milwaukee, WI, once a vibrant middle class neighborhood, but has since morphed into a poor neighborhood as a result of economic decline, changing infrastructure and racist housing policies. One home was vacant and the other was filled with the belongings of the previous tenant(s) who had been evicted. This study aims to examine how foreclosure and eviction affects the architecture and cultural landscape of the community. The findings from this research shows that the interconnectivity between income, foreclosure and eviction has created an inability for Washington Park residents to become self-sufficient. As a result, the architecture of the homes has deteriorated over time because many of them are hardly inhabited or homes has deteriorated over time because many of them are hardly inhabited or repaired. The cultural landscape has diminished due to the displacement of community members and the disinvestment in jobs and other basic resources throughout the neighborhood. This research provides a historical perspective of the Washington Park Neighborhood regarding some of the challenges that are disabling it from becoming stable—economically and socially. It also acknowledges how a system of unequal distribution of wealth and power operates in the built environment every day.

Kennia Coronado
Undocumented Millennial Latinxs: Political Activism in the Age of Trump
Mentor: Paru Shah, Political Science
Poster Presentation, Easel 129

The purpose of this study is to examine what factors influence immigrant political activism. This study looks into the social psychology of protest and efficacy theories to further explain if undocumented millennial Latinx are more or less likely to be politically active in the Age of Trump. I am interested in explaining if English speaking and bilingual (English and Spanish speaking) undocumented millennial Latinx are more inclined to participate in political activism because they speak the dominant language. In addition, I look into socio-economic factors to further explain if political participation is higher amongst undocumented millennial Latinxs whom have access to higher education, live above poverty levels, have Deferred Action for Childhood Arrivals (DACA) and feel that their fate is linked to other undocumented immigrants facing discrimination under the current presidential administration. Lastly, I am interested in studying if gender plays a role in political activism amongst undocumented millennial Latinxs. For this study, I survey this demographic using Qualtrics.

Joseph Corrao
Acid Treatments of Naturally Occurring Microporous Particles for the Purpose of Water Filtration
Mentor: Marcia R. Silva, Freshwater Sciences
Poster Presentation, Easel 102

Naturally occurring porous particles are some of the oldest mediums for water filtration. Most of these are carbon, polysaccharide, silica or alumina based. The molecular framework of the natural porous particles used here primarily consists of tetrahedral aluminaolate bonds. This unique Si/Al framework makes them good choices as adsorbents, especially for heavy metals and wastewater treatment. Recent developments in this field have shed light on the potential of these materials to be chemically modified in order to further aid in freshwater filtration. Among these methods, acid treatment seems to be one of the most common and simple treatments that can be applied. The aim of the acid treatments is to de-aluminate the porous particles, removing applied. The aim of the acid treatments is to de-aluminate the porous particles, removing alumna bonds from the cage structure. To accomplish this, various acids can be utilized to achieve the adsorption increasing results of acid treatment, including: H2S O4, HCl, HNO3, and acetic acid. The material goes through a cleaning process of sonication and microwaving, and then treated with the aforementioned acids. This study focuses on comparing the effectiveness of these acids in increasing the overall Si/Al ratio among the molecular framework of the porous material, in turn making the particles more mesoporous and increasing adsorption surface area. The porous particles were analyzed in their raw state, after the cleaning process, and after each type of acid treatment. Materials were characterized by gas sorption analysis, Fourier transform infrared (FTIR) spectroscopy, XRD analysis. The results show that acid treatments are effective in increasing overall adsorption surface area and meso/microporosity.
Ameralys Correa
Integrating Self Healing Materials and Structural Health Monitoring
Mentor: Nathan Salowitz, Mechanical Engineering
Oral Presentation, 12:20pm, Union 280
When engineered structures fail, the consequences can be fatal. In order to proactively prevent this, the two fields of structural health monitoring and self-healing materials are coming together to facilitate a closed loop system. In this system, the structure will be able to detect damage, repair itself, and report to supervisors. This presentation illustrates the recent progress of the self-healing materials side of the closed loop system and preliminary results of ultrasonic damage detection. By casting a single plane of prestrained shape memory alloy Nickel Titanium (NiTi) wires in a thin brick of aerospace grade thermoset epoxy, the brick can be cracked so that only the wires bridge the gap. This composite can be heated at the wire's activation temperature to make the wires contract. Due to prestraining, the wires pull both halves of the brick to return to a shorter length than the length they were prestrained to. Since the halves cannot pass through one another, the epoxy holds the wire at the length it was cast at. The wires want to contract further than the epoxy will allow, so the epoxy halves' fracture faces are kept together and in a way – healed. To detect the damage, piezoelectric sensors are placed with conductive epoxy on either side of the damage. These piezoelectrics double as actuators and sensors; the actuating piezoelectric is used to send out ultrasonic waves that are propagated through the sample and detected by the receiving piezoelectric sensor. By comparing the signals of the current and previous states, it is expected that the material's status, damaged or undamaged, can be known. If self-healing materials can detect and heal without external maintenance, hard to detect damage or damage occurring while a structure is in service can be slowed or stopped altogether before expensive and catastrophic failure occurs.

Erin Corrigan
Longitudinal Examination of Anxiety Levels in Children with Neurofibromatosis Type 1
Mentor: Bonita Klein-Tasman, Psychology
Poster Presentation, Easel 158
Neurofibromatosis type 1 (NF1) is a rare, highly variable, genetic neurodevelopmental disorder caused by a mutation on chromosome 17 and characterized by elevated levels of executive functioning, attention, and emotional/social functioning difficulties. Previous research has indicated that children with NF1 experience higher overall anxiety than the normative population. However, research on anxiety is limited and calls for more examination to better understand the reported elevated rates of anxiety within the NF1 population. This longitudinal study seeks to analyze change in patterns of anxiety from a period of early development (ages 3-9) to pre-adolescence (ages 9-12). Within the sample, increased levels of anxiety over time are expected. Parents of 22 children with NF-1 completed either the Preschool Anxiety Scale (PAS), or the Spence Children's Anxiety Scale (SCAS), depending on the child's age, over multiple annual assessments to determine levels of anxiety. Correlational tests, within-subject paired T-tests, and frequency statistics will be performed to ascertain correlated patterns across examinations, changes in anxiety scores over time, and the frequency of elevated scores within the sample.

Wesley Cruz
The Effects of Methylene Blue on Trace Fear Memory and Proteolytic Activity in Young and Aged Rats.
Mentor: James R. Moyer, Jr., Psychology
Poster Presentation, Easel 82
Both humans and rats experience age-related deficits in declarative memory. Recently, plasticity-associated protein degradation in synapses has been shown to be necessary for memory formation. A decrease in basal proteasome activity with increasing age is evident across various species. Decreased plasticity-associated proteasome activity with normal aging could underlie age-related deficits in memory performance previously documented in aged rats. Using trace fear conditioning (TFC) to model episodic memory in rats, we attempted to rescue age-related memory decline by upregulating proteasome activity via dietary administration of the compound methylene blue (MB). MB increases chymotrypsin- and trypsin-like proteasome activity in 3xTg-AD mice. Two experiments were conducted to test the effects of MB on trace fear memory and proteolytic activity in non-transgenic F344 young (3 months) and aged (18 months) rats. In Experiment 1, 3-month-old rats were administered 50mg of MB per 100g of powdered food for 4 months. This treatment did not affect memory performance. However, there was a significant increase in chymotrypsin-like activity in synapses of the retrosplenial cortex (RSC). Since MB treatment is dose dependent, we lowered the dose in Experiment 2. 3 month and 18-month-old rats were administered 25mg of MB per 100g of powdered food. MB treatment in young rats enhanced memory performance, while not affecting memory performance in aged rats. However, there was a significant increase in chymotrypsin-like activity in synapses of the RSC for both aged and young rats, and the cytosolic portion of the dorsal hippocampus for young rats. These results suggest a 25mg dose of MB per 100g of food has a significant effect on TFC in young rats but not aged rats. Therefore, additional research is needed to determine the optimal dose at which MB enhances TFC in aged rats.

Michael DeLaet
Single Session of Mindfulness Meditation Improves Cardiovascular Recovery After Anger
Mentor: Marcellus Merritt, Psychology
Poster Presentation, Easel 133
While mindfulness meditation (MM) interventions have immediate benefits for cardiovascular health, they lack sufficient sustainability. Brief forms of MM may be equally as effective for cardiovascular health under certain
conditions. In particular, MM may be especially effective for those who ruminate (i.e., continually reflect on negative events) less often. Therefore, we evaluated the direct cardiovascular health benefits of a single-session of MM, and if trait rumination moderated cardiovascular and affective recovery. College students aged 18 to 30 (n=72) participated in the following lab stress reactivity tasks: a five-minute resting baseline, a five-minute anger recall task with thinking and verbal recall, and then during subsequent recovery random assignment to one of two conditions [either sit quietly (control) or complete MM for ten minutes]. Persons assigned to MM received a five-minute MM training session before the resting baseline period. Mean systolic and diastolic BP, heart rate, total peripheral resistance, and positive and negative affect were computed for each task. Repeated measures ANOVA tests found a significant period by condition effect for systolic BP [p(F) < .014]; the MM (vs. control) condition showed lower systolic BP levels during thinking, verbal recall, and the second five minutes of recovery. Also, there were significant period by condition effects for negative and positive affect scores [p(F's) < .026]; with lower negative affect scores for the MM (vs. control) condition after anger recall and higher positive affect scores for the MM (vs. control) condition after recovery. However, there were no significant differences for any CV measure by level of rumination [p(F's) > .102]. Thus, a brief MM training session predicts greater cardiovascular recovery (perhaps by way of more positive mood) for those who practice MM after anger recall. Future studies will measure brief MM in field settings and compare practicing and non-practicing meditators systematically.

Nicholas DeLeo
The Development of Lab Equipment Used in the Study of Protein Hydrogels
Mentor: Joel Nowitzke, Physics
Poster Presentation, Easel 84

A protein hydrogel is a network of polymers which displays a number of potentially useful properties for biomedical applications. Though its potential is promising, it is a relatively new material and as such, little research exists on the topic. The UWM lab responsible for researching this topic is also new and is still in the process of developing custom equipment to run its experiments. The tests being performed seek to learn more about the elastic properties protein hydrogels exhibit. Experimentation is done by applying a specified force to a hydrogel suspended in solution, causing the gel to stretch. Data is collected via a specialized force sensor which the gel is connected to. This project will look into detail at the equipment used and how it was designed and developed to meet the needs of the lab. More specifically, it will look at the apparatus used to mount the data collection equipment and set up the experiments, as well as the cooling device which will be used to control the temperature of the hydrogel solution. Design and development considerations will be analyzed as well as their relative success. In addition, alternative design considerations will be presented and compared. Conclusions will seek to answer whether the testing equipment is optimal, and if not, how improvements can be made.

Nicholas DiPasquale, Thomas Larson & Caleb Rozema
Investigation of Cavitation in Micro Hydro Turbines
Mentor: Ryoichi Amano, Mechanical Engineering
Poster Presentation, Easel 35

By the year 2020, 70% of the dams in the United States will be at least 50 years old and will need repair. In addition, the World Energy Council estimates that there are ~200,000 gigawatt hour (GWh) per year of unused power available in low head locations, making now a perfect time to develop and design more efficient hydro turbines as the world becomes more reliant on alternative energy sources. Cavitation in turbomachinery is always a threat to the performance and the lifetime of the blades and other components (e.g. casing and draft tube). Working on understanding this phenomenon and the conditions for generation and propagation in a system proposes effective solutions to eliminate or at least diminish the detrimental effects. In the submitted project, cavitation patterns were investigated numerically and experimentally in a scaled model of a Kaplan hydro-turbine. Numerical methods were applied in a computational fluid dynamics (CFD) software to predict the flow behavior through the turbine and study the occurrence of cavitation with the link to the output power. The experimental study comprised of generating a recirculated-water setup to test a 3D-printed 3-inch Kaplan turbine with a maximum head of 9 feet. In this study, the team has demonstrated the cavitation effect with different conditions of the rotor speed and the flow rate.

Dick Dubbelde
Proportional Context of Distracters Alters Top-Down Sets during Contingent Attention Capture
Mentor: Adam Greenberg, Psychology
Poster Presentation, Easel 58

Attention is a filter through which sensory information is restricted to only what is relevant. It’s easy for us to find our friend wearing a green shirt in a crowd; we simply “look” for the color green. The instantiation of this filter to prioritize a search for green is called the top-down set. One may think a top-down set for green would be unaffected by the presence of other items in the visual scene, but evidence suggests that top-down sets may be malleable in certain conditions. However, the variables affecting this malleability are currently poorly understood. We examined whether context can drive top-down set malleability by manipulating the proportion of critical colored distracters in a contingent attention capture paradigm. We presented subjects three rapidly changing streams of colored letters, one central target stream and a distractor stream on either side, and asked them to identify a green letter within the target stream. The distractor streams contained four types of letters: neutral (gray), target colored, non-target
colored, or threshold colored. We varied the proportion of four distracter types in three conditions: equal occurrence of threshold and target colored distracters, double occurrence of threshold versus target colored distracters, or one-half occurrence of threshold versus target colored distracters. If proportional context affects the malleability of top-down sets, this will appear as a difference in threshold distracter accuracy between the two unequally proportioned conditions. Alternatively, if top-down sets are unaffected by proportional context, threshold distracter accuracy in these conditions should match the equally proportioned condition. Results were consistent with the former prediction: threshold colored distracters captured attention differentially in conditions 2 versus 3. Thus, proportional context leads to top-down set malleability; or, your top-down set for green is different depending on the crowd your friend runs with.

Alessandra Ebben
Calcitroic Acid as a Potential Key Element in Colon Cancer Prevention
Mentor: Alexander Arnold, Chemistry & Biochemistry
Poster Presentation, Easel 132

Vitamin D is one of the factors involved in maintaining the proper balance of several minerals in the body, such as calcium and phosphate, which are essential for the normal formation of bones and teeth. It can be acquired through diet as vitamin D2, or produced in the body through sun exposure as vitamin D3. The vitamin D gene provides instructions for making a protein known as vitamin D receptor (VDR), which allows the body to respond appropriately to vitamin D. The VDR is a nuclear hormone receptor which regulates a number of genes responsible for many cellular processes throughout the body, hence playing a vital role in one's health. It is activated by vitamin D and its corresponding metabolites, including 1,25-dihydroxyvitamin D3, also known as calcitriol, which is the most active metabolite. The end product of calcitriol is the presumed inactive compound calcitroic acid. VDR acts in the colon by regulating an enzyme which aids in the regulation of bile acids, which in turn are essential for the digestion and absorption of lipids in the small intestine. Higher concentrations of certain bile acids have been found to be toxic and have been linked to the development of colorectal cancer. Our hypothesis is that calcitroic acid is the main regulatory ligand for VDR in the intestines in order to break down excess bile acids. As a result, a higher uptake of vitamin D supplements or a diet rich in vitamin D could potentially decrease one’s risk of developing colorectal cancer. Our main focus is the synthesis of calcitroic acid, using ergocalciferol, also known as vitamin D2, as the starting material, and working with a series of organic chemical reactions and further biochemical testing, as a means to possibly determine whether it is, indeed, a major factor in colon cancer prevention.

Byron Edwards & Anne Barlas
Influence of Deposition of a Zeolite Layer on Mechanical Properties of Reverse Osmosis (RO) Membrane by Using a Tissue Tester
Mentor: Marcia R. Silva, Freshwater Science
Oral Presentation, 12:40pm, Union 260

Influence of deposition of a zeolite layer on mechanical properties of Reverse Osmosis (RO) membrane by using a tissue tester Byron Edwards, Anne Barlas, Marcia Silva, David Garman One of the most common water technologies used to produce high-quality clean water from unusable water sources in commercial and residential water filtration. Biofouling is a critical issue in membrane technology – for both water and wastewater treatment - as it can greatly impact the overall efficiency of the treatment processes. Biofouling is difficult to control, and significant economic resources have been dedicated to the development of effective biofouling monitoring and control strategies. Deposition of a zeolite layer onto RO membrane does reduce biofouling issues as zeolite is known for its anti-biofouling properties. However, there is need for investigation whether or not the tensile strength of the RO membrane will change with this modification. In this study, we will utilize a tissue tester for evaluation of the tensile strength of the membranes. Tissue testing equipment has historically been applied in the medical and biological fields of research. This project seeks to explore how the technology can be applied to membranes for water filtration. If successful, it can bring advantages over traditional tensiometers as analysis software allows images to be analyzed to identify and quantify strain non-uniformities and regional property variations. A mechanical profile will be developed for a control (unmodified) membranes and modified membrane: zeolite coated RO membrane. Expected outcomes of this project include a comprehensive study of mechanical properties of both unmodified and zeolite coated membrane.

Bushra Fathima
Identification of Borrelia burgdorferi in the Brains of Regulatory T Cell Depleted Mice
Mentor: Dean Nardelli, Biomedical Sciences
Poster Presentation, Easel 27

Lyme disease, caused by the spirochete bacterium Borrelia burgdorferi, is a significant health concern. According to CDC data, an estimated 300,000 people are diagnosed with the disease every year. It is spread through the bite of a black legged tick infected by the bacterium, and may cause symptoms in the neurological, musculoskeletal, and cardiac systems. However, not all individuals infected by B. burgdorferi develop the symptoms of Lyme disease, suggesting that there are immune factors regulating the severity of symptoms following infection. We hypothesize that CD4+CD25+Foxp3+ regulatory T (Treg) cells prevent B. burgdorferi from entering the central nervous system (CNS). To investigate this phenomenon, our lab aims to determine how infection with B. burgdorferi will compromise the blood brain barrier of mice, allowing the
Connor Finnegan, Cory Fitzsimmons, Amanda Houchens, Elisabeth Markman, Parker Munoz, Erik Peppey, Izaiah Ramirez, William Thiemann & Eleanor Wenker

Our Orphan Train: Devising and Communicating History Through Theatre

Mentor: Robin Mello, Theatre Performing Arts Presentation, 2:00pm, Union Cinema

This is a collaborative theatre research project exploring best practices of devising new works of historical theatre with social activism at its core. We discuss how we have created a team-based ‘company’ approach to theatre-inquiry. Our research question is: How the history of the Orphan Train Movement, 1853-1929, might best be dramatized, performed, and presented in order to educate the general public about this hidden piece of American history. We based our current research on our pilot project, Orphan Train (Spring 2016), which required us to work as a theatre company and learn research already published on the topic. We were charged with crafting an original and collaborative theatre piece focusing on the social issues and lived experience of the Orphan Train Movement. This work-in-progress was presented to the public in April 2016. We built on this foundation and used the outcomes from the project (nascent script, radio interview on Lake Effect, post-show discussions and lectures, dramaturgical and historical research from archives and other primary and secondary sources, and music pertaining to Orphan Train history) to pursue new research on the subject. In the Fall 2016 we developed and implemented workshops that engage new learners in both the history and the craft of devising new work. We have strengthened our collaborative by sharing leadership roles, working as a supportive team, and finding ways to explore new ideas while developing a shared vision. In February we began new archive research and are in the midst of rewriting and expanding the Pilot script. Our presentation will briefly present the workshop content, engagement with archival materials, and examples from the evolving script. We will also review lessons learned, processes that support our collaborative, audience feedback, and what we view our next steps to be.

William Fiore, Eric Edwards, Zach Komassa, Kaleb Maracci, Rusty Mundorf & Kaylee Yelk

ARCC@UWM: Searching and Solving Pulsar Puzzles
Mentor: Xavier Siemens, Physics
Mentor: David Kaplan, Physics
Mentor: Dawn Erb, Physics
Poster Presentation, Easel 153

Pulsars are a type of evolved star that are extremely dense and rotate with an extremely reliable period producing an intense beam of radiation, similar to a lighthouse pulse. This unique pulse allows for novel ways to study the universe, the most exciting of which being the potential to detect previously undiscovered gravitational waves giving further evidence to Einstein’s theory of relativity. The Arecibo Remote Command Center (ARCC) was formed as a way for undergraduate students to be involved in the search for new pulsars. Students remotely observe from UWM with two of the world’s largest radio telescopes, Arecibo Observatory in Puerto Rico, and the Green Bank Telescope in West Virginia, and analyze the resulting data to discover and study these incredible neutron stars. Students at UWM also collaborate with students at a number of other US institutions, including the University of Texas - Rio Grande Valley, Kenyon College, Hillsdale College, Franklin & Marshall College, Swarthmore College, and with researchers across the globe.

Karl Flanagan-Morris

Copper Doping of Zinc Oxide Thin-films
Mentor: Nidal Abu-Zahra, Materials Science & Engineering
Poster Presentation, Easel 125

In this presentation, the doping of ZnO thin films with copper will be investigated. The films are doped with copper in order to increase the conductivity of the film to be a viable replacement for Indium Tin Oxide (ITO) as an electrode on a solar cell. The characterization and electrical properties will be determined via XRD, SEM-EDS, and UV-Vis Spectroscopy.

Jarincy Flores Rodriguez

The Exquisite Corpse
Mentor: Nikole Bouchard, Architecture
Poster Presentation, Easel 127

There are large amounts of foreclosed homes in the Milwaukee area that are boarded up and slated for demolition. Many of these homes are left in poor condition and are condemned for demolition. Therefore, I decided to focus my project based research on the Milwaukee area. Through my research, I sought to answer many of the questions that arise when studying urban vacancy and demolished building. Will it be reused or end up in a landfill? Who is responsible for ensuring that materials are reused? I focused on architectural home typologies that are specific to Milwaukee. I looked at the way that these topologies are expressed around Milwaukee. During that process, I was drawn to a more specific location in Milwaukee. In particular the more concentrated areas affected by urban vacancy. These areas
include the 30th street corridor along with the Amani neighborhood. I also explored different ways to reimagine the materials and typologies through photography and on site exploration. I used the photographs and information gathered to collage and develop three dimensional studies. After gathering this information, I began to develop some ideas about the areas I chose and I started to generating my own design ideas and intervention.

Hanna Fowler  
Racial & Ethnic Disparities in the Juvenile Justice System: How Digital Technology is Expanding the Carceral State  
Mentor: Robert Smith, History  
Poster Presentation, Easel 64

The purpose of this research is to shed light on the alarming rate at which our youth are being put in prison in Milwaukee. Additionally, we need to recognize as a community that this issue disproportionately effects youth and people of color. Wisconsin leads the nation in incarcerating black men. Although African Americans make up 13% of the U.S. population, the prison population is comprised of 40% black males. The need for criminal justice reform is undeniable. In a study done of four Wisconsin counties, it was found that 70 percent of youth that were held in secure detention returned to the system in less than a year of their release from detention. The current model is not working and most research points that instead of reforming those that go through the system, incarcerating more people simply increases recidivism. In order to reduce the impact that incarceration has on the Milwaukee community, we must further understand how far that impact goes. This research focuses specifically on GPS tracking and electronic monitoring by law enforcement officials to further criminalize and dehumanize youth in our community.

Marijam Frahmand  
Associations between Genetic Risk for Alzheimer's Disease and Hippocampus-Dependent Memory and Learning in Healthy, Middle-Aged Adults  
Mentor: Ira Driscoll, Psychology  
Poster Presentation, Easel 78

Both normal and pathological aging are accompanied by memory decline. The epsilon 4 (e4) allele of the apolipoprotein E (APOE) gene is the best-established genetic risk factor for Alzheimer's disease (AD) which is behaviorally hallmarked by memory loss. We focused our considerations on the hippocampus based on the fact that (1) the hippocampus is critically involved in memory, and (2) is especially vulnerable to the deleterious effects of aging. We employed the virtual Morris water task (vMWT) to assess hippocampus-dependent spatial learning and memory. The vMWT is a translational version of the classic paradigm used to investigate place learning and memory in rodents and requires participants to acquire, consolidate, and retrieve distal spatial cues to navigate a large pool and find a hidden escape-platform. The objective of the present study was to assess the association between the APOE gene and spatial learning and memory using the vMWT. We hypothesized that APOE e4 risk-carriers would have longer latencies and travel longer distances to find the platform during learning trials. Furthermore, we predicted that the APOE4 risk-carriers would have lower latency and travel shorter distance in the goal quadrant of the vMWT probe trial, all indicators of poor learning and memory. In our sample of healthy, middle-aged adults (N=143; age 40-61), APOE e4 risk-carriers traveled significantly shorter distance in the goal quadrant of the probe trial, and there was a trend toward higher total latency in finding a hidden platform across the learning trials. These outcomes signify poorer spatial learning and memory in the APOE e4 risk-carriers, when compared to the non-carriers. Our findings indicate that the vMWT may be a useful early detector of cognitive changes, and that memory deficits may be present early and well prior to any clinical impairment in those at genetic risk for AD.

Eileen Frerex  
Shape Memory Polymers  
Mentor: Rani El Hajjar, Civil & Environmental Engineering  
Poster Presentation, Easel 135

Shape memory polymers (or SMPs) materials that are able to transform to their permanent shape after being deformed when triggered by an external property such as light exposure, temperature, or electricity. These multifunctional pieces of material are gaining even more attention due to lower costs, flexibility, and light weight. These advantages make industrial as well as medical procedures much more efficient and minimally invasive. In addition, the properties of the polymer can be changed easily in order to manipulate the degree of the conditions which will trigger to polymer to transition to its permanent shape. With this research, we explore the how chemical changes in the polymer affect how responsive it is to changing magnetic fields. Test subjects are assembled using a 3D printer, and deformation will be observed under levels of magnetic field. After this observation, we will be able to easily control retention and recovery of the polymer's shape. Through this research, progress in industrial and medical procedures could be made by furthering the knowledge of SMPs responsive to magnetic fields.

Zane Gayle  
Milwaukee Stories: Documenting Place, People, and History throughout Milwaukee along the Green Line  
Mentor: Arijit Sen, Architecture  
Poster Presentation, Easel 167

The focus of this project was to document; place, people, and history of spaces throughout Milwaukee. The research was conducted over in two distinct phases, spanning from January to August of 2016. The first phase was conducted in the Architecture and Human Behavior course at the University of Wisconsin-Milwaukee during the spring 2016 semester. The information gathered
during this time would be used in the second phase of the project. This course, which I was enrolled in had a main objective. Groups comprised of three students were assigned to a bus stop along the Milwaukee County Transit System Green Line bus route. From their assigned stop, groups were to find a building near the bus stop that interested them. Whichever building they chose, would become the focus of their work. Once having chosen a building or a site would conduct research over four separate stages. Over the four stages, the groups would gather observations, conduct archival research, and have interviews to gain insight to their chosen areas. The final stage was to take all of their work and create a theme or character for their site and then present it. The second phase was collating the information and data that was gathered during phase one in order to publish the work. The first stage of this was a synthesis of all projects and materials that were created during the course. Once all of the information had been organized I began the second stage of transferring and organizing the information, in order to create a website that displayed all of the information gathered. Once the information, images, and audio were transfer to the website. I was able to reorganize the website into a more user friendly website that was later published and made available for public viewing.

Trevor Georgeson
Reconfigurable Flexibility In Pneumatic Architecture - “The Worlds Most Flexible Inflatable”
Mentor: Whitney Moon, Architecture
Oral Presentation, 12:40pm, Union 280
This past fall I decided to sign up for an architecture seminar called Pillow Talk: “Blow Up!,” instructed by Professor Whitney Moon. The project our class is currently working is a temporary inflatable installation in the outdoor garden space of the Open, a new gallery located in the Riverwest neighborhood of Milwaukee. Our design is a low-pressure pneumatic enclosure that can be connected to a heat source, making it habitable (i.e., thermally comfortable) during the winter months for a variety of events and uses. Initially, we intended for the pneumatic installation to be DIY (do-it-yourself), but given that we had designed the air-filled enclosure to be installed around an existing outdoor pizza oven, it became essential for us to work with a flame-retardant material. As a result, we contacted a fabricator located in the Midwest (Landmark Creations, located in Minneapolis, Minn.), who specializes in pneumatics. Having raised the requisite funds to construct it, we will have Landmark Creations fabricate the structure in January, so that it can be installed at a local art gallery in February. As a result of creating this partnership with the fabrication company, I have become very interested in exploring and researching the malleability, mobility, controllability, flexibility, and interconnectivity of pneumatics. This past fall, my explorations in modeling pneumatics began with clay studies. I noticed how malleable and flexible the clay became as I rolled it like dough, creating noodle-like shapes. It made me start thinking about how flexible an inflatable can become — where it can start connecting, snapping or folding onto itself creating multiple spaces/shapes while using different materials (fabrics/skins). Also, I am exploring how flexible air becomes once it is contained inside these different tube skins, while keeping in mind affordability and maximizing mobility. The question I want to answer through this research (SURF, spring 2017) is how using the uncomplicated shape of an air-filled tube (“noodle”) can perform and create infinite spatial complexity. This is why we have titled our proposed SURF research project “The World’s Most Flexible Inflatable.”

Lily Gierke
Population Genetic Structure of the Bull-Kelp, Nereocystis luetkeana
Mentor: Filipe Alberto, Biological Sciences
Poster Presentation, Easel 72
Despite its vast geographic range and important role in coastal ecosystems in the northeast Pacific, the bull kelp, Nereocystis luetkeana, has historically not been as widely studied as its globally distributed sister kelp, Macrocystis pyrifera. To date, there have been no published studies on the population genetic structure of Nereocystis luetkeana. We developed 10 polymorphic microsatellite markers with 454 sequencing and used them to genotype a total of over 2000 samples distributed from over 50 sites from Cambria, CA to Kachemak Bay, AK in an effort to elucidate the biogeographic and evolutionary history of Nereocystis luetkeana populations along the North American coastline. We also tested the classical isolation-by-distance regression model and examined potential bottlenecks, genetic diversity, and allelic richness. The results from this study have given us the information necessary to proceed with selecting samples to be used for population genomic analyses with Double Digest Restriction Associated DNA Sequencing (ddRAD).

Olivia Gloria
Engineering Protein Constructs for Force Spectroscopy and Fluorescence Measurements
Mentor: Ionel Popa, Physics
Poster Presentation, Easel 76
Cells have a remarkable range of motility, and the mechanical forces at cell adhesions are emerging as a critical factor governing adhesion growth, maturation, and cell migration. Talin is a cytoskeletal protein domain responsible for activating integrins and regulating the formation of cellular adhesions, including cancer metastasis. The desired engineered polyprotein construct contains one HaloTag, one SpyTag domain, two protein G domains, two talin domains, two protein G domains and an AviTag. The talin domains are investigated by experimentation by combining magnetic tweezers with Fluorescence Resonance Energy Transfer (FRET) to measure the binding and un-binding of ligands, and it will determine the exact distance between talin and two of its binding partners, RIAM and vinculin. A force-dependent unfolding and refolding of the domains will determine...
how different binding partners bind to talin at different mechanical forces. The main outcome is the investigation of the mechanical response of talin in the presence of its different binding partners. This polyprotein construct study is the initial understanding of the relationships between its domains and serves as a basis to explore the different scenarios that exist at cell-matrix adhesions.

Joseph Glowacki
1-D Kinematics: An Intuitive Approach to Motion Using Everyday Objects
Mentor: Anja Blecking, Chemistry & Biochemistry
Poster Presentation, Easel 8

Research shows that many high school students have misconceptions about the physical concept of motion, especially the relationship between time, position, velocity, and acceleration. As part of a larger professional development project with Milwaukee in-service science teachers, UWM research design and provide active learning modules based on latest educational research for classroom implementation. The described physics module focuses on developing students’ understanding of the relationship between time, position, velocity, and acceleration using a scaffolding approach, moving students progressively toward stronger understanding and, ultimately, greater independence in their learning process. The module design follows the demands of the 3-dimensional approach of the Next Generation Science standards, connecting disciplinary core ideas, science practices, and crosscutting concepts. The module incorporates the use of Vernier motion detectors and video capture to help students understand, apply, and translate these concepts into everyday life. The presentation will describe the module design, underlying research, and implications for practice.

Zahra Gohari
A Review of Technologies for Detection of Zika Virus
Mentor: Marcia Silva, Freshwater Sciences
Poster Presentation, Easel 119

Zika virus (ZIKV) is a mosquito-borne flavivirus with a single-stranded positive RNA and is transmitted by many Aedes spp. mosquitoes. It was first identified in monkeys in Uganda in 1947. The first human case was detected in Nigeria in 1954 and there have been further outbreaks in Africa, South East Asia and the Pacific Islands. Most of these outbreaks were small and Zika has not previously been considered a major threat to human health until May 2015, when it was reported in Brazil and has since spread rapidly, being considered a “pandemic re-emergence” by the US National Institute of Health (NIH). This work will present a review of technologies for detection of zika virus, including standard serological approaches, nucleic acid-based detection methods, and methods that fall under “rapid” detection methods. We will mostly focus on the rapid detection methods as the recent Zika virus outbreak highlights the need for low-cost diagnostics that can be rapidly developed for distribution and use in pandemic regions. They can be classified in three categories: (a) programmable RNA sensors called toehold switches, (b) freeze-dried, paper-based, cell-free protein expression platform, and (c) a combination of these two technologies generating a technology platform for rapidly and inexpensively developing and deploying diagnostic sensors.

Saleena Gomez
Infant Mortality: A Literature Review
Mentor: Kris Barnekow, Occupational Science & Technology
Poster Presentation, Easel 156

Infant mortality is a public health problem in the United States and is predominantly found in African American families. Studies suggest reducing stress on African American women while pregnant may have a positive impact on birth outcomes. African American fathers may have a positive influence on stress reduction by engaging in the prenatal period. This poster demonstrates the usefulness of community-based participatory research in learning more about the experiences of African American fathers living in an urban center in the Midwest. A community-based participatory research study using phenomenology and focus group interviews was used for this study. A community-based approach includes individuals who are affected by an issue and develops strategies to resolve or to assist in understanding said issue. These interviews consisted of 45 fathers participating in four group interviews and one member-checking group. Community organizations were given the flexibility to utilize strategies to recruit and engage the participants in the focus group interviews. Results show that fathers in the study revealed multiple factors that inhibit their identity, performance, and engagement during the prenatal period. These include no transportation, no means of communication, and no means of work. Eliminating these factors lead to more father engagement and increased their overall knowledge of infant mortality. Allowing community organizations to determine optimal methods for recruiting and engaging fathers resulted in significant participation. Providing incentives that match the organizations’ services for the fathers such as transportation, food, and means of communications such as a temporary phone, resulted in increased father engagement for this study. More engagement in the prenatal period from fathers can help decrease stress on the mothers—making it possible for infant mortality to decrease.

Ryan Gonzalez & Courtney Nachreiner
Effects of Laughter on Stress
Mentor: Raymond Fleming, Psychology
Poster Presentation, Easel 136

This study investigated the effect of laughter on stress to address current gaps in the literature on the psychophysiological effects of laughter on cardiovascular reactivity. While there is data relating humor to stress reduction, there is little data on the relationship between laughter (and its mechanics) and stress reduction.
To evaluate stress, the experiment used self-report (e.g., personality traits, stress levels) and physiological measures (e.g., heart rate [HR], heart rate variability [HRV], respiratory sinus arrhythmia [RSA]), including respiration and ECG using a MP36 Biopac system. First, all participants’ physiological measurements were recorded during a 5-minute baseline, then stress was induced via the Trier Social Stress Test, a test involving the serial subtraction of 13 from 1,022. This was followed by having participants watch either a nature video (control group) or a video intended to make them laugh (experimental group), all while participant laughter was recorded. The study ended after a second 5-minute baseline. A repeated measures ANOVA on stress levels using a Greenhouse-Geisser correction determined that responses to stress differed between groups (F(1.29, 49.005) = 23.754, p <.001), such that those in the laughter group reported significantly less stress than those in the control group following the video. Analysis revealed no significant between group differences on psychophysiological responses to stress. These results suggest that laughter has a positive impact on perception of stress. In conclusion, these results could prove useful as an effective adjunctive treatment of patients. This information may also help future research focused on laughter’s effects across longer spans of time.

Carl Greer
African American Males Perception of High School Teacher Efficacy
Mentor: Gary Williams, Educational Policy & Community Studies
Oral Presentation, 1:00 pm, Union 240

The purpose of this research is to analyze the effects that teacher and student expectations have on African American male student’s learning experience. Unfortunately, many African American males face the barrier of teachers with low expectations for their academic success. This limits their achievement by developing negative personal beliefs in the student themselves over time. An illustration of this is the high school graduation rate in Wisconsin: the rate for white students is 92.4%, but for black students' it is only 66% (NCES.com). The study asks the following questions: How important is the introspective view of the student? How does a teacher’s personal beliefs impact the African American student’s academic experience? What are the outcomes that African American males experience because of these factors? The theoretical framework is based on the Teacher Efficacy Theory. Teacher Efficacy is defined as a teacher’s “capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated” (Woolfolk & Hoy, 1990). Participants of the study will be 40 high school students (20 Black male and 20 White male) selected from different school districts around the Milwaukee area. Questions based off the National Center of Educational Statistics (NCES) longitudinal study will be put into a survey. (E.g. “Has your teacher encouraged you to take higher level classes?”) Responses will be measured using t test comparisons to determine if there is a significant difference between the participant groups. The hypothesis is African American male students will perceive less opportunities in comparison to peers in other demographics. Having teachers high in efficacy creates greater success in students translating to better opportunities in life.

Rachel Gremminger
Sex Differences in the Memory Enhancements Effects of 17\textsuperscript{\theta}-Estradiol
Mentor: Karyn Frick, Psychology
Mentor: Wendy Koss, Psychology
Poster Presentation, Easel 92

Infusions of 17-estradiol (E2) into the dorsal hippocampus immediately following training increases the memory in object placement and object recognition tasks in ovariectomized female mice. In females, the E2-induced memory enhancements are mediated through cell-signaling cascades including the extracellular signal-regulation kinase (ERK) cascade. In males, systemic post-training injection of E2 enhances spatial memory consolidation, but the signaling pathways necessary for E2 to enhance memory formation in males is unknown. To investigate this, female mice were ovariectomized and male mice were left gonadally-intact and then implanted with bilateral dorsal hippocampal cannulae. Immediately after in object placement and object recognition tasks, mice received bilateral infusion of vehicle or E2. In the second experiment, male mice were castrated and compared to intact males in the same behavioral tasks. This allowed us to investigate whether endogenous estrogens have any effects on E2's memory enhancements. In both experiments, it was confirmed that E2 increased memory in both castrated and intact male mice similar to ovariectomized female mice. Next, we tested whether the ERK pathway was required for the memory enhancements, as it is for females. In this experiment, castrated male mice were implanted with triple cannulae in the dorsal hippocampus and dorsal third ventricle (ICV). Immediately after training in object tasks, mice received infusions of vehicle or E2 into the ICV and vehicle or an ERK inhibitor (U0126) into the dorsal hippocampus. Results showed that U0126 did not affect the enhancement of memory consolidation by E2 in either object task. This would suggest that E2-induced memory enhancements in males do not work through the same biochemical pathway as females. Further studies of the other cell signaling pathways such as mTOR and PI3K/AKT, is necessary to determine the biochemical processes responsible for the increase of memory consolidation in males after E2 treatment.
Sarah Groh  
**Adverse Adult Experiences: Prevalence and Association with Childhood Adversity**  
Mentor: Joshua Mersky, Social Work  
Poster Presentation, Easel 4

Research has shown that over half of American adults have experienced at least one adverse childhood experience (ACE) in their lifetime. Research also indicates that greater exposure of ACEs, including child maltreatment and household dysfunction increases the risk of poor health outcomes. What is less clear, however, is whether adult exposure to adversity has effects that are similar to the effects of childhood adversity. This study examined the prevalence of adverse experiences in adulthood, and whether exposure to childhood adversity increases the risk of adult adversity. To answer these questions, data were analyzed from the Families and Children Thriving (FACT) Study, an investigation of low-income women who received home visiting services in Wisconsin (N=894). ACE data were collected from participants by home visitors using the Childhood Experiences Survey, while information on adult adverse experiences was taken from survey responses to the Adult Experiences Survey. Results showed that there were high rates of adverse adult experiences in this sample. For example, since turning age 18, 37% of women reported that they had experienced homelessness, and over 40% reported that a partner had physically abused them. Nearly one-half of the women (47.5%) had experienced the incarceration of a spouse or partner, while nearly one quarter (22.3%) had personally been in prison or jail. Results also showed that the number of childhood adversities and the number of adult adversities reported. The findings suggest that low-income women in Wisconsin experience significant adversity over the life course, and that exposure to ACES increases the risk of exposure to adverse experiences in adulthood. The implications for two-generation programs like the home visiting services, which may act as both intervention and prevention strategies, will be discussed.

Megan Grose  
**Studying Rheology Using Cleavage Refraction in Quartz-rich Layered Rocks from Baraboo Wisconsin**  
Mentor: Dyanna Czech, Geosciences  
Oral Presentation, 12:40pm, Union 250

In metamorphic rocks forming at depth in tectonic regions, cleavage forms by the planar alignment of minerals. In layered metamorphic rocks, this cleavage will develop in different orientations based on the strength of the various rock types comprising the layers, causing cleavage refraction across layer boundaries. We can use this cleavage refraction to estimate the strength differences (in terms of effective viscosity ratios) between layers, a critical parameter that is poorly constrained in naturally-deformed rocks. Effective viscosity ratios can be used to evaluate whether rocks deformed by a simple linear-viscous model or whether a more complex rheologic model is needed. Layered quartzites and phyllites exposed near Baraboo, Wisconsin provide an ideal natural laboratory for study. The rocks contain varying proportions of quartz (strong phase) and pyrophyllite (weak phase) with only minor amounts of hematite and other minerals. Previously collected cleavage orientation and mineralogy data are used from those layers to estimate effective viscosity ratios and relate them to mineralogy between not only adjacent layers, as has been previously reported, but nonadjacent layers as well. Within a particular outcrop, the qualitative relationship between quartz content and cleavage orientation is clear; the angle between cleavage and bedding is smaller in layers with lesser amounts of quartz (and conversely more pyrophyllite). Graphs comparing the effective viscosity ratios and volume of strong phase (quartz) show an exponential relationship that fits within theoretical end-member curves of two phase mixtures with strong and weak phases. However, the data plot closer to the curve for strong inclusions in a weak matrix rather than the curve for weak inclusions in a strong matrix, which is contrary to what we expect from the mineralogy and microstructural evidence. Nevertheless, the data demonstrate that we can link mineralogy to effective viscosity ratios in naturally deformed rocks.

Katelyn Gruell  
**The Inclusion of CCM styles in the Nation’s Young Artist Programs**  
Mentor: Tanya Kruse, Music  
Poster Presentation, Easel 70

Young artist programs are the voice equivalent of an internship program in the business world. Due to the large amount of applicants versus scarce positions available, these are highly sought out positions and often lead to an important network for the emerging young professional opera singer. Even though these programs are for future opera singers, there is currently a trend of including music theatre within the sung repertoire, which is essentially counter-culture, as this genre hasn't been included in traditional operatic seasons due to many cultural factors. Because many YAPs are associated with or are run by major opera companies, young singers are being asked to include music theatre in their auditions for these programs but are often not trained to manage the vocal demands nor understand what is stylistically appropriate for this genre of music. A longitudinal study of the repertoire within the seasons of these YAPs and quantification of the audition postings that include non-classical requirements was done as well as identification of the type of musical theatre genre (legit, pop, rock, etc.) that has been performed in these YAPs. The study is ongoing and will eventually include interviews of YAP participants and directors as well as an analysis of pedagogy and technique participants receive.
Jie Guo
Development of Self-Healing Materials for use in Wind Turbine Blades
Mentor: Ryo Amano, Mechanical Engineering
Poster Presentation, Easel 25

The goal of the project is to apply self-healing to wind turbine blades to reduce maintenance cost. There are many ways to apply self-healing material into wind turbine. However, considering effectiveness, material saving, material property, etc; there is only one solution that serve the purpose. That solution can develop with technology. Theoretically, this concept could reduce cost, as we obtained sample data that self-healing concept can prevent creep and cracks further developing lead to unstoppable damage. The next big step is to determining the most efficient way to apply self-healing to wind turbine blade.

Ann Hackl
Development of a Genetic System for DNA Transfer into Aeromonas Hydrophila
Mentor: Daad Saffarini, Biological Sciences
Poster Presentation, Easel 25

Aeromonas hydrophila is a gram-negative bacterium and opportunistic pathogen that usually inhabits aquatic ecosystems throughout the world. A. hydrophila strains can cause diseases in humans, fish, and other animals. Several virulence factors, such as aerolysin, have been studied extensively and their role in pathogenesis has been identified. However, several factors predicted to be involved in pathogenesis, such as chitinase, have not been yet investigated. To determine the role of these additional virulence factors, a genetic system for the isolation of mutants needs to be developed. I have used a plasmid that contains the mini-transposon himarRB1 to generate transposon-induced mutations in A. hydrophila. Unfortunately, the efficiency of transposition was extremely low. One possibility for this low efficiency is the digestion of DNA by the A. hydrophila restriction system. The A. hydrophila genome, however, does not appear to encode a restriction/modification system, suggesting that DNA modification and restriction may be performed by a novel system in this bacterium. To begin to analyze this system, total chromosomal DNA was isolated from A. hydrophila cells and digested with different restriction enzymes. The results obtained will allow us to identify enzyme restriction sites that are protected in A. lyriciphila, and thus will help identify the type of DNA restriction system this organism possesses. We expect that identification of the A. hydrophila restriction/modification system will allow us to develop better tools for the isolation and analysis of A. hydrophila mutants.

Chad Haehle & Alice Lecus
Novel Macroporous Material for the Removal of Mercury from Water
Mentor: Marcia Silva, Freshwater Science
Poster Presentation, Easel 112

Under the 1987 Great Lakes Water Quality Agreement, the lower Green Bay and Fox River estuary has been labeled an Area of Concern due to mercury contamination from over-industrialization. Mercury attaches onto sediment and is introduced into the water column where it can either be buried along with the sediment, resuspended in the water, or methylated by bacteria. The result of methylation is a bioaccumulative organic compound known as methylmercury. This release of mercury into the region has led to environmental concerns due to its high toxicity, which is dependent on the chemical form and type of exposure. Three primary forms of mercury are: elemental mercury, inorganic, and organic compounds. Each form is present in the atmosphere and can be deposited into surface waters. Current mercury remediation attempts include coagulation, Granular Activated Carbon, Lime Softening, and Reverse Osmosis. While all have proven to remove mercury with various degrees of success, issues remain about cost, eco-friendliness, and effectiveness. To provide a more efficient, affordable solution for the removal of mercury, the adsorption properties of the novel macroporous material were evaluated. This research studies the effectiveness of a novel macroporous material for the removal of mercury from water. The material was tested in column experiments by spiking it with a range of mercury contamination levels indicative of conditions found in the sediments in Green Bay. Water samples were collected from contaminated sediments to analyze and to assess the new materials’ performance. Preliminary column experiments indicate removal of up to 100% of mercury from the water column.

Jacqueline Haertel
The Role of the Medial Prefrontal Cortex in Estradiol-mediated Enhancement of Object Memory Formation in Female Mice
Mentor: Karyn Frick, Psychology
Poster Presentation, Easel 91

Systemic injection or dorsal hippocampal infusion of the potent estrogen 17-estradiol (E2) can improve memory in ovariectomized (OVXed) female mice. Estrogen receptors are also expressed in other brain regions important for memory formation, including the medial prefrontal cortex (mPFC), and the role of the mPFC in E2-mediated memory enhancement is unknown. To address this question, female mice were OVXed and implanted with bilateral cannulae aimed at the mPFC. Mice were then tested in object recognition (OR) and object placement (OP), E2-sensitive tasks routinely used to evaluate object recognition and spatial memory in rodents. Immediately after training in each task, mice were infused with 5g/hemisphere E2 or vehicle. Memory
retention was then tested 48 or 24 hours later, as vehicle-treated OVXed mice do not remember the familiar or unmoved object location at these delays, whereas OVXed mice infused with E2 into the DH do. In the present study, we found mice infused with E2 into the mPFC had intact OR and OP memory, whereas vehicle-treated control mice did not. These data demonstrate that E2 infused directly into the PFC can enhance both OR and OP memory, and provide critical new insight into the estrogenic regulation of memory in female mice.

**Taylor May Hagenburcher, Grace Portz & Sarah Weiss**  
A Student's Guide to Revising  
Mentor: Vicki Bott, English  
Poster Presentation, Easel 154

A Student’s Guide to Revising The “Student's Guide to Revising” project is a handbook that was written specifically for college students who are revising work for any discipline. In the handbook, students will find a section explaining what revision actually is, tips and strategies (framed as approaches) for actual intensive revision of a project or essay, as well as a section dedicated to tips and strategies for giving, getting, and interpreting feedback from both instructors and peers. In our most recent phase of research and development, we have added a deeper understanding of how to define revision based on reading many academic texts. We have also added to our current understanding of how to revise by developing our own strategies for revising. Furthermore, we have added significantly to the section dedicated to peer feedback by surveying our fellow students for their own experiences with both revision and giving and getting feedback. In future endeavors, we are considering expanding our handbook to include a section on editing, on interpreting and using sources, and/or potentially adding a focus for high schoolers and preparing them for college-level writing.

**Jessye Hale**  
MdsC Proliferation in the 4T1 Breast Cancer Tumor Model  
Mentor: Douglas Steeber, Biological Sciences  
Oral Presentation, 12:00pm, Union 250

The immune system generates a T cell-mediated response to fight the progression of tumor growth by targeting abnormal self-cells. However, under conditions such as cancer, the production of suppressor cells in the bone marrow significantly increases and inhibits the anti-tumor response thus promoting tumor growth and metastasis. One specific type of suppressor cells are the myeloid-derived suppressor cells (MDSCs). These myeloid-lineage cells are released from the bone marrow in an immature state and are subsequently recruited to the tumor site. Previous studies in our lab using the murine 4T1 breast tumor model showed that MDSCs within the primary tumor were largely present in clusters located adjacent to regions of hypoxia where they increased in size with tumor growth. To determine the contribution of MDSC proliferation to cluster formation, bromodeoxyuridine (BrdU) labeling was performed followed by analysis with flow cytometry and immunohistochemistry. Specifically, 4T1 tumors were induced by injecting 4T1 cells into the mammary fat pad of female BALB/c mice and were allowed to grow for 4-5 weeks. Mice were pulsed with 100 micrograms/kilogram BrdU for 1 hour before sacrifice. The tumors were harvested and either frozen for cryosectioning or digested for single-cell preparations, and then labeled for MDSCs and BrdU for analysis by fluorescence microscopy and flow cytometry, respectively. Flow cytometry results showed that ~20% of the MDSCs were BrdU+ and thus indicated proliferation was occurring within the tumor. Immunohistochemistry studies are currently ongoing and will determine the location of the BrdU+ MDSCs in the tumor. Understanding the process of MDSC proliferation during tumor growth may provide novel information for the development of immunotherapeutic strategies targeting MDSCs to enhance the patient's anti-tumor immune response.

**Lianna Hawi**  
Upper Extremity Muscle Activity During Geared Manual Wheelchair Mobility  
Mentor: Brooke Slavens, Occupational Science & Technology  
Poster Presentation, Easel 15

It is estimated 248,000 people have a spinal cord injury (SCI) that significantly affects their daily life activities. Many individuals in this population use manual wheelchairs to assist them in propulsion and activities of daily living. However, manual wheelchairs often lead to an increase in shoulder pain and injuries. The aim of this study was to evaluate the biomechanical effects of a new, geared manual wheel for users with SCI. We seek to better understand the upper extremity biomechanics and muscle activity during manual wheelchair mobility. Ten (10) able-bodied individuals ages 18–30 (5 females, 5 males) participated in this study. A Breezy manual wheelchair (Sunrise Medical LLC) was used by participants with both standard wheels and Easy Push (IntelliWheels, Inc.) geared wheels. The geared wheels have a gear ratio of 1:1.6. Participants propelled on level, tile flooring and up an ADA compliant wheelchair ramp (4.8 degree slope). Delsys Trigno wireless surface electrodes were placed on the anterior deltoid, pectoralis major and infraspinatus muscles of the participant’s dominant side to measure muscle activity. Electromyography (EMG) signals were normalized by subject specific maximum voluntary contractions (MVCs) and used to quantify peak and integrated muscle activity during a wheelchair stroke cycle. The results indicated that peak and integrated shoulder muscle activity decreased when using geared
The Greenwood District in Tulsa, OK was the pinnacle of the American Dream; The year is 1921, segregation is the social norm, Jim Crow is synonymous with state and federal laws, and Black Americans are still second class citizens. Through all the adversity, there was hope in a 35 square block district in the booming city of Tulsa, OK. Greenwood or famously known as Black Wall Street, was the epicenter of black economics, business, self-reliance, and the strength the black dollar possessed. It was here, in the heart of racial tension, hatred and discrimination an all-black business district thrived; Constant population growth, healthy business competition, and a vast selection of a variety of stores, gave black consumers discriminatory free shopping options. The year is 1921, the day May 31; the day Greenwood burned. The racial tension hit its peak, and a simple touch caused a 35 square block district to become leveled in less than 12 hours. If you do a Google search of Black Wall Street, this is the story you will get. A thriving district brought to its knees by hate, the destruction of Black Wall Street. But I knew there had to be more. What were these businesses that ran for over a decade? Who were the owners? How did the black citizens of Tulsa live in a city that openly showed their hatred towards them? How did this district thrive successfully in the most racially tensioned part of American History? The goal of my research is to discover the businesses, community and people of the district. After discovery, I plan to make this information accessible to the public through an interactive website, okgreenwood.org.

Christian Holland, Maggie Franzen & Riley Mahr
AR/VR/MR Immersive Media Infrastructure and Technology
Mentor: Christopher Willey, Art & Design
Poster Presentation, Easel 14

The exponential rise of developing technologies has left the world with the ongoing question, “What is the next big medium?” This is what Professor Christopher Willey and I have been researching within the Immersive Media Lab, and the results have generated a campus-wide buzz about the team that has been adapting virtual, augmented, and mixed reality. Our research started rigorous skill acquisition to learn the applications and techniques necessary for both generating and experiencing AR/VR/MR content, with a focus on 3D modeling, animation, and data remediation. The product of our endeavors has resulted in synthesizing our knowledge into curriculums for classes aimed towards aspiring Digital Media professionals. Our cross-disciplinary explorations with the Physics department demonstrated the malleability and adaptability of this medium, and fostered aspirations to legitimize and monetize this research, resulting in proposals for STEM based RGI Research Grants and other funding. Our team has grown by three, and we have undergone the task of completely understanding the full implications and applications of the medium. The team has rounded out our research with an understanding of engineering and hardware, content creation and animation, conceptual and theoretical knowledge, and ultimately… artistic interpretation. While our primary focus is currently on digital creativity, the data and content is adaptable across nearly every field of study and practice. GODSPEED, the current project in the Immersive Media Lab, is providing a necessary foundation for current project in the Immersive Media Lab, is providing a necessary foundation for learning and possibly adopting AR/VR/MR technology into UWM and Peck School of the Arts, and truly synergizing fine arts, science, programming, and nearly anything else you
can think of. We will have equipment available for viewing experience at the UW-Milwaukee Research Symposium.

Zachary Hying
Exploring The Rhizobial Interactions with Non-nodulating Legume *Gleditsia triacanthos*
Mentor: Gyaneshwar Prasad, Biological Sciences
Mentor: Laura Ketelboeter, Biological Sciences
Mentor: Sreevidya Sambukumar, Biological Sciences
Poster Presentation, Easel 80

Legumes are by far the largest contributors of biologically fixed N2 to terrestrial environments due to their symbiotic association with bacteria (rhizobia). Although nodulation is often considered to be a distinguishing characteristic of legumes, many legume species do not nodulate. However, non-nodulating legumes live in the same native environments as their nodulating “cousins” and yet have the same in planta N concentrations. In contrast to detailed understanding of rhizobial interactions during nodulation and nitrogen fixation, very little is known if the non-nodulating legumes can interact with rhizobia and if they can fix nitrogen. To answer this questions, we are utilizing *Gleditsia triacanthos*, (honey locust) that is native to USA and is widely used for timber and ornamental purposes. This study encompasses a multidirectional approach to better understand the relationship between *G. triacanthos* and rhizobial bacteria. Analysis of the roots of naturally growing honey locust revealed the presence of nodule-like structure and microscopic observations showed presence of bacteria in these structures. Further isolation and 16S rDNA sequencing identified the bacteria as different species of Rhizobium. In a complementary approach surface-sterilized seedlings of honey locust were inoculated with various strains of legume-nodulating rhizobium marked with -glucuronidase (GUS) and/or Green Fluorescent Protein (GFP) and colonization was studied by histochemical GUS staining and microscopy. Further work is in progress to determine if the similarities/differences of these associations vis a vis nodulating legumes and whether rhizobial infection in *G. triacanthos* leads to nitrogen-fixing symbiosis.

Madeline Kallenbach
Impaired Proactive Control Under Threat of Shock
Mentor: Christine Larson, Psychology
Poster Presentation, Easel 21

In this study, we are looking deeper into the theory concerning dual-mechanisms of control. The theory splits control into two parts: reactive and proactive. It is believed that while reactive control is intact for those with anxiety, proactive control is impaired. That while reactive control is intact for those with anxiety, proactive control is impaired. To research this aspect of the theory, 31 undergraduate participants have been tested using an event-related potential while completing various tasks under threat of shock. The presentation of random shock creates a state of cognitive anxiety and the task used is AX-CPT to measure proactive control in alternating trials of random shock/safe from shock. The AX-CPT task is goal oriented where participants should only answer yes if presented an X that directly follows an A. By comparing the results of the task under threat of shock versus no threat of shock, we will have a neural measurement of proactive control in cognitively impaired individuals. Because the study is still running and data is being processed, there have been no conclusions made yet but we will use the data to better understand control in those with different anxiety disorders.

Kylee Karzen
Understanding the Impact Stressors Have On Cognitive Control
Mentor: Christine Larson, Psychology
Poster Presentation, Easel 22

The purpose of the Cognitive Control and Emotion EEG study is to better understand how emotional stress (i.e., threat) may influence the cognitive process a person uses to effectively respond to visual stimuli. One goal is to determine the effect of shock on an individual's proactive and reactive cognitive control processes. Results from this study will inform our understanding of how a person's ability to keep a task's goal in mind is impaired by an ongoing stressor. The two paradigms used in this experiment to measure proactive and reactive processes are the Flanker Task and the AX Task. The Flanker Task is used to achieve an estimate of a person's reactive control without a threat being present. Reactive control is the process of responding to a stimulus without keeping a relevant task goal in mind. This baseline measure of reactive control will be used to predict a participant's performance on the following AX Task. The AX Task measures both reactive and proactive control; the process of responding to a stimulus when there is a task goal in mind. An electrical stimulation will be presented to induce stress during the threat blocks of the AX task, and will be set at a level by the participant that is painful, but tolerable. We predict an ongoing stressor will decrease the participant's ability to use proactive control and therefore rely on reactive control. We also predict their baseline reactive control performance will influence how they respond during the AX Task. Once there is an understanding as to how a stressor may affect a person, one can then gain insight as to how a person who experiences stress may process and respond to their environment.

Molly Kiefer
17²-Estradiol Activates the Wnt/²-catenin Pathway in the Dorsal Hippocampus of Ovariectomized Female Mice
Mentor: Karyn Frick, Psychology
Poster Presentation, Easel 60

Females are more susceptible to age-related cognitive decline than males due to the loss of circulating estrogens at menopause. Understanding how estrogens regulate memory could provide beneficial information for creating new treatments for memory dysfunction. Within the dorsal hippocampus (DH), a brain region implicated in
memory processes, the potent estrogen 17-Estradiol (E2) mediates activation of several cell-signaling pathways. This activation is necessary for E2 to enhance memory consolidation in female rodents. The Wnt/-catenin pathway, which regulates hippocampal development and synaptic plasticity, is necessary for memory consolidation. However, the extent to which E2 interacts with Wnt/-catenin signaling to facilitate memory is not well understood. To characterize whether E2 activates Wnt/-catenin signaling in the DH, ovariectomized female mice were infused with vehicle or E2 into the DH, and the DH collected at various time points afterward. Using Western blotting to quantify changes in target Wnt/-catenin proteins and PCR to quantify changes in mRNA expression, we demonstrate that E2 can regulate aspects of the Wnt/-catenin pathway. Future studies will explore these interactions by studying the effects of the Wnt inhibitor, Dkk-1 on protein levels and mRNA expression.

Westly Klasen

Marital Mental Health Conversations in Military Families: Dilemmas Faced in Necessary Conversations

Mentor: Erin Parcell, Communication

Mentor: Brittnie Peck, Communication

Poster Presentation, Easel 71

This study expands on existing research examining dilemmas experienced by military service members and their families when it comes to having conversations about mental health concerns following deployment. The current analysis focused on understanding post-deployment interactions that take place between service members and their spouses. The study utilized semi-structured, qualitative interviews of 50 U.S. military service members and their spouses (n=100). The authors analyzed interview transcripts by looking for previously identified dilemmas as well as emergent themes in the current data. While the interviews addressed a variety of topics, the present analysis focused on the portion of the interviews inquiring about whether or not the service member, their spouse, or children have ever sought mental health services for dealing with the stressors of deployment, and if so, how did the families talk with one another about it. In answering these questions, service members and spouses addressed dilemmas faced around talking about mental health within their families (e.g., wanting to talk about their mental health concerns but being concerned the other person would not understand them). Participants reported feeling dilemmas that were located in the individual (self and/or other) as well as their relationship. The reasons for these conversations being sites of communicative dilemmas varied, and most participants discussed multiple reasons. Some feared disrupting their re-integration period, others desired to shield their partner from additional stress, and many reported feeling incapable of understanding their partner's deployment experiences. One of the key elements of this research is its capacity to translate into real-world strategies for effectively addressing mental health concerns within military families following deployment. We strongly encourage the recognition of these communicative dilemmas by not only military family members but those who support them (e.g., chaplains, counselors, and supervisors).

Bridgette Knecht

Amygdala Volumes & Depressive Symptoms between Marijuana Users and Controls

Mentor: Krista Lisdahl, Psychology

Poster Presentation, Easel 94

Marijuana is the most commonly used drug, after alcohol, with 35.6% of 12th graders using in the past year (Johnston et al., 2016). Marijuana has many effects on both the brain and body. The amygdala is a structure that processes emotional memory and fear; previous studies have found volumetric abnormalities in the right amygdala of marijuana users (Gilman et al., 2014). McQueeney and colleagues (2011) found that female MJ users had larger right amygdala volumes and increased depressive symptoms when compared to controls. This is consistent with Hastings and colleagues (2004), who found reduced amygdala volumes in depressed patients, especially females. The current study examined whether marijuana group status differed in amygudla volumes. Data was collected from MJ users (n=23) and controls (n=45) between the ages of 16 and 25. Participants completed neuropsychological tests and self-report questionnaires, such as the Beck Depression Inventory (BDI). Brain MRIs were collected and processed utilizing FreeSurfer. MJ users did not demonstrate differences in their amygdala volumes (p>0.05). However, in MJ users, there is a marginal relationship between increased depressive symptoms and increased right amygdala volumes, r(66) = .38, p <.05. The brain behavior relationship between the right amygdala and depressive symptoms was significantly different between MJ users and controls, z= 2.07, p=.0385. Therefore, abnormal amygdala brain behavior relationships were observed in the MJ users, suggesting that MJ users with increased depressive symptoms may be more likely to show amygdala morphometry increases. Longitudinal studies are needed to examine the causal relationships.

Jacob Koepp

What Environmental Factors Influence Hatching Success of Tree Swallows?

Mentor: Peter Dunn, Biological Sciences

Oral Presentation, 12:20pm, Union 250

The importance of my study on Tree Swallows, with the help of Professor Peter Dunn, was to monitor and test environmental factors on the hatching success of Tree Swallows at the UW-Milwaukee Field Station. This study on hatching success was conducted due to declining populations of Tree Swallows on the east coast of the United States. We wanted to see if populations in the Midwest were declining, or if we could find a reason for depleted hatching success to help enlighten the issues on the east coast. To conduct this study, we measured abiotic environmental conditions, insect biomass, female fitness,
and hatching success of individual nests. Environmental conditions like temperature, wind, and precipitation were monitored using sensory equipment at the field station. To measure insect biomass, we caught flying insects in a suction trap, sorted them by their groupings, and averaged the weight of each batch based on previous weight measurements. Female fitness was measured by using previous year averaged weights. Lastly, hatching success was measured by monitoring each nest, and seeing what percentage of the eggs laid, actually hatched. While conducting bivariate analyses, female fitness (mass) positively correlated to hatching success, while temperature 10 days previous from hatching negatively correlated to hatching success. We also conducted a multivariate analysis including insect biomass availability, female fitness, Julian lay date, and wind, rain, temperature, solar irradiance, and soil temperature variables 10 days before hatch. We found that insect biomass availability and female fitness were significant to the hatching success of Tree Swallows, but the analysis only explained 1.7% of the variance over a 482 bird sample. Both the multivariate and bivariate analyses were based on available data on nests since 1997. Overall, our studies found that female fitness and environmental conditions don’t affect hatching success of Tree Swallows.

David Koltermann
Cloning of Hydroxylamine Oxidoreductase from Nitrosomonas Europaea into Shewanella oneidensis
Mentor: A. Andrew Pacheco, Chemistry & Biochemistry Poster Presentation, Easel 31

Hydroxylamine Oxidoreductase (henceforth HAO) is a trimeric protein found to contain 7 c-type hemes and one unique heme called P-460 for every monomer of the protein. HAO is a necessary part of the bacterium Nitrosomonas europaea’s ability to participate in the nitrogen cycle. The function of HAO in N. europaea is to catalyze the reduction of hydroxylamine to nitrite. The primary goal of this project was to clone the HAO gene into the bacterium Shewanella oneidensis. Whereas N. europaea cultures take many weeks to grow a minimum usable optical density (OD), S. oneidensis cultures grow to a much higher OD overnight. This in turn means that substantially higher quantities of HAO can be purified from S. oneidensis than from N. europaea cultures, and they can be obtained more rapidly. This is an enormous advantage for experiments performed in the Pacheco group, which require large quantities of HAO. An important reason why S. oneidensis cells in particular were chosen is for their ability to readily produce c-type hemes. This poster will present the progress made to date in the attempt to clone HAO into S. oneidensis.

Michelle Kondrat
The Use of Chaining for Becoming Accustomed to Daily Living Tasks
Mentor: Jeffrey Tiger, Psychology Poster Presentation, Easel 53

Applied Behavior Analysis Therapy often attempts to diminish problem behavior that negatively impact one’s daily life or learning. Our client is a twenty-one year old male diagnosed with Autism Spectrum Disorder and Down syndrome. Five days a week in his home setting we are working on increasing compliance while decreasing problem behavior during every day tasks, such as hair combing, shaving, tooth brushing, and currently mustache trimming. A task analysis is created for each small, individual task and followed with a chaining procedure. Chaining is when small steps are identified and chained together until an overall goal task is accomplished. Each individual step results in reinforcement being given. In order to progress through each individual step, ninety percent compliance and no problem behavior in two exposure sessions is required. During sessions, all problem behavior exhibited by our client does not result in attention or escape of any kind or, in behavior analytic terms, put on extinction. Through chaining procedures we have seen an immense improvement in our client’s compliance with everyday tasks. The overall anticipated results from our therapy sessions are a decline in aggressive, destructive, and self injurious behaviors while accomplishing every day tasks. Applied Behavior Analysis Therapy and chaining procedures could be an effective method for those who struggle with compliance with daily living tasks.

Mia Krantz
Gardens In Milwaukee
Mentor: Arijit Sen, Architecture Poster Presentation, Easel 11

In this study I am comparing three different people’s concept of the word “garden”. I start by listening to the interview’s of three people, collected by the Field School, and then create a word taxonomy to reveal how people think of the idea garden and what it means to them. This comparison of just three people can act as a sample of Milwaukee’s larger community and show how gardens function in this city and how people’s ideas of them influence their interaction with them.

MacKenna Krupa, Ana Isabel Cortés, German Gomez & Trey Savage
Ni De Aqui, Ni De Alla (UMOS Mural Project)
Mentor: Raoul Deal, Art & Design Visual Art Presentation, Table A

Ni de Aqui ni de Alla/From Neither Here nor There (Phase 2), is a mural and research project that consists of telling the stories gathered from interviews with local Chicanx civil rights activists. This mural is in collaboration with Artworks for Milwaukee, United Migrant Opportunities Services (UMOS), and the Butters-Fetting Building on 1st and Mitchell where the mural will be installed. The project was carried out by a team of Undergraduate Research Assistants, professional staff members, and high school interns. The team collected oral histories from founding members of UMOS as well as other vital members of the Latinx community. Interns participated in roundtable discussions to decide
Hana Kursel & Erica Steib
The Impact of a Gratitude Intervention on Health: A Psychophysiological Approach
Mentor: Raymond Fleming, Psychology
Poster Presentation, Easel 137

Psychology Previous research indicates that a written gratitude practice improves self-reported well-being including lower levels of anxiety and depression, better active coping strategies, as well as increased happiness, self-acceptance, and quality of life. However, little research has been conducted to investigate the relationship between gratitude practice and physiology. The original study, used a 2-group design with a 14-day intervention. Our pilot study was run to attempt to address problems with compliance with the study procedures. For both studies, participants first completed a qualifying survey. They were then matched before beginning a 14-day written gratitude intervention. The original study had participants complete a survey daily during the 2 week intervention period while the pilot had participants complete surveys 6 out of 14 days. At the end of the intervention period, participants completed a post-intervention survey before completing an in lab portion of the study, which included a 4-hour ambulatory period followed by the final laboratory component and debriefing. During a 4-hour ambulatory data collection period, participants were prompted 4 times to answer questions about what they were doing and what they were thinking about during the 10 minutes leading up to the prompt (pager alarm). This ecological momentary assessment strategy allows us to measure concordance between the self-reported and physiological data to determine whether, and in what manner, the measurements (HR and HRV) may indicate effects of gratitude on cardiovascular and respiratory responses. The results of the initial study were inconclusive, especially with regard to the nature of the gratitude intervention. For the current study, participants were required to complete a similar procedure to the original study, but participants were exposed to one of two gratitude interventions: one prioritized people that the individuals were grateful for, while the other asked for general items (people, daily occurrences, places, etc.). An untreated control group was not used for the pilot. A total of 9 participants have completed this study thus far, resulting in 4 pairs of participants for data analysis. Repeated measures ANOVAs will be used to determine differences between the two intervention protocols. In this manner, both between and within participant variability can be used to describe the outcomes of the pilot.

Jared Kuschewski
Phenological Observations in Downer Woods
Mentor: Dr. Mark Schwartz, Geography
Poster Presentation, Easel 83

The rate at which the earth's climate is changing is a rapidly growing concern in today's world. This project uses phenology, the study of seasonal plant cycles, to quantify the effects of climate change. Observations are taken at multiple forested locations across Wisconsin, with Downer Woods being the focus of this part of the project. Downer Woods has a permanent grid system, upon which are located 27 sites. Each site consists of 4 trees. These trees were the focal point of the observations. The two predominant species in these observations were white ash (Fraxinus americana sp.) and basswood (Tilia americana sp.), with a significant number of red oak (Quercus rubra sp.) and white oak (Quercus alba sp.), and rather small numbers of boxelder (Acer negundo sp.), hophornbeam (Ostrya virginiana sp.), and hawthorn (Crataegus sp.). White ash, basswood, and the oak species are dominant woody species that occupy the upper emergent and canopy forest layers. Boxelder, hophornbeam, and hawthorn are smaller, woody shrub-like species that occupy the midstory forest layers. The actual observations consisted of recording leaf coloration in each individual tree, as well as leaf fall in each individual tree. Coloration was recorded as four different numerical values. These values were placed into 4 categories that were based on the percent of leaf coloration per tree. By observing the leaf change and leaf fall in Wisconsin forests, we are able to quantify plant-climate interactions and relate this seasonal data to the yearly climate trends that are being observed simultaneously.

Morgan Langereis & Ryan Majinski
Development of New Analgesic Drugs
Mentor: Mahmun Hossain PhD, Chemistry & Biochemistry
Poster Presentation, Easel 61

The goal of our project is to synthesis analogs of Advil, a common over-the-counter nonsteroidal anti-inflammatory drug (NSAID); used for reducing inflammation in pain patients. We have synthesized our compound from salicylaldehydes and ethyl diazoacetate in quantitatively high yields in order to examine the
biological effects of our compound. Our lab has already published a faster procedural method for synthesizing different analogs of Advil, in which we are able to produce them in only four steps. Industrially made Advil has a para-isobutyl group on the naphthol structure and is produced using a six-step method, whereas we are synthesizing ours with a para-amino and other related groups on the benzene ring to test its use as an analgesic drug. Due to this change in composition we are unsure if our compound could be used for its original function as a NSAID, therefore we will test the compound's biological effects. In addition, the synthetic compounds will be tested for anti-cancer agents. This project's results could potentially have a significant impact on a patient's health by improving the effectiveness of analgesic drugs with lower toxicity or could also be developed into a new anti-cancer drug.

Alice Lecus
Concentration and Distribution of PCBs in Sediments in the Fox River, Green Bay and Proposed Novel Porous Material for Remediation of PCBs
Mentor: Maria Silva, Freshwater Sciences
Poster Presentation, Easel 117

The Green Bay lakes including the Fox River has a legacy for polychlorinated biphenyls (PCBs) with reported levels as high as 248ppm. Over time, PCB's can accumulate in aquatic species tissues in high concentrations. In addition to their persistence, they are also very toxic compounds that show carcinogenic responses in both humans and animals. PCB's impose numerous problems once released into the environment including health hazards and high natural remediation times. They are both chemically and thermally stable increasing the time it takes for these compounds to decompose, which can take anywhere from years to decades. This research aims to investigate the concentration levels of PCB's (Aroclor 1242) in Green Bay lake sediments and to evaluate our engineered novel microporous materials absorptive capabilities to remove these hazardous compounds from water. Preliminary data shows the sample concentration range being between 1µg/kg and 0.01µg/kg with the average at 1 µg/kg. These findings are significantly lower than findings presented by other authors with a range between 710,000µg/kg and 16µg/kg and 0.01µg/kg with the average at 1 µg/kg. These results show that the rate of NO production is pH-dependent, and that an amino acid, needs to be protonated for the enzyme to be active.

Sarah Lehman & Kyle Jennette
Gender Differences in Verbal Memory Performance in Adolescent Marijuana Users and Controls
Mentor: Krista Lisdahl, Psychology
Poster Presentation, Easel 95

Marijuana (MJ) is one of the most popular recreational drugs used by young adults and has known detrimental impacts on cognitive function, particularly learning and memory (Medina et al., 2007). This study assessed whether gender differences exist in the impact of MJ use on verbal learning and memory performance, as measured by the California Verbal Learning Test-Second Edition (CVLT-II). A sample of 147 adolescent MJ users (n=61) and controls (n=86) were drawn from the community as part of a larger study of adolescent brain function. Independent samples t-tests were conducted to compare past-year MJ joint use by gender. MJ users and controls were also compared on short-delay free recall (SDFR) scores and long-delay free recall (LDFR) scores by gender. SDFR and LDFR were measured using the CVLT-II, a normed and standardized assessment of verbal learning and memory. No significant difference was observed between men (n=38) and women (n=23) for SDFR [t(59)=0.88, p=0.38] or LDFR [t(59)=0.17, p=0.86] in the MJ sample, despite the fact that men in the sample had significantly higher past year joint use compared to women [t(59)=2.03, p=0.05]. Within the control group (n=86), there was no significant difference between men (n=39) and women (n=47) on SDFR [t(84)=1.25, p=0.21] or LDFR [t(84)=1.59, p=0.12] performance. In this sample, no significant differences were observed between the male and female MJ users compared to same gendered non-users in verbal memory performance despite significant differences in past year

Desiree Legaspi-Humiston & Kaleb Keefe
Ferrocyanide, Nitrite, and pH Dependence of ccNiR Catalyzed Reduction of Nitrite to Nitric Oxide
Mentor: A. Andrew Pacheco, Chemistry & Biochemistry
Poster Presentation, Easel 144

Cytochrome c Nitrite Reductase (ccNiR, or NrfA) is a periplasmic, enzyme that catalyzes the six-electron reduction of nitrite to ammonia (ammonification). Under physiological conditions ccNiR catalyzes the process without release of intermediates. However, in vitro we have found it possible to trap intermediates, or to release partially reduced nitrogen species such as nitric oxide. Such experiments provide valuable insights regarding ccNiR-catalyzed ammonification of nitrite. When the weak reductant ferrocyanide is used as the electron source, ccNiR catalyzes the one-electron reduction of nitrite to nitric oxide. Via the manipulation of individual reagents, within an anaerobic atmosphere, it has been determined that reaction rate has hyperbolic dependence on nitrite and ferrocyanide concentrations, and linear dependence on ccNiR concentration. Kinetic studies also show that the rate of NO production is pH-dependent, and that an amino acid, needs to be protonated for the enzyme to be active.
Andrew Leithiser  
Optimizing Navigational Behavior and Social Media Interaction in Asynchronous Web Development  
Mentor: Tian Zhao, Computer Science  
Poster Presentation, Easel 150

Modern web development has a strong emphasis on asynchronous content generation, intuitive navigation, and social media connections. However, the implementation strategies for dynamic content generation have a negative impact on the ability to innately implement intuitive navigation and social media connections. Navigation related issues, such as page caching, bookmarking, and navigation history, were traditionally handled by browsers. However, in asynchronous web development, these fundamental concepts must be explicitly handled by the web developer due to the inherent nature of asynchronous content generation being executed in an environment devoid of natural state changes. Moreover, social media interaction with web content, typically presented as a snapshot of a web page, can no longer be relied upon to function properly in an asynchronous setting. These snapshots are constructed using a “scraping” algorithm on the URL of a web page. This presents issues in asynchronous web development owing to the fact that every page of generated content may have both the same URL and the same data being scraped. It is thus the developers’ responsibility to explicitly spoof a URL that can be interacted with, as well as serve the desired data when that URL is scraped. This project builds a framework -- NavArrows, on top of a flexible JavaScript library for asynchronous programming, to give web developers a unified toolbox to pursue asynchronous content generation while maintaining the integrity of intuitive navigation and social media connections. Using NavArrows, a developer can configure desired behavior on navigation and social media scraping, then let the framework handle navigation through history states, dynamic URL spoofing, page caching, and social media scraping requests.

Nicole Lensmire  
The Effects of Exercise Sequence on Learning and Memory  
Mentor: Rodney Swain, Psychology  
Poster Presentation, Easel 141

Aerobic exercise promotes enhanced learning and memory in both human and non-human animals. Structurally, exercise improves blood perfusion, vascularization, and neurogenesis in brain structures associated with learning and memory. Behaviorally, exercise facilitates acquisition and improves retention on a variety of learning tasks. Numerous studies have shown that an animal that exercises prior to learning a task exhibits faster learning and better recall of the task when compared to sedentary controls. However, it is not well-known what effect exercise has on learning and memory if exercise occurs after learning. Some studies have proposed that the sequence of exercise after learning a task impedes the recall of that task. However, this has only been shown in mice and dogs. The present study aims to examine what behavioral effects the sequencing of seven days of voluntary exercise has on acquisition and retention in rodents. Long Evans rats will be divided into two groups. The first group will be allowed seven days of access to a voluntary running wheel prior to training on an altered version of the Morris Water Maze (MWM). The second group will be trained on the M.W.M., given seven days of voluntary exercise, and then subjected to a probe test. It is hypothesized that animals that voluntarily exercise after learning will exhibit hindered recall of the M.W.M. compared to the sedentary controls and to those that exercised prior to learning. The outcomes of this study will allow us to better understand any potential downsides that exercise may have on memory.

YuTing Lin  
Novel Macroporous Material for the Removal of Persistent Organic Pollutants (POPs)  
Mentor: Marcia R. Silva, Freshwater Sciences  
Mentor: Yan Zhang, Materials Science & Engineering  
Poster Presentation, Easel 101

Nowadays, persistent organic pollutants (POPs) include typical toxic chemicals such as atrazine, metformin, bisphenol A (BPA) and perfluorooctanoic, which are stable for long periods of time in the environment, have a great potential risk to human and environment health. However, adopting high-technology pollutant capture technologies often come with high budget. Therefore, this research aims to explore a new cheap and effective natural porous material functionalized with graphene based products to remove emerging POPs. In this research, the comparison of natural porous materials and the materials functionalized with graphene-based products for POPs removal was investigated. A modified coating method was developed (“drying” method) to be compared with the conventional vacuum coating method. The acid treatment of the engineered materials has been characterized by X-ray powder diffraction (XRD), scanning electron microscope (SEM), energy-dispersive X-ray spectroscopy (EDS), Brunauer, Emmett and Teller adsorption characteristics (BET), Raman spectroscopy and Fourier transform infrared spectroscopy (FTIR). We expect that increased loading of graphene-based products onto the natural porous material can result in a high removal efficiency of the target POPs. This technology has potential for application on an industrial scale in utilities for all parts of the water cycle.
Robert Lindert  
Analysis of Clinical Proton Therapy Beams  
Mentor: Sarah Patch, Physics  
Poster Presentation, Easel 145  

Particle therapy deposits less radiation in healthy tissue than conventional radiation because doctors are able to control where the majority of the beam’s energy is delivered. Thus, larger doses of radiation can be prescribed. Clinical particle therapy beams can administer ions in various doses and propagate protons to two-thirds the speed of light. The range and straggles of these beams is easily affected by internal structures, so it is imperative they hit their target to avoid unnecessary damage to vital bodily tissues. Experiments requiring use of clinical beams are expensive and difficult to schedule. Therefore, we model and analyze them using SRIM Monte-Carlo software. After we obtained the specifications of various particle therapy beams (Varian, Mevion, and IBA), we ran multiple simulations of 90k hydrogen ions into water and other tissue mimicking materials with known stopping power. For instance, the Varian system accelerates protons to 230MeV with an energy spread of 99.5keV and a Gaussian lateral profile with 3.6mm standard deviation upon entry into the water target. Longitudinal range is 32.56cm and lateral range is 5.23mm. Accelerating these same protons into targets with a tissue mimicking layer yields comparable results with a longitudinal range of 32.45cm and lateral range of 5.14mm. A similar longitudinal range is obtained when a 5.2mm bone layer is inserted between two tissue mimicking layers. Other vendors offer similar beams; all induce thermoacoustic pressure of about 1 Pa/pC (roughly 1 cGy/pC) delivered to the target.

Mariah Linske  
Aging- and Learning-Related Changes in Immediate Early Gene Expression  
Mentor: James Moyer, Psychology  
Poster Presentation, Easel 52  

Due to the growing portion of the population that is expected to reach old age in the coming years, incidences of aging-related neurodegenerative disorders like Alzheimer’s disease are also expected to become more prevalent. To determine areas of the brain that may be functionally impaired, the expression of immediate early genes (IEGs) such as c-Fos and Zif-268 were studied; because expression of these in a brain region can indicate aging-related changes in activity. To study learning- and aging-related changes in the expression of IEGs, immunohistochemistry was used to label IEGs. Thus, this study is designed to explore the relationship between aging-related changes in cognitive function and neuronal activity during learning and memory. In the present experiment, rats were subjected to either trace fear conditioning, trace fear conditioning with extinction, pseudo conditioning, or were left naïve and thus remained in their home cage. Prior analyses illustrated that adult rats showed increased levels of c-Fos and Zif-268 in the prelimbic and infralimbic medial prefrontal cortex after training, while this increase is less pronounced in aged animals. Additionally, training resulted in increased expression of c-Fos in the lateral amygdala for all age groups, while no changes were observed after extinction for aged or middle aged rats. No discrepancy between age groups and their ability to acquire the training was found, but variation in IEG expression suggests differences in brain function between groups. Ongoing research is studying the expression of these IEGs in the dorsal and ventral hippocampus. Studying aging-related changes in IEG expression in conjunction with their learning-dependent changes allows for the identification of how information processing changes across the lifespan.

Angelina Lochner  
Do Ecstasy and Marijuana Use Compromise Brain Structure? Examining Three Frontolimbic White Matter Tracts Using Diffusion Tensor Imaging  
Mentor: Krista Lisdahl, Psychology  
Poster Presentation, Easel 96  

3,4-Methylenedioxymethamphetamine (MDMA), more commonly called “Ecstasy” or “Molly” is a recreational drug known to produce euphoria, arousal, heightened mood and mild hallucinations in users. Use of MDMA among young people is a rising public health concern; 4.2% of college aged students reported using MDMA in 2015, while 3.6% of high school seniors reported using the drug in that same year (Johnston et al., 2016). Research has suggested that ecstasy use may be correlated with deficits in verbal memory and other neurocognitive processes (Medina et al., 2007; Price & Lisdahl, 2012). Prior examination has found that when compared to controls, ecstasy users showed significantly slower reaction times when tested with selective and divided attention and working memory tasks (Jacobsen et al., 2004). Results of an fMRI task assessing working memory found abnormal dysfunction in the left hippocampus in ecstasy users (Jacobsen et al., 2004). To date, little research has examined whether ecstasy has the potential to affect brain structure and no studies to date have specifically examined frontolimbic white matter integrity. The current study investigated whether ecstasy and marijuana (MJ) use was associated with white matter integrity in three frontolimbic tracts: the anterior thalamic radiation (ATR), unsinate facilicus (UNC), and forceps minor. Two MANCOVAs were run with ecstasy group, MJ group and controls as the primary factor and age as a covariate predicting ATR, UNC and forceps minor. MJ users demonstrated marginally reduced FA in the left UNC (MD = .0322, p = .084). Ecstasy users demonstrated significantly increased MD in forceps minor (p=.02), left ATR (p=.03), right ATR (p=.008), and right UNC (p=.03), left UNC (p=.07) compared to controls, but not in ecstasy users when both were compared to controls. MJ users also demonstrated reduced MD in forceps minor (p=.04), right ATR (p=.02), right UNC (p=.02), and left UNC (p=.02). Ecstasy users did not significantly differ from MJ users in any tracts. Both MJ users and ecstasy users demonstrate reduced white matter integrity in frontolimbic tracts, although they did not differ from each other. Additional research is needed to examine dose-dependent effects of ecstasy or impact of ecstasy use that is not comorbid with MJ use.
Jordan Ludyan
Diverse Hydrothermal Conditions at Lassen Volcano: Relevance to Early Mars
Mentor: Lindsay McHenry, Geosciences
Poster Presentation, Easel 97

Active fumaroles and hot springs explored at Lassen Volcano, California reveal alteration processes dominated by acidic, oxidizing conditions that result in a range of secondary mineral phases. In this report, X-Ray Diffraction (XRD) and X-Ray Fluorescence (XRF) mineral and rock analyses are interpreted to reveal alteration pathways as dacitic host rocks come into contact with these hydrothermal conditions. Fumaroles at Pilot’s Pinnacle and Terminal Geyser eject plumes of volatiles that yield acidic condensates, leading to leaching of soluble ions, residual silica enrichment, and in many cases, $S^8$ precipitation. Where samples are collected near acidic hot springs and are not in direct contact with active acid-steam clouds, precipitation of a variety of sulfate phases dominates, and mineral diversity increases. Pilot’s Pinnacle also hosts a mildly acidic ($pH < 4$) stream that flows through the hydrothermal field and sustains vigorous biological activity in spite of its relative acidity. Together, these observations allow us to understand fine-scale behavior in a complex alteration system. Acid-sulfate hydrothermal environments are invoked to explain certain features on Mars such as silica and sulfate rich rocks and soils near Columbia Hills, Gusev crater, observed by the Mars Exploration Rover (MER) Spirit. On Earth, hydrothermal environments sustain diverse microbial ecosystems. Better understanding the transition of primary mineral phases to secondary alteration products allows us to apply more refined interpretations to observations gathered in the search for biosignatures on Mars, and can help identify noteworthy samples for collection in future missions to Mars.

Briana Magruder
Kinematics of Activities of Daily Living in Patients with a Rotator Cuff Tear
Mentor: Brooke Slavens, Occupational Science & Technology
Poster Presentation, Easel 16

Current research on rotator cuff tears, specifically supraspinatus tears, and post-operative rehabilitation insufficiently discusses kinematics during activities of daily living (ADLs). Kinematics is important for understanding how an individual may compensate with their injured arm preoperatively, which will direct post-operative rehabilitation. The purpose of this research was to examine the kinematics of an individual’s injured and non-injured arm to better understand how one may compensate with their injured arm due to a rotator cuff tear. The ADL task evaluated was combing hair. A 15 camera Vicon T-Series Motion Capture System was used to gather kinematic data of the participant performing three trials of the combing hair task with each arm. The average (standard deviation) peak joint angles and joint range of motion (ROM) in the coronal plane were calculated for the shoulder joint. The average peak abduction was 78.99° ($\pm 1.31°$) for the non-injured arm and 69.63° ($\pm 2.91°$) for the injured arm. The average coronal plane ROM was 69.94° ($\pm 2.74°$) for the non-injured arm and 50.52° ($\pm 2.71°$) for the injured arm. The non-injured arm was more abducted throughout the entire task. The injured arm is performing the task differently from the non-injured arm due to the supraspinatus tear. With these findings, rehabilitation after rotator cuff repair surgery may be improved by understanding how an individual compensates with their injured arm prior to surgical repair. This is significant because after surgery, it is expected that the compensation would be reduced. If compensation is not reduced, therapists may use strategies to target the affected areas. Reducing compensatory motions will allow an individual to return to their functional ability before injury.

James Mahr
Auxin Controls Megaspore Mother Cell (MMC) Initiation Or Proliferation During Ovule Development
Mentor: Dazhong Zhao, Biological Sciences
Poster Presentation, Easel 26

In most flowering plants, a hypodermal cell at the tip of the nucellus differentiates to an archesporial cell then later forms megaspore mother cell (MMC) that accomplishes the transition from a somatic cell fate to a germine fate. However, how the MMC is formed and how the plant keeps only one MMC are still unclear. Our research focuses on elucidating the molecular mechanisms by which auxin controls megaspore mother cell (MMC) initiation or proliferation during ovule development via employing molecular genetics and cell biological techniques. Recently we found that application of auxin transport inhibitor and manipulation of auxin signaling that lead to disrupt the polarized auxin response and cause more MMCs. Thus, we hypothesize that the auxin maximum in the apical cells of nucellus provides a positional cue to restrict the somatic cells entering into the reproductive meiocyte. Moreover, activation of auxin signaling inside the nucellus will promote the MMC initiation or proliferation.

Victoria Mandella
The Physiochemical Characterization of Deep Melting Eutectics
Mentor: Mark Dietz, Chemistry & Biochemistry
Poster Presentation, Easel 115

For a number of years, organic solvents have been utilized frequently. Within the last two decades, these organic solvents have been proven to have poor effects on the environment, specifically because of their volatility and toxicity. In search of an alternative chemical compound, “deep-melting eutectics” (DMEs; also known as “deep-eutectic solvents”), have been suggested. DMEs can be formed by mixing organic solids that display the hydrogen-bonding interactions is a significant decrease in the melting point of the mixture relative to the initial
organic solids. The degree of change in the melting point varies with the mixture components and their proportions. With the appropriate choice of constituents, the formation of liquids that are biodegradable or environmentally benign can be achieved. More recent studies have shown that hydrophobic eutectics can be prepared, which proposes the possibility that the deep-eutectic solvents can be applied to two-phase systems for catalysis and separations. The objective of this research is to complete a physical and chemical characterization of hydrophobic DMEs. The characterization includes melting points, water solubility, water content, density, and thermal stability. The hydrophobic deep melting eutectics are desirable in the exploration of the extraction of toxic metals and organics from water.

Nathan Manning & Jacob Tretow
Bicycle Tire Stability and Handling Testing
Mentor: Andrew E Dressel, Mechanical Engineering
Poster Presentation, Easel 7

The objective of this project is to design a device to collect data on the mechanical properties of bicycle tires with the goal of validating Rotta's 2D model and enhancing the current bicycle model. In validating Rotta's 2D model, a better understanding of how bicycle tires behave will be achieved. This study will also take into account different parameters, such as tire size and construction methods. In addition, the data collected will enhance the current bicycle model and show how tire behavior influences bicycle stability and handling. By analyzing the combination of these two models, optimal tire design will be facilitated. Six constraints govern the device's design: accept tires up to five inches wide, prevent wheel rotation about any axis and allow vertical and lateral movement, apply a vertical load to the wheel, measure vertical displacement and lateral force, and simulate various camber angles. The device uses a parallelogram design connecting the frame and fork together, thus allowing for vertical movement of the wheel, but preventing lateral movement or roll rotation. At the base of the frame, a steel plate will be mounted on a hinge and controlled by a screw. This screw will allow the plate to tilt, simulating the wheel at various camber angles. The device will collect data using various PASCO force sensors, and the data will be compiled using DataStudio.

Zachariah Marrero
The Enneagram: Towards an Empirical Assessment of Disintegration
Mentor: Raymond Fleming, Psychology
Poster Presentation, Easel 47

The enneagram theory asserts a model of personality incorporating traits, motivation, and both temporary and lasting personality changes through process whereas most personality theories emphasize either one or two of these characterizations. Findings from research validating the nine personality types proposed in theory now merits an investigation of other core enneagram constructs. Two previous efforts have been made to assess disintegration, the characteristic behavioral and emotional responses patterns to stress and anxiety, but found no supportive evidence likely because the instrument used to measure disintegration was originally designed for a different purpose. For this third investigation we have assembled a measure based on the most recent descriptions from theory. A small sample (N= 104) study was conducted to evaluate the correlation between an enneagram personality assessment and disintegration descriptions with considerations of prior knowledge, response duration, and other potentially relevant variables.

Jennifer Martin & Victoria Fletcher
An Evaluation of the Necessity of Video Model Components
Mentor: Tiffany Kodak, Psychology
Mentor: Brittany LeBlanc, Psychology
Poster Presentation, Easel 123

Video modeling is a video that contains a demonstration of how to complete a task. Video modeling is documented as an effective strategy to train both children and adults, however it is unclear what instructional components are critical for effective and efficient learning. The purpose of this study is to evaluate the effects of providing non-examples following examples in a video model. Our study taught a prompting strategy called least to most (LTM) to undergraduate students. This is a common procedure that can be used with individuals with developmental disabilities in a variety of settings that involves transferring stimulus control from response prompts using the least amount of assistance. The current project utilized single-subject research design, specifically a multiple baseline design, to investigate the necessity of including non-examples and examples compared to including just examples when teaching the LTM prompting strategy to undergraduate student participants. The participants watched a video model of the prompting procedure with a confederate. Participants were randomly assigned to treatment conditions. In one condition participants viewed a video model with non-examples and examples of how to complete the LTM prompting strategy. In the other condition, participants viewed a video model that just included examples on how to complete the LTM prompting strategy. We anticipate that the condition with both non-examples and examples will be more effective in teaching undergraduate participants how to use the prompting strategy. Results of the current study will inform future work utilizing video modeling as an instructional tool when teaching adults interventions. These results will help identify the most effective and efficient training components for video modeling.

Natalie McNall
Resultant Deformation and Deposition of Sediments from Possible Seismic Events in the Berea and Pampa de Tepuel Formations during the Paleozoic Era
Mentor: John Isbell, Geosciences
Poster Presentation, Easel 88

Deformation and deposition of sedimentary materials...
resulting from earthquakes remain poorly understood despite their importance in identifying areas and times of intense tectonically activity in and adjacent to sedimentary basins. Such strata are often misidentified as glacial shelve or the result of rapid deposition. Therefore, their identification is essential in making accurate determinations of seismic events. Direct objectives of this study are to continue determining macroscopic and microscopic deformation features, and magnetic characteristics that resulted from earthquake induced liquefaction of sedimentary deposits, thus furthering our understanding of when and where seismic activity occurred in deep time. A suite of sedimentary rocks and paleomagnetic cores were collected from Mississippian age strata exposed near Garrison, Kentucky. These strata were previously interpreted to be a result of earthquakes. The strata were logged for vertical and lateral changes in sedimentary structures, facies, and textures. Samples were processed by hand into petrographic thin sections for micromorphological analysis to determine deformation processes during liquefaction, and spatially oriented rock cores were processed for magnetic susceptibility and examined to determine their magnetic fabrics. Small-scale simulation experiments recreating similar earthquake deformation were run and the resultant deposits were examined for similarities and differences with features observed in the rock samples. Additionally, recent interpretations and data from the complex Pampa de Tepuel Formation of Carboniferous age strata were added to differentiate between tectonically induced deformation in marine settings and sedimentary slumping and sliding deformation on the paleo-shelf edge. Further analysis is being conducted to fully understand the seismic events that these sediments have undergone.

Robert Mikenis & Jenna Arends
Literacy In Museum Experience (Milwaukee)
Mentor: Chris Lawson, Educational Psychology
Poster Presentation, Easel 20

Current literacy rates in Milwaukee’s public schools are extraordinarily low with statistics claiming that nearly 86% of MPS (Milwaukee Public Schools) students are behind in reading (Kertscher, 2013). Betty Brinn Children’s Museum in Milwaukee is an alternate resource that schools have the opportunity to use to improve reading literacy. The purpose of the study is to understand how a museum experience can benefit literacy development of children and parents. We are focusing on two early literacy skills; vocabulary development and narrative development. To test these literacy skills we have set up a scavenger hunt around the museum. We placed green boxes around different exhibits, and had objects linked to the questions. For the vocabulary treatment the boxes have objects such as pliers, cast, and asparagus and we instructed parents to focus on repeating these words a lot. For the Narrative group we asked parents to focus on three parts of a story: the problem, feelings/thoughts, and a resolution. The stories were about different stuffed animals that encountered some type of problem, had thoughts about it, and found a solution. The families were asked to go about the museum, and depending on whether they were a vocab or narrative group, they were told to tell a story or repeat words. We also had control groups that were not told about the narrative/vocabulary treatment. We used the control groups in order to compare data to the experimental groups. For preliminary evidence in the vocab group the data we collected says that kids in the experimental group performed better at the picture task (picking out the word cast) than the control group. Kids in the experimental group we believe performed better because of the strategy we instructed the parents to use in repeating words in their visit.

Amanda Miller
Reliability of a Lab-Based Measure of Response Inhibition in Youth with Williams Syndrome
Mentor: Hanjoo Lee, Bonita P. Klein-Tasman, Psychology
Poster Presentation, Easel 41

Williams syndrome (WS) is a genetic disorder characterized by poor response inhibition (RI; the ability to suppress behavior). There have been no examinations of the reliability of lab-based measures of RI for WS. The purpose of the current study was to determine the reliability of commission errors from the Go/No-Go task (a measure of RI) in a sample of youth with WS. Twenty-two youth with WS (ages 10-17) participated in a pilot study of a computerized intervention aimed at improving RI. Participants completed a computer-based Go/No-Go (GNG) task at baseline and after 5-7 weeks of either treatment or waiting, with commission errors (CE; incorrect No-Go trials) used to measure RI. Performance was examined for each quarter of a testing session (240 total trials; Q1=trial 1-59). For reliability analysis, 1-3 participants with high studentized residuals were excluded from each correlation. GNG CE for the entire sample (n=22) at baseline was significantly correlated between the first two quarters of the task (r=.593, p=.006), with all the other correlations between quarters significant with somewhat larger effect sizes (r’s=.78-.907, p’s<.001). GNG CE for the wait-list group (n=12) across the baseline and post-wait assessments demonstrated adequate test-retest reliability for the third quarter of the task (r=.747, p=.008), and poor (Q1 r=.538, p=.09; Q2 r=.551, p=.1) to very poor test-retest reliability (Q4 r=.158, p=.66) for the other quarters. Commission errors from the third quarter of the Go/No-Go task appeared to have the strongest test-retest reliability and appeared to predict performance of the other quarters relatively well for this sample of youth with WS. Obtaining a reliable score is important for measuring response inhibition in WS and for determining suitable measurement endpoints for randomized controlled trials. Future research should investigate the validity of Go/No-Go commission errors for measuring inhibition in everyday contexts in WS.
Zach Miller
Mitral Valve Biomechanics to Combat Regurgitation
Mentor: Mohammed Rahman, Mechanical Engineering
Poster Presentation, Easel 122

Heart disease continues to be the number one cause of death on a global scale leaving a huge burden on societies and their public health outlook. The purpose of this research is to quantify new data on the way mitral valve mechanics operate. Specifically studying the biomechanical properties of valve leaflets in coordination with chordae tendineae the intent being an increased understanding of how to prevent Mitral regurgitation (MVr). The data collected will be used to implement new devices into these finite areas giving biomedical engineers increased vision and parameters that will aid in the creation of new cardiac devices.

Joseph Moore
Queer Film Now: a LGBT+ Curatorial Project
Mentor: Carl Bogner, Film
Film Presentation, 12:00pm, Union Cinema

The goal of Queer Film Now is to create film screenings that provide a historical context for current practice and work to expand definitions of LGBT+ film. Many artists in early LGBT+ film face underrepresentation, due to the lack of circulation of their work. The earliest examples of LGBT+ film are not found within the conventional modes of commercial filmmaking nor are they easily accessible. Experimental and underground film movements were essential in providing support for early queer voices. Through the process of researching historical film criticism, historical art texts, and exhibition histories (film festival schedules, underground film venue screening histories) I assembled a working catalogue of artists and films to select from for potential screenings. My research also included total immersion in film viewing, as I watched over 32 hours worth of films (more than 100 individual films by more than 50 individual filmmakers, including 2 feature films). In working with campus resources, community partners, and film and video distribution organizations, I curated individual programs, each asserting an independent, foundational thesis. The research project has already resulted in the exhibition of one program, “Corporeal Materialism: A Brief History (1963-1974) of Bodies from the Queer Underground”, supported by the Milwaukee LGBT Film/Video Festival on October 16, 2016. The research project will also materialize in a second program, showcasing the works of the 1960s underground filmmaker José Rodríguez-Soltero. I will provide introductory remarks and program notes for each screening. The purpose of these film screenings will be to not only help viewers gain a more expansive sense of LGBT+ history, but also to help negotiate formal and conceptual relations between historical work and contemporary film practice. Ultimately, this is a research project about the practice of representation, and the crucial role diversity plays in art exhibition.

Andrew Morgan
Deposition of Carbon Particulates on Natural Porous Particles by Electron-Beam Evaporation by Graphite
Mentor: Marcia Silva, Freshwater Sciences
Poster Presentation, Easel 104

In this work we present the adsorption of amorphous carbon particulates on the surface of natural porous particles through electron beam evaporation by graphite. Recent studies indicate that the modification of the surface topography of these porous particles can significantly enhance their adsorption capabilities thereby increasing their effectiveness in removing harmful materials from the environment. Our experiment shows what inherent characteristics of the parent particles can be modified by depositing carbon onto their surface. The evaporation rate and final thickness as a function of the beam power during the procedure is measured. The dependence that the evaporation rate has on the beam power has a threshold character. The lowest power for evaporation is 390 W in our experiments with a maximum power of 740 W. The evaporation rate was 0.10-1.0 ú/s throughout the process and 1ú/s on the final soaking power output. An analysis of the deposited carbon particulates was done by Fourier Transform Infrared (FTIR) spectroscopy and Raman spectroscopy. FTIR and Raman spectroscopic analysis determined that a conversion from sp2 to sp3 bonding indicates a ring to chain carbon formation seen in amorphous carbon particulates. Surface area and pore volume/size analysis of the porous particles were determined. Analyses of the porous particles indicated that the adsorption properties of this material are significantly enhanced after deposition thus permitting their application in multiple fields such as environmental and medical.

John Mortimer
Two-Dimensional MXene/Sn Nanocomposite as a Novel Anode In Lithium Ion Batteries With Ultra-High Energy Density
Mentor: Junjie Niu, Materials Science & Engineering
Poster Presentation, Easel 68

A new generation of two-dimensional (2D) transition metal carbide materials called MXene, is attracting wide attention in energy storage particularly with lithium ion batteries (LIBs) due to its remarkable electrical conductivity and low Li+ ion diffusion barrier. Herein, we present a novel lithium-based battery system that shows a greatly improved energy density. The anode electrode is comprised of MXene/Sn hybrid nanocomposites, which were synthesized using a facile hydrothermal-assisted approach. The significantly enhanced conductivity of 2D MXene along with the uniformly dispersed Sn nanoparticles leads to a drastically increased electrochemical property. The assembled battery system exhibits a high specific capacity of 700 mAh/g after 100 cycles at 0.5 C and a capacity of 450 mAh/g after ultra-long 1000 cycles at 2 C, respectively. These results demonstrate the MXene/Sn composite has a promising potential in next-generation LIBs. Further,
the pouch-type full cell using the composite as anode and \( \text{Li}[\text{Ni0.6Mn0.2Co0.2}]_x \text{O2} \) as cathode displays a reliable and repeatable battery performance, which opens an avenue for large-scale stacking batteries in broad applications such as potable electronic devices.

**Kwendo Mwaniki**  
**Bacteria-Detecting Water Sensor**  
**Mentor:** Lijuan Bi, Mathematical Sciences  
**Mentor:** Marcia Silva, Freshwater Sciences  
**Mentor:** David Garman, Freshwater Sciences  
**Poster Presentation, Easel 105**

Microbial contamination is a common concern in the public sector water with supplies constantly need supervision and analysis to ensure the health of many. Testing for all pathogens in water would be very expensive, so total coliforms and *E. coli* are used as indicators of water quality in relation to microbiological standards, as an inexpensive test. However, it takes 18-24 hours to obtain the results of these tests. There is an urgent need for low cost technologies capable of detecting bacteria in near real-time. The basic principle of the proposed bacteria-detecting water sensor is by measuring the electromagnetic characteristics of water. Based on the concept of permittivity, the process consists of applying an electrical charge then analyzing the discharge signature. Detection of bacterial content can be measured in seconds. Temperature compensation has proven to be essential giving a factor of 10-fold improvement in stability. Eventually the sensor will serve as a patented tool for environmental purposes. A number of techniques were developed for these measurements. The temperature of DI water (no bacteria) was varied, the temperature characteristic was measured and mathematically corrected. A sample inoculated into sterile lysogeny broth (LB) media was kept at 37°C for 18 hours with no appreciable change in value. Another sample of sterile LB media was spiked with a small quantity of *E. coli*. Over the next 18 hours the complex rate of growth of *E. coli* was observed. All experiments were repeated multiple times reconciling the signal change with physical *E. coli* number counts to prove the repeatability of the sensor.

**Chelsea Nanfelt & Lilly Luft**  
**Divergent Fates**  
**Mentor:** Yevgeniya Kaganovich, Art & Design  
**Visual Art, Easel 159**

This project aims to explore new media and materials for both Professor Kaganovich’s next major project, and for an ART 473 Class regarding the use of reclaimed and uncommon materials for jewelry and metalsmithing. We have expanded upon Professor Kaganovich’s previous research and work with plastic shopping bags. Through our research we have carefully tested a large number of different types of plastic bags, separating them by their working characteristics. Utilizing these newly categorized bags, we have developed new methods of working with them, and refined old methods to produce better, more consistent results. Through this research we have created a method and model for the utilization of new materials in making art, and furthered the precision and quality of Professor Kaganovich’s work. Our continuing research with paper and wood derived materials will follow a similar model and contribute directly to the creation of this new body of work. The results of this research will also be utilized in the creation of a new ART 473 course curriculum for other students to have exposure to uncommon and reclaimed materials.

**Duy Nguyen**  
**Chemistry in Action - Collaborative Implementation of Chemistry Active-Learning Activities in Middle School**  
**Mentor:** Anja Blecking, Chemistry & Biochemistry  
**Poster Presentation, Easel 36**

Chemistry instruction does not only concentrate on the teaching of a certain body of knowledge, it is a way of conveying scientific concepts and principles, and enabling learners to critically evaluate scientific information in everyday life. Well-designed science instruction provides information and tools to students interested in investigating the world around them. Middle school chemistry instruction is about triggering students’ excitement for science and laying a solid foundation for future science experiences and instructions. This study describes the results of a collaborative project between the West Allis West Milwaukee School District and the UWM Science House. During the project, active-learning experiences in physical science have been implemented in three 8th grade science classes over the 2015/2016 school year. An analysis of various collected assessments focuses on students’ learning progression in regards to particle presentation, detailed description of scientific observations, usage of academic language, and overall understanding of the presented physical science concepts. This study is part of a growing body of collaborative research conducted in middle and high schools, based of a growing body of collaborative research conducted in middle and high schools, based on latest educational research and best practices.

**Samantha Nitti**  
**Lessons Learned: Historical and Policy Analysis of Emerging Infectious Diseases - the Case of the HIV/AIDS Epidemic in the United States**  
**Mentor:** Aaron Buseh, Nursing  
**Poster Presentation, Easel 32**

Over 40 years ago, a poorly understood disease sent shockwaves throughout the public health community. The disease would later become known as Acquired Immunodeficiency Syndrome (AIDS) caused by the Human Immune Deficiency Virus (HIV). To date, HIV/AIDS continues to be a public health issue that carries stigma and fear of death, perceptions which affects treatment and prevention of the disease. What lessons can the public health community learn from the HIV/AIDS epidemic in the US that could be extrapolated in addressing current infectious diseases such as Ebola, Zika Virus etc? The purpose of this study is to conduct
a historical analysis of the HIV/AIDS epidemic in the US. The study focuses on developing a historical timeline, documenting populations initially affected by the disease; the US Government initial and current approaches to addressing HIV/AIDS. The role of the private sector and advocacy groups in addressing the HIV/AIDS epidemic in the US will also be documented. This project employs a secondary historical analytical approach. Several databases will be used including information from Medline/PubMed, government related reports; and white papers developed by organizations/ agencies involved in addressing HIV/AIDS. Critical findings include: (a) Slow response in addressing the HIV/AIDS disease by the US Public Health Service; (b) Development of public health policies that lacked evidenced-based research; (c) HIV/AIDS may be here to stay and should be viewed within the realm as a chronic disease; and (d) Engaging and partnering with local communities should be an essential component of any prevention and treatment strategies. This project provides relevant information that could be used by public health officials in planning and designing programs aimed at addressing current and future emerging infections such as the Zika disease.

Danielle O’Hagan Kennedy
Ceramic Irrigation System
Mentor: Ty Bender, Art & Design
Poster Presentation, Easel 157
This research project provides evidence of the ability to control the flow rate of water through ceramic material by the addition of various materials to clay before firing. The materials being tested include varying ratios of recycled paper, saw dust, and grog. The method applied to test the flow rate has been to use 5 variations in ratios of added material, followed by observing the effect on flow rate each different ratio has. Recycled paper is the material used as a starting point for the tests on flow rate. Then additions of different materials will be tested to further adjust the flow rate variability congruent with different materials. The ability to control the flow rate through ceramic material has various applications. In this project we will focus on the application of ceramic permeability for use in the irrigation systems of raised garden beds.

Adam Oknin
PNOME 2.0 Pneumatic Dome - A Solution for Occasional Functions
Mentor: Professor Whitney Moon, Architecture
Poster Presentation, Easel 69
For the past couple of years, I have been working with professor Whitney Moon on pneumatic, inflatable structures. Lightweight and mobile forms that are designed to facilitate temporary functions during occasions where permanent architecture is not called for. During this period, I have dedicated time to explore their materiality, construction process + structure and usability. Initially, I have designed and built Pnome 1.0, pneumatic-dome, a double-membrane inflatable prototype made up of plastic sheeting and packing tape, affordable and commonly available materials found in every hardware store. However, recently I have developed a more complex form, Pnome 2.0, that addresses some of the issues later discovered in the first prototype. Pnome 2.0 is a lightweight and mobile inflatable pavilion that is designed for recreational purposes as well as for outdoor seminars. The double-curved surface of the biomimetic Pnome encompasses occupants with pillow-like cushions that are intended to stimulate a tranquil environment. In addition, the double-membrane envelope is fabricated out of rip stop nylon, a highly durable and water-resistant material that keeps the elements from percolating inside, and prevents tears from expanding. Along with the added internal air pressure and ground anchors, the envelope is seamed together with a tensile ribbon structure that is devised to be wind resistant.

Sebastian Olaciregui
The Effect of Different Cooling Rates on the Grain Size, Second Phase Morphology, and Wetting Behavior of A205-T7 Heat Treated Aluminum Alloys
Mentor: Pradeep Rohatgi, Materials Science & Engineering
Poster Presentation, Easel 66
A205-T7 is an Aluminum-Copper alloy considered to one of the highest strength commercially available alloys for castings. Its castability is comparable to 300-Series Aluminum-Silicon alloys and a unique microstructure that eliminates the shrinkage porosity, hot tearing and stress corrosion cracking that have heretofore inhibited the widespread implementation of investment casting of 200-Series alloys. A205-T7 is being considered for use in products where strength vs. weight ratio is a crucial consideration such as in aerospace and transportation. In the present study, the effect of cooling rates on the grain size, second phase morphology, and static contact angle of A205-T7 aluminum alloy with water has been investigated. To study the effect of cooling rates, a sand casting with varying section thicknesses was made and subjected to T-7 heat treatment (solutionizing and over-aging). Microstructural analysis and water contact angle measurements have been performed on the fully polished specimens using optical microscopy and a goniometer respectively. Furthermore, the effect of droplet size (4 μL to 10 μL) on the wettability of alloys with water was studied. The hardness of the specimens was evaluated using micro hardness measurements. The results show that by increasing the casting thickness, the average grain size increased from 27 μm to 75 μm and the static contact angle was decreased from 76 to 70 degrees.

Kelvin Olin, Dominic Bieniewski, Joe Bowers & Maya Maric
Beneficial Effects of Self-Affirmation on Heart Rate Variability, Respiratory Sinus Arrhythmia, and Emotion
Mentor: Raymond Fleming, Psychology
Poster Presentation, Easel 120
Affirmation of personal values and characteristics (e.g., relations with friends and family, romantic values, sense
of humor) has been shown to have positive effects, including but not limited to buffering against stress, coping with threatening situations, and promoting healthy behaviors. However, the immediate emotional and cardiovascular responses impacted by self (or value) affirmation have not been fully explored. Therefore, the present study aims to provide more insight into the immediate effects of self-affirmation on emotion and cardiovascular reactivity. One hundred and twenty-five UWM students completed this study (M_{age} = 22.90, SD_{age} = 6.09). The researchers used a within-subject design, in which each participant went through both the control and self-affirmation conditions (order of presentation was counterbalanced). In the self-affirmation condition, participants were asked to write about their top-ranked personal value, whereas a writing exercise unrelated to personal values was used in the control condition. After each writing exercise, the International Affective Picture System (IAPS) was used to induce positive and negative affect. Cardiovascular measures and self-reported emotional responses were collected throughout the experiment. Results showed that compared to their state during the control task, when self-affirmed, participants showed greater high-frequency heart rate variability (HF-HRV), F(1, 123) = 34.80, p < .001, and higher levels of respiratory sinus arrhythmia (RSA), F(1, 122) = 14.82, p < .001, reflecting more parasympathetic activity. After self-affirmation, participants reported more positive affect, F(1, 123) = 11.67, p = .001, and higher levels of self-worth, F(1, 124) = 14.04, p < .001. These findings suggest that the act of focusing on a core personal value has beneficial effects on physiological and psychological well-being. These results may provide more insight into the role of cardiovascular reactivity in self-affirmation and emotion.

Danielle Olsen & Cassandra Clearwater
Health Promotion and Chronic Disease Prevention: Personal and Professional Care
Mentor: Sandra Million Underwood, Nursing
Poster Presentation, Easel 59

Chronic diseases are among the most common causes of disability and death in the United States. The feet have been described as the “mirror” of a person’s general health given that signs and symptoms of chronic disease are often reflected in the feet. Why then, one might ask, are the feet so often ignored, overlooked, neglected and taken for granted? In an effort to better understand these issues a cross-sectional exploratory study of the perceptions and primary care experiences of a targeted group of men and women was undertaken. The study aimed to explore perceptions of the importance of foot health and to identify needs relative to foot health and foot care. Data was collected from 1617 men and women engaged in social service and community empowerment programs within S.E. Wisconsin using an investigator designed survey. The survey measures were based on the principles of foot care endorsed by the American Medical Association. Data collected were reviewed, tabulated, scanned and entered into a computerized database. Data were analyzed using descriptive and inferential statistics. Data revealed that the greater majority of the study participants felt that foot care was important to their overall health, however there were significant variations were noted based on the participants age, race, education, and history of foot problems. Findings also suggested that there were deficits in the self-management of foot care among the men and women involved in the study and gaps in the delivery of foot care by doctors and nurses. This presentation will provide an overview of the study findings and efforts subsequently undertaken by the team to better address the health promotion and health care needs of the community.

Elena Olsen-Valdez & Stefanie Valverde
City as Canvas : Student Artist in Residence embedded in Shorewood Government and Identity, Race, Ethnicity and Diversity Conversations
Mentor: Anne Basting, Theatre
Oral Presentation, 1:00pm, Union 340

The community of Shorewood has an ongoing challenge with issues of diversity. SAIRs were invited to engage with the Shorewood High School to address these efforts through a year of in-depth observation and collaboration. Our research goal was to find an artistic way to move this issue forward. In turn, we consider if placing SAIRs in city governments can assist them in finding creative solutions to civic challenges. We follow a four stage process of community-engaged arts practice—Observation/Research (attending meetings and visiting the High School); Creative Generation (creating two questions: What is one question you’d wish someone would ask you (in regards to identity/race)? What is a perception that people have about you that is wrong?); Creative Refinement (collecting and analyzing responses); Culminating Event/Evaluation (creating an artistic product to engage the school). Through the collection of responses (audio/written), we create a platform for the school community to view and reflect upon what they have been trying to share and ask all along amongst each other. We provide the artwork as a gift to help sustain their conversations and reflections over time, and prompt students to be more actively involved in their personal and local experiences. We found that by exposing vulnerabilities (such as personal fears and concerns), free-flowing conversations were possible. We found that staff and students were originally overwhelmed with constant attempts to talk about identity and race, thus, this process helps sustain what can be a difficult dialogue. Our hope is to have Shorewood serve as a model for other schools and communities around the world that need the same push. As SAIRs, we found we held a perfect perspective, and were warmly accepted into their community and pre-existing attempts at conversations on identity and race. Hence, we find embedding SAIRs to be crucial for long-term growth.
Kayla Olson
Comparative Material of the Malloura eCatalogue and the Next Stage in Cypriot Cultural Preservation and Accessibility
Mentor: Derek Counts, Art History
Oral Presentation, 1:00pm, Union 250

Since 1990, the Athienou Archaeological Project (AAP) has excavated a large corpus of material. Since 1990, the Athienou Archaeological Project (AAP) has excavated a large corpus of material from a religious sanctuary dating to ca. 700-100 CE in the Malloura Valley, near the village of Athienou, Cyprus. Several 3D digital models of terracotta and limestone sculptural fragments from the site will soon be available for viewing and study through a digital publication produced in collaboration with UWM's Digital Commons. The Malloura eCatalogue shall maintain some aspects of traditional catalogues that have served useful and have been proven to assist researchers. One of these components is the reference to comparative material (comparanda), which I am responsible for finding and analyzing. This task is completed by first examining published 2D paper materials and museum websites which contain static images alongside object descriptions. Then, one can take it a step further by looking at these 2D images with 3D scans side-by-side, whose angles, size, and shading may be manipulated in a 3D processor (Meshlab); I can then reveal otherwise unknown details and profiles. Thus far, it has become clear that these details may elucidate the individual craftsmanship of the statue fragments, allowing for future analysis of aesthetic trends in the region, alongside the economic implications of local workshops and trade networks. Ultimately, the production of an open access digital catalogue that utilizes 3D imaging alongside traditional methods of archaeological description, analysis, and comparison allows for a new way to not only preserve Cypriot cultural heritage, but to provide open, easy access of the corpus to researchers and the public alike. Access to said 3D corpus addresses, and surpasses, the limits presented to researchers by traditional, static 2D catalogues, and will contribute to more accurate archaeological interpretations in the future.

Stephanie Paly & Judy Kattan
Balance Testing for Normally Aging Adults and People with Diabetic Peripheral Neuropathy who use Multifocal Eyeglasses
Mentor: Dennis Tomashek, Occupational Science & Technology
Poster Presentation, Easel 29

The purpose of this pilot study is to investigate the effects of multifocal lenses (MFLs) on balance and stability in people with diabetic peripheral neuropathy (DPN). Dias Mellitus affects over 26.5 million people in the United States, with DPN occurring in up to 50% of these individuals. Currently, no research investigating the impact of MFLs on stability in persons with DPN exists. Past studies suggest that vision contributes to an increased risk of falls in older adults. People with DPN...
Brandon Patterson
Glyoxylate Reductase: An Unexpected Journey
Mentor: Nicholas Silvaggi, Chemistry & Biochemistry
Poster Presentation, Easel 124

We are studying how organisms like Streptomyces hygroscopicus biosynthesize enduracididine from arginine by three enzymes. Our preliminary data suggest that MppQ catalyzes the last step in the process, the transamination of the ketone form of enduracididine (“keto-End”) and an amino group donor, like alanine or glycine. MppQ also reacts with ketoarginine and an amino group donor to recycle the dead-end product back to L-arginine. Alanine is quite a poor substrate, having very low affinity for the enzyme (K_M > 50 mM). We suspect that glycine will prove to be a more efficient amino donor substrate, but in order to measure the steady state parameters of the reaction we need a coupling enzyme that will work with glyoxylate (the product when glycine donates its amino group to the “keto-End” or ketoarginine). The lactate dehydrogenase that we used to measure the reaction with ketoarginine and alanine would not accept glyoxylate as a substrate. To get around this problem, we cloned glyoxylate reductase (GR) from E. coli, which we reasoned should react well with glyoxylate. Surprisingly, GR has a higher affinity for 2-ketoarginine than its native ligand, glyoxylate. This makes wild-type GR a poor coupling enzyme for monitoring the reaction of MppQ with ketoarginine and glycine. We have undertaken structural studies to guide our efforts to engineer a form of GR that will not react efficiently with ketoarginine. Here we present our structural evidence for the binding mode of ketoarginine to the GR active site, as well as the steady state kinetic characterization of GR reacting with 2-ketoarginine, glyoxylate, α-ketoglutarate, NADH, and NADPH. We have found that there is significant substrate inhibition with glyoxylate, but not with 2-ketoarginine. Given the low concentrations of glyoxylate in our MppQ assays, this substrate inhibition is unlikely to be a problem for our future work with MppQ.

Jane Pfeiffer
Infiltration of Municipal Effluent Into Deep Dolomite Wells Located Near the Upper Fox River and its Implications
Mentor: Timothy Grundl, Geosciences
Poster Presentation, Easel 152

The upper Fox River in Waukesha County, WI receives a large amount of effluent, which is being discharged from three municipal wastewater treatment plants located on the river. Previous studies have shown that effluent is infiltrating into shallow sand/gravel wells located directly adjacent to the Fox River. This deduction was made by an observed increase over time in Na and Cl, the other primary source of excess Na and Cl in urban areas. This study explored the infiltration of municipal effluent into two other wells located near the Fox River that draw water from a deeper dolomite aquifer. The methods utilized in this experiment include analyzing the temporal changes in major ion content via AA, IC and ICPMS techniques. The mineral dissolution/precipitation and other geochemical reactions were also assessed. The numeric model PHREEQC developed by the U.S. Geological Survey was used to analyze the geochemical reactions within the system. Our findings indicate that the two deep dolomite wells display Na and Cl levels that rise to 2 and 3 times greater than background levels within the deep dolomite aquifer, respectively. Background conditions in the dolomite aquifer were established by examining a third well distal from the river that pumps pristine aquifer water. Furthermore, the B/Cl ratio of observed in these wells indicates that treated effluent is in fact entering the system, as opposed to road salt infiltration. The background well demonstrates neither of these trends. This study establishes that wastewater treatment effluent directly affects the water quality of those municipal wells in the Waukesha area that are located in close proximity to the Fox River. Implications for the transport of other, potentially dangerous compounds into shallow riparian wells in SE Wisconsin will also be discussed.

Sarah Philippi
Wnt/²-catenin Signaling is Necessary for E2-Mediated Memory Enhancement
Mentor: Karyn Frick, Psychology
Poster Presentation, Easel 2

Estrogens mediate the function and morphology of the hippocampus, a brain region important for learning and memory. In the dorsal hippocampus, the potent estrogen 17-estradiol (E2) facilitates memory through the activation of cell-signaling cascades. The Wnt/-catenin cell-signaling pathway regulates hippocampal development and synaptic plasticity. Our lab previously showed that blockade of Wnt/-catenin signaling with Dickkopf-1 (Dkk-1) impairs object recognition memory in male mice (Fortress et al, 2013). However, the potential involvement of Wnt/-catenin signaling in the memory-enhancing effects of E2 are unknown. To address this issue, 10 week-old ovariectomized female C57BL/6 mice were trained on object recognition (OR) and object placement (OP) tasks designed to test object recognition and spatial memory. Immediately after training, mice received bilateral infusions of vehicle or Dkk-1 into the dorsal hippocampus and unilateral infusion of vehicle or E2 in the dorsal third ventricle. Memory was tested 24 or 48 h later. In contrast to mice receiving infusions of E2+vehicle, those receiving infusions of E2+Dkk-1 did not exhibit intact memory consolidation in either task. These results indicate that Wnt/-catenin signaling is necessary for the memory-enhancing effects of E2 in female mice. Future studies will characterize the effects of E2 on Wnt/-catenin signaling in the dorsal hippocampus.
Brooke Pinar
The Relationship Between Sleep Disturbances and Perceived Injury Severity
Mentor: Christine Larson, Psychology
Poster Presentation, Easel 23

There is growing evidence supporting the relationship between sleep disturbances and the development of post-traumatic stress disorder. Post-traumatic stress disorder is a psychological phenomenon that potentially affects those whom experience a severe traumatic event in his/her life. As a result, the traumatic event can trigger a “fight-or-flight” response that ultimately determines how the given situation is psychologically recovered. Depending on the individual, one recovers from these experiences in a variety of ways, both positively and negatively. Those who continue to experience negative psychological and/or physical instabilities may ultimately be diagnosed with post-traumatic stress disorder. It is hypothesized that individuals with sleep disturbances may therefore perceive a traumatic event as more severe on self-reported questionnaires. Thus, individuals with sleep disturbances may not only be at a higher risk of developing post-traumatic stress disorder, but receiving successful psychological treatment in regards to his/her experience of a traumatic event. This may be indicative of the success of future treatments to impede the development of post-traumatic stress disorder. Sleep disturbances were determined using the Pittsburg Sleep Quality Index among 52 individuals, and perceived trauma severity was determined from self-reported questionnaires. Given prior research, along with any correlation found in this study, further research may seek to explore if treatment of sleep disturbances in individuals with post-traumatic stress disorder (or suspected development of post-traumatic stress disorder) may lead to a greater degree of successful psychological trauma treatment. Treatment for post-traumatic stress disorder, upon data calculation, may hold ramifications for treatment design. Data collected for this hypothesis is in the process of being analyzed and concluded.

Cedric Price & Emily Szamocki
Activated Fly Ash-ash and Nano-silica Blends for Sustainable Self-consolidating Concrete
Mentor: Konstantin Sobolev, Civil & Environmental Engineering
Mentor: Marina Kozhukhova, Civil & Environmental Engineering
Poster Presentation, Easel 30

The production of portland cement is a carbon intensive process releasing considerable amounts of CO2. Because of the scale involved, reduction in the amount of cement used in concrete can have significant effect on carbon dioxide emissions. Utilizing a by-product such as flyash is an ideal way to supplement the binder, but doing so while replacing portland cement without sacrificing the performance of concrete is challenging. The implementation of activation can convert this by-product to a higher-grade material capable of replacing portland cement. The combination of nano-engineered cement (NEC) and mechano-chemical activation (MCA) of fly ash with chemical admixture was realized, with the MCA being achieved through vibro-milling. Supplementary cementitious materials (SCMs) such as super-plasticizers and viscosity modifying admixtures were optimized to achieve critical properties such as workability, viscosity, and mechanical performance. Mortars with nano-silica and SCMs such as fly ash C and F were produced and studied for flowability and compressive strength. The activation of fly ash through vibro-milling accelerated the hydration of cementitious systems with fly ash and reduced setting time, enhancing early strength of blended cementitious composites of up to 30% fly ash. Results indicate that mortars based on activated class C fly ash had better performance than reference portland cement in all ages of curing. The effects of activation can be seen in the improvement of 1 and 7-day strength. While systems with 20% activated class F fly ash had 7 and 28-day compressive strength comparable to reference portland cement, 1 day performance was about 50% lower than the reference. Results also indicate that nano-silica can be effectively used to boost performance of systems with activated fly ash. Further research into the effect of class F fly ash, activation of fly ash, and its effect on composition and morphology beyond 28 days must be investigated.

Yazeed Qadadha
Overlay of Thermoacoustic Images onto Scanned Histology Slides of Human Prostates
Mentor: Sarah Patch, Physics
Poster Presentation, Easel 146

TCT images of fresh surgically removed prostates are analyzed and overlaid onto histology images by matching the anatomical marks and tissue types seen on both, histology and TCT. Overlay of different cases will allow for comparing and illustrating how cancer regions show up on the greyscale-TCT images. TCT pulses were generated by using electromagnetic waves to heat up the prostate which was immersed in a highly electrolytic solution and emissions were detected using an ultrasound transducer connected to a Verasonics ultrasound system. A set of TCT images was produced for each prostate. Each image showing the TCT data for one axial level with the thickness of 3mm. After obtaining the TCT images, the prostate was sent to MCW to be cut up into axial slices of 3mm and fixed onto microscope slides. Histology slides were scanned in using an image scanner to create digital copies which were used in the overlay. Overlay of images involved creating a 3D structure using the 3DSlicer software where TCT images were combined. Utilization of the 3D visualization along with viewing the physical histology slides under the microscope, and under the supervision and directions of the pathologist David Hull, MD, histology levels were oriented and processed to match to corresponding TCT images. Some of the aspects taken into consideration included but were not limited to: brightness of tissue on TCT (reflecting ion concentration), anatomical marks, edges of prostate
after trimming out the adipose tissue, and cancer regions seen on histology. Overlay is in its final stages. In order to avoid errors final conclusions will be made when all sets have been overlaid and compared. Initially, overlaying one case would take a long time and often times cases needed to be redone due to lack of back ground info. However, now after doing more than 10 cases and learning a great deal from Dr. Hull, overlaying is much more efficient and errors are minimized.

Kylee Radulovich
A Comparison of Forensic Anthropology to Bioarchaeology
Mentor: Pat Richards, Anthropology
Poster Presentation, Easel 65

Forensic Anthropology is the field of study that uses the analysis of human skeletal remains to extract as much information as possible with the goal of identifying the circumstances surrounding the death of the individual(s) being analyzed. Bioarchaeology is the field that seeks to provide information about human life or the environment in the past by studying bones and other biological materials found in archaeological remains. This poster will illustrate the analytic differences between these two fields by comparing the two types of analyses that would be used for a case study of human remains from the MCIG research project at UWM (MCIG stands for the Milwaukee County Institution Grounds Cemetery Project). This research includes washing and stabilizing the remains from this site, and will require careful analysis of the remains chosen for study. The individual will be examined and will be documented according to forensic anthropological evidence analysis as well as being documented according to rules of analysis for bioarchaeological evidence. This is important and helpful when looking at details like age, sex, health and nutritional information, as well as other characteristics of the individuals being studied. This project will give examples of scientific methods and views on understanding human remains and the details surrounding death in comparison to the way human remains can be studied in order to provide background on what their lives may have been like. They are now bones to be cleaned and studied, they were once parts of a living human, and they should be shown respect and be learned from, that is the goal of this project.

Adela Raicu
How Does Anxiety Affect Cognitive Control?
Mentor: Chris Larson, Psychology
Poster Presentation, Easel 45

Cognitive control is a construct from modern day neuroscience that refers to stimuli and information processing that occur in the brain, as well as the execution of behaviors which adapt to one’s internal goals and external environmental changes. As described in a recent theory, the Dual Mechanism of Control (DMC), cognitive control can be distinguished by two distinctive operations: proactive and reactive control (Braver, 2012). Anxiety is known to increase the distribution of attentional and working memory resources to threat-related stimuli, and this results in an impairment of cognitive performance. However, not much research has been done on how anxiety affects the two forms of cognitive control, so the purpose of this study was to attain a better understanding of the impact of anxiety on both proactive and reactive control. To examine how state anxiety impacts proactive control, the AX-continuous performance task was utilized, and its effect on reactive control was studied through the use of the classic Stroop task. The hypothesis was that state anxiety will inhibit proactive control in the AX task, and in contrast, increase reactive control in the Stroop.

Ana-Maria Raicu
Role of Non-Muscle Myosin II in Regulating Cell Shape During Zebrafish Brain Morphogenesis
Mentor: Jennifer Gutzman, Biological Sciences
Poster Presentation, Easel 55

Cell shape changes during neural tube morphogenesis are essential for development of cell shape changes during neural tube morphogenesis are essential for development of normal structure and function of the brain. In order to elucidate the molecular mechanisms that regulate cell shape changes in the developing brain, we examine the first fold in the neural tube that forms the highly conserved midbrain-hindbrain boundary (MHB). We use the zebrafish system for these studies because it allows for in vivo imaging at single cell resolution during early brain development. In zebrafish the MHB forms between 16 somite stage (ss) and primordium 6 (Prim-6), where a group of cells form the point of deepest constriction, the midbrain-hindbrain boundary constriction (MHBBC). We previously determined that cells at the MHBBC constrict basally and expand apically by Prim-6 to fold the tissue. We recently determined, using knockdown studies with antisense morpholino oligonucleotides, that non-muscle myosin II (NMII) protein isoforms, NMIIA (encoded by myh9) and NMIIIB (encoded by myh10), differentially regulate cell shape changes during MHB morphogenesis. In order to further examine the roles for these proteins, we are using CRISPR-Cas9 genome editing to create myh9 and myh10 specific mutant zebrafish lines. This is essential to compare to our morpholino knockdown phenotypes. Our current results indicate that we have successfully generated F2 generation myh10 mutants and we are currently screening myh9 mutants. The examination of these mutant zebrafish lines will provide new insight into understanding the molecular mechanisms that mediate MHB formation, which are likely conserved in other morphogenetic events and in other vertebrate species.
Nicole Recka
Genome Wide Search for Transcriptional Motifs in Central Nervous System Regeneration
Mentor: Ava J Udvdadia, Biological Sciences
Poster Presentation, Easel 38

Adult mammals are unable to repair spinal cord, brain, and other CNS tissues. Although mature mammals cannot undergo regeneration of their CNS, some lower vertebrates can regenerate as adults. The differential response to CNS injury is due in part to the induction of regeneration-associated genes in lower vertebrates that remain inactive in mature mammals. In order to understand how regeneration-associated genes are regulated during successful CNS regeneration, we are studying gene regulatory networks that are activated after optic nerve injury in the model organism, zebrafish. Specifically, we are using Assay for Transposase Accessible Chromatin with high-throughput sequencing (ATAC-seq) to identify regeneration-associated gene promoters and enhancers. This technique uses transposase to introduce PCR primers into regions of accessible chromatin to find potentially “active” promoter and enhancer binding sites. In order to perform this technique, we had to first optimize protocols for isolating regenerating retinal ganglion cells from GFP-expressing transgenic zebrafish retinas at different stages post optic nerve injury. My research focused on optimizing retinal tissue dissociation and isolation of cells by fluorescence activated cell sorting to enable this approach. As a result of this work we determined the number of zebrafish retinas required and the specific conditions for enzymatic and mechanical tissues disruption that has resulted in the successful construction of ATAC-seq libraries at 0-, 4-, and 7-days post injury. We anticipate that sequencing and bioinformatics analyses of these libraries, in conjunction with previously obtained RNA-seq data, will yield important insight into the critical regulatory factors enabling activation of regeneration-associated genes.

Yi Ren
Optimization of Pumps Scheduling in Wastewater Treatment Plants
Mentor: Lingfeng Wang, Electrical Engineering
Poster Presentation, Easel 98

As energy-intensive industrial sectors, water and wastewater treatment consumes about 75,000 to 100,000 GWh electricity, which accounts for nearly 3% of U.S. annual energy consumption. Instead of being energy-intensive, wastewater treatment plants (WWTPs) consume a large amount of electricity during peak hours, which makes load management a potential way to achieve demand response. The main purpose of demand response is to improve the stability of the electric grid and reduce the use of electricity during peak periods so as to lower the total energy costs. Two kinds of strategies can be utilized to reduce electrical loads during peak periods, including load shedding and load shifting. Load shedding strategy is to reduce the total electrical load during a demand response event; and load shifting is to reschedule the flexible electrical loads to partial-peak or off-peak hours. In this work, we review the main treatment processes and their energy-consuming behaviors in WWTPs. The pumping system is one of the most energy-intensive components in WWTPs, so we build a load shifting model focused on pumps in order to reduce the load during peak hours. Based on the particle swarm optimization algorithm, a mathematical problem is formulated. The obtained simulation results indicate that the proposed method can effectively manage the electric demand of pumps; and also verify that economic benefits can be achieved by shifting load demands from peak hours to off-peak hours.

Isaac Repinski
A Review of Magnesium Syntactic Foam Biomedical Applications and Processing
Mentor: Pradeep Rohatgi, Materials Science & Engineering
Poster Presentation, Easel 12

The properties of Mg foams have been extensively studied in the last decade due to their potential for use as biomaterials. Their lighter density and Mg's role in the ossification process make these foams ideal as scaffolding for bone replacements. The addition of spacer materials and alloying elements make up for the weaker mechanical properties associated with Mg. Research is still being carried out on developing new processes that allow control over the microstructure of these foams. This review will give an overview of the unique properties of Mg foams compared to other metallic foams and the processes that have been developed so far. Their applications as biomaterials and in batteries will be covered as well. The objective of this review article is to bring together and analyze the works on Mg foam that have been done so far to outline prospects for future research the UWM Center of Composites can engage in to contribute to this particular field.

Emily Roche
Optimization of Cleaning Processes for the Production of a Novel Porous Material for the Removal of Phosphorus
Mentor: Marcia Silva, Freshwater Sciences
Mentor: David Garman, Freshwater Sciences
Poster Presentation, Easel 106

The research goal was to optimize the method of base material preparation for a novel porous material fabrication for removal of phosphorus from water by reducing costs in the preparation phase. By using a natural porous material and functionalizing it with metal nanoparticles we can remove phosphorus in an effective manner comparable to other more expensive alternatives. The production method includes the initial cleaning process of the porous material prior to fabrication with metal oxides. Reduction of the cleaning processes was examined to save money and resources in a proposed large scale production. By simplifying the cleaning process, the production cost for cleaning wastewater can
Danielle Rodamer
Validating Chemical Actinometers as Simple, Cheap Means of Measuring UV Exposure in Aquatic Ecosystems
Mentor: John Berges, Biological Sciences
Poster Presentation, Easel 33

UV radiation, especially UV-B (320 to 290 nm), has many negative effects in aquatic ecosystems, ranging from the individual (e.g. DNA damage) to the community (e.g. selection for more tolerant taxa). With the thinning of the ozone layer, accurate, regular measurements of UV-B are increasingly important, but, measurements rely on equipment not typically available in aquatic biology labs. An accessible method to measure UV radiation is needed. UV actinometers (chemical devices that react with different wavelengths of light) When exposed to UV radiation nitrate and nitrite participate in reactions that form salicylic acid and p-hydroxybenzoic acid which fluoresce and can be easily measured. UV actinometers have not been widely used, so the goal of this study was to calibrate them using known UV sources, and to apply them in measurements in local freshwaters. UV actinometers were prepared as solutions of either 1mM NaNO3 or 10 mM NaNO2 (in 2.5 mM sodium bicarbonate with 1 mM benzoic acid), prepared in 11 ml borosilicate vials. To measure UV exposure, the amount of nitrate/nitrite broken down, fluorescence was measured in a plate reader (excitation 305 nm, emission to 410 nm). In order to calibrate, actinometers were exposed to UV from a laboratory transluminator (peak emissions 315 nm) for various period of time and using different amounts of neutral density screening. In addition, exposures to natural outdoor solar radiation were performed. Actinometers were quite sensitive. For example, for nitrate actinometers, relative fluorescence after 8 min exposure to the transluminator was approximately 800 units (vs. 70 units for unexposed actinometers). The exposures showed a linear region of response with amount of UV radiation, with a clear saturation at higher dose. Currently, we are using data to create a calibration curve and beginning field trials in Estabrook Park pond.

Hayley Ruch
Evaluating Novel Porous Materials for Anti-Biofilm Capacity
Mentor: Marcia Silva, Freshwater Sciences
Poster Presentation, Easel 110

The formation and persistence of surface-attached microbial communities, known as biofilms, are responsible for 75% of human microbial infections. We are developing a novel method for evaluating biofilm growth on the surface of natural and engineered porous particles using environmental Escherichia coli (E. coli) as a model organism. E. coli was grown on modified mTEC agar from return activated sludge samples collected at Milwaukee Metropolitan Sewerage District. Colonies were then picked and inoculated in Luria-Bertani Broth (LB) and incubated to form a liquid culture. E. coli cultures were then diluted and introduced to natural and engineered porous particles. Images were taken using a Zeiss LSM 710 Confocal microscope and beginning fluorescence intensity values were observed at 0 hours. The porous particles and E. coli mixture were then incubated at 37°C and images and fluorescence intensity values were obtained 24 hours later and again one week later. By measuring the fluorescence intensity values of a serial dilution of E. coli, we were able to build a calibration curve between concentrations of bacteria using the standard EPA Method 1603 versus the fluorescence intensity. Over the course of a week, the fluorescence intensity values increased, indicating that natural porous particles sustained biofilm growth. The same procedure was performed with engineered porous particles and the biofilm growth was minimal after 45 hr. Two more novel materials will be tested following similar procedure. It is expected that these novel materials will also exhibit anti-biofilm capacities.

Ryan Rufer
Graphic Design for Next.cc
Mentor: Mark Richard Keane, Architecture
Poster Presentation, Easel 116

In my project I created Graphic Diagrams for different types of Journeys to help explain to students or users of this website, what a certain element of a design topic is. For instance, showing the many different colors, forms and sizes of a brick. In this process I used Photoshop, Illustrator and Sketch-up to create the graphics, models and Gifs. My work consists of images in which I designed and interpreted into what the website needed for the particular Journey. Overall, I created Images that will be very beneficial in the objective of Next.cc in teaching design through these topics in which my graphics are part of.
Organic solar cells have yet to reach the market due to their susceptibility to environmental degradation. A countermeasure to degradation is to utilize a protective thin film made of transparent Indium-tin oxide (ITO). Due to the toxicity and scarcity of Indium, Zinc oxide has been researched as a replacement for ITO. Previous methods of creating thin films resulted in energy intensive, and time consuming processes. Our research has utilized sol-gel method of the synthesis for producing ZnO thin coats, which implies a faster, low energy deposition method with the potential to lead to the development of improved industrial processing of thin film materials. The purpose of this research is to investigate the impact of aging time of the sol-gel and spin coating parameters to optimize the electrical and optical properties of ZnO thin films.

Matthew Ryther
The Role of Carbon Dioxide Within Lake Michigan's Nitrogen Cycle
Mentor: Russel Cuhel, Freshwater Sciences
Poster Presentation, Easel 142

The goal of this experiment is to determine how surface area effects the growth of nitrifying bacteria. This type of experiment is called a roller bottle experiment because there are 9 different bottles on a rolling table. The 9 bottles are separated into 3 groups; sand, beads dosed with ammonium, and beads dosed with nitrite. The beads represent zebra mussel shells on the floor of Lake Michigan. In the bottles that contain beads there is one with 90 beads, one with 45 beads, and one with zero beads. By comparing the increase or decrease of nitrite and ammonia in the different bottles we are able to pick up on trends that relate to the surface area. We can anticipate that the bottles dosed with ammonium will show an increase in nitrite and a decrease in ammonia. The bottles with the highest surface area (90 beads) will have the largest amount of nitrite. Something different happens for the bottles dosed with nitrite, as in the levels of nitrite will decrease and levels of nitrate will increase; with the 90 beads bottle having the highest amount. I specifically studied the levels of carbon dioxide in each of the bottles using flow injection analysis. Doing so we were able to predict roughly what level the other compounds were at. This is due to the fact that the nitrifying bacteria require carbon dioxide to oxidize ammonia to nitrite and then nitrite to nitrate.
auditory deficits will coincide with visual deficits, such that orienting will not be affected. Possible future directions may involve an MRI brain imaging study to examine the functional brain mechanisms correlated with symptoms/severity of chemobrain. Findings of reliable behavioral and neurological markers of chemobrain may be instrumental in the creation of preventative cognitive therapies in the form of “brain games” and other take-home exercises.

Cristal Sanchez-Estrada
Growth Analysis of Nutrient Rich Cladophora Using Various Temperature and Light Gradients
Mentor: Russell L Cuhel, Freshwater Sciences
Poster Presentation, Easel 143

The alga Cladophora is often assigned as the cause for irksome smell in Lake Michigan; however, other factors are involved in this issue. Cladophora grows in well-lit shallow water, but it appears ashore and pile on the beach because it is ripped from its habitat by storms or in old age. Wastewater is very rich in phosphorus (P) compounds and if not controlled, P can be used by Cladophora to grow and store for later use. The purpose of this experiment is to grow Cladophora and differentiate among the organic phosphates and polyphosphates by using hydrolysis treatments; a crucial procedure in determining how much P is stored in Cladophora. Cladophora clumps were treated with phosphorus and other nutrients, grown under different temperature and light gradients and sampled over a course of two weeks. Untreated clumps of Cladophora were also grown and compared to the nutrient-rich samples. Samples were tested for silicate, phosphorous, CO₂, and nitrogen uptake. All clumps were weighed before incubating and after our last sampling. Lastly, clumps were homogenized to measure the amount of organic phosphorus material and polyphosphate stored. Other crucial biochemical analysis were done. Current results show that Cladophora did indeed grow under certain light and temperature conditions. In two weeks, Cladophora weighed almost three times as much under the brightest light gradient. Under the brightest light gradients there was also a decrease in P from the media grown. Biochemical analysis of the organic filamentous material will be done in order to prove that Cladophora took in the nutrients from the media. Based on our current chemical analysis, we expect to see a higher amount of organic P and polyphosphate in the enriched Cladophora.

Trishika Santebenur
Integrating Self-Healing Materials and Structural Health Monitoring
Mentor: Nathan Salowitz, Mechanical Engineering
Poster Presentation, Easel 161

When engineered structures fail, the consequences can be fatal. In order to proactively prevent this, the two fields of structural health monitoring and self-healing materials are coming together to facilitate a closed loop system. In this system, the structure will be able to detect damage, repair itself, and report to supervisors. This presentation illustrates the recent progress of the self-healing materials side of the closed loop system and preliminary results of ultrasonic damage detection. By casting a single plane of prestrained shape memory alloy Nickel Titanium (NiTi) wires in a thin brick of aerospace grade thermoset epoxy, the brick can be cracked so that only the wires bridge the gap. This composite can be heated at the wire's activation temperature to make the wires contract. Due to prestraining, the wires pull both halves of the brick to return to a shorter length than the length they were prestrained to. Since the halves cannot pass through one another, the epoxy holds the wire at the length it was cast at. The wires want to contract further than the epoxy will allow, so the epoxy halves' fracture faces are kept together and in a way – healed. To detect the damage, piezoelectric sensors are placed with conductive epoxy on either side of the damage. These piezoelectrics double as actuators and sensors; the actuating piezoelectric is used to send out ultrasonic waves that are propagated through the sample and detected by the receiving piezoelectric sensor. By comparing the signals of the current and previous states, it is expected that the material's status, damaged or undamaged, can be known. If self-healing materials can detect and heal without external maintenance, hard to detect damage or damage occurring while a structure is in service can be slowed or stopped altogether before expensive and catastrophic failure occurs.

Sarah C. Sarich, Majdulin Nabil Istiban & Samantha L. Skorlinski,
Characterization of Crispr/Cas9-Mediated Cabin1 Deletion on Craniofacial Morphology in Larval Zebrafish
Mentor: Ava J. Udvadia, Biological Sciences
Poster Presentation, Easel 39

Although craniofacial abnormalities are among the most common birth defects, the genetic mechanisms regulating craniofacial development remain poorly understood. We are interested in exploring novel roles of a transcriptional regulator originally discovered for its role in T-cell activation, Cabin1, in craniofacial development. Based on our preliminary findings we hypothesize that Cabin1 is necessary for appropriate craniofacial development, including proper migration and differentiation of the cranial neural crest cells. To test our hypothesis, we collaborated with Dr. Brian Link (Medical College of Wisconsin) to generate Cabin1 knockout fish using CRISPR/Cas9 genome editing. We have two independent mutant strains in which the Cabin1 gene contains a premature stop codon and is expected to give rise to functionally null proteins. Here we will present our preliminary findings on the morphological differences in craniofacial development between Cabin1 mutant and wildtype strains. To characterize the developing craniofacial cartilage, we stained 5-day old larvae with Alcian Blue and used morphometric analysis to identify differences in craniofacial morphology between Cabin1 mutants and wildtype strains. Our preliminary analyses suggest that there are differences in jaw morphology of
the Cabin1 mutants, however the differences are subtle compared with those we previously observed using gene knockdown strategies. We are currently investigating how the observed craniofacial phenotypes in our mutant strains correlate with long term survival.

Anthony Schaeve
Flow Cytometry & Optical Imaging
Mentor: Yongjin Sung, Mechanical Engineering
Oral Presentation, 12:00pm, Union 280

The central purpose of this research is to develop a flow system that can be incorporated into the laboratory's new optical imaging system. The lab has been developing a novel holographic method to record 3-D images of cells continuously flowing in a sub-millimeter channel. This imaging system requires a flow system to introduce cells seamlessly from the cell reservoir to the site of interrogation through a 30 micron-diameter channel. When a cell moves across the beam of light, it scatters the light according to the granulation and size. These cell characteristics can be measured without any extra contrast agents using an off-axis digital holography and with a high-speed camera. In this semester, I have designed a fixture with a V-shaped slot to allow a flow channel to run across a beam of light in the imaging flow cytometer. I am currently developing a hardware-software interface control to optimize the operating conditions such as the flow rate and cell rotation through the channel to match the data acquisition speed. Precise control of these operating conditions is essential to capturing the 3-D images of cells with high speed and accuracy. After measuring the degree of cell rotation for different flow rates, I will optimize the components and integrate them into the existing laboratory set-up. We anticipate that the flow channel developed through this research will be an essential component to successfully demonstrating the 3-D imaging capability of the system that the lab has been developing. We envision that these methods altogether will allow fast and accurate diagnosis of hematologic malignancies such as acute myeloid leukemia by obviating complex sample preparation and subjective human evaluation steps.

Hannah Scherkenbach
Complement Receptor type 1 Polymorphisms Associated with Reduced Cortical Volume and Thickness in Healthy Middle-Aged Adults
Mentor: Ira Driscoll, Psychology
Poster Presentation, Easel 51

Complement Receptor type 1 (CR1) has been proposed to contribute to the Complement Receptor type 1 (CR1) has been proposed to contribute to the neuropathology of Alzheimer’s disease (AD) through the modulation of neurotoxic amyloid-beta plaque metabolism (Rogers et al., 2006). The purpose of the present investigation was to characterize the relationship between CR1 polymorphism (rs1408077) and structural brain integrity (volume and cortical thickness) in healthy middle-aged adults, allowing us to study structural differences that are present years before cognitive impairments attributed to pathological aging may begin. Participants (N = 150; age 40 - 60) underwent genetic testing and magnetic resonance imaging (MRI). Regional brain volumes and cortical thickness were calculated using Freesurfer. Consistent with its role as an AD risk allele (Biffi et al., 2010; Kok et al., 2011), we found that the CR1 rs1408077 T-allele carriers had lower cortical thickness in the bilateral lateral orbitofrontal cortex, right inferior parietal cortex, and right precuneus (p’s <.05, familywise error corrected). T-allele carriers also had smaller volumes of the precuneus bilaterally and lateral occipital cortices, as well as the right inferior parietal cortex (p’s <.05). Atrophy of the aforementioned structures has been found to be associated with cognitive impairment as well as mild AD (McDonald et al., 2009). Collectively, these results suggest that the CR1 polymorphisms are related to structural brain differences evident well prior to any overt impairment, making CR1 gene a potential biomarker of AD.

Brandon Schmidt
AIRAP/AIRAPL Overexpression as a Potential Underlying Mechanism of Thymoquinone Modulation of Aβ Toxicity in Neuronal Cells
Mentor: Wail Hassan, Biomedical Sciences
Poster Presentation, Easel 139

Alzheimer’s is a neurodegenerative disease that affects an estimated 5.3 million Americans. Beta-amyloid plaques are found in the brains of Alzheimer’s patients and amyloid beta is thought to play a central role in Alzheimer’s pathogenesis. Our study looks at modifying the expression of two genes, AIRAP, and AIRAPL, in mouse neuronal cells. AIRAP and AIRAPL help to increase degradation of proteins by the proteasome which would help to alleviate the toxicity of amyloid beta. The genes AIRAP and AIRAPL are human homologues of the AIP-1 gene in the Caenorhabditis elegans worm. Upregulation of the AIP-1 gene in C. elegans has been shown to protect against amyloid beta toxicity. Expression of AIRAPL in C. elegans was able to suppress amyloid beta toxicity. Expression of AIRAP in C. elegans was not shown to alleviate toxicity. TQ is a substance that is extracted from plants and has been shown to protect neurons against amyloid beta-induced neurotoxicity in rats. We have also been able to demonstrate the alleviation of amyloid beta toxicity by TQ treatment. This research aims to define the molecular mechanisms underlying the protection offered by TQ treatment.

Jared Schmitz
Architecture and Neighborliness: Defining Spaces of Social Interaction and Hierarchy
Mentor: Arijit Sen, Architecture
Oral Presentation, 7:00pm, Union 280

Milwaukee’s Martin Drive neighborhood demonstrates a unique sense of neighborliness. According to architectural
Gevork Seifert

Antibody Purification Using Protein Hydrogels
Mentor: Ionel Popa, Physics
Poster Presentation, Easel 77

Antibody purification via protein binding has been extensively used within the biotechnology industry. Protein L is a protein commonly used in the purification of antibodies. It binds to the variable light-chain of an antibody, thus having a wider range of antibodies it can bind when compared to other proteins. Here we demonstrate how protein L binds specific antibodies and how this hydrogel can bind, retain and release IgG antibodies in a highly controlled manner. By altering the concentration of protein L, we can affect the binding capacity. This property of protein hydrogels may provide a new potential method for the purification of antibodies.

Viktoriia Senych

Synthesis of Calcitroic Acid to Determine its Potential for Prevention of Colon Cancer
Mentor: Alexander E Arnold, Chemistry & Biochemistry
Poster Presentation, Easel 148

The vitamin D receptor (VDR) is a member of the nuclear receptor family and regulates gene transcription responsible for cellular processes and calcium homeostasis. The receptor is activated by vitamin D and its corresponding metabolites. The most active metabolite is 1,25-dihydroxyvitamin D3 (calcitriol). However, the lifetime of this potent vitamin D analog is very brief due to fast enzymatic conversion. As a result, calcitroic acid is formed predominately in the liver and kidney and secreted into the colon via bile or eliminated by urine. In the colon, VDR is highly expressed and believed to respond to high concentrations of harmful bile acids such as lithocholic acid with CYP3A4 regulation. Subsequent enzymatic hydroxylation of lithocholic acid reduces irritant and toxic effects that have shown to cause irritable bowel syndrome and the development of colorectal cancer. Our hypothesis is that calcitroic acid, which is secreted together with digestive fluids, is an additional regulatory ligand for VDR in the intestines in order to initiate the breakdown of harmful bile acids. Therefore, increased uptake of vitamin D supplements could potentially decrease the risk of irritable bowel syndrome and colorectal cancer. In order to investigate this hypothesis, calcitroic acid and its metabolites have to be synthesized. Calcitroic acid synthesis consists of 11 steps. The first step is an ozonolysis reaction to generate a diol from plant-based ergocalciferol, second and third are conversion of diol to tosylate and protection of tosylate group, fourth is chain extension by substituting tosylate group with cyanide followed by 7 more additional steps. Once we have synthesized large amounts of calcitroic acid, we will generate possible phase 2 metabolites and carry out cell-based and enzymatic analysis.

Kirill Shmilovich

Force Clamp Measurements and Dynamic Modeling of Protein Hydrogels
Mentor: Ionel Popa, Physics
Poster Presentation, Easel 1
Oral Presentation, 1:00 pm, Union 260

Protein hydrogels show great promise in their applications to developing smart biomaterials and drug delivery systems. A protein hydrogel is defined to be a highly cross-linked network of individual multi-domain proteins. Variable protein constructs and concentrations allow for protein hydrogels to exhibit highly malleable mechanical properties. Here we examine the force specific response of protein hydrogels made from different protein concentrations, and provide a dynamic mathematical model for hydrogel extension. By mathematically modeling individual protein's orientation and force-dependent domain unfolding within the hydrogel we may explain the macroscopically observed
Carnivorous pitcher plants capture insect prey, which is broken down to release nutrients for plant uptake, compensating for poor nutrient supply from soils. Unlike some carnivorous pants, pitcher plants make no digestive enzymes of their own. They therefore depend on a microbial community in pitcher fluid to produce hydrolytic enzymes including chitinase, which breaks down the chitin in insect exoskeletons. This research aimed to examine the regulation of chitinase activity in pitcher microbial communities in response to additions of insect prey and supply of alternative nitrogen (N) and carbon (C) substrates. Pitchers maintained in the greenhouse were enriched with *Drosophila* fruit flies, glucose as a C source, or glutamine as a C and N source. Chitinase and protease enzyme activity was measured in pitcher fluid samples collected at 0, 6, 12, 24, 48, and 96 hours after additions using fluorometric assays. Samples were also collected for bacterial abundance measurements using epifluorescence microscopy. To determine the contribution of chitinase activity from flies, rather than the bacteria, whole and ground flies were added to sterile water and chitinase activity assayed over 2 weeks. Fluorometric assay data was plotted and change over time analyzed by regression to obtain rates of hydrolysis, proportional to enzyme activity. Preliminary results indicate that enzyme activity was quite variable between pitchers, even with the same treatment. Chitinase activity peaked 12-24 hours after addition of nutrients and/or flies, and declined in all treatments by 48 hours. High activities were observed with all 3 pitcher additions, and glutamine- or glucose-only additions also showed high chitinase activity. These results suggest that supply of alternative C and N substrates for bacteria did not suppress chitinase activity targeted towards fly carcasses. Results also suggest that some chitinase activity measured in pitchers may be derived from fly carcasses, not from resident bacteria.

**Christopher Spiewak**

**Robotics-Based Hand Rehabilitation Assistive Device**

Mentor: Mohammad Habibur Rahman, Mechanical Engineering

**Poster Presentation, Easel 121**

For those who have lost the capability to control their hand (paralysis/spasticity) correctly due to some form of injury. The most common method of recovery is to perform repetitious motions with the controlled by a therapist. We have developed a robotic assistive device (RAD-HR) to recover lost hand functions. This method is not meant to replace but to improve upon the more traditional method of therapy. The RAD-HR contains five degrees of freedom enabling basic movements while supporting the arm during exercises. We have used a nonlinear computed torque control technique which manages, directs, or regulates the behavior of the RAD-HR. Our controller has been augmented with an integrated EMG component to estimate the intended torque in the joints. This controller was tested for accuracy in simulations (MATLAB/Simulink environment) using a Myo Armband to measure the EMG.

**Michael Sportiello**

**Quinolones for β–Sheet Interception**

Mentor: Alan Schwabacher, Chemistry

**Poster Presentation, Easel 140**

Much of antibiotic resistance results from membrane proteins that, through the process of active transport, remove antibiotics from within the membrane to outside the membrane, rendering said antibiotics useless. Many membrane proteins called efflux protein complexes responsible for this are, in part, folded by a different protein-complex called the β-barrel assembly machine (Bam). The secondary structure of proteins folded by this machine is of the form of a β-barrel, composed of β-pleated sheets. Currently, a rigid quinolone structure, a common structure of many antibiotics that act by other mechanisms, with strategic hydrogen-bonding sites is being pursued as a molecular template that will hydrogen-bond small peptides by mimicking the interactions in a β-sheet. These templates will be used to study intramolecular forces in β-sheets and β-barrels. Inhibition of the β-barrel assembly machine with modified substrate peptides has been shown to be bactericidal in vitro. However, these peptides make poor drug candidates due to their inherently poor quality of being metabolized by the patient to which these drugs may be given. Therefore, we propose possible inhibition of the β-barrel assembly machine by our synthetic target molecule, mimicking the interactions of that modified substrate peptide.
Nicholas Stellpflug
Stress Sensors for Biomedical Applications
Mentor: Chiu Law, Electrical Engineering
Poster Presentation, Easel 19

Research was conducted to develop a design for an effective sensor to be used in biomedical applications, specifically to monitor the stress on joint implants received by patients. The sensors will be synthesized using a magnetostrictive composite material (MCM) of Terfenol-D (Tb 0.3D y0.7F e2), epoxy resin, and ferromagnetic material. The sensing is based on the Villari effect, or inverse magnetostriction. The magnetic domains in the sensor will line up and expand, thus modifying the magnetic properties of the material when an external mechanical stress is applied. A magnetic circuit will be fabricated to wirelessly sense the stress in the sensor, and further research will be gathered to compare and contrast the prototype to sensors for the same application currently available in the field. The goal is to use information about current sensors and the magnetic properties of the sensor that will be fabricated to create a less-invasive, effective, and wireless sensor to monitor joint implants.

Shawn Strong & Michael Ballo
Digital Inline Holographic Microscopy (DIHM)
Software for Bacteria Detection
Mentor: Marcia Silva, Freshwater Sciences
Poster Presentation, Easel 111

According to the Environmental Protection Agency (EPA) Method 1603, the current industry standard for detecting Escherichia coli (E. coli) bacteria in waters is 24 hours. The water sample must first be sent to a laboratory for analysis, which is laborious and takes time to release the results. This is unacceptable in terms of public safety as infected drinking water may be distributed to a large population before the infection can be detected. To solve this problem, this project aims to produce a hand-held sensor that can detect bacteria in a matter of hours without laboratory analysis. This project describes how the magnetic properties of the material when an external mechanical stress is applied, thus modifying the magnetic properties of the material. The quick speed of bacteria detection by the hand-held sensor is also determined by software. Once the images are taken of the water sample, volume reconstruction is done through the DIHM method. The software then gives an accurate particle concentration measurement. By using advanced software techniques such as DIHM, the sensor’s cost is reduced and the speed is increased. This allows for the sensor to provide bacteria detection that’s much faster than the current industry standard, allowing for much better public health standards.

Kayla Strunz
Uncovering the Unseen Design of 3-dimensional Hands-on Models of Analytical Chemistry Instrumentation
Mentor: Anja Blecking, Chemistry & Biochemistry
Poster Presentation, Easel 9

Hands-on activities engage students to use critical-thinking and problem-solving skills. Chemistry instrumentation can be very complex, processes happening inside the equipment are often not completely understood. In an attempt to uncover the unseen processes, this project describes the design of a hands-on model of a dispersive infrared spectrometer uncovering the main processes and simplified details of equipment design. The interactive model is designed to be implemented in high-school science instruction. The model will support instruction aligned to the 3-dimensional instruction (disciplinary core ideas, science practices, crosscutting concepts) as described in the Next Generation Science Standards. The hands-on model incorporates movable key components such as the source, sample and reference compartments, monochromator, and the detector and is designed to teach problem solving skills and basic knowledge of instrumental design and logic. Students will be prompted to arrange the key components and the mirrors to allow the laser beam to reach the detector. The laser beam serves as a tool for students to get immediate feedback on if they’ve assembled the instrument correctly. They will also label the compartments with their correct names and definitions to ensure their understanding of the key functions of the instrument. The instrument exploration is embedded in the context of a very important environmental problem: global warming. Students will investigate the increasing global CO2 levels and its applications with infrared spectroscopy. A CO2 molecule with moveable bonds and atoms will serve as an example to demonstrate molecular vibration and infrared absorption frequencies.

Alex Swanson
Differentiation of Motor Intention vs Visual Attention in Human Parietal Cortex
Mentor: Wendy Huddleston, Kinesiology-Integrative Health
Poster Presentation, Easel 165

Regions in the parietal cortex of the brain have been associated with saccade planning (a rapid eye movement between fixation points), however, the extent to which this brain region is specifically involved in motor planning vs visual attention during this task has not previously been differentiated. Our goal was to determine which regions of parietal cortex contributed to visual attention and motor intention, and how these regions related to one
Adapting to Novel Sensorimotor Conditions

Grant Tays

Adaptation to Novel Sensorimotor Conditions
Mentor: Jinsung Wang, Kinesiology-Integrative Health Poster Presentation, Easel 56

Adapting to a novel sensory-motor environment while performing a goal-directed movement, which is a type of motor learning, has long been thought to occur implicitly. Recently, however, there has been a debate in the neuroscience literature regarding whether sensorimotor adaptation may involve an explicit learning process as well. The objective of the present study is to determine the extent to which explicit and implicit learning processes overlap during adaptation to a novel visuomotor condition. Neurologically intact young adults were tested under two experimental conditions: an explicit condition, in which they were instructed to perform reaching movements toward a direction that was rotated 30 degrees clockwise relative to the target, and an implicit condition, in which they were instructed to perform reaching movements directly toward the target. In the latter condition, the visual display of reaching movements were rotated 30 degrees counterclockwise about the start position without the subject’s awareness. Half of the subjects were tested under the explicit condition first, then under the implicit condition; and the other half were tested under the implicit condition first. It was predicted that if visuomotor adaptation primarily occurs implicitly, initial training under one condition would not facilitate subsequent performance under the other condition. These findings suggest that visuomotor adaptation primarily involves an implicit learning process, and also that while visuomotor adaptation may still involve some explicit learning process, it is unlikely that an explicit learning process is a main component of visuomotor adaptation.

Madison Dawne Tebo

TimeSlips - Connecting Through Creativity
Mentor: Jessica Meuninck-Ganger, Art & Design Poster Presentation, Easel 164

In a time when we deny aging and isolate our elders, TimeSlips provides hope and improves quality of life through creativity and meaningful connection. Creative Care: The Wisconsin Project is a collaborative project focusing on meaningful engagement opportunities as a powerful and joyful way to connect with elders experiencing cognitive challenges. The multi-phase effort fosters partnerships between cultural institutions, elder care systems and higher education programs throughout Wisconsin to provide inspiration for imaginative conversations, stories and activities with our elders. Inspirational narrative sessions are held in elder care homes to engage and influence imagination and creativity in the lives of residents. To stimulate participation in group storytelling meetings, trained facilitators offer playful pictures collected from Wisconsin museums, libraries and art centers to serve as prompts for creative feedback. Coordinators ask open-ended questions about the images and record the responses of the elders, which are a mixture of memories and imagination. These collective dialogues are then transcribed into full, imaginative stories and transformed into a large, interactive artists book. The imagery and text of the books reflect themes from the prompts that had been given as well as the inventive anecdotes we receive from the storytelling sessions. The book will be involved in and partnered with a performance as it is exhibited across the country. It is the goal, through these collaborative sessions and implementation of the cross-sector training process in many care facilities statewide, to improve the well being of the elders by infusing creativity into care relationships and systems. Research suggests that integrating creative strategies for making meaningful connections increases the quality and quantity of engagement between staff and residents.

Cinthia Téllez Silva

Embodying the Border: Structural Barriers to Health for Immigrant and Refugee Women in Milwaukee, Wisconsin
Mentor: Jenna Loyd, Public Health Poster Presentation, Easel 54

The health status of (undocumented) immigrant and refugee women is shaped by social, economic, and political forces that vary across space, depending on changes in federal, state, local, and institutional policies. Researchers have documented how contact with local or federal law enforcement and fear of such contact, as created by
xenophobic political and legal climates, create further barriers to care and services for immigrant, refugee, and mixed-status families. In locations far from the border, migration policing and fear of deportation are elements of the structural vulnerability that (undocumented) immigrant and refugee women face. This project uses the concept of structural vulnerability, which argues inequality from systemic political, economical and material marginalization contributes to oppression through gender, ethnic, and class-based discrimination, in order to understand the specific gendered dimensions of structural vulnerability for immigrant and refugee women in Milwaukee County, Wisconsin. The objectives of this study are to learn from organizations and agencies that serve immigrant and refugee women about: 1) their perspectives on how the current political and policy climate and policing practices are shaping access to services and care for their clients and constituents; and 2) their perspectives on how such barriers might be dismantled. The research will rely on semi-structured interviews with immigrant and refugee service providers and organizations in Milwaukee, WI. The interviews will be recorded, de-identified, transcribed, and analyzed. Findings from this research are significant because they will provide a better understanding of current conditions for immigrant and refugee women in Milwaukee County that can be used to inform policy advocacy on the local, state, and national levels in support of the health and well-being of these populations.

Timothy Trinklein
Development of a Flow Injection Method for Determination of Total Curcuminoids
Mentor: J. Aldstadt, Chemistry & Biochemistry
Poster Presentation, Easel 73

Curcuminoids are phenolic diarylheptanoids which constitute the active ingredient in turmeric, a cooking spice. Curcuminoids have been demonstrated to possess numerous health benefits and have been included in various pharmaceutical products as well as over-the-counter beverages and foods. A method based upon Flow Injection Analysis with fluorescence detection was developed for the determination of total curcuminoids in extracts of turmeric root. The automated flow injection system allows for future modifications and inclusion of other components, such as chromatographic columns. The use of molecular fluorescence detection allows for selective measurement in the low part per million range.

Timothy Trinklein
Effect of Light Pollution on Behavior of Gray Tree Frogs
Mentor: Gerlinde Höbel, Biological Sciences
Poster Presentation, Easel 74

The construction of roads, buildings, and stadiums has caused an unprecedented problem in a field of conservation - light pollution. Currently, the effects of light pollution on many animals are largely unknown. We set out to determine whether static (non-moving sources) light pollution was a concern with regards to frog behavior. The result were astounding—light pollution produced no effect on mate choice or behaviour.

Kaitlin Trokan, Madeline Boland & Victor Hoel
M³ Aligning English Curricula Based on Teacher Perceptions
Mentor: Vicki Bott, English
Mentor: Shevaun Watson, English
Poster Presentation, Easel 155

M³ is the educational initiative that partners Milwaukee Public Schools (MPS), Milwaukee Area Technical College (MATC), and UW-Milwaukee (UWM) with several goals to increase post-secondary education success rates. The section of M³ focused on in this study is aligning the English/Language Arts curricula. In order to conduct this research, several surveys (to varied audience and in multiple contexts) were devised and distributed to MPS middle and high school teachers, MATC English professors, and UWM first-year composition instructors. The results were then compiled and analyzed using Qualtrics. The large scale results of this research have not yet been determined because the study is ongoing. However, initial survey results reflect that MPS educators feel concerned that students are performing at too low of a level for college standards and that the current high school curriculum, standards, and placement are not conducive to getting students prepared for college. Additionally, the surveys reported that teachers desire to see more alignment in regards to instructional vocabulary, rubrics, and placement testing. These results provide a starting point for continued understanding of exactly what goes on in classrooms at each level in the hopes of taking the best of various methods, approaches, and techniques used to educate students in English classrooms and apply them throughout the three major institutions - Milwaukee Public Schools, Milwaukee Area Technical College, and UW-Milwaukee.

Rebecca Trout
Calling Activity of Gray Treefrogs: Circadian Patterns of Activity and the Role of Environmental Factors
Mentor: Gerlinde Höbel, Biological Sciences
Poster Presentation, Easel 49

Temporal patterns of breeding activity in frogs are highly variable, and species can be classified as either explosive (breeding <14 days), or prolonged breeders (breeding >1 month). Eastern Gray Treefrogs (Hyla versicolor) breed for 2-3 months, which should classify them as prolonged breeders. Using data from a long-term recorder stationed at our study pond, we tested the hypothesis that Gray treefrogs indeed show a chorusing pattern typical for prolonged breeders We predicted that (i) calling activity is concentrated in nightly choruses, that (ii) choruses form each evening, and that (iii) interruptions to chorusing would be brief and caused by cold fronts or storms. We scored the recordings (1 min every hour) for chorus intensity using the 1-3 point North American Amphibian Monitoring Program (NAAMP) index; non-chorus calling (1-3 individuals) was also scored (as <1). In addition, we gathered weather data from the UWM Field Station weather station. Some of the results deviated considerably from our predictions: (i)
Caige Tubic
Holocrinus the First Moving Crinoid or How CO₂ Forced a Sea Lily to Walk
Mentor: Margaret Fraser, Geosciences
Poster Presentation, Easel 114

The Permo-Triassic Extinction was the most devastating mass-extinction event to have ever impacted life on earth. Ninety six percent of marine species and 70% of terrestrial vertebrates species went extinct. The extinction was a result of a massive volcanic event the Earth has never seen since. The release of CO₂ into the atmosphere is hypothesized to have caused geologically rapid global warming causing marine invertebrates to be unable to develop their skeletons, due to the acidification of the ocean. Of the Phylum Echinodermata, only one genus from the class Crinoidea survived. The Subclass Articulata represents the first crinoid with the ability to mobilize and contain a distinct star structure. This new major shift in morphology and behavior can be seen within modern crinoids. Two crinoid species represent this shift during the Lower Triassic, Moenocrinus and Holocrinus. Based on their structure we suggest that the chaotic times of extinction created new evolutionary pressures. The pressures forced the species to develop radically new methods of survival. In order to correlate the mobility, and morphology change we examined fossils in lab and compared the findings with previous papers, examined the fossil fragments using digital microscopy, and we used hydrochloric acid to dissolve the surround matrix. Lastly, upon reviewing the literature we looked for patterns and trends in post extinction reefs and contrasted them with our findings. We hypothesize that the rapid rising levels of CO₂ and acidification of the oceans were the primary biological stressors on the crinoids forcing them to become mobile. We can use this massive shift in one species to extrapolate upon our own current rising CO₂ levels and how this could affect modern marine invertebrates and reefs.

Stefanie Valverde
Ecological Aesthetics: Artful Tactics for Humans, Nature, and Politics
Mentor: Nathaniel Stern, Art & Design
Oral Presentation, 12:20pm, Union 340

As Nathaniel Stern, author of "Ecological Aesthetics: Artful tactics for humans, nature, and politics" states, "... here people and peoples are continuously emergent with their conceptual and material environments, are part of intricate, complex and ongoing assemblages; in other words, are always more than the boundaries of what we know, or feel, or make. The best of this artwork 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." In the time of this semester, I have been helping to edit this book with the aim to help re-order its sections, as well as input/edit glossary terms throughout the sections, and finally, create its index. Up to now we have been exploring variations of orders that may best communicate content, as well as its aura, and that may most successfully encourage and support the personal journey of the audiences that will come in contact with the book. Hence, this book is one that introduces meanings, concepts, and ideas for the very first time; it plays with the reader's sense of exploration and tactically encourages one to self-expand, and consider the book as more than merely a physical object. I have found it to be rhythmic and beautiful, a prose in itself right from section one; it is personable and uses adequate references to reinforce and expand upon notions; it allows and encourages room for thought and wonder (as well as even wander, for its artist's accounts may intrigue the reader, enough to physically go about and explore); the book is an affectual artwork itself--it pulls reactions from realizations to statements that resonate with the idea of ecology under a different state of mind, even a re-thinking and re-learning of thought.

Gabriella Van Den Elzen
Matrix Training: Considerations for Recombinative Generalization and Efficiency of Acquisition
Mentor: Tiffany Kodak, Psychology
Poster Presentation, Easel 151

Matrix training is a teaching procedure in which some combinations of component skills are taught and novel combinations are probed for emergence of recombinative generalization (i.e., the acquisition of novel combinations of previously mastered components). Matrix training aims to maximize instructional efficiency by arranging targets in a way that recombinative generalization is more likely to occur and thus eliminate the need to teach all possible combinations. The current study used an adapted alternating treatments design with generalization probes to compare two matrix training procedures and a procedure that involved teaching components directly. We evaluated procedures on their efficacy (i.e., acquisition to mastery) and efficiency (i.e., instructional time to mastery). The Components and Combination condition, a novel approach to matrix training, involved teaching
individual component skills and the combination within the same trial and probing for novel combinations of the mastered components. The Combination Only condition, an approach in the extant literature, involved teaching the combination skills and probing for component skills and novel combinations. The third procedure, the Components Only condition, consistent with many early intervention practices, involved training each component separately and probing for the combination skill. One participant, Austin, was a 6-year-old male with ASD who learned noun-verb combinations in Spanish. For Austin, Components and Combination was the most efficacious and efficient teaching procedure. The second participant, Lexie, is a typically developing 4-year-old female who is learning to read consonant-vowel-consonant sight words, and her evaluation is still in progress. This study extends the matrix training literature by including a novel approach, the Components and Combination condition. Further, we compared the two matrix training approaches to a procedure that trained component skills in isolation. Results from this study will inform future researchers and practitioners on the most efficient and efficacious strategies to promote recombinative generalization.

James Van Erden
Combining Microscope Images: Generating a Broader Perspective on the Microscopic World
Mentor: Woo-Jin Chang, Mechanical Engineering
Poster Presentation, Easel 13

This project focuses on the development of novel microscopy methods with the goal of creating a complete perspective of the microscopic world. Our understanding of the structure and function of microscopic subjects is limited by the narrow field of view observed through a microscope. The visual data processing methods of image stitching combine overlapping photographs to produce 2D mosaic images of microscopic subjects. The optical processing methods of image stitching will generate images of microscopic subjects with a broader field of view than standard microscope images. This project has resulted in the improved understanding of visual data collection and processing techniques that reveal the structure and function of microscopic subjects.

Jennifer Venancio
The Healthy Families Study
Mentor: Joshua Mersky, Social Work
Mentor: Leah Coe, Social Work
Poster Presentation, Easel 90

In 2010, The Patient Protection and Affordable Care Act established the MIECHV (Maternal Infant and Early Childhood Home Visiting) program. Since it was established, MIECHV has distributed $2.5 billion nationwide to support evidence-based home visiting. It’s important to note, research on home visiting programs, even those that are evidence-based, have proven mixed results. Although most home visiting programs use long-term service models, it’s still unclear how long the services should be. The Healthy Families Study is a randomized trial of two home visiting programs at the Milwaukee Health Department. One program, Empowering Families of Milwaukee (EFM), is a long-term model that begins prenatally and lasts up to three years postpartum. The second program, Parents Nurturing and Caring for their Children (PNCC), begins prenatally as well, but provides less intensive services than EFM and is only available up to 60 days postpartum. The study compares clients who were randomly assigned to EFM or PNCC to each other and to a third group of participants that were referred to the Health Department for home visiting but did not receive services. Over the course of 12 months, participants in the three groups completed a series of assessments to record changes in maternal and child outcomes. This study focused on health-related outcomes of mothers in all three study groups up to six months postpartum. Results showed that, compared to women who received PNCC services and women who did not receive home visiting services, women served by EFM were more likely to have breastfed (OR=3.25, p=0.02). No major between-group differences were observed in maternal physical or mental health, however. The findings reinforce prior research indicating that home visiting programs often produce inconsistent results. Suggestions to increase the effectiveness of the programs will be discussed.

Bridgette Walters
The Quantitative Analysis of the Impact of Classroom Salon on Introductory Chemistry Student Performance
Mentor: Anja Blecking, Chemistry & Biochemistry
Poster Presentation, Easel 10

Classroom Salon (CLS) is a social online learning platform that has been developed by educators at Carnegie Mellon University. The platform allows students to interactively comment and discuss ideas, texts, videos, news articles and other reading material. Classroom Salon has been implemented into introductory chemistry classes at UW-Milwaukee in 2012 as delivery method for content reading assignments prior to covering the content in class. Students comment and ask questions about the text, which then allows instructors to directly incorporate these comments into instruction. As part of the assigned reading, students were also asked to answer questions that were embedded in the text and which were meant to promote critical thinking skills and deeper learning. Quantitative analysis has shown that students who utilize CLS perform on average higher on the final exam than students who enrolled in a different lecture section of the course and were assigned the same reading from the textbook chapters. As an extension of this research, this project describes a more detailed analysis of specific final exam items that correlate directly with each of the ten content areas of the reading assignments, gender comparison, ACT score comparison, and engagement with the online learning platform. Items were rated according their complexity by expert raters, compared to the questions in the reading assignments, and then student performance on these items was compared. The
University of Wisconsin-Milwaukee

Emily Watton, Stephanie Harleston & Matthew Harvey
The Diversity of Vibrio Bacteria in Sediment and Surface Waters of Boca Ciega Bay, Florida
Mentor: Charles Wimpee, Biological Science
Poster Presentation, Easel 42

Vibrio are among the most abundant culturable bacteria in coastal waters. The genus Vibrio has a large number of species, which include several bioluminescent forms. This laboratory has spent many years studying bioluminescent Vibrio in Boca Ciega Bay, Florida, and has amassed a large amount of data on species diversity and seasonal variations in the bioluminescent Vibrio community. There are definitive "summer species," dominated by Vibrio campbellii and Vibrio harveyi, and "winter species," dominated by Vibrio chagasi. Since seasonal seawater temperatures vary from as low as 15°C in the winter to as high as 35°C in the summer, it is likely that seasonal variations in the community are driven primarily by temperature. A question that has arisen over the course of this work is whether the sediment acts as an off-season reservoir for bioluminescent Vibrio. The work described here explores and expands that question, addressing the diversity of both bioluminescent and non-bioluminescent Vibrio in Boca Ciega Bay. Vibrio were isolated on Vibrio-select TCBS (thiosulfate-citrate-bile salts-sucrose) growth medium from sediment at various depths. In addition, Vibrio were isolated from surface water during the same time period. Species identification was done using gene sequencing. Bioluminescent Vibrio were identified using the luxA gene, and non-bioluminescent Vibrio were identified using the mexB gene. Genes were amplified using PCR, purified, fingerprinted using the restriction enzyme Alu1, sequenced, identified using the BLAST program, and then subjected to phylogenetic analysis. Among the conclusions: (1) A wide variety of Vibrio, including summer and winter bioluminescent species, can be found in sediment as deep as 9 cm. (2) Both sediment and surface water harbor a wide diversity of non-bioluminescent Vibrio, some of which have sufficiently low identity scores that they might represent previously undescribed species.

Jennifer Wendlick
Wnt5b Mediated Regulation of Cell Shape Changes During Tissue Folding at the Midbrain-Hindbrain Boundary
Mentor: Jennifer Gutzman, Biological Sciences
Poster Presentation, Easel 50

In the developing vertebrate brain a highly conserved structure forms in the neuroepithelial tissue known as the midbrain-hindbrain boundary (MHB). During MHB formation, cells at the point of deepest constriction shorten, narrow, basally constrict, and apically expand to form a sharp fold in the neural tube. Using the zebrafish model, we previously determined that two ubiquitously expressed isoforms of the cytoskeletal motor protein, non-muscle myosin II (NMII), differentially regulate cell shape with non-muscle myosin IIA regulating cell length and non-muscle myosin IIB regulating cell width. However, their upstream signaling pathways are unknown. wnt5b is a candidate mediator of MHB morphogenesis because of its known roles in early morphogenetic events and it is specifically expressed at the MHB during the onset of its formation. Using wnt5b knockdown, cell shape was analyzed using live confocal imaging of membrane GFP-injected embryos combined with a new morphometric technique that we developed using digital sectioning to reveal 3D cell shape. Results from these studies led to the discovery of a differential role for Wnt5b signaling in shaping MHB cell width and basal constriction. We further examined a potential connection between Wnt5b and NMII activity using immunohistochemistry and revealed that Wnt5b mediates Rho-associated kinase-1 (ROCK1), a known regulator of NMII activity, localization basally at the MHB during morphogenesis. Additionally, cell proliferation was not found to contribute to Wnt5b-dependent cell shape. Together, these findings suggest that Wnt5b mediates cell shape during embryonic brain morphogenesis and could possibly play a role in shaping other epithelial cells and tissues throughout development.

Rebecca Willer & Ala Abdeljaber
Minding the Achievement Gap: A Collaborative Effort to Build Interventions to Support Emergent Literacy Skills in Children Living in Poverty
Mentor: John Heilmann, Communication Sciences & Disorders
Poster Presentation, Easel 57

A disproportionate number of children living in poverty have difficulty reading, which has a direct impact on their overall educational and economic attainment. The goal of the present study is to build foundational reading skills in young children living in poverty so that they enter school better prepared for reading and academic success. This goal will be achieved through the continuation of a partnership between investigators from the University of Wisconsin-Milwaukee and the Betty Brinn Children's Museum. In this study, we will implement a parent-based emergent literacy intervention with 100 families living in poverty. The caregivers in these families will receive training on evidence-based practices to help their children acquire critical pre-reading skills (i.e., recognizing letters and the sounds they make). The caregivers will implement these strategies within the children's museum experience and will be given strategies for extending the learning at home. Several measures will be collected to document the impact of the intervention on caregiver-child interactions and on children's learning. Upon completing this project, we will collect data to demonstrate caregiver mastery of techniques used to facilitate early-developing emergent literacy skills, such as an increase in letter recognition and knowledge of sound-letter relationships.
Nick Williams & Justin Grah
In Vivo Testing of $\text{H}_2\text{O}_2$-Activated Arylboronate Anticancer Drugs
Mentor: Xiaohua Peng, Chemistry & Biochemistry
Poster Presentation, Easel 149

Toxicity of cancer treatments has been a major concern to cancer patients and physicians. Targeted therapies need to be created to prevent this toxicity to the patient. Arylboronate compounds with various electron donating substituents and different leaving groups have been synthesized in our lab. These compounds are activated by endogenously generated $\text{H}_2\text{O}_2$ by tumors to form quinone methides. These compounds are designed to target the tumor and reduce side effects of the chemotherapy. We tested the compound containing OMe as the electron donating group in vivo in nude mice. The mice were injected with the compound five times per week along with control mice being injected with the vehicle. The tumors were measured for size and the mice were weighed once a week. This compound was proven very effective in inhibiting tumor growth compared to the control sample. The tumor size and weight significantly decreased with no detrimental effect to the mice. The compound tested showed promise for further testing and analysis for possible human application in the future.

Jenna Willoughby
The Zuckerberg Files: A Discourse Analysis of Zuckerberg’s Public Language
Mentor: Professor Zimmer, Information Studies
Poster Presentation, Easel 134

Social networking sites like Facebook have a daily impact on nearly every person in society as they shape social interactions and identities. These SNS hold a lot of personal information, such as characteristics, interests, and relationships, so it is important to analyze their policies on information privacy. The Zuckerberg Files is an publicly available content from Mark Zuckerberg including articles, interviews, press events, earnings calls, letters to shareholders and Facebook posts. Transcripts were uploaded to the qualitative data analysis software called Nvivo and then coded for questions and quotations by Zuckerberg. The questions were then further coded for advertising, AI, financial, future of Facebook, Internet.org, privacy, virtual reality, and so on. Using Nvivo, we queried the data to see where particular content reoccurs and find exact matches of the content or find stemmed words, synonyms and generalizations. The software also allows us to find the most frequent words in the transcripts and for Zuckerberg the most frequent words are “people”, “think”, “Facebook”, and “know”. In this project we are concerned with privacy, so I can easily go to the “privacy” node and see every source of data that is talking about privacy. I can easily locate the quote from Zuckerberg, “I think the right thing is to make it so that certain information, by default, is always private” (Heussner, 2010). Although Mark Zuckerberg himself does enact online privacy policies, Facebook is undeniably a major influence in SNS and sets the precedence for future privacy policies.

Raven Wood
A Systematic Review of the Use of Health Information Technology to Improve Mental Health Care Delivery
Mentor: Celeste Campos-Castillo, Sociology
Poster Presentation, Easel 18

Previous systematic reviews has examined the effectiveness of health information technology (IT) to improve health care delivery, but few have looked at the effectiveness in regards to mental health care delivery. Health IT may facilitate mental health care delivery, but also be a barrier. There is a stigma associated with mental health, causing patients to view health IT as beneficial, yet also detrimental for their mental health care. Providers may also see both advantages and disadvantages in health IT. This project fills the gap in the literature by conducting a systematic review of the use of health IT in mental health care delivery. A guideline to improve systematic review and meta-analysis protocols, PRISMA, or Preferred Reporting Items for Systematic Reviews and Meta-analysis, was followed. Search terms for health IT and mental health were entered into the PsycINFO database to identify relevant articles. 280 articles appeared in the search and the research team, comprised of two undergraduate research assistants and a faculty member, decide on whether or not an article is relevant. From the 60 that have been reviewed so far, 22 fit the criteria. Of the 22 relevant articles, 13 focus on patient outcomes, 6 collect provider perspectives, 10 focus on depression, and 4 focus on other mental illnesses. Thus far, most studies focus on depression and patient outcomes, leaving gaps in knowledge about provider perspectives and other mental illnesses. The research team will continue to review articles in the PsycINFO database and other databases to fill this gap in knowledge.

Jasmine Woodley
Filling in the Gap: A South African Study on Young Caregivers and ALS
Mentor: Melinda Kavanaugh, Social Work
Poster Presentation, Easel 109

South Africa has a population of 55 million people. There are an unknown number of families across South Africa with Motor Neuron Disease (MND) also known as Amyotrophic Lateral Sclerosis (ALS). ALS is a progressive neurological disease where the nerve cells are destroyed and causes disability. Some symptoms include muscle weakness, overactive spasms, fatigue, impaired voice, difficulty swallowing, mild cognitive impairment, shortness of breath and severe unintentional weight loss. This ultimately causes the disease to become fatal. Currently there is no cure but there is medication available that can prolong the disease. While the incidence of ALS among the United States is 2 per 100,000, in South Africa these numbers remain unknown. Providing care, many young caregivers, ranging in age from 8-18, are involved in personal, physical, emotional and/or intimate care for family members with ALS. While working alongside UWM Assistant professor Melinda Kavanaugh, and two other students were given the opportunity to assess young
caregivers and their family member with ALS. During the two weeks in country, we took notes, kept a journal, and discussed our experiences daily with Dr. Kavanaugh. We completed 20 family interviews, in both Capetown and Johannesburg, South Africa. Purpose: The goal of this exploratory pilot project was to provide baseline data for long-term projects and research on a previously unknown population, ALS families in South Africa and their young caregivers, ages 8-18. Methods: One on one interviews were conducted with the adults and youth at MND clinics and family homes in both the Capetown and Johannesburg areas. Each interview lasted approximately 30-45 minutes. All interviews were tape recorded for future qualitative analysis. Results: Data revealed extreme time youth spent on caregiving. Youth spent an average of 24 hours a week providing care to family members, with 65 percent never receiving any caregiving training. Parents were aware of intensity of youth caregiving, but felt they had no choice, while youth felt a strong responsibility for care. Culture and stigma played a large role in knowledge of illness and need for care. Further details will be shared in the poster presentation as results are still being analyzed. Conclusion: Findings suggest that there are potential barriers around patient knowledge, as well as how patients communicate needs, illness and progression to their young caregivers and family members. Understanding these differences can allow potential support programs to be implemented, and provide the development of essential education and critical conversation building among families diagnosed with ALS and their young caregivers.

Brooke Woolever & Alyssa Eisner
The Impact of Informal Learning Environments on Early Oral Language Development
Mentor: John Heilmann, Communication Sciences & Disorders
Mentor: Christopher Lawson, Educational Psychology
Poster Presentation, Easel 44

When many think of language development, most would attribute the betterment of a child’s language to school environments—formal learning environments. With this study, a look at informal learning environments was chosen to examine the significance that a local museum may have on the development of oral language development via scavenger-hunt tasks. To perform this study, parent-child dyads were assigned to a storytelling scavenger-hunt in which they were asked to create an interesting story based on designated characters during a single visit (i.e. treatment group). The treatment group was given the three narrative components as a guide for their visit. The components are: problem, feelings, and a conclusion. Additionally, parent-child dyads were involved that were asked to go throughout the museum as they normally would with no guidance (i.e. control group). At the end of the control and treatment group visits we interviewed both parent and child to see what was learned about storytelling during their time at the museum. Analysis of the interview results concluded that the tasks only played a significant role on the use of the problem narrative component for those children in the treatment group. The most influential impact came from the parent results. For the control group, participants had significantly lower outcome in using the narrative components compared to the treatment group who showed increases across all three narrative components. Overall, this study demonstrated the usefulness that a museum can provide in facilitating and fostering children’s oral language skills via parent interactions, as well as increase a parent’s awareness of strategies that can support oral language development. The study also demonstrated the effectiveness of informal learning environments on language development.

Shaoshu Xu
Reliability-constrained Wastewater Treatment Plant Demand Response
Mentor: Lingfeng Wang, Electrical Engineering
Poster Presentation, Easel 99

This work analyzes the overall treatment processes in wastewater treatment plants (WWTPs). A holistic WWTP energy efficiency evaluation procedure is proposed considering a comprehensive set of system components including pumps and aeration blowers. Unlike drinking water treatment systems, most energy used in wastewater treatment systems is due to the treatment processes. The first critical task is to identify the main energy-consuming equipment. It was found that the largest load in wastewater treatment is contributed by aeration blowers which are used for creating air flow in the aeration treatment process – They often result in about 50% of the total load in a WWTP. Additionally, the pumping system also contributes about 15% to the load in wastewater treatment. The main purpose of this work is to minimize the total energy cost of WWTPs by deploying the demand response technology while ensuring the core mission of WWTPs is achieved. By comparing the WWTP influent profile and the wastewater treatment capacity, the performance of the WWTP could be simulated. Further, a storage model is proposed in this work for influent storage in the WWTP. By considering the available capacity of the storage system, the main electrical load could be rescheduled to partial-peak or off-peak hours. The proposed method is highly promising to improving the WWTP energy efficiency and reduce the electricity cost.
Refugee crises are issues that the world continues to face. Sometimes people are forced to leave because of natural disaster and most of the time, refugees flee war. My presentation is based on research I conducted with Professor Chia Youyee Vang’s Hmong across the World Oral History Project in 2015. After the Vietnam War, over 150,000 Hmong refugees from Laos were resettled in Western countries. Since the refugees came from agrarian backgrounds, the French placed almost 1000 men, women and children in its department in South American, French Guiana. From nothing but the clothes on their backs, the refugees have worked hard to build their new lives in the South American jungle. The Hmong Guianese population increased to approximately 3000 in 2015. They represent slightly more than one percent of the French Guiana population, but they provide an estimated 70-90 percent of fresh produce and fruits sold in the department. Many are happy with their new lives because of the economic opportunities, but they are isolated from the rest of French Guiana society because they live in their own Hmong villages.

Marlene Zahn
TCDD impact on Hematopoietic Stem Cells
Mentor: Michael Laiosa, Public Health
Poster Presentation, Easel 118
Recent studies provide evidence for the impact of environmental contaminants when exposed to humans/animals cause detrimental damage towards health. In this study we aim to test the impact of TCDD, and the AHR on mitochondrial health in Hematopoietic stem cells (HSCs). Our hypothesis is that AHRs impact on HSC self-renewal has an impact on mitochondrial homeostasis leading to a change in the polarization leading to differentiation within HSC mitochondrial membrane potential. In Vitro cultured bone marrow HSC cells were exposed to TCDD and JC-10 dye in order to identify the impact of TCDD on the mitochondrial health. Our results indicate an impact on the AHR receptor thus changing polarization of mitochondrial health. Our findings indicate, JC-10 optimization has been successful allowing us to now confirm that TCDD impacts JC-10 staining and thus mitochondrial membrane potential. In relation to the three different isolation procedures exposed to JC-10 dye, we can conclude isolation of in vitro culture Hematopoietic Progenitors presented confirmation of polarization within HSC mitochondrial membrane potential. More data is yet to be configured.

Kelli Zeleski
Water for Par or for Free: Does it Matter for Children’s Health?
Mentor: Itziar Lazkano, Economics
Poster Presentation, Easel 79
Waterborne and other diseases reduce the standards of living of a high share of children in developing countries. For example, the World Bank estimates that 3.8% of children in Malawi are considered wasting compared to 0.5% in the US. Using data collected in 2013 from four villages along Lake Malawi, we observe that children under the age of five suffer from waterborne diseases, even though they have access to paid, treated water. Using the data, we estimate the probability that socioeconomic factors impact the rate of sick children, such as how much water is paid for and how much is taken from the lake, how long it takes to collect water, or if people bathe in the lake. Results show that while using paid water decreases the chances of a child getting sick, it does not eliminate these chances. Frequent testing, or better treatment of water, both paid and free, could help improve children’s health along Lake Malawi.