



**11th ANNUAL  
UNDERGRADUATE RESEARCH SYMPOSIUM**

**APRIL 5, 2019**

## Contents

|  |    |
|--|----|
| Letter of Welcome.....                 | 3  |
| Information .....                      | 4  |
| Symposium Schedule .....               | 5  |
| Oral & Performing Arts Schedules ..... | 6  |
| Abstracts.....                         | 11 |



We are thrilled to announce that UWM was selected in the fall of 2018 as one of two national recipients of the prestigious Award for Undergraduate Research Accomplishments (AURA) by the Council on Undergraduate Research. The award recognized UWM “as a leader in undergraduate research at an urban, public research university.”



Dear Symposium Attendees:

Welcome to the 11th 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 300 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 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, at least a thousand UWM students work directly with faculty in research. About half of these students either volunteer or receive academic credit for their work; the other half 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 tradition 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. Around 150 UWM faculty, staff, and graduate students are serving today as judges.

Sincerely,

A handwritten signature in black ink, appearing to read "Nigel".

, Director  
Office of Undergraduate Research

## Information

### **Presenter & Judge Registration - Union 2nd Floor Hallway**

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

### **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 10:30am to 5:00pm.

### **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 (PowerPoint, 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](mailto:open-access@uwm.edu). We will contact your mentor(s) for their approval. The deadline for your submission is June 1, 2019. The deadline for your mentor(s) approval is July 1, 2019.

## **Symposium Schedule - Friday, April 5, 2019**

### **10:30-11:45am**

Registration & Presentation Set-Up, Union Wisconsin Room

Oral Presentation Set-Up (Load/Test PowerPoints in Union Breakout Rooms)

### **11:45am**

Welcome, Nigel Rothfels, Director of the Office of Undergraduate Research,  
Union Wisconsin Room

### **12:00-1:40pm**

Oral Presentations, Union Breakout Rooms (see schedule on page 6)

### **1:30-3:30pm**

Poster and Visual Arts Presentations, Union Wisconsin Room

### **3:30pm**

Closing Remarks by Chancellor Mark Mone and UW System President, Ray Cross.

Announcement of Senior Excellence in Research Awardees and Undergraduate Research

Mentor of the Year; Acknowledgement of Outstanding Presentations, Union

Wisconsin Room

### **4:00-5:00pm**

Campus-wide R1 Celebration honoring UWM's continued status as one of America's Top  
Research Universities, Union Second Floor Lounge

## Schedule of Oral & Performing Arts Presentations by Time

| Time    | Room         | Presenters                    | Presentation Title  | Research Mentor  |
|---------|--------------|-------------------------------|---|--|
| 12:00pm | Union 240    | Austen Norberg                | Analysis of Penetration of Colloidal Carbon (India Black Ink) in Blood Clots by Light Microscopy                                | Julie Oliver, Biological Sciences                                      |
| 12:00pm | Union 250    | Cody Casper                   | Using Image Processing in MATLAB to Analyze Cavitation of a Micro Hydro-Turbine   | Ryoichi Amano, Mechanical Engineering                                  |
| 12:00pm | Union 260    | Teonna Cooksey                | The Work of a Community: Oral History Reports from the Sherman Park Neighborhood  | Arijit Sen, Architecture   |
| 12:00pm | Union 280    | Bailey Flannery               | Magical Animal Transformations: Medieval Commentary on Toxic Masculinity  | Jacqueline Stuhmiller, English   |
| 12:00pm | Union 340    | Margarita Garcia Rojas        | "So American it Hurts": Stories of the 1.5 Generation   | Rachel Buff, History   |
| 12:00pm | Union 344    | Brianna Suggs                 | Caregiving Policy & Program: Lack of Attention Paid to Young Caregivers   | Melinda Kavanaugh, Social Work   |
| 12:00pm | Union Cinema | Nia Keranova                  | Music and Memory: The Capacity of Music to Trigger Memory and Elicit an Emotional Response                                      | John Stropes, Music  |
| 12:20pm | Union 240    | Kelsey O'Hara                 | Mate Preference Function Variation Throughout the Life of Female <i>Enchenopa binotata</i> Treehoppers (Hemiptera: Membracidae) | Rafael Rodriguez, Biological Sciences                                  |
| 12:20pm | Union 250    | Andrew Thompson               | Detection of <i>Cryptosporidium</i> using Digital Inline Holographic Microscopy   | Marcia Silva, Freshwater Sciences & Thomas Hansen, Freshwater Sciences |
| 12:20pm | Union 260    | Bella Biwer                   | Countermapping Sherman Park   | Arijit Sen, Architecture   |
| 12:20pm | Union 280    | Elpiniki Tianis               | The Impact of Community   | Peter Blewett, English   |
| 12:20pm | Union 340    | Max McHone                    | Spirit of Resistance: The Hukbalahap Rebellion and Anti-Imperialism in the Philippines  | Rachel Buff, History   |
| 12:20pm | Union 344    | Rebecca Willer                | Do People with Dementia Have a Voice in Decisions Regarding Their Care? Current Clinical Assessments of Quality of Life         | Sabine Heuer, Communication Sciences & Disorders                       |
| 12:20pm | Union Cinema | Isaac Repinski & Nia Keranova | Comprehensive Analysis of the Performances of Finger-Style Guitarists at the 1969 and 1970 Ann Arbor Blues Festivals            | John Stropes, Music  |

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|---------|--------------|--|--|--|
| 12:40pm | Union 240    | Jennifer Wendlick  | The Role of Laminin in Shaping the Cells that form the Midbrain-Hindbrain Boundary   | Jennifer Gutzman, Biological Sciences                    |
| 12:40pm | Union 250    | Alexandria Miller  | Coaxing Truth from Noise: A Pipeline for Implementing Spatially Aware Filtering Algorithms on Velocity Fields                          | Roshan D'Souza, Mechanical Engineering                   |
| 12:40pm | Union 260    | Megan Vélez,<br>Caitly Grubich<br>& Maddie Prokop        | Embodying Milwaukee Communities: Explorations at Sherman Park  | Simone Ferro, Dance                                      |
| 12:40pm | Union 280    | Hugo Ljungbäck   | Making the Invisible Visible: Handcrafting in Experimental Cinema  | Tami Williams, English                                   |
| 12:40pm | Union 340    | Easton Orlopp & Fernanda Gonzalez                        | Nature Education Organizations' Use of Twitter for Public Engagement   | Taisik Hwang,<br>Journalism, Advertising & Media Studies |
| 12:40pm | Union 344    | Jayson Schalk  | Intrahippocampal Infusion of G-protein Coupled Estrogen Receptor Agonist Increases CA1 Spine Density and Enhances Memory Consolidation | Karyn Frick, Psychology                                  |
| 12:40pm | Union Cinema | Morganna Milgrim,<br>Emily Schneider & Kiana Van Dornick | Body Talk: Together We Bear It   | Robin Mello, Theatre                                     |
| 01:00pm | Union 240    | Christine Wiese  | Evidence of Insect Syntax: Bout Level Processing in the Communication System of <i>Enchenopa binotata</i>                              | Rafael Rodriguez, Biological Sciences                    |
| 01:00pm | Union 250    | Justin de Wees   | Cavitation Threshold Determination for Heavy-Ion Particle Therapy  | Sarah Patch, Physics                                     |
| 01:00pm | Union 260    | Kristen Leer   | Milwaukee's Opioid Epidemic on Youth Populations   | Tina Freiburger, Criminal Justice                        |
| 01:00pm | Union 280    | Bailey Flannery  | The Monstrous Mouths of Women in the #MeToo Era  | Jacqueline Stuhmiller, English                           |
| 01:00pm | Union 340    | Mackenzie Tubridy  | Beyond Nationalism: the Estonian Popular Front's Visions for a New Estonia   | Christine Evans, History                                 |
| 01:00pm | Union 344    | Anne Lochner   | The Power of Personhood: An Investigation into the Quality and Effectiveness of Eldercare  | Ellyn Lem, English, College of General Studies           |
| 01:00pm | Union Cinema | Annie Peterson,<br>Katelyn Altmann & Amanda Laabs        | Between Form and Formlessness: Reimagining Architecture of Body in Space   | Maria Gillespie, Dance                                   |

## Schedule of Oral & Performing Arts Presentations by Time

| <b>Time</b> | <b>Room</b>  | <b>Presenters</b>                                  | <b>Presentation Title</b>  | <b>Research Mentor</b>                                      |
|-------------|--------------|--|--|---|
| 01:20pm     | Union 240    | Ryan Majinski & Tory Clearwater                    | A Detailed Study of Acid-Catalyzed Reactions of Carbonyl Compounds with Ethyl Diazoacetate | M Mahmud Hossain, Chemistry & Biochemistry                  |
| 01:20pm     | Union 250    | Azia Barner  | Gamma and Beta Radiation Effects on pGlo DNA Plasmids                                      | Carol Hirschmugl, Physics                                   |
| 01:20pm     | Union 280    | Magen Babcock, Dominique Wilkerson, & Pilar Olvera | Student Transition Experience: MPS Graduates at MATC                                       | Vicki Bott, English   |
| 01:20pm     | Union 340    | Megan Roshak                                       | Relationships in High Definition: An Analysis of Media Influence on Connection             | Barry Liss, Arts and Humanities, College of General Studies |
| 01:20pm     | Union Cinema | Simone Safian & Caleb Peavy                        | LGBT+ History Project Film   | Jenny Plevin, Film  |



## **Presentation Abstracts**

**Maysam Abdeljaber**

Hmong, Laotian, &amp; Karen History Harvest -

The Meaning of Home

Mentor: Arijit Sen, Architecture

Poster Presentation, Easel 30

The Hmong, Laotian, Karen history harvest is a part of a bigger project called “Picturing Milwaukee”. Picturing Milwaukee is a project that collects stories and relaying tales of places and neighborhoods in Milwaukee. The objective of this project is to conjure up –or picture– various neighborhoods of Milwaukee like designs in a wonderfully complex quilt. The purpose of this project is to examine how the local and the urban relate to each other – how a street fits into a larger urban narrative. The history harvest research began in Fall 2018, where research assistants interviewed Southeast Asians (Hmong, Laotian, and Karen refugees) who now live in the Milwaukee neighborhoods. The Southeast Asians were gathered and interviewed in the St. Michael’s Church in Milwaukee. Results of this interview portrayed the evolution of their definition of home as their values and beliefs were preserved and applied to their new home in the US. The interview was conducted orally (podcast) and valued belongings (e.g. traditional clothing, gardening tools) were photographed. The participants reported a higher quality of life here due to better job opportunities and education. They feel more secure in a free country like the US than they did in Southeast Asia, where they were living in fear of being imprisoned or killed by their oppressors. Despite the fact, Milwaukee has had a positive impact on their lives as they now call it home, they still miss and long for more memories in their first home in Southeast Asia. In addition, their transition to the US was difficult due to language and cultural barriers. Understanding this relationship between the whole and its parts is important because it signifies how individuals construct a sense of place and how places produce the larger world.

**Adedamola Adeniyi & Gracia Kalongo**

The Use of Sensors, Systems and Devices to Diagnose and Treat Autism Spectrum Disorder

Mentor: Zhi Zheng, Electrical Engineering

Poster Presentation, Easel 64

The objective of my research is to explore the use of sensors, LEDs, and electronics to create a sensory apparatus to be used in the diagnosis and intervention for children with Autism Spectrum Disorder (ASD). It is speculated by data that children with ASD react to certain stimuli such as flashing lights, moving objects and color patterns differently than their typically developing peers. The sensory apparatus developed during my research consists of two parts that aim to explore this theory further. The first part of the apparatus involves the use of the Arduino electronics platform with a series of LEDs to create an element that allows for the control of flashing and lighting patterns of the LEDs by physical switches as well as through the Unity Game Engine virtual environment. The second part of the apparatus

utilizes an accelerometer connected wirelessly to a PC. The Unity virtual environment will take information sent from the accelerometer and use it to rotate and manipulate objects and shapes in the created virtual environment. This apparatus will allow for the creation of a virtual and real environment in which researchers can control for the appearance of stimuli and observe if any given stimuli causes aversion, attraction, or is ignored by children with ASD. With this information, it may also be possible to create classroom and learning regiments tailored to fit the needs of individual children with ASD by reducing the appearance of certain elements that cause distraction or discomfort.

**Kathryn Alexander**

Improving the Cultivation of Oligotroph

Microorganisms from Lake Michigan

Mentor: Ryan Newton, Freshwater Sciences

Poster Presentation, Easel 1

A diverse collection of microorganisms inhabit freshwater ecosystems. These microbial communities are the primary nutrient recyclers and a major source of system productivity, which together influence water quality and ecosystem processes. However, many of the most abundant microorganisms have not been brought into culture, which limits our understanding of these microbes. This is especially true of oligotrophic (low nutrient) systems, like Lake Michigan. We hypothesize that developing a defined medium that more closely mimics the conditions of oligotrophic lakes will improve our ability to culture their inhabitants. To approach this issue, we altered the nutrient and ion concentrations of an existing defined medium, JW5, designed to culture oligotroph microbes from the ocean, to mimic Lake Michigan. We then collected and plated samples from the Milwaukee River and Lake Michigan on five occasions. On average, we recovered 407 colony forming units (CFUs) plated onto MI5 media. This result was lower, but not significantly different, from the number of CFUs obtained from the same samples plated onto 1/10 strength R2A, a commonly used but undefined medium, which was found recover 481 CFUs on average. Additionally, we scraped each plate from both media types to collect all colonies, resuspended the cells, extracted DNA, and then sequenced the V4 region of the 16S rRNA gene from the mixed colony suspensions. The sequence data suggested that at least 140 different genera formed colonies on the MI5 medium. We found the two media cultured a similar subset of bacteria; however, media type was correlated significantly to the cultured community present on each plate. Overall, our defined MI5 medium resulted in a similar CFU quantity and bacterial representation from Lake Michigan as a common undefined medium. In the future, we will work to understand how our media formulations impact the culturing of microbes relevant to oligotrophic lakes.

**Lauren Andrews**

A Fluorescence Method to Study BSA  
Protein Hydrogels  
Mentor: Ionel Popa, Physics  
Poster Presentation, Easel 2

Here we want to develop a new method of measuring the mechanical response of biomaterials in parallel with a fluorescent probe, which reports on the amount of secondary structure inside the protein hydrogel. Low volume Bovine Serum Albumin (BSA) is turned into hydrogels of cylindrical shapes using Teflon tubes as a template. A hydrogel is tethered between two hooks connected to a voice coil motor and a force sensor. An analog Proportional Integral Differential (PID) system compares the force measured by the force sensor with the set point from the computer and adjusts the gel extension by moving the voice coil to minimize the difference between the two inputs. This clamping of the force allows for new types of experiments for measuring the biomechanics of proteins. By using an inverted microscope and an EMCCD camera, we can measure the fluorescence signal coming from the fluid chamber to quantify the domains unfolding. With the use of 1-anilino-8-naphthalene sulphonate (ANS), a fluorescent marker, we can decouple the extension from unfolding protein domains and the matrix shifting. ANS binds to the hydrophobic parts of the molecule and emits a fluorescence signal when it is excited at 350-nanometers. As the protein is stretched on the Force Clamp Rheometer, the molecule loses its fluorescence due to losing the hydrophobic zones which decreases the amount of bound ANS. This method will allow us to use a bulk approach to measure the mechanical properties of single molecules which we are doing now using magnetic tweezers. This way we will also be able to answer the question of how proteins behave in crowded environments and how they unfold inside of hydrogel.

**Ciara Ayala**

Predictors of Post-Traumatic Stress Disorder  
Development: Exposure to Community Violence &  
History of Childhood Trauma  
Mentor: Christine Larson, Psychology  
Poster Presentation, Easel 34

The research conducted was part of a larger study known as iSTAR (Imaging Study for Trauma and Resilience) which focused on the identification of neurobiological and psychological markers for risk of the development of post-traumatic stress disorder (PTSD). The demographics of the participants consisted of a civilian populous, within Southeastern Wisconsin whom have suffered a recent traumatic event. Participants were recruited from the Emergency Department at Froedtert Hospital and underwent multiple tasks assessing their risk for developing PTSD. When enrolled into the study, participants completed self-report questionnaires which were administered two weeks following a traumatic event as well as 6 months post injury. In addition to the questionnaires, a Clinician-Administered PTSD Scale

(CAPS) was completed at 6 months and was used to determine whether or not the participant has developed PTSD from their trauma. Given the data collected, researchers have found a positive correlation within the measures as well as their ability to predict the development of PTSD. The researchers were also able to demonstrate that the participants that have had a significant amount of childhood trauma and have recently lived in a community where they were exposed to violence are proven to be at more risk of developing PTSD. These findings will be beneficial for future diagnosis and prevention of PTSD, as well as assist in its early detection and treatment.

**Magan Babcock, Dominique Wilkerson & Pilar Olvera**

Student Transition Experience: MPS Graduates at MATC  
Mentor: Vicki Bott, English  
Oral Presentation, 1:20pm | Union 280

Alongside Bott, Magen Babcock, Dominique Wilkerson, and Pilar Olvera will present for those interested in M<sup>3</sup> and our project that seek to transform the future of Milwaukee through education. The team will discuss the findings from various focus groups of students who graduated from Milwaukee Public Schools (MPS) and are now currently enrolled at Milwaukee Area Technical College (MATC). Babcock, Wilkerson, and Olvera will suggest how both institutions can improve their support for these students in their transition to college. Moreover, researchers will discuss the results found on the challenges students faced, their academic advising experience, and their sense of preparedness in various core subjects.

**Azia Barner**

Gamma & Beta Radiation Effects on  
pGlo DNA Plasmids  
Mentor: Carol Hirschmugl, Physics  
Oral Presentation, 1:20pm | Union 240

UW-Milwaukee's RockSat-C experiment exposing plasmid to radiation during outer space flight in 2017 showed in preliminary results, that transformation rates of *E. coli* by pGLO DNA plasmids increased with increasing exposure to gamma and beta radiation. If the structure of DNA plasmid is altered by radiation, then bacterial transformation rates by DNA plasmids could also be affected. Effects of gamma and beta radiation on bacterial transformation rates may be seen through changes in plasmid structure and conformation. Following the 2017 results, the team hypothesized that the radiation exposure changed the structure of the DNA pGLO plasmid, allowing it to transfer to the *E. coli* more easily. In this literature review we will review DNA plasmids' topology and plasmid conformation, and for experimental analysis we will use Fourier Transform infrared (FTIR) spectroscopy "fingerprints" to potentially explain changes transformation rates, and the maximum amount of radiation a DNA plasmid can withstand. By using FTIR spectroscopy we will compare the fingerprints of the plasmid conformations of B-DNA: supercoiled, closed circular, and linear to the fingerprints of the pGLO DNA DNA plasmids. The experiment group will

consist of the unshielded group - B-DNA DNA plasmids exposed to gamma and beta radiation during RockSat-C sounding rocket launch, the shielded group - B-DNA DNA plasmids exposed to gamma radiation only, and the control group - B-DNA DNA plasmids not exposed to either gamma or beta radiation. Through the comparison of fingerprints, the effects of gamma and beta radiation can clearly be seen to affect the chemical compounds of the pGLO DNA plasmids.

#### **Marcail Bayer**

An Assessment of the Advocacy Network Mitigating Human Trafficking in Milwaukee

Mentor: Dylan Bennett, Social Sciences, College of General Studies

Poster Presentation, Easel 203

The problem of human trafficking has gotten considerably more attention these last couple years with the growing amount of concern and media coverage. As the problem is underground, the solutions for the problem are hard to measure and keep track of though. This study examines the advocacy network trying to mitigate human trafficking in Milwaukee. I took this comprehensive assessment by looking at the problem through three different lenses: prevention, intervention, and aftercare; in each category examining direct and indirect ways Milwaukee is fighting the problem. The research draws upon previous research done, published reports, interviews, and publicly available data like budget reports and organizations websites. I will present on the individual strategies and methods used by different organizations, law enforcement, faith-based communities, activists, government officials and medical personnel. This will be the start of learning how to make the advocacy network stronger by providing a place where they can find possible partnerships and help all in one compiled platform.

#### **Evan Bennett**

Effects of Technologically Relevant Ni-enriched NMC Nanomaterials on *D. magna*

Mentor: Rebecca Klaper, Freshwater Sciences

Poster Presentation, Easel 5

Nanotechnology has emerged as a novel technique to solve problems in material science, with new nanomaterials being produced for numerous purposes, having numerous applications across many consumer products. Nickel-magnesium-cobalt oxide (NMC), nanoparticles are being developed as alternatives to lithium cobalt oxide for next generation batteries. As batteries are typically disposed of in landfills rather than recycled, and therefore may inadvertently be introduced into the environment, there is a potential for environmental impact. Therefore, it is essential to screen for these effects early in the development of these particles, which is the goal of The Center for Sustainable Nanotechnology. We studied the effects of NMC nanoparticles that differ in their nickel content on the model organism *Daphnia magna*, a model organism for environmental toxicity due to their importance in

the food web as primary consumers, quick lifecycles, and their ability to remain viable in lab cultures with relative ease. Another benefit for using *Daphnia* is that they reproduce asexually via parthenogenesis, essentially making clones of themselves, ensuring that DNA lineages are kept constant throughout the culture. This study exposed *Daphnia magna* to various compositions of NMC materials of various sizes at concentrations of 1-25 mg/L for acute (48 hours) as well as a chronic exposure (21 days) measuring reproductive impacts. Nanoparticles can affect the organisms in several ways, such as altering DNA, interacting with the cell membrane, or interfering with normal cell processes, depending on the properties and shape of the molecule. Earlier studies have examined the biological impacts of other NMC materials, as well as lithium cobalt oxide materials, but not comparing different NMC materials. Consequently, adverse effects on survival were measured endpoint as well as gene expression to determine the effects on metabolism and detoxification.

#### **Kari Berna**

Development of Investment Casting Mold Material for Tissue Engineering Using Metal Foams

Mentor: Benjamin F. Schultz, Materials Science & Engineering

Poster Presentation, Easel 6

Bone damage by illness, stress, or disease, has the ability to heal itself as long as the fracture is small. However, when bone injuries reach a size where this is no longer possible than the body will need outside means to heal the injury. A porous metal composite can be used to bridge the defect providing load bearing support and the means for new cells to grow while the scaffold deteriorates, leaving a newly formed bone. The development of metal porous scaffolds, specifically magnesium, has proven to be difficult to replicate on a consistent level. Through the use of 3D printing and the creation of a ceramic mold material, this project has set to develop an investment casting process for producing the same designed scaffold with consistency. The ceramic mold material has been developed to have a high load bearing strength, surviving high temperatures and pressures, while having little reactivity with the metals tested. Initial results were able to reproduce unit cells of basic shapes in magnesium and zinc that showed little difference in structures from the original 3D printed part. With an experimental setup that was used in this experiment, this process can be built upon to produce full size bone scaffolds that can be used for bone tissue regeneration.

**Erick Bernal**

Effects of Gender & Binge Drinking on Hippocampal Structure of Young Adults  
Mentor: Krista Lisdahl, Psychology  
Poster Presentation, Easel 7

Alcohol is one of the most used drugs amongst young adults. The Substance Abuse and Mental Health Services Administration (SAMHSA) found in a 2017 national survey that 36.9% of young adults between the ages of 18 and 25 engaged on binge drinking in the past month. This is a concern because studies have showed that the developing brain, but especially the hippocampus, is vulnerable to the damaging effects of alcohol. The aim of this study was to examine the relationship between binge drinking, gender, and hippocampal volume in young adults. There were 39 participants (59% female, 71.8% white) aged 18-25 selected from a parent study. After 1 week of abstinence from alcohol and other substances, participants underwent a brain MRI scan, battery of neuropsychological tests, questionnaires, drug use interview, and toxicology/pregnancy testing. A series of multiple regressions was conducted to examine whether binge alcohol use (as defined by past year binge episodes, past year binge drinks, and past 3-month maximum drinks) and the interaction of gender with binge alcohol use predicted hippocampal volume. Covariates included age, total brain volume, and past year cannabis and cigarette use. The interaction of past year binge episodes and gender significantly predicted right hippocampal (R-HC) volume ( $p=.015$ ) and marginally predicted left hippocampal (L-HC) volume ( $p=.080$ ). With greater past year binge episodes, females exhibited larger L-HC (marginally) and R-HC volumes while displayed smaller L-HC (marginally) and R-HC volumes. Past year binge drinks and gender significantly predicted R-HC volume ( $p=.017$ ). With greater past year binge drinks, females exhibited larger R-HC volumes while males exhibited smaller R-HC volumes. Past 3-month maximum drinks, as well as its interaction with gender, did not predict hippocampal volumes. Inconsistent with previous research, males exhibited smaller hippocampal volumes with greater past year binge drinking behavior, while females demonstrated the opposite effect. These findings should be replicated in a larger, longitudinal sample.

**Bella Biwer**

Countermapping Sherman Park  
Mentor: Arijit Sen, Architecture  
Oral Presentation, 12:20pm | Union 260

In general, mapping is the act of identifying important and influential places, but who is deciding what places are worth mapping? “What actors, resources, or social relations enabled a particular map to be produced? What relations does a particular map enable the reader to see? Or, otherwise stated, what relations of power and partiality does the map itself produce?” In reality, mapping is a tool used to spread the mainstream narrative and either, “reinforce or contribute to power imbalances.” Therefore, it is also a means of further disinvesting in places that

are not considered important or worth protecting. In return, countermapping is the act of creating a map that ‘counters’ normal cartographic conventions and power relations. In terms of environmental justice, social justice, and conservation, this act is a form of resistance in itself. Countermapping can be used to, “codify, to legitimate, and to promote the world views which are prevalent in different periods and places,” and cultures. Therefore, counter mapping is a means to quantify those perspectives that differ from the mainstream narrative, and, as a result, offers, “alternative ways of visualizing and inhabiting the world.” The method we used to create a countermap of Sherman Park, Milwaukee were a series of resident-led Jane Jacob’s walks through the neighborhood, during which community members shared their knowledge of places in the neighborhood, pointed out significant places, and talked about what they would like to change. The result is an interactive countermap of Sherman Park that includes vibrant homes, businesses, cultural spaces, and parks. Through this, we have learned about the neighborhood from community members’ points of view, and seen their world through their eyes. The ultimate hope is that acknowledging valuable places in neglected neighborhoods will improve overall investment.

**Leo Bohlmann**

Characterizing Chemical Signaling Between Honey Locust & Rhizobia Using HPLC/MS  
Mentor: Gyaneshwar Prasad, Biological Sciences  
Poster Presentation, Easel 9

Many legumes form a symbiotic relationship with rhizobia that leads to formation of specialized structures called nodules in which the bacteria fix atmospheric nitrogen in exchange of carbon from the host-plant. Chemical signaling plays a crucial role in the symbiotic interaction. The host-plant secreted flavonoids/isoflavonoids are recognized by the symbiotic Rhizobia leading to the rhizobial production of Nod factors that are in turn recognized by the host plant. Although nodule formation is common throughout the legumes, there are many legumes, especially in the Caesalpinioideae subfamily, which do not form root nodules. However, the reasons for the non-nodulation are not known. To investigate if non-nodulating legumes can initiate symbiotic interactions with rhizobia, we assayed root and seed exudates of honey locust (*Gleditsia triacanthos* L.) using coupled high-performance liquid chromatography and mass spectroscopy (HPLC-MS). Analysis of the exudates showed that honey locust roots secrete apigenin, diadzein, luteolin, and naringenin, all of which are known to be involved in symbiosis in various legumes. These results suggest that Honey Locust is capable of an initial symbiotic communication with Rhizobia. This research has important applications due to the importance of the Rhizobia symbiosis in modern agriculture, as well as to further characterize the symbiotic relationship in a legume species that does not nodulate.

**Leo Bohlmann**

Optimizing the Induction of the Reproductive Stage of Gametophyte Germplasm in *Macrocystis pyrifera*

Mentor: Filipe Alberto, Biological Sciences

Poster Presentation, Easel 8

The Department of Energy ARPA-E MARINER (Macroalgae Research Inspiring Novel Energy Resources) project is a broad scale program with the goal of optimizing marine biomass sources for use in biofuel and chemical industries. Giant kelp (*Macrocystis pyrifera*) is the main algae of interest in this research. We have produced and are maintaining a breeding line (i.e. germplasm collection) of roughly 550 individuals sourced from different Southern California Bight populations for this research. Individuals are maintained in the gametophyte stage, which is an independent sexual phase consisting of either male or female haploid tissue. The process of this breeding program involves: growth and maintenance of gametophytes in a germplasm collection, genotyping and crossing of all individuals, and finally the induction of the sexually reproductive phase. The reproductive phase results in the production of sporophyte tissue, which is the final blade of kelp. The induction of the reproductive phase is imperative to producing sporophyte tissue. We need to optimize this process, and if possible make it synchronous. This experiment is attempting to use a salinity shock to induce sexual reproduction faster. Gametophyte tissues will be crossed from four different genetic groups, and using the same populations over three salinity treatments, the number of cells in each stage of reproduction will be counted daily for about two weeks. Response to the different salinity treatments will be assessed to find the optimal level of salinity shock. With these results we can then use the optimal technique for the entire breeding program to maximize efficiency in preparing viable sporophytes for shipment to California kelp farms.

**Brandon Bojar**

Comparative Analysis of Antibiotic Resistance Among *Escherichia coli* Isolates Within Hospital Wastewater & Throughout the Urban Wastewater Process

Mentor: Troy Skwor, Biomedical Sciences

Poster Presentation, Easel 10

Annually, the United States combats two million antibiotic resistant cases claiming thousands of lives and a substantial impact economically. Of these, the CDC has identified carbapenems and extended spectrum cephalosporin resistance in *Enterobacteriaceae*s serious public health threats. The aims of our study are: 1) To determine the differential loads of carbapenem-resistant and ESBL-producing *Escherichia coli* between hospital and urban wastewater; 2) To determine the effect of wastewater treatment on the prevalence of antibiotic resistant *E. coli* isolates. Hospital wastewater, as well as influent, pre-chlorinated and post-chlorinated effluents from an urban wastewater treatment facility were filtered and placed on modified mTEC with or without cefotaxime (2 µg/ml) to obtain *E. coli* isolates. Wastewater

samples were obtained during Fall 2018. Antimicrobial susceptibility of isolates was determined using the Kirby-Bauer disk diffusion assay for ceftriaxone, ceftazidime, ceftazidime/clavulanic acid, cefotaxime, carbapenems, and 7 others. Overall, urban wastewater influents contained over one log higher *E. coli* CFUs than hospital wastewater. After analyzing 126 isolates from all water sources, the average multiple antibiotic resistance (MAR) index was over seven times greater in hospital isolates compared to urban influents. Multi-drug resistance (2 or more antibiotic groups) was highest among hospital isolates > post-chlorinated > influent = pre-chlorinated. All isolates were susceptible to carbapenems, but 8.7% were ESBLs producers. Although *E. coli* CFUs were reduced 5 logs post-wastewater treatment, MAR index of post-chlorination isolates was double compared to influents. The samples isolated and grown on mTEC with cefotaxime, the highest MAR samples were found in the hospital wastewater averaging resistance to 7 of 12 antibiotics tested. Our data highlight the high prevalence of MDR *E. coli* isolates in hospital wastewater and suggests resilience of these isolates to chlorination.

**Jared Bonack**

Thoracohumeral Joint Kinematics During Weighted Reaching Tasks Preoperative Versus Postoperative Supraspinatus Repair

Mentor: Brook Slavens, Occupational Science & Technology  
Poster Presentation, Easel 11

Rotator cuff (RC) tears are one of the most common injuries to the shoulder joint as around a quarter of the United States population will experience an RC tear, with a majority of these being tears in the supraspinatus tendon. These tears can make activities of daily living difficult, as the pain and injury impede the individual's range of motion (ROM). Approximately 300,000 Americans need surgery to repair an RC tear each year. The goal of surgery is that ROM of the injured arm is increased after operation. Therefore, it is important that the amount of time necessary for successful recovery is understood, which this study aims to evaluate. Six subjects were tested within three months before operation, three months postoperatively, and six months postoperatively. Subjects performed the following tasks: lifting a weight from the waist height up 30.3 cm onto a platform, and lowering a weight from a platform at eye level down 30.3 cm. Each task was completed five times in both the sagittal plane and coronal plane, and used a maximum weight of two pounds. A 15 camera Vicon T-Series Motion Capture System was used to capture reflective markers placed on specific locations of the upper limbs and torso. A custom biomechanical model was applied to the motion data to calculate the 3D thoracohumeral joint (humerus relative to torso) angles. The ROM in coronal and sagittal planes will be calculated and averaged over three trials. Individual and group averages will then be compared across the visits. It is expected that the subjects' average ROM will increase following surgery as the supraspinatus heals. The data from this study could be used by therapists and clinicians to develop new strategies to improve the recovery process, or as evidence for insurance companies to provide for more postoperative therapy.

**Lauren Bonofiglio**

Who Are Milwaukee Microbes?

Mentor: Ryan Newton, Freshwater Sciences

Poster Presentation, Easel 12

The Milwaukee estuary contains a diverse collection of microorganisms, some of which naturally occur in freshwater and others that originate from human activities. In the Milwaukee estuary, both untreated sanitary sewer water (influent) and treated wastewater (effluent) from the municipal wastewater treatment plant discharge large numbers of microorganisms to the ecosystem. The fate of these microorganisms once they mix in the aquatic estuary environment is relatively unknown. Are these wastewater microorganisms viable or do they rapidly decay in this new environment? Similarly, how are estuary microbial communities impacted by urban discharge? To address this question, we collected water samples from influent, effluent, and Lake Michigan. We then created a source-water medium and cross-inoculated each sample onto all source-media. After incubating the culture plates for 12 days at 18 °C, we counted the number of colony forming units (CFUs) on each. We found that Lake Michigan plates with influent and effluent inoculate were too numerous to count, along with the cross-plated influent and effluent plates. Effluent plates with Lake Michigan inoculate had the least number of CFUs, which may be due to lower nutrients in treated sewage. Additionally, we chose single colonies for re-isolation, long term storage, and scraped colonies from plates to collect the full range of microorganisms that were cultured. From the plate scrapes, we extracted DNA, amplified the 16S rRNA genes, and used illumina-sequencing to examine the microbial diversity grown on each plate. We discovered that media-type was preferential for the growth of certain microbial taxa. For instance, *Flavobacterium*, a dominant genus of influent, grew successfully on each type but best on media derived from influent. Our results indicate that many microorganisms found in untreated and treated wastewater are capable of surviving in the Milwaukee estuary. Further work is needed to understand which organisms contribute to ecosystem processes.

**Vanessa Bravo, Danielle Hobach & Sami Basnet**

Comparisons of the Effectiveness of Mindfulness-Based Interventions &amp; Their Study Designs

Mentor: Bhagwant Singh Sindhu, Occupational Science &amp; Technology

Poster Presentation, Easel 14

Mindfulness involves intentionally bringing one's attention to the present moment and acknowledging one's thoughts, feelings, and bodily sensations in a non-judgmental way. It is often taught through a variety of meditation exercises, which can be web-based, self-administered, or led by an experienced meditator. Mindfulness appears to be a useful modality to incorporate into usual treatment protocols to alleviate symptoms of psychological distress that can interfere with physical rehabilitation. Mindfulness-based interventions (MBIs) have been increasing in popularity since the creation of

Mindfulness Based Stress Reduction (MBSR) in 1979. MBSR is considered as a gold-standard among MBIs and has been described as “a group program that focuses upon the progressive acquisition of mindfulness.” The purpose of this study is to conduct a critical review of literature to determine 1) which mobile application based MBI appears to be more effective, and 2) which assessment tools best capture outcomes of practicing mindfulness. Our inclusion criteria for studies we will examine are: studies more recent than 2010, studies that use a mobile application-based MBI, and experimental studies where the outcomes are compared between two groups (i.e. a group that received the mindfulness meditation treatment and a control group which did not receive the treatment). We will look at studies whose populations are individuals with anxiety disorders, individuals with musculoskeletal disorders, and individuals with cancer. Information found in this literature review will help us solidify the design of our pilot study and future studies on how the use of MBIs affect individuals with upper-limb musculoskeletal disorders such as rotator cuff tears.

**Madeline Bruss**

Disparities in the Prescription Patterns of Intravesical Therapies in Treatment of Non-Muscle Invasive Bladder Cancer

Mentors: John Weissert, Public Health &amp;

Kourosh Ravvaz, Aurora Health Care

Poster Presentation, Easel 15

Last year in the United States, bladder cancer was diagnosed in about 81,000 patients resulting in nearly 17,000. Intravesical therapy including Postoperative single dose intravesical chemotherapy (PSDIVC) and Bacillus Calmette-Guerin (BCG) immunotherapy is guideline recommended therapy in patients with Non-Muscle Invasive Bladder Cancer (NMIBC). In this study, we aimed to determine if there were any unexpected disparities in the utilization of PSDIVC and BCG. Using the National Cancer Database Participant User File (PUF) we conducted a retrospective nationwide cross-sectional observational study from 2004-2014 to evaluate unexpected disparities (i.e. not guideline recommended) in the use of PSDIVC and BCG following surgical intervention. Patients with age > 40 years old, tumor stage Ta, T1 or Tis, and one lifetime cancer diagnosis were included. Outcomes were the receipt of PSDIVC or BCG treatment. Stepwise regression was used to identify variables, which were unique and not significantly correlated with each other. Then, Binomial logistic regression was used to identify patient characteristics significantly ( $p < 0.05$ ) associated with differential odds ratios of receiving therapy compared to not receiving treatment. We identified 484,367 patients diagnosed with NMIBC and met our analysis inclusion criteria. 209,004 (43.15%) of the patients received BCG and/or PSDIVC treatments. Of the variables tested facility type, facility location, age, sex, and ethnicity were significantly associated with not receiving BCG. Additionally, we found that facility type, facility location, age, income, education attainment, and urban versus rural were significantly associated with not receiving PSDIVC. In a nationwide

cohort of patients with NMIBC, significant unexpected disparities in the utilization of intravesical therapy exist. It is critical that patients and physicians are aware of such disparities so that all patients have the opportunity for high quality guideline based NMIBC therapy.

#### **Ian Buck**

Energy Storage System Implementation & Testing for Smart Grid Applications

Mentor: Adel Nasiri, Electrical Engineering

Poster Presentation, Easel 207

When engineering an electrical device, you will need a source. Most of the time, the source for the device is the wall outlet, other times it's a natural source such as the sun, and sometimes a rechargeable battery is used. There are many factors to be considered when choosing the correct rechargeable battery for a device. One of those factors is the power of the battery, another is the temperature of the battery, and another is the battery life estimation or how many times the rechargeable battery can be discharged and charged again. In order to find the life of the battery, you must find the state of charge and the depth of discharge. The terms state of charge and depth of discharge refers to the amount of charge left to be distributed in the battery. State of charge is the amount of charge left in the battery and depth of discharge, the complement of state of charge, is how far a battery is close to being fully discharged. The charge of the battery can be found by measuring the voltage, the energy potential of two points per charge. For this research, voltage sensors are attached to the battery, the battery is discharged and then charged again, and the voltage is measured after the battery is recharged. The voltage after the recharge is compared to the original charge of the battery and a rate can be determined. Once the voltage is fully drained, the life estimation of the battery can be determined. It is important to know how many times a rechargeable battery can be recharged. Electric cars, cellphones, and many other devices use rechargeable batteries, so knowing a battery's life can determine how long the device can be used.

#### **Caed Budris**

Relationship Between Mood Disorders & Working Memory

Mentors: Salahadin Lotfi & Hanjoo Lee, Psychology

Poster Presentation, Easel 4

Mood Disorders such as anxiety and depression have been demonstrated to greatly impair cognitive function. A significant deficit in working memory capacity (WMC), as a fundamental component of cognitive functioning, has been linked to mood disorders. As part of a bigger study, this experiment examined the relationship between Mood Diagnoses and WMC (N= 57) through self-report questionnaires (DASS21 and rumination Response Scale) and a Visual Working Memory task (VWM). In this task (Neutral version), trials are presented with two stimulus arrays: a memory array and a test array. Oriented colored rectangles as memory arrays are randomly presented across a short retention period. Participants attempt to remember the locations of arrays and recall

the orientations by responding if there is a change or not. While a significant negative correlation was found between VWM and Mood Diagnosis,  $r(57) = -.28$ ,  $p < .035$ , there was a significant positive correlation between VWM and Rumination,  $r(57) = .283$ ,  $p < .033$ . Consistent with previous studies, our result confirms the link between cognitive impairments and mood disorders. The relationship between Rumination and WMC disagrees with current research that has shown cognitive impairments in people with excessive ruminations. A possible explanation for this comes from research that shows rumination largely comes from the inability to switch between information of emotional value and information of un-emotional value. Our VWM task was not sensitive to capture emotional information and didn't require task switching. However, the emergent positive correlation between rumination and WMC may indicate individuals with larger WMC tend to use available WM resources to ruminate, resulting in excessive emotional distress. Future studies could be designed with sensitive components to emotional value to further shed light on the association between rumination and WMC.

#### **Alexandra Campos**

An Examination of Teachers' Experiences in the Development & Implementation of a Home-School Literacy Program in Classrooms of Young Emergent Bilingual Learners

Mentor: Leanne Evans, Curriculum & Instruction

Poster Presentation, Easel 16

The importance of family involvement in the literacy development of young children is well documented in existing research. More specifically, successful biliteracy development is significantly influenced through home literacy programs, teachers' abilities to integrate cultural funds of knowledge, and programs that value the rich language resources children bring to their early school experiences. Scholarship has identified that language and literacy home experiences support young learners' development in both languages. It is essential for educators and program developers to understand how early home language and literacy experiences can be supported. The guiding question for this research is the following: What are early literacy teachers' experiences as they design and implement a home literacy program for young bilingual (Spanish/English) learners in a Head Start program serving children 0-5 years of age? An inductive approach will be used to study the data retrieved from the focus groups, interviews, and needs assessment reflection sessions. Data analysis will be implemented through a rigorous open coding process. Throughout the analysis a constant comparative method will be used to clarify and refine patterns. The process will remain a reflective work until a final set of themes emerges. A consideration of any delineation over time will be noted and analyzed. We will offer implications for early childhood teachers and administrators. We will also offer implications for teacher preparation programs at the university level. Our work is based on the need to examine how home literacy programs can be created and implemented to be most effective for the literacy/biliteracy development of young emergent bilingual learners.



**Cody Casper**

Using Image Processing in MATLAB to Analyze Cavitation of a Micro Hydro-Turbine  
Mentor: Ryoichi Amano, Mechanical Engineering  
Oral Presentation, 12:00pm | Union 250

Image processing is a powerful tool for effective data analysis. The particular areas of interest for image processing in this experiment were to find the total area of cavitation around the turbine blade from multiple experiments and Images taken from a computational fluid dynamics (CFD) program as well as finding a way to display the cavitation in a more visible manner without compromising the integrity of the image. There are two particular areas of interest for image processing in this experiment: 1) Find the total area of cavitation around the turbine blade from multiple experiments and images taken from a CFD program; 2) Find a way to display the cavitation in a more visible manner without compromising the integrity of the image. Issues encountered when searching for the area of cavitation from experimental data were the following: 1) Movement of the camera to a different location each time data was collected; 2) Finding the appropriate threshold value for converting the images into binary images without ruining the integrity of the data represented within each image. To improve upon the re-usability of the script, object recognition was investigated as a next step as a method for “auto-scaling” the images from different experimental test runs. For the image processing, respectively to 1 and 2 areas of interest; 1) The CFD images were cropped around an area of interest then the turbine was subtracted out of the image, leaving behind just the cavitation. The percentage of cavitation about the turbine was then found by taking the area of cavitation divided by the total area of the turbine blade. 2) To make the experimental images more visible, a colormap was applied to the image. The lighter regions of the image are given lighter colors while the darker regions are given darker colors.

**Louis Chapman**

Porous Material for Removal of Ammonia from Water  
Mentor: Marcia Silva, Freshwater Sciences  
Poster Presentation, Easel 188

When rivers and streams become overloaded with nutrients, they undergo expedited eutrophication, a process which leads to the proliferation of algae and threatens the health of our ecosystem. Modern practices in agriculture and industry lead to high volumes of nutrient discharge into the rivers. Areas with high volumes of discharge are known as point sources. Wherever possible, we use available technologies to remove the contaminants from the run-off in these locations. Current methods of ammonia filtration such as nitrification and oxidation require installation of large tanks at the point of filtration. This incurs prohibitive costs and makes these methods unfit for wide-scale application. Furthermore, these options cannot be implemented in colder climates, necessitating the development of a new filtration mechanism. Many

alternative methods such as chlorination perform best in the absence of other contaminants. This project focuses on development of a porous material designed for targeted removal of ammonia. Our chosen material can operate in colder climates where nitrification cannot. This material does require low levels of water hardness to function properly, but it can be engineered to accept ammonia over other contaminants, making it a good choice for use in waters with multiple pollutants. This study aims to optimize adsorption kinetics of the material and ensure its suitability for application under these parameters. Preliminary data shows a 60-80% adsorption rate. We expect to see this rate to surpass 90% as we refine the modification process and the material’s selectivity for ammonia increases. This research illustrates the potential of engineered materials in addressing problems around the world.

**Rene Chavez**

Quantifying Regionally-derived Sedimentary Rocks in Pleistocene Oak Creek Formation Glacial Till  
Mentor: Scott Schaefer, Geosciences  
Poster Presentation, Easel 53

This project looks to identify and quantify regionally-sourced sedimentary rock eroding from glacial till exposed along the beach at Sheridan Park in Cudahy, WI. Tills are a mix of geologic clasts—which are the most common types of rocks people think of when told about sedimentary rocks—and sediment transported by glaciers. The glacier that covered Wisconsin million years ago brought with it igneous and metamorphic rocks which now get mixed in with the sedimentary rocks. Sedimentary rocks at Sheridan Park appear to be exclusively from the Silurian and Devonian periods. Bedrock of such age extends north of Sheridan Park along Wisconsin’s eastern border into the Upper Peninsula of Michigan. This project will quantify this material relative to the rest of the till and could verify source localities for such rock, a task that has yet to be done for this deposit. Rocks that are being used for this project were collected in random bulks in three different GPS coordinates. They were then separated into categories of being either from the Silurian or the Devonian. The way to tell whether a rock is Silurian or Devonian is by looking at the colors. Silurian rocks tend to be more tan and light, while the Devonian rocks are darker. The overall purpose of this project is Sheridan Park records geologic history specific to Wisconsin and Milwaukee and its proximity to UWM means it is frequented for field trips. The site has become central to multiple outreach programs aimed at increasing ethnic diversity in the geosciences.

**Alexis Cleland & Michael Kozlowski**

Exploration of Meaningful Work for Pediatricians & Pediatric Nurses  
Mentor: Nadya Fouad, Educational Psychology  
Poster Presentation, Easel 207

Within the high demands of pediatrics, many practitioners and nurses report high burnout rates. This

issue has become imperative for the well-being of both the patient and practitioner to comprehend how people in the pediatric field remain engaged in their work. Meaningfulness at work is presented to be an important concept in our understanding of physician's engagement in their work and negatively associated with burnout symptoms. We were intrigued to seek what pediatric service providers found meaningful about their work while working at a large children's hospital and associated outpatient clinics. Our group interviewed thirty-seven pediatric service providers at a large Midwestern children's hospital. The interviews were transcribed, then analyzed using a thematic analysis paradigm with multiple rounds of review from multiple judges. Our participants appeared to conceptualize their work as meaningful from working at a prestigious hospital, having enough time with patients, and especially working with children. The multiple layers of administration endemic with working in a larger hospital system was seen by the participants to be an obstacle to experiencing meaningfulness at work. Results provided us with some initial evidence that hospitals may benefit from a continuous evaluation on how system-wide policy changes influence the provider's perception of meaningfulness in their work.

#### **Ismael Coello**

Characterization of Oxide Layers on Alumina-Forming Alloy by Electrochemical-Impedance Spectroscopy

Mentor: Benjamin Church, Materials Science & Engineering

Poster Presentation, Easel 39

Stainless steel alloys are normally resistant to corrosion because of its chromium oxide (chromia) surface layer. Because chromia-forming stainless steel corrodes in the presence of extreme water vapor, carbon, and sulfur at high temperatures, interest has grown in a stainless steel alloyed with a small amount of aluminum. Instead of a chromia layer, a layer of aluminum oxide (alumina) can be formed on the surface. Alumina is superior in corrosion resistance because of its ability to inhibit the chemicals that chromia cannot impede. In this, there is no simple method to measure the corrosion resistance of an alumina-forming alloy (AFA). Electrochemical impedance spectroscopy (EIS) is seen as test that is relatively short, accurate, and inexpensive. To properly quantify the corrosion resistance of an AFA through EIS, a set of parameters are needed such as: the open circuit potential, perturbation amplitude, frequency, current, bandwidth, and several other adjustments. Parameters were tested in reference to a baseline stainless steel trial. Starting with this baseline, every parameter was modified and documented to see the effects of the changes on the results. The EIS trials were analyzed in different environments to see if errors in the results arose from sensitivity to its surroundings or testing framework. Bode plots were formed from the data and modeled to fit an equivalent circuit. This equivalent circuit is chosen as a theoretical model that can best represent the way in which the metal corrodes. Analysis is not complete and requires further parameter development.

#### **Haley Collins, Lisa Collins & Mayesha Sahir Mim**

Intelligent Robotic Systems Research for Human-Machine Interaction

Mentor: Zhi Zheng, Electrical Engineering

Poster Presentation, Easel 54

Nao is an autonomous programmable humanoid developed by Aldebaran Robotics. The Nao humanoid is employed to demonstrate gentle exercise programs, such as Tai Chi, to improve joint function, circulation, and motor skills in individuals with physical limitations. Nao is also utilized to assist children with sensory and motor deficits to improve their quality of life by gaining new cognitive and social skills. The application of a non-human device to improve the lives of humans is an example of the integration of our increasingly technological society and the need for such devices to enhance the lives of those in need. Humanoids are becoming increasingly accepted and popular among the older and younger populations and are viewed as a cost-effective tool in industry. We have utilized Choregraphe software to write and develop the Python code that brings Nao to life. Nao's movements and speech are carefully orchestrated using a timeline in Choregraphe. This timeline makes up the network of commands which are imported to Python code and translated to the live robot. The movements must be perfectly timed to coincide with Nao's speech, in order to create a seamless performance which Nao's audience can easily understand. Nao's movements are constructed to mimic human gestures and patterns of communication. All movements performed by Nao are approved by a licensed Tai Chi instructor. This project will open the door to a range of possibilities for the use of an interactive android to help improve the physical functioning of those in need and increase motivation and involvement of this population while interacting with Nao.

#### **Luzareli Contreras**

What Information do Nationwide Surveys Provide us with about the Social Ecology of Sexual Risk Among Latinx Teens

Mentor: Heidi Luft, Nursing

Poster Presentation, Easel 17

Latino teens are one of the fastest growing populations in the United States, they are also at high risks of contracting STI's/HIV, teen pregnancy, being in violent or abuse relationships, and engaging in risky sexual encounters. To find the risk factors the social ecological model (SEM) was used. The model proposes risk factors present in the individual, social and sexual networks, community, and public policy levels. Compared to their white peers, Latinx teens have higher rates and unique risk factors for sexually transmitted infections. Most research studies have focused on identifying and addressing risk factors present primarily at the individual and interpersonal levels and employed small, single-site samples. Therefore, there were three aims of this project: (1) Identify national surveys that collected data about sexual health outcomes among Latinx teens in the US, (2) extract additional variables examined in the survey, and (3) summarize the

variables according to the SEM. Results will summarize factors at each level. At the sexual network it was found that the age of first sex, the number of sexual partners and sexual history disclosure between partners to be frequently surveyed. Some individual factors included health literacy on knowledge about AIDS/HIV, and condom usage. The factors in the social network category mainly were about close peers' perspectives on sexual knowledge. Family closeness is also a part of an important factor in social networks especially if the parents are together in the home to be a mother or father figure to the adolescent. Some community factors included safety in neighborhood, presence of rundown housing, and garbage in the streets. The factors in the public policy category included having insurance and the types of healthcare clinics available to teens. The project is still underway although a summary of each risk factor of the social ecological model will be created.

**Teonna Cooksey**

The Work of a Community: Oral History Reports from the Sherman Park Neighborhood  
Mentor: Arijit Sen, Architecture  
Oral Presentation, 12:00pm | Union 260

The transformation of American cities caused by urbanization and gentrification has created an outlet where foreclosure and eviction have become sources of capital. Housing policies implemented in the past, such as redlining, have created areas within American cities where poverty is highly concentrated. This research presents a vivid century long pictorial, structural, and economic transformation of homeownership, resources, and living through the struggles of not having a place to call home. This research identifies the work being done in the Sherman Park Neighborhood to make it a more livable place. This multi-faceted story exposes barriers such as eviction, foreclosure, economic decline, and safety hazards. It exposes the hope community residents have to take back their communities despite difficulty and reclaim the way they live. The findings from this research suggest that despite the systemic dismantlement of the community over time, residents and community organizers are resilient and determined to sustain the culture and structure which will allow their neighborhood to thrive. This research provides a historical perspective of the Sherman Park Neighborhood, as well as details that are being used for revitalization. The results broadly provide insight to challenges that are disabling impoverished communities from becoming stable—economically and socially.

**Erin Crownover**

The Quantity of Evidence Supporting the Validity & Reliability of Commercially Available Fitness Trackers  
Mentor: Ann Swartz, Kinesiology  
Poster Presentation, Easel 68

Physical activity assessment devices or fitness trackers (wearables) have become very popular. For example, according to FitBit as of February 2018 there were over 25

million users, with Fitbits accounting for ~19%. Because these devices are so widely used, and individuals spend between ~\$100-\$500 on a device, it is important that the consumer is aware of the accuracy and reliability of these devices. The purpose of this research was to review and summarize features and quantify the number of published validity and reliability studies for commercially available wearables. To determine features, an Internet search was performed. To determine the number of peer-reviewed articles published on each device, a PubMed search was performed using the “Wearable name” and either the term “validity” or “reliability”. Initially, features of 34 commercially available wearables were collected. Features reviewed included price, Bluetooth syncing availability, aspects of physical activity, posture, breathing, sleep, and battery life. Results showed that FitBit was the most extensively evaluated wearable in terms of both validity and reliability, having 25 published studies on validity and 11 published studies on reliability, with 18 of these studies focusing on the FitBit Zip model. Apple Watch Series 1 (N=1) and Xiaomi Mi Band (N=1) had the fewest number of articles on validity, and Jawbone (N=2) and Garmin (N=2) had the fewest studies published that evaluated the reliability of the device. There were no published studies that evaluated the validity or reliability of the Motiv, Samsung, Polar, Lumo Bodytech, and Moov brands. While features are very important to consumers when choosing a wearable device, they should also consider the validity and reliability of the device. This would be especially true if tracking data is used to guide health management, as decisions based on accurate data are more likely to help them achieve their goals.

**Karly Cushway**

A Temporal Genetic Analysis of *M. pyrifera* Pre & Post Disturbance on Catalina Island  
Mentor: Felipe Alberto, Biological Sciences  
Poster Presentation, Easel 40

Available LANDSAT remote sensing data shows reduced surface biomass coverage in southern California for the giant kelp, *Macrocystis pyrifera*. Significant disturbances have occurred in the last five years, such as large storm surges in 2014, El Niño 2015-16, invasive *Sargassum horneri* spread, and sea star wasting disease. This study concerns the consequences for genetic diversity of this putative population decline, due to these significant natural disturbance events, by temporally analyzing four *M. pyrifera* populations surrounding Catalina island, California. We will be comparing giant kelp allelic richness and genetic differentiation between 2018 and 2008 samples. Within populations, we will be determining if there has been a reduction in genetic diversity and looking for any potential evidence of demographic bottlenecks. Additionally, we will be testing if genetic differentiation is higher due to increased habitat fragmentation. Genomic DNA was extracted from dried *M. pyrifera* blades collected in January 2018 using standard DNA extraction protocols and genotyped at seven microsatellite loci. Microsatellite lengths will be assayed on a DNA sequencer to score allele sizes before raw data is organized using peak

identification and ordination programs such as R software. These analyses serve to further our understanding of the mechanisms behind genetic differentiation among *M. pyrifera* populations, especially when considered from an aquaculture breeding for bioenergy production perspective. Thus far, our current findings demonstrate that there has been no change in genetic differentiation or allelic richness of *M. pyrifera* on Catalina Island in the past ten years despite the multiple disturbance events that have occurred since then.

#### **Robert Dahl & Hayley Sentz**

The Investigation of the Gas Diffusion Layer in a Zinc-Air Flow Battery

Mentor: Jingyu Si, Mechanical Engineering

Poster Presentation, Easel 41

The zinc-air flow battery is one of the most promising methods of large scale energy storage that is currently being developed. The benefits of the zinc-air battery combined with the benefits of the flow battery allow for a battery that is low cost, has a high energy density, and has a long cycle life. These characteristics allow the zinc-air flow battery to compete with other emerging battery technology in today's marketplace. Our experiments investigated the gas diffusion layer (GDL) in the zinc-air flow battery. The GDL is a porous surface that supports the electrochemical reaction between the zinc slurry and air inside of the battery. GDLs are made by pressing and rolling a mixture of catalyst, graphite and PTFE binder into a thin film. Our experiments investigated the effects of changing the ratio between catalyst and graphite and changing the amount of PTFE binder used to make the GDL. The thickness after the initial press for the GDL is around 0.34 mm. The effect of reducing the thickness to 0.2 mm and 0.15 mm was also researched. The thickness should not go below 0.15 mm as discovered during our failed attempts at making the electrodes with the much thinner GDL. Electrodes are made from the GDL, a layer of nickel mesh, carbon cloth, and PTFE paper. Our results come from analyzing the performance of the electrodes in the battery during testing.

#### **Sarah Damiano**

Declarative Memory Functioning as a Predictive Factor for the Development of PTSD

Mentor: Christine Larson, Psychology

Poster Presentation, Easel 42

Although memory disturbances such as traumatic amnesia and intrusive memories are part of the diagnostic criteria for Post-Traumatic Stress Disorder (PTSD), deficits in verbal declarative memory functioning have frequently been observed among PTSD patients. Previous investigations have pointed toward a negative relationship between the presence of PTSD symptomatology and verbal declarative memory performance, with speculation that pre-trauma declarative memory deficits may serve as a risk factor for PTSD development. Inconsistencies in the literature have been common however, potentially due to the contribution of comorbidities such as depression and substance abuse. This study sought to clarify this connection

between verbal declarative memory functioning and PTSD symptomatology by observing the relationship longitudinally. Participants were recruited from a Level 1 Trauma Center and assessed for verbal declarative memory performance and PTSD symptom severity two weeks following exposure to a traumatic event, as well as six months later. We hypothesized that poor verbal declarative performance would be associated with greater PTSD symptom severity, and that this relationship would remain after controlling for the presence of depression and substance abuse. Additionally, we hypothesized that poor verbal declarative memory performance at baseline would predict higher symptom severity at six months, and that this relationship would be similarly constant after controlling for depression and substance abuse. We found that there was no correlation between declarative memory performance and overall symptom severity at either time point, nor did performance on the declarative memory measure at baseline predict symptom severity at six months. Interestingly, we did find a significant correlation between poor verbal declarative memory performance and the presence of re-experiencing symptoms at both assessments. These results indicate that there may be other contributory factors to the observed connection between declarative memory dysfunction and PTSD symptomatology, and that further investigation into the specifics of the relationship is warranted.

#### **Jose De La O Arechiga**

Effects of 3-week Abstinence from Cannabis on Depression & Anxiety

Mentor: Krista M. Lisdahl, Psychology

Poster Presentation, Easel 44

Research has shown that cannabis users experience greater symptoms of depression after one week of abstinence. The aim of this study is to investigate how abstinence from cannabis over a 3-week period affects depression and anxiety. 87 participants (49 controls and 38 cannabis users) aged 16-25 and balanced for gender (56% male) were included in the study. Controls had fewer than 5 joints and cannabis users had more than 52 joints in the past year. Participants were monitored for abstinence across a 3-week period. The Beck Depression Inventory (BDI) and State-Trait Anxiety Inventory (STAI) were used at baseline and after 3 weeks of abstinence to measure symptoms of depression and anxiety. Separate repeated measures ANCOVA were run to examine the interaction between time and group on depression and anxiety while covarying for gender. Cannabis users had higher levels of depression ( $p=.09$ ) and anxiety at baseline compared to controls. After abstinence, cannabis users experienced a trend of increased depression symptoms but decreased anxiety symptoms. Consistent with the general literature, cannabis users had greater symptoms of anxiety and depression. Further, cannabis users demonstrated recovery in their anxiety symptoms. The increase in depression symptoms is likely reflecting symptoms of prolonged withdrawal from cannabis. Future studies may want to examine a longer period to capture recovery from this withdrawal.

**Justin de Wees**

Cavitation Threshold Determination for Heavy-Ion Particle Therapy  
Mentor: Sarah Patch, Physics  
Oral Presentation, 1:00pm | Union 250

Particle therapy is the most technologically sophisticated method for cancer treatment in practice today. X-rays are more commonly used to irradiate malignant tissue, however photons deliver more energy closer to the source and gradually lose energy as they transverse through the body. Protons and heavy-ions offer distinct advantages over this, as they can deposit most of their energy into malignant tissue just before coming to rest, leaving healthy tissue in front of the target less irradiated than with X-rays and tissue behind the target unaffected. Microbubbles are gas filled bubbles surrounded by a protein or lipid shell on the order of 1 to 10 microns in diameter, typically used as imaging contrast agents. In recent years the possibility of using them to aid treatment of radiation-resistant cancer cells has been under investigation. The Argonne Tandem Linear Accelerator System (ATLAS) at Argonne National Laboratory was used to investigate response of air-filled and perflutren-filled microbubbles to a pulsed beam of  $^{12}\text{C}^{5+}$  carbon ions. Different concentrations of microbubbles in deionized water were passed through 508 micron ID Vention tubing using gravity driven flow. The tubing was immersed in a bath of deionized water and observed with both a USB camera and B-mode ultrasound imaging by a 128-channel linear array (ATL L7-4). The lowest possible voltage of 1.6 V was used to transmit 5.5 MHz pulse echoes. Multiple time structures and currents were used to catalog effects of various ion beam profiles. In many but not all cases, the beam induced visible cavitation in both the tubing and the surrounding water, an effect that would be disastrous if it occurred within healthy tissue. Next-generation particle accelerators are being designed to deliver intense pulses and must avoid cavitation in healthy tissue. Further research is required to define cavitation thresholds.

**Augustin Deniaud**

Effects of Acidic pH on Sexual Reproduction in the Giant Kelp *Macrocystis pyrifera*  
Mentor: Filipe Alberto, Biological Sciences  
Oral Presentation, 1:00pm | Union 250

As atmospheric  $\text{CO}_2$  concentrations increase due to anthropogenic sources, ocean acidification (OA) rates are predicted to increase. As more  $\text{CO}_2$  enters the ocean ecosystem, bicarbonate ( $\text{HCO}_3^-$ ) and  $\text{CO}_2$  concentrations increase while carbonate ( $\text{CO}_3^{2-}$ ) concentrations decrease. Seaweeds like the giant kelp, *Macrocystis pyrifera*, an ecosystem engineer, can utilize both bicarbonate and carbon dioxide as a carbon source. However, they must convert bicarbonate into metabolically useful  $\text{CO}_2$  using  $\text{CO}_2$ -concentrating mechanisms (CCMs).  $\text{CO}_2$  uptake therefore requires less energy than bicarbonate uptake, and it has been shown that seaweeds increase their  $\text{CO}_2$  uptake in lower pH conditions. The MARINER

project's goal is to create a sustainable off-shore seaweed aquaculture program aimed at biofuel production. In the Alberto lab our goal pertains to the genomic selection of gametophyte lines to seed such aquaculture systems by characterizing the association between genes and phenotype traits of interest. The performance of microscopic sexual phases (gametophytes) is an important aspect for assessing how both a farm and natural populations would fare in a more acidic ocean. We hypothesize that *M. pyrifera* will use less energy on CCMs in low pH conditions and therefore will have increased reproductive performance. We will test this by applying control (7.8), worst-case OA scenario (7.2), and extreme (6.5) pH conditions to three genetic populations gametophytes. Gametophyte sexual performance will be evaluated by tracking the amount of time taken to produce egg cells and sporophytes, and the proportion of egg cells and sporophytes in each sample. Preliminary results indicate a strong ability for *M. pyrifera* metabolism to buffer pH conditions. Gametophyte health was also not affected in a low pH (6.6) trial.

**Lukas Dommer**

Assessment of Sleep Disturbance and Cannabis Withdrawal Symptoms Across Sustained Abstinence in Adolescent and Young Adult Cannabis Users  
Mentors: Krista Lisdahl & Ryan Sullivan, Psychology  
Poster Presentation, Easel 46

It has been established that cannabis withdrawal symptoms include, but are not limited to, sleep difficulty, restlessness, and irritability, with previous literature reporting some improvements seen after abstinence. However, the knowledge surrounding the temporal presentation of these withdrawal symptoms in adolescent and young adult cannabis users is less known. We aimed to examine the change in reporting of these symptoms across sustained abstinence; hypothesizing that symptoms of withdrawal will increase at acute withdrawal but decrease as cannabis abstinence is sustained. Eighty adolescents and young adults (age,  $M = 21.16$ ; cannabis users,  $n = 39$ ) completed three weeks of monitored substance use abstinence, Cannabis Withdrawal Symptom Checklist (CWSC), and Pittsburgh Sleep Quality Index (PSQI). General linear regressions were run examining CWSC across time points. An independent t-test examined PSQI scores between cannabis users and controls. Analyses indicated there was a quadratic relationship between sleep disturbance across time points, such that cannabis users first increased and then decreased scores across abstinence. Cannabis users were no different from controls on sleep disturbance after three weeks of abstinence. However, the model was nonsignificant when looking at total withdrawal scores in cannabis users across time points. Findings indicate that at acute withdrawal, cannabis users report more instances of sleep disturbances; however, as subjects continue to abstain from cannabis, their reported sleep disturbances match that of controls after just three weeks. Implications surrounding recovery of sleep quality while abstaining from cannabis and future directions are discussed.

**Cassandra Doolittle**

Genre-Specific Music Training Gives Rise to Differential Dependencies on Structural Metrics of Sound During Perceptual Judgments

Mentor: Adam Greenberg, Psychology

Poster Presentation, Easel 47

Acquired expertise has been shown to alter perception. Previous research from our lab has revealed a correlation between differences in auditory object perception and extent of formal music training. Additionally, we have shown that musicians rely upon specific sound features when categorizing objects, whereas non-musicians seemingly use no such strategy. The present experiment explores whether musicians with different training backgrounds (genre) rely upon similar sound features during judgments of musicality. Participants completed a prescreening survey designed to document formal music training and subjective measures of interaction with various musical genres. Subsequently, participants were tested behaviorally while listening to randomly generated pure tone “melodies”, by rating the “musicality” of each. The analyses of the data from these perceptual measures showed diverging results—1) Survey results revealed a double-dissociation regarding comfort with deviations from musical notation: Classical musicians are more comfortable with deviations while listening to music, whereas Jazz musicians are more comfortable with deviations while performing. 2) Counter to our prediction, classical and non-classical musicians showed a striking similarity in musicality ratings, suggesting auditory object perception may be surprisingly consistent among formally trained musicians of different genres. A remarkable number of the lowest (50%) and highest (82%) rated melodies were identical for classical and non-classical musicians. 3) Correlations between ratings and six objective metrics of sound features (contour, range, etc.) showed a significant relationship with classical musician ratings, but no relationship with non-classical musician ratings. A Principal Components Analysis revealed significant latent variables within the behavioral data that may better represent perceptual response strategies of genre groups. These results, considered within the context of our previous findings, suggest that judgments of “musicality” may be related to level of training (and are generalizable across genre), but processing of sound feature metrics and notational deviation comfort may be more indicative of genre-specific training.

**Nancy Duque**

Major Element Geochemistry of the Pulo do Lobo Metasedimentary Rocks Affected by the Southern Iberian Shear Zone, Andalucia, Spain

Mentor: Dyanna Czeck, Geosciences

Poster Presentation, Easel 48

A shear zone is a zone that is comprised of rocks that are more highly strained than adjacent rocks. The Southern Iberian Shear Zone (SISZ), formed during collision of two tectonic plates, extends across the northwestern parts of Andalucia, southwestern Spain into Portugal.

Metasedimentary rocks including a mixture of schists and quartzites in the Pulo do Lobo (PdL) formation are found on the south side of the SISZ. During shear zone deformation, fluids interact with rocks and enhance or facilitate deformation processes. The fluids themselves are transient, but they may leave signatures of altered rock chemistry, metamorphic reactions, and/or distinctive microstructural evidence. For this project, X-Ray Fluorescence was used on 20 samples in the PdL near the SISZ to determine the major element geochemical changes related to deformation and fluid interaction. We determined that the intermediate silica samples are the best targets for further evaluation. In one transect, there were ten PdL samples in this group, so we were able to evaluate nine altered samples (closer to the SISZ) compared to the least altered sample furthest from the SISZ. In an isocon plot, many of the major elements show consistent patterns: MnO, MgO, Fe<sub>2</sub>O<sub>3</sub>, K<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub>, and CaO show enrichment, and SiO<sub>2</sub>, Na<sub>2</sub>O, and Al<sub>2</sub>O<sub>3</sub> show depletion. The major elements were plotted versus distance from the SISZ and compared to qualitative strain magnitude, determined by the degree of fabric formation. Several of the major elements show a pattern with strain. At the transition to the strongly foliated highly strained samples, K<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub>, MnO, MgO, and CaO increase and Na<sub>2</sub>O and SiO<sub>2</sub> decrease. These trends suggest the deformation related geochemical signature in the PdL may be separated from heterogeneity of the PdL itself, and the PdL warrants further study for fluid/rock interaction during shear zone deformation.

**Eric Edwards**

Synthesis and Fluorescence Study of a Rhodamine B Derivative

Mentor: Jorg Woehl, Chemistry & Biochemistry

Poster Presentation, Easel 49

My research involves the synthesis and fluorescence study of a pH-sensitive Rhodamine B derivative via a two step process initially reacting Rhodamine B with hydrazine and ethanol under reflux to obtain Rhodamine B Hydrazide and later reacting this product with 4-formylbenzene-1,3-disulfonate under reflux to obtain the unnamed final product. The fluorescence spectra of this final product are taken at various pH values to verify that fluorescence intensity varies with pH. The goal of this project is to make a pH sensor by covalently bonding the Rhodamine B derivative to optical fibres.

**Anna Emerson**

Time Perception in Virtual Reality

Mentor: Chris Willey, Art & Design

Visual Art, Table 131

I am exploring one of the aspects I find most intriguing about virtual reality: how and why our senses are “fooled” into the virtual realm. My experimental research focuses on sensory and time perception. I am studying my subjective experience of how time passes in different environments— including in virtual reality— measuring perceived time versus real time. Learning about how our brains function in virtual environments will provide valuable insight for the creation of immersive experiences.

**Marie Enderle**

Adaptive Behavior in School-Age Children with Neurofibromatosis Type 1: Relations to Cognitive & Executive Functioning

Mentors: Bonnie Klein-Tasman & Dani Glad, Psychology  
Poster Presentation, Easel 50

Neurofibromatosis type 1 (NF1) is an autosomal dominant genetic disorder affecting 1 in 3,000 people and is characterized by attention and learning problems. There has been minimal research regarding adaptive behavior in school-age children with NF1, and close to none examining the associations of adaptive behavior with cognitive and executive functioning. The current study will investigate adaptive behavior in school-age children, measured by the Scales of Independent Behavior (SIB-R). Additionally, this study will examine the relations between adaptive behavior and cognitive functioning, using the Differential Ability Scales (DAS-II), and executive functioning, using the Behavior Rating Inventory of Executive Functioning (BRIEF). Participants are thirty-nine (n=39) school-age children with NF1 (ages 9-13) and their parents. As part of the neuropsychological battery, the DAS-II was administered to each participant and parents completed the SIB-R and BRIEF. We expect to find that school-age children with NF1 have difficulties in adaptive behavior in comparison to other children their age, based on comparisons to normative data, along with difficulties in cognitive and executive functioning. We also expect to see significant relations of the SIB-R with the DAS-II and BRIEF, as similar associations have been noted in past research. We also anticipate specific limitations in motor skills for school age children with NF1, as difficulties in this area have been found in a past study involving preschool children with NF1. Studies regarding adaptive behavior have the potential to help inform parents and teachers about the care of children with NF1 and represents a topic that needs to be more broadly explored to more effectively prepare children with NF1 to succeed in the home at and school.

**Emily Ernest**

Finding Identity in a Multicultural Community

Mentor: Ben Trager, Educational Policy & Community Studies

Poster Presentation, Easel 18

Through the interaction of multiple relationships, it is relevant to reflect on the differences that ones bring to the table. UWM and its partnership with CBI (community-based internship) has allowed the engagement of students into the communities to see the roots of what is happening there. Through the placement of myself into the non-profit organization of PeppNation I am actively engaged in the MPS system (Milwaukee Public Schools). Through this placement I was able to reflect on my time there and how over time I watched my identity shift. Receiving a massive influx of diversity and a new cultural setting allowed for the reflection on how different communities engage with one another. Specially

I am here to reflect on how my identity was shifted through the interaction of children who were different than I. Through personal experience stories you will be able to understand how I came to this end goal concept. I want to understand how my service learning experience influenced my cultural competence along with how this experience is impacting me long term rather than short. Service learning is something that affects everyone differently but if given the right effort can produce extraordinary stories.

**Michael Esson**

Effects of Body Fat on Sleep

Mentor: Krista Lisdahl, Psychology

Poster Presentation, Easel 52

Obesity, an excessive amount of body fat, affects 36% of young adults and 21% of adolescents in the United States. Previous research has shown a relationship between body fat percentage and poor sleep quality in adults, however little is known on the impact of body fat percentage on sleep in young adults and adolescents. The current study predicted that higher total fat would be associated with poorer sleep quality. Participants with higher visceral fat (VF), will report worse sleep quality compared to participants with higher subcutaneous fat (SCF). Seventy-four participants (62% males and 68% Caucasian), ages 16-26, participated in the study. After three weeks of abstinence, participants were administered a neuropsychological battery, including a sleep quality measure, and an abdominal MRI to determine SCF and VF levels. Linear model was run to determine how SCF and VF percentiles impacted sleep quality, while controlling for past year alcohol use. Results indicate that total fat was not significantly associated with poorer sleep quality. Participants with higher VF did not significantly report worse sleep quality than participants with higher SCF. In contrast to our hypotheses, increased total fat percentage was not significantly associated with poorer sleep quality. Also, participants with higher VF did not differ on reported sleep quality compared to participants with higher SCF. Our results suggest there may be underlying factors affecting sleep that were not explored. Research demonstrated that higher fat ratios distributed from the neck to abdomen were significantly related to obstructive sleep apnea. Therefore, could be contributing to poorer sleep quality. This could mean that high levels of fat distribution, although not a primary contributor in sleep quality, may be involved in disordered sleep.

**Jacob Exline**

The Effects of CABIN1 in Auditory & Vestibular Function of Zebrafish

Mentor: Ava Udvadia, Biological Sciences

Poster Presentation, Easel 55

The auditory and vestibular systems mediate hearing and balance and are critical for an organism's survival. Previous work in our lab suggested that reduced expression of the CABIN1 protein leads to diminished auditory and vestibular function in developing zebrafish.

CABIN1, a gene encoding a calcineurin binding protein, is upregulated in neural and neural crest-derived tissues during development. In this study, we test the hypothesis that the CABIN1 gene is necessary for proper auditory and vestibular development. Four behavioral assays will be performed on zebrafish strains possessing targeted gene knockout mutations in the CABIN1 gene. Application of light otic vesicle pressure, or ear touch, elicits an auditory escape response. Head and tail touches also elicit escape responses, allowing use to distinguish specific deficits in auditory response from more general deficits in the motor activity of CABIN1 mutant fish. Additionally, vestibular function will be assessed by comparing the resting posture between wildtype and CABIN1 mutant zebrafish. Based on our preliminary findings, we expect that CABIN1 mutants will have diminished ear touch responsiveness, but not to head or tail touch, along with a reduced ability to maintain an upright posture, indicating developmental deficits in the auditory and vestibular systems.

#### Alexander Fairburn

E-liquid Promotion Perceptions on Instagram  
Mentor: Linnea Laestadius, Public Health  
Poster Presentation, Easel 56

As the e-liquid market continues to develop and expand, new avenues are being utilized for advertisement and marketing. E-liquids are the fluids used to deliver a nicotine to a vapor. E-cigarettes use e-liquids to deliver optional nicotine and flavor. Social media has become helpful to the e-liquid industry in terms of marketing their content to young adults. This study aimed to analyze e-liquid marketing on Instagram through focus groups and qualitative content analysis. We took part in recruiting and note-taking for the focus groups. Specifically, we searched for 18 to 24-year old non-smokers, vapers, smokers, or dual users for focus groups. We posted flyers at local schools, coffee shops, grocery stores, and vape shops. In the focus groups, participants were shown five e-liquid advertisements from various Instagram accounts. They were asked to mark what they liked and did not like about the image, and then were asked to discuss among themselves. Some of the themes discussed include hashtag use, caption length, warning labels, colors, and flavors. Color and flavor imagery were also explored in the image content analysis, in which one undergraduate and one graduate assistant engaged in coding 1,500 e-liquid related posts from Instagram. The coding sought to determine if certain themes were more prevalent than others in colors, flavors, or imagery of the posts. The results of the study are still being finalized.

#### Travis Fichtenbauer

The Chronicles of Nulling Pulsars  
Mentors: Joe Swiggum & David Kaplan, Physics  
Poster Presentation, Easel 104

Pulsars are rapidly rotating neutron stars that emit radiation from their magnetic poles. A small portion of the pulsar population is known to occasionally cease radio emission for periods of time; these are called

nulling pulsars. The study of nulling pulsars allows us to better understand the emission mechanism of pulsars and how pulsars “die.” Observations for this project were made using two of the world’s largest radio telescopes - the Green Bank Telescope and the Arecibo Observatory. We proposed confirmation observations of 15 nulling pulsar candidates, sources originally discovered in the Green Bank North Celestial Cap (GBNCC) survey, and we have conducted observations for all of them. Until now, techniques used to estimate the the nulling fraction (fraction of time pulsar spends in a null state) were biased, so we employ a new method using Gaussian mixture models to better estimate nulling fractions and characterize the nulling behavior of several recently-discovered pulsars.

#### Bailey Flannery

Magical Animal Transformations: Medieval  
Commentary on Toxic Masculinity  
Mentor: Jacqueline Stuhmiller, English  
Oral Presentation: 12:00pm | Union 280

There is a pervasive theme across medieval literature in which women manifest their power through animal transformations, moments that often coincide with women mastering themselves and men through speech and wisdom. Well-known examples include the Mabinogi’s Rhiannon and the Irish mythology’s Macha, both of whom are strongly associated with and even turn into horses in critically layered symbolism. Horses are physically powerful and impressive, yet non-predatory, indicating that these women exercise non-violent forms of power. Furthermore, horses are often the tools of men. Thus, these women’s transformations symbolize a reversal in which the tools of men master men, proposing a non-violent form of power that overturns hierarchies. In stark contrast, animal transformations in men frequently coincide with their violent mastery of women. Examples include the fourth branch of the Mabinogi’s Gwydion and Gilfaethwy, both of whom sexually assault a woman. These men transform into creatures of the hunt in an oblique reference to the love-hunt trope, an inherently violent metaphor of erotic pursuit in which men chase and forcefully overtake their female prey. Hence, men’s animal transformations are both revelations and punishments of their predatory behavior. This paper contends that magical animal transformations in medieval literature not only delineate two competing models of power, but also stress the danger of a toxic masculinity based in the performance of violent mastery, foreshadowing contemporary gender struggles.

#### Bailey Flannery

The Monstrous Mouths of Women in the #MeToo Era  
Mentor: Jacqueline Stuhmiller, English  
Oral Presentation: 1:00pm | Union 280

The vagina dentata, literally meaning “toothed vagina,” is an age-old, pervasive motif in art and literature that spans from ancient Greek epics to modern American media. Across time periods and cultures, depictions of



the vagina dentata allow women to symbolically “bite back” against sexualized violence and castrate the men who attack them. Notably, these depictions often conflate women’s facial mouths with their toothy nether mouths. Thus, the facial mouth also operates as a locus of power and rebellion for women, another monstrous mouth. With the development of the #MeToo movement, women have begun utilizing their monstrous mouths to bite back in a new way: voicing their experiences of men’s sexual predation. In doing so, they have inspired a social revolution that empowers women and holds men accountable for their behavior. The rise of women’s voices has created a new form of castration: social and professional castigation of men who abuse their power. It has also challenged the notion that toxic masculinity, which is based in violence and dominating women, is the only masculinity, prompting many to question, “If this way of being a man is no longer acceptable...then what is? What is modern masculinity?” By examining manifestations of the vagina dentata in pivotal media moments over the past year, this paper provides an understanding of the present American moment and its shifting gender landscape, ultimately revealing a troubling, escalating pattern in which men and women become monstrous, unintelligible others to one another.

#### **Brooke Follansbee**

An EEG-Based Brain-Computer Interface (BCI) for Stroke Rehabilitation

Mentors: Qussai Mohammed Obiedat & Roger O. Smith, Occupational Science & Technology  
Poster Presentation, Easel 58

Does Electroencephalograph (EEG) guided Functional Electrical Stimulation (FES) facilitate the recovery of a stroke? Stroke survivors’ main obstacle of recovery is restoration in the upper extremity motor function. Loss of motor function affects the ability to carry out activities of daily living and reduces independence. The effects of a stroke refrain intentional movements in the motor cortex from occurring. Brain-Computer Interface (BCI) could potentially enhance upper extremity motor rehabilitation for stroke survivors by stimulating the muscles with the FES system. FES helps in rehabilitation recovery with visual feedback and the intention of muscle movement “closing the loop”. This therapy utilizes brain plasticity to achieve the goals of rehabilitation. BCI utilizes EEG data to activate the FES device. This system recognizes event-related desynchronization or synchronization from the motor cortex, resulting in the ability to control the frequency of stimulation. Restoring the upper extremity motor functioning is crucial for the process of stroke recovery. Our aim is to discover if Functional Electrical Stimulation can increase stroke survivors’ fine and gross motor skills, focusing mainly on behavioral measures and utilizing brain plasticity. 40 stroke survivors, ages 21-85 will be recruited for this study. The participants will receive BCI-FES therapy for a duration of 4-6 weeks. Behavioral assessments will be administered before, during, and after interventions. The behavioral assessments include: Action Research Arm Test, Stroke

Impact Scale, Barthel Index, etc. After waiting another 4 weeks, while the participants receive no therapy, we will then administer a final session of behavioral assessments. Repeated measures of ANOVA will be used to compare the results of the assessments. We expect to observe an increased recovery of general motor skills and overall function of the individual’s affected arm using EEG-BCI.

#### **Matthew Fox**

MATLAB Program & GUI for Biomechanical Research Data Report Generation

Mentor: Alyssa J Schnorenberg, Occupational Science & Technology  
Poster Presentation, Easel 59

The Mobility Lab conducts research regarding human movement. The lab gathers three-dimensional data on subject joint kinematics (angles), joint kinetics (forces and moments), and spatial-temporal parameters through motion analysis of the subject’s movement. After processing the data, the lab members manually create reports which succinctly represent relevant data. Due to the lab’s multiple studies, this data accumulates quickly, which means that creating these reports is time intensive. Also, manually generating the reports are subject to human error. In order to reduce time and errors, this project will provide automated report generation for the biomechanical research data in Word documents with the use of a graphical user interface (GUI) which may be used by any lab associate for any project. The report generator will allow lab members to accurately, consistently, and efficiently create biomechanical research data reports without errors. These reports will be used to discuss study data with other lab members or clinicians. In addition, the automated reports will contain the same aesthetics allowing for universal understanding across all lab members. The report must include an introduction page presenting subject information, graphs and tables representing kinetic and kinematic data. The GUI must contain multiple input boxes related to the subject, and various buttons that handle different functions. This GUI must be intuitive and clear, so lab personnel won’t have trouble working with it. In addition, the GUI should be able to load and save previously entered subject information in order to provide multiple reports for the same subject. Object oriented programming was the driving concept to keep the project code intelligible and concise. MATLAB was used to build the graphs and tables using trial data, while C# helped populate the Word document with the aforementioned components. This project is beneficial for the lab by reducing workload while maintaining accuracy.

#### **Sydni French**

Behavioral Play Therapy with Children with Williams Syndrome: Examination of Parent Ratings of Anxiety  
Mentors: Bonita P. Klein-Tasman, Brianna Yund & Kenia M. Rivera, Psychology  
Poster Presentation, Easel 60

Williams syndrome (WS) is a rare genetic neurodevelopmental disorder caused by a microdeletion on chromosome 7q11.23. Previous studies have found that fears are a

significant behavioral characteristic of WS (Dykens, 2003). Behavioral Play Therapy (BPT), based heavily in Replays (Levine & Chedd, 2007), uses cognitive behavioral therapy techniques and a play-based approach focused on humor to reduce anxiety. Replays has children practice being in the situations that make them anxious with adult support (Levine & Chedd, 2007). The adult uses humor and play to allow children to reexperience the event with less anxiety. BPT provides a manual that guides the clinician in conducting focused functional behavior assessments, fear ladders, and unbundling (Klein-Tasman & Levine, in progress). The current study aims to examine the methods used to collect and organize survey tracking data to identify areas for improvement in the treatment manual and research approach. Seven participants (ages 5-7) participated in 2-3 BPT sessions over a period of two to three days at UWM. Parents completed online weekly and daily tracking surveys before and after the treatment sessions. The surveys required them to score anxiety (i.e., maximum, minimum, typical, anticipatory questions) and parental factors (i.e., amount of interference, degree stopped, parental distress) for different fears. Their data will be examined. This study is a small but crucial step in the long-term goals of the BPT study, which is to create an online manual to train practitioners working with kids with WS in BPT to maximize resources for kids with WS. Fine-tuning the approach based on our work to date can help to improve the approach used so that community-based research about the effectiveness of this approach in decreasing anxiety can be conducted.

#### **Madeline Fruehe**

The Carryover Effect of Stereotype Threat on Women  
Mentor: Stephanie Baran, Sociology  
Poster Presentation, Easel 61

This study investigated the relationship between stereotype threat (women performing poorly on math related tasks) and carryover effect (under performance on an unrelated task immediately following the stereotype threat). Participants were randomly assigned to either the stereotype threat condition or the control condition. All participants received an activity packet that was identical except for the inclusion of a stereotype threat in the introduction of stereotype threat condition packets. Participants read the introduction, filled out demographic and distractor questions, and then completed a logic puzzle from the Spring 2008 LSAT that did not require math related skills. There was a significant difference between conditions on task performance concluding that stereotype threat may carryover to cause underperformance on an unrelated task.

#### **Nicholas Fults**

Phosphorous Recovery from Natural Porous Material  
Mentor: Marcia Silva, Freshwater Sciences  
Poster Presentation, Easel 62

Phosphorous is a major resource for fertilizers and is widely used in farming, but like most resources it is limited. The ability to recycle phosphorous has proven to be a necessary process today. Excessive amounts of phosphorous can be found in run off or wastewater

which can then be collected through various adsorbents that capture the excess phosphorous before it has a chance to speed up eutrophication. Many of these methods involve the use of natural porous material that have high ionic exchange properties. When these materials remove the phosphorous from water there is an opportunity to recover the phosphorous through known means such as sodium hydroxide (NaOH) baths. This now recovered phosphorous can be reused, leading to an improved cycle of phosphorous content in water. The aim of this research is to analyze the various factors such as time, temperature, NaOH concentration, etc. that effect the rate of desorption of phosphorous from low-cost natural porous material.

#### **Armand Gamboa**

Analyzing University Involvement in Social Justice  
Mentor: Arijit Sen, Architecture  
Poster Presentation, Easel 19

Social inequality is a taxing issue for many of the inhabitants in Milwaukee, particularly so for those within the Washington Park and Sherman Park communities. This research examines university involvement across various disciplines within the UWM system and how it integrates with established community countermeasures, such as local grassroots responses. Areas of focus within the University include art, dance, theatre, architecture, geography, and storytelling. The goal of the research is to document the interventions present within these disciplines in order to better understand how their unique interactions help to enrich the communities they serve. On a broad scale, the findings of this research illuminate how individual actors operate individually and cooperatively to address the social justice within Milwaukee.

#### **Margarita Garcia**

“So American it Hurts”: Stories of the 1.5 Generation  
Mentor: Rachel Buff, History  
Oral Presentation, 12:00pm | Union 340

The concept of the “American Dream” has long been the basis for migration to the United States. It is the belief that anyone, regardless of where they were born or what class they were born into, can attain their own version of success in a society where upward mobility is possible for everyone. However immigrants who remain undocumented can begin to feel worn down by the animosity, fueled by prolonged and re-energized xenophobia, towards them. Despite their criminalization by mass media and the Trump administration, immigrants continue to labor in unstable employment positions to support their family. Children brought to the United States at a young age by their parents and raised here belong to the 1.5 generation. Forced to navigate between cultures and identities while guiding parents through the system, although challenging, is a small price to pay for their parent’s sacrifice. Their established American identity can feel denied because of anti-immigrant policies and rhetoric. While some may be too young to remember the migration journey, it is

critical their stories be preserved in order to dismantle the negative narratives of who immigrants are, understand the complexity of their identity formation, and how they see themselves in American society. This research for this paper involves interviews with 30-35 university students who identify with the 1.5 generation in Milwaukee, Wisconsin. Questions target their experiences growing up undocumented or in a mixed status family while dealing with hostility towards Latinx and immigrants. The recorded interviews will be used to create a podcast that revolves around the 1.5 generation experience with biculturalism, family, support services, community and definitions of home. It's important this generation has a platform to share their families' migration journey to counteract inaccurate perceptions of who immigrants are and why they migrate.

#### **Maximillian Geis**

Emergence Patterns of Silphium Gall Wasps in a Restored Prairie

Mentor: Teresa Schueller, Department of Mathematics & Natural Sciences, College of General Studies

Poster Presentation, Easel 204

Historically prairies were diverse ecosystems, important to many species of both flora and fauna of the Midwestern region of North America. Unfortunately, these ecosystems nearly vanished as they were plowed under to create farmland and make room for development. Recognizing the essential role prairies play in the environment, scientists and environmentalists have begun restoring these habitats, creating a new habitat—restored prairies. It is important to properly document and study the function of these newly-created ecosystems, the oldest of which are only a few decades old. The UW-Milwaukee at Waukesha Field Station is home to a 13-acre, restored prairie, ranging in age from 3 to 50 years in different sections. Using the presence of a group of prairie specialist Silphium gall wasps as indicators of a healthy environment we collected the stems of four species of Silphium plants, the wasp host plants, in the fall of 2016 and 2017. The stems were held in sealed plastic bags, and the wasps were collected and counted every 2 to 3 days from May to July of the following year, as they emerged from the stems. We documented the emergence patterns of the wasps for each plant and year. This study is the first comprehensive study of the emergence patterns of the Silphium gall wasps. This data is important in understanding the biology of the gall wasps and other prairie sensitive insect species. We hope that the results of this study will also lead to studies addressing other important questions regarding these wasps, such as how these emergence patterns compare with those from remnant, untouched prairies, how insect fauna are affected by fire events, and how this information could develop our understanding of a changing environment.

#### **Elizabeth George, Amber Joshway, Aaron Meyer & Emily Wallander**

Surfin' USA: Women, Candidates of Color, the Democratic "Wave" of 2018

Mentor: Paru Shah, Political Science

Poster Presentation, Easel 63

Headlines touted the "wave" of women and minority candidates running in the 2018 elections, leading some to conclude that 2018 would be the new "year of the woman" and perhaps "year of the candidate of color." Scholars were equally excited about the prospects of the 2012, 2014 and 2016 elections, and important strides towards equity have been made. Yet we also know that 90% of elected officials at most levels of government in the US continue to be white, and the vast majority of them white men, despite changes in racial/ethnic minority demographics. In this paper, we examine the over 2,000 Congressional candidates for office in 2018, examining the candidacies of women and candidates of color. Did they raise as much money as their white, male counterparts? Did they have as many challengers? Did they garner a substantial portion of the vote share? And did the Democrats make more inroads than the Republicans? The results point to important structural challenges that continue to face women candidates and candidates of color, and add to the broader scholarship on emergence and leadership.

#### **Sanjna Girdhar**

Engineering of Fluorophore-Polyprotein Construct

Mentor: Ionel Popa, Physics

Poster Presentation, Easel 65

Protein L, consisting of 719 amino acid residues, is isolated from the surface of bacterial species *Peptostreptococcus magnus* and is known to bind to immunoglobulins through L chain interaction. The objective of this project was to engineer and express a polyprotein construct made from eight domains of protein L in series with a fluorescence domain, EGFP, and determine its possible usefulness as a secondary detection reagent for applications such as Western blots. Starting from the monomeric unit, we applied molecular biology protocols and engineered a polyprotein L made from eight repeats. This can be classified into three simple steps: monomer to dimer, dimer to tetramer, and finally tetramer to octamer. Two restriction enzyme digestions were followed to cut open the vector (containing octamer) and digest the fragment. The two were then ligated together. The final product was screened in the lab and also sent for sequencing to double check. We have finally expressed this protein and tested its antibody labeling activity using Western blot technique.

**Olivia Gloria**

Mechanical & Optical Response of Proteins to Force Studied with Single Molecule Magnetic Tweezers  
Mentor: Ionel Popa, Physics  
Poster Presentation, Easel 66

The objective of this project is to establish a system that combines single molecule magnetic tweezers with two-photon FRET micro-spectroscopy. We use a polyprotein that has been successfully engineered and expressed, containing the following domains from N to C: HaloTag-(I27)-(I27)-SpyTag-(I27)-(I27)-AviTag as well as another protein, eGFP-SpyCatcher. The HaloTag and AviTag are used to tether this molecule using magnetic tweezers, and the four I27 domains (from muscle protein titin) produce a mechanical fingerprint. SpyTag-SpyCatcher form a covalent isopeptide bond and allow the attachment of fluorescent proteins sideways, such that they cannot experience the force placed on the tethered protein. This type of attachment is crucial, as fluorescent proteins simply placed in series would unfold and bleach. We also implemented a system based on the binding between fluorescently tagged antibodies and bacterial protein L. In this case, the mechanical fingerprint comes from the unfolding of protein L domains while the fluorescent signal comes from eGFP. We anticipate that this new technology will foster an entirely new approach – 3D force spectroscopy, which will evolve into an invaluable tool in the study of biological processes such as cellular mechano-transduction, sensing, and communication. Additionally, it will provide key insights into the reduced dimensionality of ligand binding and enzymatic reactions under normal physiological conditions and in disease. The immediate outcome will be to establish the parameters needed to operate this new instrument and to demonstrate the new technique on a simple protein construct.

**Annika Gogan**

The State of the Audit Committee: What We Have Learned in the SOX Era  
Mentor: Colleen Boland, Business  
Poster Presentation, Easel 69

In 2002, the Sarbanes-Oxley Act (SOX) created the Public Company Accounting Oversight Board to protect investors and further the public interest in the preparation of informative, accurate, and independent audit reports, which led to improved accounting practices and financial quality regulation. The ideas presented by SOX and the Securities and Exchange Commission, encouraged stock exchanges, including the New York Stock Exchange and National Association of Securities Dealers Automated Quotations, to make rules requiring publicly traded companies to have audit committees. Audit committees, a committee of a company's Board of Directors, are independent of management and serves as a liaison between external auditors and management and the company's Board of Directors. They are also a safeguard for a company's financial reporting quality. We provide a review of the literature since the passage of SOX. We start by identifying the evolution of audit

committee responsibilities in the SOX era. Next, we identify research in four determinants of audit committee effectiveness: composition, authority, diligence, and resources (Dezort et al. 2002). We identify gaps in the literature, including the effects of technology upon an audit committee's purpose and responsibilities. Our project should be of interest to researchers, companies and regulators in describing the current understanding of audit committee's responsibilities and authority.

**Jacob Grudnowski**

Dynamics of Intrasexual Aggression in the Lake Malawi Cichlid Fishes of the Genus *Labeotropheus*  
Mentor: Michael J. Pauers, Biological Sciences,  
College of General Studies  
Poster Presentation, Easel 70

Sexual selection, both female mate choice and male-male aggression, has been important in the rapid and explosive evolution of the cichlid fishes of Lake Malawi, Africa. In this study, we take a unique approach to the study of aggression by examining aggression in a pair of closely-related, sympatric species of the genus *Labeotropheus*. We hypothesize that males of both *Labeotropheus fuelleborni* and *L. trewavasae* will be more aggressive towards conspecific males than they will to those of the other species. The results of this study will demonstrate how behavioral barriers can promote the evolution of new species

**Lukas Guillien**

Optimization of Wind Farm Configuration  
Mentor: Ryoichi Amano, Mechanical Engineering  
Poster Presentation, Easel 71

With the increasing popularity of wind farms, the question of what is the optimum turbine placement has arisen. This study aims at determining the minimum wind turbine spacing while maintaining maximum power generation. Performance will be judged by percentage of free stream velocity recovery as well as by the average turbine power coefficient ( $C_p$ ). A model will be generated within Star CCM+ using Large Eddy Simulation (LES) and validated by wind tunnel testing. Historically, experiments have concluded that a spacing of 8 rotor diameters in an in-line configuration yields a free stream velocity recovery of 88%. This study will test staggered configurations which should increase the free stream velocity recovery, while allowing for smaller turbine spacing. The results will serve as a guide for designing future wind farms and predicting power output.

**Jesse Gultch**

Precision of Multi-Segment Foot Model Anatomical Landmark Identification  
Mentor: Steven Cobb, Kinesiology  
Poster Presentation, Easel 72

Multi-segment foot models allow measurement of the movement (kinematics) of multiple joints within the foot (e.g. rearfoot, midfoot, forefoot) during gait. Kinematics must be repeatable across testing sessions and testers (e.g. researchers in different labs/clinics) for the data to

be clinically relevant. Two of the most common sources of error associated with kinematic gait studies are skin movement artifact and anatomical landmark location variability. The precise identification of anatomical landmarks is critical to the subsequent joint motion calculations. The aim of this study is to investigate the within-tester and between-tester precision of placing markers on leg and foot bone anatomical landmarks for a surface marker based multi-segment foot model. Ten apparently healthy participants (age 18 – 44 years) will be recruited from UWM and the surrounding community. First, an initial screening procedure for inclusion/exclusion criteria will be completed. Then, anatomical landmarks on the right leg (medial malleolus, lateral malleolus, tibial tuberosity) and foot (calcaneus, navicular, cuboid, metatarsals, hallux) will be palpated. Reflective markers will be placed on the skin over the anatomical landmarks. Next, the participant will stand and the positions of the markers will be captured for 1 s by a 14 camera motion capture system. All of the reflective markers will then be removed and a second tester will complete the procedures. Finally, each participant will return within one week and the procedures will be repeated by both testers. Within- and between- tester precision will be calculated as the root mean square (RMS) of the deviation between the positions of the anatomical landmarks in a trial and the landmarks mean position. The data collected in the current study will be the first to provide information related to the precision of anatomical landmark location associated with a kinematic multi-segment foot model.

#### **Lauren Hahn & Camren Bento**

Pre-to-Post Analyses of Cognitive Bias Modification in Targeting Primary Obsessions

Mentor: Han Joo Lee, Psychology  
Poster Presentation, Easel 72

Thought-Action-Fusion (TAF) is an important cognitive bias in OCD, referring to the belief that having a random, strange thought increases the chance of an event occurring or represents a person's true dark morality. The Thought-Action Fusion Scale-Revised (TAFS; Shafran et al., 1996) captures the general moral and likelihood constructs of TAF but does not consider idiosyncrasy of obsessional symptoms. Siviec and colleagues (2017) developed the Primary Obsession Evaluation of TAF Scale (POETS) to assess primary obsessional intrusions in terms of TAF bias and associated negative emotions. Participants were undergraduates (N=57) reporting TAF belief, were randomized to either: (a) an Active CBM-I (TAF Incongruent; TAF-INC), (b) a Control/Maintenance CBM-I (TAF-CON) that does not challenge TAF thoughts, or (c) Stress Management Psychoeducation (SMP), a comparison condition that reduces obsessional severity without directly targeting TAF. Primary outcome measures were the TAFS and POETS, a 15-item self-report measure, incorporating three subscales, (1) general emotional reaction (POETS-GE), (2) moral TAF (POETS-M), and (3) likelihood TAF (POETS-L). Findings supports the POETS' construct

validity, as well as its internal consistency. Results indicate there was a significant difference between conditions at post-training on POETS-M ( $F(2,50) = 5.14, p = .009, 2 = .10$ ), POETS-L ( $F(2,50) = 4.59, p = .015, 2 = .10$ ), and POETS-GE ( $F(2,50) = 3.419, p = .049, 2 = .07$ ). Findings indicate a single session of computerized cognitive bias modification for interpretations (CBM-I) can reduce TAF belief and distress, including primary obsessions, as measured by the POETS. The implications of these findings will be discussed.

#### **Nikia Handy**

My Community Based Internship: Cultural Competency vs. Diversity  
Mentor: Benjamin Trager, Educational Policy & Community Studies  
Poster Presentation, Easel 36

In 2019, cultural competency and diversity is pushed in the workplace more now than ever. My community-based internship showed me the importance of cultural competency. In addition, it shaped my understanding on cultural competency. According to Wilson, cultural competency is the ability to relate to others. Whereas cultural diversity acknowledges the existence of a variety of cultural groups within a society. Cultural competency challenges diversity because it seeks interaction and understanding of one's culture. In my experience, cultural competency directly engages with others and sympathizes with their culture even if you cannot necessarily relate. Whereas, I have seen diversity become limited to workplace trainings and including other cultures without depicting the meaning behind it. It has been integrated in the workplace and has been used because you are working with others from different cultural backgrounds. Through my research I have found three components that are fundamental to cultural competency is: (1) Relationship building (2) Knowledge of other's cultures (3) Effective Communication. Relationship building is a fundamental part of cultural competency and is based on expectations and attitudes. Secondly, being knowledgeable of others help you relate to others and maintain a self-awareness of what is going on around you. Lastly, effective communication is important in relating to others. The Community-Based Internship shaped not only my cultural competency but my view on my community. In my CLIP experience, I work with a team of diverse individuals: African-American, Filipino, Indian, and Caucasian. Each has a different cultural and socio-economic factor and contributes to our community uniquely. My view is no longer limited to defining community as the ones I have something in common with but more so finding community by cultivating relationships with those from different socio-economic backgrounds and cultures.

**Sarah Haq**

Horizontal Gene Transfer of the Lux Operon  
Observed in the Genus *Vibrio*  
Mentor: Charles Wimpee, Biological Sciences  
Poster Presentation, Easel 74

Horizontal gene transfer has had an enormous effect on the evolution of bacterial genomes. Typically, this event would be detected retrospectively, in congruent phylogenetic trees or anomalous base composition. In certain cases horizontal gene transfer can result in the replacement of a resident gene. When this occurs, it is possible that the recipient bacteria will (at least temporarily) harbor two nonidentical copies of the same gene. Our lab has seen multiple examples of this with the *luxA* gene, strongly indicating ongoing horizontal gene transfer. Merodiploids have been detected by sequence analysis showing multiple occurrences of double peaks in the same place. The gene was amplified using high fidelity Phusion polymerase to preclude the mistakes made by the more error prone Taq polymerase. The products of the amplification were cloned and sequenced. Results of the sequence showed that where double peaks were previously seen now had either one of the two base pairs seen in the clones. This indicates the presence of two different copies of the *luxA* gene. One copy is 99% identical to *luxA* from *Vibrio harveyi*, and the other copy is 99% identical to *luxA* from *Vibrio campbellii*. The two copies are 97% identical to one another. The entire Lux operon was also amplified, cloned and sequenced. The results of this sequence indicated the presence of two different copies of the Lux operon.

**Megan Harris, Samantha Borden & Brenden Mock**

Durational Feature of Speech Segments in  
Children with Cochlear Implants  
Mentor: Jing Yang, Communication Sciences  
& Disorders  
Poster Presentation, Easel 77

Spoken language is acquired through hearing a language clearly and hearing oneself speak the language. This chain of learning can be broken by hearing impairments. The purpose of our research is to compare the durational feature of speech segments produced by prelingually deafened native Mandarin children with cochlear implants to those by Mandarin-speaking peers with normal hearing. The durational measurements were performed on a total of 10 native Mandarin children (4 with normal hearing and 6 with cochlear implants). A visual-auditory repetition task was used to elicit speech samples from the participants. Each child was shown a picture on a computer screen followed by an audio prompt produced by a Mandarin-speaking adult. Then each child was asked to repeat the target word. The speech materials included a list of Mandarin disyllabic words which contains 6 Mandarin affricates /ts, ts<sup>h</sup>, tʂ, tʂ<sup>h</sup>, te, te<sup>h</sup>/, five fricatives /f, s, ʃ, ʒ, x/ and seven Mandarin monophthongal vowels /a, i, u, y, ɿ, ʝ/ located in the first syllable of the words. Fricatives are speech sounds that are produced by forcing air through a narrow space, for example, an

'f' or a 'v' sound. An Affricate is a speech sound that is produced by blocking the airflow then releasing into a Fricative sound, such as the 'ch' sound. Vowel sounds are classified as sounds that have little restriction in the vocal tract, for instance, the 'a' sound in apple. Acoustic Analysis was performed to measure the duration of affricates, fricatives, and vowel sounds.. According to previous literature that showed deviations of speech characteristics in CI children relative to normal hearing children, we anticipate that the acoustic deviation will also be reflected in their duration features. The findings from this study will help researchers, clinicians, and teachers, better understand the speech production of children with CIs and thus develop a more targeted intervention plan to improve their speech intelligibility.

**Hannah Hellman**

Applied Behavioral Analysis and Equine Therapy:  
A Comparative Report  
Mentor: Kris Barnekow, Occupational Science  
& Technology  
Poster Presentation, Easel 75

According to the CDC, around 1 in 59 children are currently being diagnosed with Autism Spectrum Disorder in America (CDC, 2014). When a family has a child diagnosed with autism it can be a very confusing and challenging time as they attempt to navigate through different intervention and treatment options. Using archival research, I looked into two different types of interventions: Applied Behavioral Analysis pioneered by Ivar Lovaas, and Equine Therapy a newer and developing intervention. The goal of this research was to distinguish different techniques and factors that created positive outcomes for children with autism in areas such social skills, communication, and behavior. Using the UWM Library database I researched the development, implementation, and results of these two types of therapies. Keyword searches were used to find case studies, journal articles, and self-reporting from parents and other professionals. By evaluating these two therapies a comparison and contrast of what aspects of the different interventions are effective can be formed. A combination of interventions may be highly effective in creating positive outcomes for this population which can be further explored by looking into other interventions besides ABA and Equine therapy. Because autism exists on a spectrum it is important to know what is different about these interventions. What may produce positive outcomes for one child may not produce the expected outcomes for another. In the future, a combination of working elements from different therapies may be used to create more comprehensive treatment plans. This research could also be used to help create decision making aids for parents to use to decide what treatment plans will work best to reach the goals needed for their families.

**Amillia Heredia**

The Perception of Autism in YouTube Comments

Mentor: Celeste Campos-Castillo, Sociology

Poster Presentation, Easel 76

The controversy surrounding the legitimacy of autism has our society conditioning which symptoms are worthy of recognition. Autism is a spectrum, and the conditions created by society separate people with autism by their symptoms as a way to validate their disorder, disregarding their diagnosis. To study how people respond to the different levels of autism we collected YouTube comments under videos made by autistic YouTubers describing their day to day lives. After collecting the comments, we coded the comments according to what the commenter mentioned, both directly and indirectly. I've found that comment sections with little mention of symptoms were more scrutinized and ridiculed compared to the comment sections that were filled with consistent mention of different symptoms. These findings emphasized the worth associated with symptoms of social disorders. I also found that most commenters who were sympathetic in the comments were either autistic themselves or had loved ones and friends who were on the spectrum. The weight of worth attributed to symptoms can be applied to most disorders or disabilities, as you will find the more impacted a person seems by their disability, the less scrutiny they will face. The more visible a symptom from a disability is, the more validation that person will receive.

**Dulce Hernandez-Blanchard**

Microstructural Observations Across the Southern

Iberian Shear Zone

Mentor: Dyanna Czeck, Geosciences

Poster Presentation, Easel 79

The interactions of tectonic plates cause deformation in rocks that results in a shear zone. A shear zone is a tabular zone of rocks that has a measurable thickness which strain is localized when two sections of rock smear against each other. Water can change the deformation of shear zones, influencing the deformation in the Earth's crust. I am contributing to ongoing research on the interactions of fluids and deformation in the Southern Iberian Shear Zone (SISZ). To research the Acebuches Metabasites, we looked at seven thin section that spanned the Calabazares transect; observed the mineralogy and found that the minerals amphibole, plagioclase, and pyroxene were abundant along with a grain size trend throughout the transect. After observing the mineralogy, we looked at two different microstructures; solution seams and veins and the mineral content and angle against foliation. We found that the veins are composed of plagioclase and amphibole minerals and that they were nearly all perpendicular to the foliation. Researching the mineralogy and microstructures more at depth will help future research in determining how fluids played a major role in controlling the metamorphic reactions and deformation style of this shear zone.

**Kevin Hicks**

Electrochemical Sensor for Detection of Phosphorus in Stormwater

Mentors: Marcia Silva, Freshwater Sciences &

Woo Jin Chang, Mechanical Engineering

Poster Presentation, Easel 80

The process of trying to stop fertilizers that farms use in their field from ending up in our water ways and bodies of water is a very difficult task that has plagued our society over the past few decades. Whenever there is a storm fertilizer that was in the field usually gets washed away into a body of water and because the main element of most industrial fertilizers is Phosphorus the process of eutrophication occurs. Eutrophication is not good for that ecosystem because the extra nutrients in the water encourage plant growth and when plants grow at an accelerated rate, they kill the marine life due to lack of oxygen. Stormwater usually has many different elements inside of it besides Phosphorus and it is hard to detect those elements. As of right now the only means of knowing how much of each element is in each sample of stormwater is to bring it back to a lab and use a spectrometer. Transporting samples back to the lab and analyzing them is very effective, but takes time and spectrometers are not cheap. So, while it is a very fine way of detecting the elements present in stormwater it is not efficient and can't be done in the field. Our goal of this project is to use our electrochemical sensor to see if it can detect Phosphorus in storm water so that we do not have to bring samples back to the lab for analysis. The experiment has two main stages that we test our sensor with, the first stage is testing the sensor ability to detect phosphate in stock solutions. Next, we will collect fresh environmental stormwater samples and perform the same test as we did with the stock solutions. From our preliminary results the sensor works for detecting phosphates in drinking water and the stock solutions.

**Dylan Hoffman**

Evaluation of Cellular Toxicity of New Compounds

Developed for CNS Indications

Mentor: Alexander Arnold, Chemistry & Biochemistry

Poster Presentation, Easel 79

Investigators in the chemistry department are developing new compounds for various CNS indication such as depression, anxiety, and neuropathic pain. The importance of my work is to determine at what concentrations these compounds are harmful to cells. This information helps to identify non-toxic compounds that will be further investigated in vivo. Therefore, I'm culturing human kidney cells (HEK 293) in the presence of CO<sub>2</sub> and at 37 degrees Celsius. Periodically, I have to loosen the cells from the flask using trypsin followed by a dilution of cells and further incubation. For the viability assay, I'm placing the cell into a 384 well cell culture plate, followed by the addition of 400 nl of a compound. The cells are incubated at 37 degrees Celsius for two days with different compound concentrations. 20 microliters of Cell Titer Glo solution is then added to break down the

cells and quantify the amount of ATP by luminescence. Several compounds have been tested so far. One compound was found to be toxic at high concentration. Other compounds show no toxicity at concentrations up to 240 micromolar. These results can then be used to determine what a therapeutic dose can be used in vivo.

#### **Robert Holloway**

Student Strategies of Student Success of Human Gross Anatomy

Mentor: Andrew Petto, Kinesiology

Poster Presentation, Easel 205

This presentation explores strategies of student success of human gross anatomy.

#### **Alec Huber**

Imidazobenzodiazepine Asthma Drug Reduces Lung Inflammation without Affecting Systemic

Immune Function

Mentor: Alexander Arnold, Chemistry & Biochemistry

Poster Presentation, Easel 84

Asthma is a common health ailment, but established modes of treatment leave much to be desired, and invite novel pharmaceutical approaches. The role of the GABA (-aminobutyric acid) in the central nervous system has long been recognized, but both the neurotransmitter and its receptors are widespread outside the nervous system. Cells pertinent to asthma pathogenesis have been found to express GABA<sub>A</sub> receptor (GABA<sub>A</sub>R) subunits, namely airway epithelial cells, airway smooth muscle (ASM) cells, CD4<sup>+</sup> T-cells, and alveolar macrophages. Some of the receptor's subunits exist in multiple isotypes, and the specific composition of GABA<sub>A</sub>Rs varies between tissues and cell types, allowing subunit-specific small molecule ligands to target particular cells and tissues to the exclusion of others. Evidence indicates that subunit-selective, orally-administered imidazobenzodiazepines are a viable means of asthma treatment. One, the drug development candidate MIDD0301, induces ASM relaxation, and reduces cytokine secretion and eosinophilia in the lungs, thereby reducing inflammation. However, its immunomodulatory properties had prompted investigation of its potential for immunotoxicity. Two 28-day studies were conducted. In the first, MIDD0301 was administered to an experimental group twice daily at 100 mg/kg. Relative to ad libitum and vehicle controls, the experimental group did not differ significantly along any of the immunological, hematological and histological variables examined. In the second, MIDD0301 was administered daily at 200 mg/kg to an experimental group, along with a positive control receiving prednisone at 5 mg/kg, and a vehicle group. Concurrently, an immunization protocol induced a humoral response in all groups. Using the same battery of tests, the MIDD0301 treated-group, unlike the positive control, did not differ significantly from vehicle group values. Together, these studies demonstrate that MIDD0301 produces neither hypersensitivity nor immune system suppression, respectively. MIDD0301 shows promise as an anti-inflammatory agent that selectively reduces inflammation in the lungs without compromising systemic immune function.

#### **Mitchell Hummel**

Fiber Optic Magnetic Field Sensor Based on Magnetostrictive Composites

Mentor: Chiu Law, Electrical Engineering

Poster Presentation, Easel 85

Our research entails the investigation of the applied magnetic field to magnetostrictive strain relationship of Terfenol-D composite sensors. The purpose of this research is to explore a way to sense magnetic fields with a novel device based on a magnetostrictive composite and an optical device, fiber Bragg grating (FBG). This method has many benefits over traditional ways in terms of enhanced safety and electromagnetic immunity while maintaining minimal loss in operation. Our goal is to explore the effects of the geometrical shape, more specifically a trapezoid shape, of a Terfenol-D composite on the mechanical strain that is transferred to an FBG attached to the composite and develop a method for quantifying the magnetic field based on the optical spectrum of the FBG.

#### **Zoe Hurdle & Jacqueline Westerdahl**

Maternal Responsiveness: Facilitating both Motor & Language Skills Concurrently with Infants

Mentor: Victoria Moerchen, Kinesiology

Poster Presentation, Easel 86

Infants with disabilities who qualify for physical therapy often also have language delays and qualify for speech therapy. An intervention model that supports the parent in concurrently facilitating both motor and language skills has not yet been studied. One approach to initiate this area of inquiry is to explore how maternal responsiveness to an infant during practice of a motor skill might be similar to maternal responsiveness to support language development. The purpose of this study was to examine whether mothers' responsiveness toward their infants during a novel motor task were similar to their responsiveness during a novel teaching activity. Mothers and their infants were studied as a dyad. Infants were typically developing 8-10 month olds who had not yet achieved walking. Two testing contexts were used: A novel teaching task and infant treadmill stepping. In both contexts, the mother supported the infant in learning and/or performing the task. During the treadmill trials, the infant stepped on the treadmill for 8 minutes supported by the mother, who was free to support the infant for rests and comfort as needed. Teaching and treadmill trials were videotaped, transcribed and later coded for five dimensions of maternal responsiveness: contingent responsiveness, emotional support, response to infant focus of attention, and quality of language input. Within subjects analyses using 3 exemplar dyads will be reported. This study reasoned that maternal responsiveness can be used to simultaneously facilitate multiple areas of infant development concurrently.



**Loretha Jack**

Bridging the Gaps in Freshwater Silicate Cycles:  
Assessing Silicate Demand and Incorporation in  
Freshwater Phytoplankton  
Mentors: Erica Young & John Berges, Biological Sciences  
Poster Presentation, Easel 87

Silicate (Si) is a potentially limiting nutrient, shaping the community structure of phytoplankton – the base of most freshwater food webs. The silicate cycle has been well studied in marine ecosystems, but is relatively poorly characterized in freshwater ecosystems, such as the Laurentian Great Lakes. Dissolved silicate concentrations in Lake Michigan have increased over the past 3 decades, which may be related to declines in Si-requiring phytoplankton such as diatoms. However, the mechanisms behind this remain unclear, as the increase appears to be too great to be due to diatoms alone. To better understand Si dynamics in lake ecosystems, the silicate demand and use by diverse freshwater phytoplankton taxa, including known Si-requiring taxa such as diatoms and chrysophytes as well as non-siliceous species, must be examined. Our experiments aimed to characterize growth rates (measured as change in chlorophyll a fluorescence) and Si incorporation into biogenic silicate (bSi) of the diatom *Cyclotella meneghiniana*, the green alga *Chlamydomonas reinhardtii*, and the chrysophyte *Chrysoocapsa* sp. Cells were cultured with full-Si growth media, Si-free media, and full-Si media with the addition of Germanium dioxide (+GeO<sub>2</sub>), an inhibitor of Si incorporation. The diatom *C. meneghiniana* showed significantly decreased growth in both Si-free and +GeO<sub>2</sub> treatments (n=3, p<0.01). Biogenic silicate analyses showed significantly higher bSi in the full Si treatment (n=3, p<0.01). Significant growth decreases were also seen for +GeO<sub>2</sub> treatments for the chrysophyte *Chrysoocapsa* (n=3, p<0.01) and the green alga *C. reinhardtii* (n=3, p<0.05). However, there were no significant differences in bSi, with both species having much lower bSi than *C. meneghiniana*. Fluorescence microscopy of cells exposed to a bSi-indicating fluorochrome, PDMPO, also showed bSi incorporation present only in *C. meneghiniana*. Experiments to quantify bSi incorporation rates using PDMPO and fluorescence spectroscopy in *C. meneghiniana* are currently underway.

**Bryan Jensen**

Revealed Proxies of Utility  
Mentor: John R. Huck, Business  
Poster Presentation, Easel 88

In finance and economic theory, utility (happiness) is an underlying driver of consumers' behavior and asset prices. However, mapping theoretical utility into a quantitative measure is problematic. The way that utility has typically been measured is through subjective well-being questions such as if the individual agrees with the statement, "Much of the time during the past week I was happy." However, answers to these questions can be sensitive to wording, framing, or question order among other factors. To get around these problems, we propose using various proxies for utility that directly reflect the psychological state of consumers. Examples of these proxies include birth/

death rates, hospitalizations, suicides, and crime. Our research seeks to use these proxies to price stock returns. The thinking behind this is that, when people participate in the stock market and invest in it, then they will be attached to the amount wealth that they have invested. And, depending on the performance of the stock market, will be more likely to act in ways that reflect their growing or shrinking wealth.

**Rebecca Jeske**

Games in Virtual Reality  
Mentor: Chris Willey, Art & Design  
Visual Art, Table 131

The current project is taking the virtual reality demonstration from the Wizards and Warriors event the IML presented at back in fall and expanding it. I plan on building it into a choose-your-own-adventure game, where the viewer can make different choices and the narrative--as well as the world around them--changes to correlate with their choices. This is planned to be an easy, simple way to introduce people to virtual reality: a short game to get those unfamiliar with this new and developing technology more comfortable with it. Virtual reality is likely to become a large part of our world in the future, and I'd like to help people become familiarized and comfortable with it.

**Erika Johansen**

The Evolution of Microfluidic Device Synthesis for  
Single Molecule Trapping  
Mentor: Jorg Woehl, Chemistry & Biochemistry  
Poster Presentation, Easel 89

Understanding interactions between charged metal surfaces and electrolyte solutions is of vital interest to the One Molecule Group's projects in electric double layer theory, DC corral trapping, and directed particle manipulation. The accuracy of our experiments requires synthesis of microfluidic devices with specific, nanoscale structures and controlled channel dimensions that allow for controlled visualization of molecules within electrolyte solutions. The creation of our microfluidic devices introduced difficulties in consistency stemming from areas such structural integrity and definition, channel depth control, and loss of solution within the channel. To ensure consistent data, our techniques have evolved to improve the creation of our devices in order to limit or remove these obstructions. Procedural adaptations have included solution sealing, channel rigidity, improved patterning and thickness during metal deposition, additional purification measures, and reducing penumbra effects. We will present the specific advancements we have added in the synthesis process of our devices, as well as future adaptations to reduce inconsistencies even further.

**AnnDee Johnson**

Auditory Object-Based Attention Uncovers Parallels with Visual Attention

Mentor: Adam Greenberg, Psychology

Poster Presentation, Easel 90

Attention gates sensory input by selecting and enhancing the behaviorally relevant subset of incoming data. However, it is unclear whether attention is domain-general or domain-specific with regard to different sensory modalities. Research on attention (conducted most frequently in the visual domain), has demonstrated that attentional selection can act upon features, spatial locations, or objects. Evidence for the latter case (known as Object-Based Attention; OBA) has shown that attended objects garner enhanced processing compared to unattended objects, even when spatial locations are overlapping or equidistant. Our goal is to investigate whether OBA in the auditory domain operates analogously to the visual domain. To induce the percept of separate but simultaneous auditory objects, participants will hear two simultaneous streams of tones. Each stream will be composed of quartets (groups of four tones) clustered around one of five distinct frequencies (300 Hz, 566 Hz, 1068 Hz, 2016 Hz, 3805 Hz). At the start of each trial, attention will be cued to one of the two objects via the presentation of a single tone at the central frequency of that object. Subjects are instructed to detect the target (a quartet of four identical, repeated tones) and response times are recorded. Critically, the target can appear within the cued object (valid condition) or the non-cued object (invalid condition). If OBA functions analogously in vision and audition, we should observe significantly better performance on valid cues versus invalid cues, indicating an advantage for attended objects. Conversely, equivalent performance in these conditions would suggest important disanalogies between attentional mechanisms within the visual and auditory domains. If our hypothesis is supported, we will conduct subsequent studies to more fully understand auditory OBA.

**Nicholas Johnson**

Entertainment Lighting Controls & Protocols

Mentor: Stephen R. White, Theatre

Visual Art, Table 43

In live entertainment, sometimes there's more going on than meets the eye. An often overlooked subject is how we control lighting and the different ways to send data to lighting equipment in order to create a desired effect. Theatre and live entertainment professionals have used many different methods to control lighting on stage: from the Greeks building their theaters to maximize sun light to the Super Bowl using moving fixtures, pyrotechnics and live drone control. The ability we have in the technical theatre community is massive and it grows everyday. But there is also a need to understand where these different protocols came from and how to use them the most effectively. Lighting is a tool to help tell stories and support an atmosphere. Understanding the protocols could help create new equipment and

develop fixtures that are even better story telling devices. By experimenting with standard lighting and technical theatre protocols we were able to write articles based on their purposes. Later we applied our new knowledge and created our own lighting control software and wireless controllable lighting fixtures. Our practical research shows how efficient and dynamic these protocols are and the types of controls the industry could create.

**Madeline Kallenbach**

The Affect of PTSD on Reaction Time

Mentor: Christine Larson, Psychology

Poster Presentation, Easel 91

A majority of research done on individuals suffering Post Traumatic Stress Disorder (PTSD) are people who have acquired it from participating in active military zones. While the symptoms from these situations tend to be more severe, there are still people who go through common traumas (such as motor vehicle collisions, assault, or recreational accidents) who can develop symptoms of PTSD. Studying the disorder in a more common setting can give people a better idea of what kinds of symptoms to expect as well as how to treat it. This study is longitudinal which tests individuals at certain points in time with different tasks. There are computer tasks performed 2 weeks after the accident, 3 months, 6 months, 12 months, 18 months, and 24 months. One task specifically, WebNeuro, tests cognitive ability, reaction time, and memory among other things. I will specifically be testing the correlation between reaction time in those who tested positive with PTSD after 2 weeks after their accident and 6 months. In addition to this, I will compare these results to those who do not have PTSD at the same time points. I believe those symptomatic of PTSD will have slower reaction times than those who do not. Data will be analyzed from 118 total subjects, 31 of whom are PTSD positive. 31 PTSD negative people will be matched by demographic, gender, and age for a true control group with no confounding variables.

**Anna Kaminski**

A Climatology of Atmospheric Rivers in the Northeastern United States

Mentor: Clark Evans, Mathematical Sciences

Poster Presentation, Easel 92

Atmospheric rivers (ARs) are a frequently studied phenomenon along the west coast of the United States. However, ARs in the northeastern United States have received considerably less attention. The purpose of this study is to analyze atmospheric rivers in the northeast by creating a five year climatology spanning 2013-2017. Atmospheric rivers in the northeast are defined as features with integrated vapor transport (IVT) values greater than 250 kg/m/s, over a length of 2000 km long, with a width of generally less than or equal to 1000 km wide. It is shown that January features the most frequent ARs with the majority lasting less than 24 hours. During the summer months, ARs tend to be less frequent but most

of the summer ARs last longer than 24 hours. Thus, ARs are actually present for a similar amount of time in both the winter and summer months. Spatially, ARs are more likely to be present along the coast and over the oceanic regions of the northeast when compared to inland regions. Future work includes expanding these results of ARs in the northeast and comparing them to ARs on the west coast, where they are more frequently studied.

**MaryJo Kanelos, Olivia Rogers, Alexandra Van Fleet & Nosipho Monese**

The Effects of Maternal Socio-Demographic & Obstetric Factors on Infant Outcomes in Malawi  
Mentor: Kaboni Gondwe, Nursing  
Poster Presentation, Easel 95

Infant birth weight and infant condition after birth are important determinant of neonatal and infant mortality. In Malawi, complications of prematurity infant infections and intrapartum complications also contribute to the high infant mortality rates. This analysis examined the predictors of infant birth weight and severity of infant conditions among preterm and full-term infants. This was a descriptive quantitative study. We used data from a parent study that examined emotional responses and mother-infant interactions on mothers of infants in Malawi. The sample included 85 infants (28 full-term infants, 29 late-preterm infants, and 28 early preterm infants). Data was analyzed using linear regression model. Backward elimination was used to retain variables in the final model. The level of significance for each statistical test was set at 0.05 (two-tailed). All statistical analyses were conducted using Statistical Analysis Software (SAS) version 9.4. Lower birthweight was associated with lower gestational age, less maternal education, female gender, and maternal history of neonatal death in previous pregnancy. Severity of infant condition was associated with lower gestational age, infants of unmarried mothers, and cesarean birth. Maternal sociodemographic characteristics and obstetrical complications predict infant's birth weight and the severity of infant's condition in Malawi.

**Ramprasad Karanam**

Non-invasive Detection of Thin Biofilm  
Mentor: Marcia Silva, Freshwater Sciences  
Poster Presentation, Easel 96

*Salmonella*, *Escherichia coli* (*E. coli*), and *Shigella* are examples of bacterial pathogens that can enter the body through drinking water. Detection of bacterial growth and biofilm in a water pipes are pertinent to avoiding such bacterial infections. Current solutions to this problem include introducing a chemical to attract the bacteria to a single point to be detected and implementing optical transceivers. We have designed a black box sensing methodology to actively detect and record biofilm growth in water through non-invasive means. The response of the system is measured and recorded to determine the amount of biofilm growth within the sample. This system was tested using samples of Poly (2-hydroxyethyl

methacrylate) (polyHEMA) to simulate biofilm in addition to contained samples of *E. coli*. The tests involved recording the change in the system's response to preset deposits of polyHEMA as well as the system's response to the growth of *E. coli* in its container over time. The non-invasive nature of its implementation as well as its ability to actively collect data gives this system an advantage over the current solutions.

**David Katz**

Clay: History, Composition, Fabrication  
Mentor: Mo Zell, Architecture  
Poster Presentation, Easel 3

A two-semester long research project looking in to the process of 3D printing and fabrication with the mindset of researching the creation of clay objects. The relationship between clay and architectural design dates back to adobe and cob building, techniques dating back hundreds of years. The relationship that clay could have to architectural design today, relates to large scale concrete printed structures currently being developed to construct homes that serve low-income housing needs. On the other side of the spectrum, small scale 3D printed ceramic objects and vessel allow for beautifully crafted items to be created for the home. There are already a few designers utilizing the versatility of the material in their own research and practice. I see the investigation of clay, through its history and material properties, extremely beneficial to my own architectural education and future as a designer. Investigation in to the material's composition and process of being made also is integral to further understanding the ability for further application in design. The vessels and objects would explore formal qualities that complement the material while also exploring techniques of fabrication that specifically lend their advantages to clay. Through fabrication and firing, artifacts will be created that best represent the medium and the most essential elements of design.

**Gillian Kearney & Fitore Rrahmani**

The Effects of Hydrostatic Pressure on Toxicity  
Mentor: J. Rudi Strickler, Biological Sciences  
Poster Presentation, Easel 67

*Daphnia magna* is an excellent model organism to understand the environmental effects on *Daphnia magna* is an excellent model organism to understand the environmental effects on aquatic animals. This research will help determine the effects of hydrostatic pressure on acute toxicity tests with heavy metal. After culturing isolated broods of *Daphnia*, we submitted them to a series of experiments. We used a Deep Water Simulator to pressurize our *Daphnia* at intense atmospheric pressures, such as 0.101 – 10.1 MPa. We measured toxicity by creating concentrations of toxic dissolved substances at 12.5%, 25%, 50%, and 100%. Toxicity effects on *Daphnia* were measured by observing movement and behaviors (i.e. swimming). Hydrostatic Pressure Tests: High levels of hydrostatic pressure will cause intense stress on the *Daphnia*. *Daphnia* show little to no movement to conserve

energy. Acute Toxicity and High Hydrostatic Pressure Tests: With increased hydrostatic pressure, we also saw an increase in toxicity effects on *Daphnia*. As a result, *Daphnia* are more susceptible to the toxins at higher levels of pressure. Based on this experiment, we understand that *D. magna* is susceptible to heavy metals at intense pressures. Hydrostatic pressures at deep levels affect *D. magna* biologically, such as their membrane permeability and enzymatic activity. The results show us that high pressures can affect physiological structures on an organism. This presented the question of would *D. magna* be able to adapt to different atmospheric pressures to decrease susceptibility to toxins? A future study can look at how *D. magna* adapt to their environments to protect their physiological structures. Other experiments for this project could involve testing other organisms, such as *Americamysis bahia* (a saltwater organism).

#### **Alex Kehoe & Ian Luecke**

Application of the Rotarod Assay in Drug Discovery Research

Mentor: Alexander Arnold, Chemistry & Biochemistry  
Poster Presentation, Easel 97

Drug development research is the process by which chemical compounds with inherent medicinal value are identified, screened, and eventually approved for human use by the Food and Drug Administration. Barring serendipitous findings, the research process begins with the identification of a clinical need that is currently not being met by the existing pharmacological market. More difficult is to connect the illness to a specific molecular target on which the candidate compound will act upon to produce the desired clinical effect. In vivo dosages have to be optimized to achieve the desired effect and toxic concentrations have to be known to determine the therapeutic window. Therefore, the Arnold Group is using a rotarod assay, which tests the motor coordination of Swiss Webster Mice at 10, 30, 60, 120, and 240 minutes after oral administration of new drug candidates. The purpose of such an assay is to identify motor impairment brought on by ingestion of a certain dose of a compound. The knowledge of the maximal tolerated dose is important for later toxicity studies that are carried out over a period of 14 days to enable FDA approval. The following data illustrates how the structure of a compound influences the effects on the motor coordination of Swiss Webster Mice.

#### **Nia Keranova**

Music & Memory: The Capacity of Music to Trigger Memory & Elicit an Emotional Response

Mentor: John Stropes, Music  
Oral Presentation, 12:00pm | Union Cinema

This project was developed in partnership with the Milwaukee-based company Photavia, whose goal is to provide positive TV content for public spaces. Applications for Photavia digital content include healthcare and assisted-living facilities with focus on Alzheimer's disease and related dementias. The goal of this project was to

research current scholarship in the psychology of music, music perception, the neurobiological basis of musical expectations, and music in advertising. Articles by Diana Deutsch, Elaine King and Caroline Waddington, and Laurel Trainor and Robert Zatorre were in the core of the study. Interviews were conducted with Joe Hausch, President/CEO of Photavia, and Clive Carroll, English guitarist and consulting professor of composition. Proceeding from this literature survey and these interviews, ten, two-minute instrumental compositions were written and recorded to provide a soundtrack for ten historical photographs from Getty Images. Each was constructed to elicit a positive emotional response. A project of this kind provides a great development opportunity in the field of composition. Increasingly today, the professional life of a musician is multifaceted, including performing, teaching, composing, arranging, and publishing. Composing music for film, television, radio, and other media is now an aspiration of all students in our program. The opportunity for an undergraduate to work directly with professionals in this field is invaluable. Photavia President/CEO Joe Hausch has agreed that these compositions will be incorporated into their video presentations.

#### **Raunak Khaitan**

Lidar Based Navigational Tool for the Legally Blind

Mentor: Mohammad Habibur Rahman,  
Mechanical Engineering  
Poster Presentation, Easel 98

The purpose of this research is to develop a navigational tool for the legally blind that helps them to navigate without any third-party involvement. Based on multiple tools available today, they focus on people with a low vision where call centers intervene to guide to the destination and comes with a price tag. This research focuses on a tool in the form of a smart glass or a rover that scans the surrounding as the owner moves and converts the scanned information into a voice guide that can be used by the person to navigate. All these things are expected to happen in real time. So far, we have tried different approaches using an ultrasonic sensor, pixy camera and rovers generating its own path and guiding itself. We see how a rover can tackle traffic avoidance and recognize objects in real time. We have also studied how a rover generates and tracks the path down. Our next goal is to use lidar system in both the cases and study the efficiency in mapping the surrounding and integrate the mapping to generate audio instructions. Once this is done, we plan to study how the rover precisely responds in agile traffic. We believe this technology can be cheaper than the available ones in the market which will be more accurate and precise in helping the legally blind in their daily commute.

**Joshua Kite**

Determining Depositional Environments using  
Paleomagnetic Data Collection  
Mentors: John Isbell & Julie Bowles, Geosciences  
Poster Presentation, Easel 99

Diamicts, which are sediment that are unsorted to poorly sorted and contains particles ranging in size from clay to boulders, suspended in a matrix of mud or sand, can hold information about past landscapes and answer questions about what has happened in Earth's past. This project attempts to determine how a diamict was deposited in a quarry in Northern Illinois. Was the diamict deposited sub-glacially, or by an underwater debris flow? This is important to determine since it will give us clues as to how far ancient glaciers had extended south from their origination near the north-pole and what the glacial activity did to the Earth's landscape. I used magnetic techniques to determine the orientation of magnetic minerals in the diamict, which is related to flow direction during deposition. We can then relate it to the surrounding sand deposit data to determine if the diamict has a different flow direction. I was able to determine that the sand flow had a NE/SW direction, while the diamict had a W/NW direction which means that the deposit is sub-glacial since a debris flow would have had the same flow direction as the surrounding sand. Field observations confirmed this finding. Imbricated rock directions and the etched rocks on the bottom of the diamict showed signs of being dragged and scoured by the glacier. By determining how far the ice stretched we can tell how much of the earth was covered with ice at any given point and also help to replace geologic time that could have been erased by the advancing glacier.

**Noelle Klitzke**

Unfolded Protein Response Pathway Coupled to  
Activation of Slt2 MAP Kinase Pathway in the Budding  
Yeast *Saccharomyces cerevisiae*  
Mentor: Madhusudan Dey, Biological Sciences  
Poster Presentation, Easel 100

Proteins are work horses in our body. They must fold into the proper shape to do their biological function. Folding occurs in the cytoplasm or inside the endoplasmic reticulum (ER). If proteins misfold or unfold inside the ER, a condition known as the "ER stress", cells activate a network of signaling pathways, collectively known as the unfolded protein response (UPR). UPR mitigate ER stress and is conserved from yeast to human. A simple assay to identify a candidate protein essential for UPR in the budding yeast *Saccharomyces cerevisiae* is that the respective protein deletion mutant is sensitivity to an ER stressor tunicamycin (an inhibitor of N-linked protein glycosylation) or dithiothreitol (an inhibitor of disulfide bond formation). Combined with this assay, the adaptive molecular response of an active UPR includes up-regulation of a transcription factor Hac1 in yeast cells or Xbp1 in human cells. Hac1/Xbp1 in turn activates the expressions of protein foldases or molecular chaperones to enhance the protein folding capacity of cells. We found

that yeast cells lacking the mitogen-activated protein (MAP) kinase Slt2 was severely sensitive to tunicamycin. Consistently, our molecular studies showed that the Hac1 protein expression was significantly decreased in the *slt2 delta* strain. In contrast, we found that the Hac1-induced expression of a molecular chaperone Kar2 remained unchanged in the *slt2 delta* strain. These data suggest that the reduced level of Hac1 protein was sufficient to activate the expression of Kar2, but to fully activate the UPR. While the Slt2 MAP kinase is known to regulate the cell wall integrity (CWI) signaling, our results demonstrate a functional link between the UPR and the MAP kinase signaling pathways.

**Westin Knigge**

The Role of Non-Muscle Myosin IIA & IIB in Proper  
Cranial Neural Crest Cell Migration & Differentiation  
Mentor: Jennifer Gutzman, Biological Sciences  
Poster Presentation, Easel 101

The neural crest (NC) is a migratory multipotent stem cell population that gives rise to cranial, vagal, trunk, sacral, and cardiac tissues in the body. Cranial NC cells are specifically important in the development of craniofacial structures, particularly the cartilage of the face and throat. Migratory patterns are key in positioning NC cells to establish these structures. Through cell culture studies, non-muscle myosin II (NMII) proteins have been outlined to play an integral role in the migration of cells. Therefore, we hypothesize that NMII proteins are also essential in the migration of the cranial NC. Here, we are using the zebrafish model to study the role of NMII isoforms *in vivo* by examining cranial NC cell migration in developing larvae. We are investigating the role of the two highly expressed and conserved NMII isoforms, NMIIA (*myh9a*, *myh9b*) and NMIIB (*myh10*). Using mutants for *myh9a* and NMII isoforms, NMIIA (*myh9a*, *myh9b*) and NMIIB (*myh10*). Using mutants for *myh9a* and *myh10*, in parallel with morpholino mediated gene knockdown studies, we are examining craniofacial cartilage formation at 5 days post fertilization. Control and mutant larvae are fixed and stained with Alcian Blue to label the developing cartilage structures in the jaw. Morphometric analysis will be used to examine Meckel's and ceratohyal cartilage using MorphoJ software. We expect to define a role for both NMIIA and NMIIB in jaw development, which would suggest an *in vivo* function for NMIIA and NMIIB in NC cell migration or differentiation. Future studies will examine earlier cell migratory behavior and cell shape in control mutant embryos.

**Nathan Kohls**

Deep Learning Applications in Biological  
Pattern Recognition  
Mentor: Peter Hinow, Mathematical Sciences  
Poster Presentation, Easel 102

Interpreting experimental outputs takes up a large amount of lab time, and generally requires training in both the discipline as a whole as well as the experimental methods in particular. By automating parts of this interpretation,

work-hours can be better spent on other aspects of research, and results will be easier to verify by removing subjective judgements from the process. This study focuses on applying deep learning neural networks to the video output created by the water analysis experiments of Dr. Rudy Steiner. By using open source tools like Tensorflow and Python, various neural networks can be created and trained on existing data. Both fully connected and convolutional neural networks will be investigated, employing various network architectures in the search for the best solution. Efficiency, accuracy, and speed will be evaluated in the context of real time analysis on a small dedicated computer, using a Raspberry Pi. Preliminary programs are successfully classifying sample data, and it is expected that further refinement of models will yield faster and even more accurate results. If these techniques prove effective in analysis for Dr. Steiner's work, it should be possible to generalise the technology to other types of water analysis that would benefit from reduced human interaction-- setting the stage for both better water safety testing as well as accelerated biological research.

#### **Yugg Kolhe & Goyko Rajak**

Analysis of Steel Foam for Better Energy Absorption  
Mentor: Hathibelagal Roshan, Materials Science & Engineering  
Poster Presentation, Easel 179

Steel foam has been made by various companies over a long period of time. But the process of manufacturing has been very expensive, so large scale use was never thought of. Now with the use of latest technology like 3-D printing and chemical admixtures, we can produce steel foam at industrial level. Our project is based on determining how useful it could be. As of present it has been used by military for ballistic application of minimizing the damage by any explosives. We carried out compression tests on the various types of the steel foam (varied by material and pore sizes) and then compared the data with actual (i.e solid) data of the same material. We also used a software called SBEDS this software is only for the use of US Military but after special permission and verification we were given excess to this software. It is very useful in stimulating the data for material used. We are also tried make this stimulating software for the steel foam. This will be very useful in in earthquake retaining structure. We have observed from the data that the area under the stress stain curve has increased which implies that the energy absorption is higher with respect to the solid. It also could be used in the automobile industry for making the bumpers which will absorb more energy incase of a collision which will reduce the damage done to the driver and passenger.

#### **Zachary Komassa, Travis Fichtenbauer, Marisa Roch & Alexander Klug**

STARS@UWM: The Search for Pulsars  
Mentors: Xavier Siemens & David Kaplan, Physics  
Poster Presentation, Easel 103

Pulsars are a type of evolved star that are extremely dense and rotate with an extremely fast and reliable period, producing an intense beam of radiation comparable to the pulse of a lighthouse. 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 Student Team of Astrophysics ResearcherS (STARS) was formed as a way for undergraduate students to be involved in the search for new pulsars and make a contribution towards the goals of the North American Nanohertz Observatory for Gravitational Waves (NANOGrav). Students remotely observe from UWM using two of the world's largest radio telescopes, the Green Bank Telescope in West Virginia and Arecibo Observatory in Puerto Rico, then analyze resulting data to discover and study these incredibly exotic neutron stars. Students at UWM also collaborate with other institutions around the country, including Franklin & Marshall College, University of Washington – Bothell, Kenyon College, Hillsdale College, West Virginia University, and more. Students from UWM have also participated in astronomy-related projects internationally in places such as China, Italy, India, and Australia.

#### **Michelle Kondrat**

Using Narrative Language Samples to Find a Dialect  
Neutral Assessment for Language Impairment  
Mentor: John Heilmann, Communication Sciences & Disorders  
Poster Presentation, Easel 20

Narrative story retell is an empirically supported assessment that has a child recount the events in a narrative story they were previously told. Narrative story retell is one effective strategy used by speech-language pathologists to collect authentic language samples from children in a naturalistic setting as well as giving examiners access to multiple linguistic features the child has (Heilmann, Miller, & Dunaway, 2009). Since standardized tests are often biased against children from non-mainstream backgrounds, narrative language sample analysis is also a good method for testing children from culturally and linguistically diverse backgrounds (Laing & Kamhi, 2003). Narrative discourse is relatively universal across cultures and more approachable than standardized testing for children who are not familiar with standardized procedures. However, many of the traditional ways we assess language may be influenced by speakers of non-standard dialect. Dialects are rule-based differences in patterns of language use. Dialects are not a disordered way of speaking, but rather a systematic difference. African American English (AAE) is a common dialect in the United States. Many features of AAE overlap with diagnostic markers for language impairment. For example,

dropping third-person singular (“she go” instead of “she goes”). We do not want to penalize children who speak AAE and potentially over diagnose language impairment. Therefore, the purpose of this study is to test the properties of narrative language sample measures that are dialect neutral. For my SURF project, I coded the samples for complex syntax using Subordination Index (SI). SI is the ratio of the number of clauses to the number of communication units (C-units). I also coded the samples for narrative organization skills using Narrative Scoring Scheme (NSS). NSS provides a standardized method to assess the child’s use of cohesion, character development, referencing, and the use of metacognitive vocabulary.

**Kaitlin Krause, Daniel Cairns, Issac Ngui, Westly Roth & Daniel Gomez**

Students for the Exploration and Development of Space  
Mentor: David Kapan, Physics  
Poster Presentation, Easel 57

Congenital brain defects can lead to physical or mental disabilities and are among the most common birth defects, occurring in 1 to 2 out of every 1000 live births. Determining how the brain acquires its shape during development is critical for elucidating the etiology of these defects. To understand formation of brain structure, we use the zebrafish model to study the mechanisms that regulate the first fold in the neuroepithelium; the highly conserved midbrain-hindbrain boundary (MHB). Laminin-111, a critical component of the basement membrane, is the primary laminin found along the developing neuroepithelium. It is a large protein composed of globular and rod-like domains arranged in a three-arm formation. Its unique structure makes it capable of anchoring epithelial cells to the extracellular matrix, as well as binding and signaling to other molecules within the basement membrane. Using live imaging, we found that the gamma chain of laminin-111 (*lamc1*), is required for proper MHB morphogenesis. However, the role for the other laminin chains, alpha1 (*lama1*) and beta1 (*lamb1*), in mediating cell shape changes remains unknown. Here, cell shape was analyzed in *bashful* (*lamb1*) mutant embryos by live confocal imaging following membrane GFP-injection. We developed a new morphometric technique to analyze cells in 3D using digital sectioning, and uncovered a role for *lama1* in mediating anisotropic cell shape to fold the neuroepithelium. Future experiments will investigate the role of the beta1 chain in mediating cell shapes required for MHB formation, and examine other basement membrane proteins such as agrin and collagen.

**Natalie Krug**

Art Education & Virtual Reality  
Mentor: Emily Berens, Art & Design  
Visual Art, Table 93

As technology advances we see virtual reality settling in, becoming more widely available for the average consumer. Until recently virtual reality has been most strongly associated with the entertainment industry.

Can the advantageous aspects of virtual reality be used in other facets of society? As an art education major I have spent my time investigating the capabilities of virtual reality as not only a creative medium but as a vital curriculum tool. Over this past year I have broken down both the technical aspects of creating virtual spaces and visited with students and teachers interested in the medium. What I have found is that the process of creating collaborative virtual spaces encourages and teaches students how to work in a team environment and gives students multiple skill sets to explore and develop in from design to coding. Currently the software I have utilized has been Co-Spaces, a free web based virtual classroom, and Blender, an open-source 3D modeling toolset. The next research steps would include implementing lessons plans focused around virtual reality in classrooms and surveying how well the students comprehend and retain the newly learned information through the new medium.

**Chris Kudlata**

Phosphorus Removal and Recovery Through Novel Adsorption Technology  
Mentor: Marcia Silva, Freshwater Sciences  
Poster Presentation, Easel 105

Due to fertilizers and animal waste in agriculture, phosphorus run off is becoming a huge dilemma in lakes, rivers, and watersheds everywhere. The unnatural amount of phosphorus being pumped into our bodies of water is causing increased algae growth which among other things, blocks sunlight from reaching other life. When algae die, bacteria break them down using dissolved oxygen in the water, which causes the other aquatic life who depend on the oxygen to die out. To prevent this issue a filtration device has been made that would filter out phosphorous material from storm water. By reducing the phosphorus coming from farmlands, algae blooms as well as other issues stemmed from phosphorus filled waters can be curtailed. The focus of this project is on the recovery of phosphorus from a saturated sorbent through the addition of compound and the act of sonication. Two methods were developed to desorb phosphorus from the sorbent and are being evaluated and compared. The two methods are chemically based, one using NaOH and another KCl solution, followed by sonication. Experiments are being performed in triplicates. Amount of phosphorus recovered from both methods will be compared so the most efficient method can be determined.

**Stephanie Kusuda**

Social Aspects of Anorexia Nervosa:  
Therapists’ Perspectives  
Mentor: W. Hobart Davies, Psychology  
Poster Presentation, Easel 106

Friendship quality has a direct effect on social development of adolescents, specifically on, self-esteem, social adjustment, and ability to cope with stressors. Research has demonstrated how social relationships can be a protective factor for children and adolescents living with chronic conditions. Positive social relationships have

shown to have a positive effect on treatment for these individuals, including improved motivation and treatment adherence. However, there is a paucity of research done to show how friendships function in the context of anorexia nervosa and how and if they are incorporated into treatment. Notably, friendships help improve self-esteem, which is particularly low in this patient population; therefore, there is potential to improve self-esteem by enhancing positive friendships. Additionally, therapists have a unique perspective and see a variety of patients with anorexia nervosa. Thus, the current study will examine how aspects of social relationships are involved in the therapeutic process for individuals with anorexia nervosa. There are three exploratory hypotheses for this current study: therapists will recognize the importance of social relationships; social relationships will not be frequently discussed in treatment; therapists will report clients are often reluctant to talk about social relationships. The study will survey therapists that work with individuals with anorexia nervosa in order to obtain information regarding how friendships are incorporated into treatment, and to what depth. The online survey will ask the therapists about how often positive and/or negative social relationships are brought up and about how they view them in the context of treatment. Implications for future research on social relationships involvement in the treatment process for individuals with an eating disorder will also be discussed.

#### **Lexie Lanphere**

Novel Techniques for the Analytical Separation of Cathinones in Forensic Chemistry

Mentor: Joseph H. Aldstadt, Chemistry & Biochemistry  
Poster Presentation, Easel 107

Cathinones are a class of synthetic amphetamines that have become increasingly abused. Due to the ease with which drug chemists are able to modify existing cathinones, the ability to separate and identify them within forensic samples is of the utmost importance. To this end, a novel sequential injection (SI) method for the separation and identification of amphetamines was developed that incorporated the Lucy method. The Lucy method was developed in the early 90's and utilizes flow injection to separate and preconcentrate a sample. This means that instead of performing a solid phase extraction with a column, the desired component in the sample is extracted using two-phase segmented flow. Adapting the Lucy method to SI allowed for a more sensitive extraction of cathinones from unknown powder samples, yielding a higher concentration of extracted cathinone. The isolated cathinones were then analyzed using nuclear magnetic resonance (NMR), which allowed for the elucidation of chemical structures and the identification of the unknown cathinones.

#### **Brittany Larson & Yael Greenberg**

An Investigation of Motivation in the Spontaneously Hypertensive Rat (SHR), a Rodent Model of ADHD  
Mentor: Rodney Swain, Psychology  
Poster Presentation, Easel 108

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most commonly diagnosed childhood neurobehavioral disorders. ADHD is characterized by three core behavioral deficits, hyperactivity, inattention, and impulsivity. These deficits significantly hinder the daily functioning of those diagnosed. Furthermore, children with ADHD have problems with motivation and often require larger, more frequent rewards in order to complete a task. While the etiology of the disorder is largely unknown, we do know that various areas of the brain, including the cerebellum, have abnormalities that warrants further investigation. In this study, we used the Spontaneously Hypertensive Rat (SHR), a rodent model of ADHD that exhibits all of the core deficits. The goal of the current study was to further validate the SHR as a model of ADHD by training rats in an operant conditioning breakpoint paradigm to investigate motivation. Twelve male SHR and 12 male control rats were trained on a Progressive Ratio schedule that increased in difficulty until the rats reached their breakpoint, which was defined as the point at which the animals stop working. The breakpoint served as a measure of motivation and the higher the breakpoint, the more motivated the animal was. Results show that the SHR animals had a significantly lower breakpoint compared to the control animals, indicating that they gave up on the task much sooner. Our findings that the SHR model of ADHD displays problems with motivation further adds to the reliability of the model. Future analyses include an examination of the cerebellum anatomy that may provide an explanation for why the motivational behavior is altered in the SHR model of ADHD.

#### **Alice Lecus**

Remediation of PCBs & Mercury from Green Bay Lake Sediment

Mentor: Marcia Silva, Freshwater Sciences  
Poster Presentation, Easel 109

The Lower Green Bay and Fox River estuary was labeled an area of concern under the 1987 Great Lakes Water Quality Agreement due to extensive industrial contamination. Among many pollutants found in the region, polychlorinated biphenyls (PCBs) and mercury are of great interest because of the substantial health hazards associated with them in addition to their persistence in the environment. While several congeners of PCBs can be found in the Lower Green Bay, one of the most abundant is Aroclor 1242 which is a well-known carcinogen. Mercury targets several vital organs and the central nervous system, causing a wide range of medical ailments. After these contaminants have been introduced into the environment, it is extremely difficult to remove them because of their high affinity to sediment. Currently the most common method to remediate the contaminated



sediment in the region is dredging, a process which arguably does more harm than good as it tends to resuspend contaminated sediment allowing for further transport over a greater area. The goal of this project is to develop a material that PCBs and mercury have a higher affinity to so that the process can be less invasive while reducing the overall cost. Preliminary data shows that a natural porous material, after subsequent treatment and surficial modification, is capable of removing mercury and PCBs from contaminated sediment.

#### **Bryant Lee**

Synthesis of Polyvinyl Alcohol (PVA) Polymer Beads for Heavy Metal Removal in Aqueous Solutions

Mentor: Junjie Niu, Materials Science & Engineering  
Poster Presentation, Easel 110

In recent years, among other existing heavy metals, lead (Pb(II)) discharged in industrial wastewater at a higher rate and this seriously threatens human health and the natural ecosystems. Prevalence of water pollution is frequently reported. Thus, designing an effective method of dealing with wastewater has become increasingly essential. There are different methods employed for the removal of Pb(II) from wastewater including adsorption, precipitation, ion-exchange, and biological treatment. Recent research has shown that synthetic polymers such as PVA show promising results as sorbents for heavy metals due to their high surface area and specificity. In this study, PVA will be synthesized and introduced into a polymer bead form and used for the adsorption of Pb(II). In this work, PVA adsorption capacity for Pb(II), at different concentrations, varying pH and contact time was evaluated.

#### **Dongwan Lee**

A Polynomial Based Far-Field Expansion for Treecode Algorithm

Mentor: Lei Wang, Mathematical Sciences  
Poster Presentation, Easel 111

Computers help us save the calculation time and deal with numerous data. Depending on the algorithm we use, the running times are different. The purpose of the research is to find a more accurate and faster way to calculate the data. We have multiple source points and target points which are both large numbers. The kernel-based summations arise in particle simulations in many physics, biology, and engineering fields involving point masses, point charges, and point vortices. Evaluating the sum by direct summation requires  $O(N^2)$  operations which is prohibitively expensive when  $N$  is large. We are interested in developing fast methods to reduce the cost. We are using Lagrange interpolation (standard/barycentric) as both far- and near-field expansion and investigating the trade-off between the accuracy and CPU time. For far- and near-field expansion for the source points and target points, we use the Chebyshev points that make the points clustered around the boundary. The interpolation method gives unique polynomials depending on the numbers of Chebyshev points. We change the interpolation points

numbers, so that we change the polynomials with highest polynomial power. We apply this work not only 1-Dimensional problems, but also 2-Dimensional and 3-Dimensional problems. The relative error between the exact values and approximation values shows us the correlation between the numbers of the interpolation points and the corresponding approximation values.

#### **Kristen Leer**

Milwaukee's Opioid Epidemic on Youth Populations

Mentor: Tina Freiburger, Criminal Justice  
Oral Presentaion: 1:00pm | Union 260

In 2017, the Centers for Disease Control and Prevention reported that 130 American died from opioid (including prescription opioids and illegal opioids like heroin) overdoses daily, six-times higher than in 1999. This epidemic has not only affected the lives taken by overdoses but also the lives of those they leave behind. This project examined the opioid overdose deaths in Milwaukee County through official data from the Milwaukee County Medical Examiner to identify common themes and patterns to generate information on possible points of intervention and prevention. The findings indicate that the effects of the opioid epidemic span generations, and have especially adverse effects on youth, placing them at risk for exposure to substance abuse behaviors, trauma, and removal from their homes. We have collected statistics that highlight the specific impact that opioids have on youth population within Milwaukee that will be further examined and held as evidence for programs to mediate and support these youth. For example, our data allows us to see the ages of those who have overdosed, if they have left children behind (including their age), police reports on the conditions surrounding the deceased time of death, narratives of their family's knowledge about the deceased, etc. Understanding the effect that the opioid epidemic has on the Milwaukee youth population will effectively support programs and mediation for at-risk children so that they are able to manage their exposure and trauma to this substance on top of losing a close family member.

#### **Sage LeGault**

Comparison of Distribution in *E. coli* Phylotypes in Beach Sand over Seasonal Changes

Mentors: Sandra McLellan, Freshwater Sciences  
Poster Presentation, Easel 112

Enumeration of *E. coli* is the current standard used to determine basic levels of water quality and fecal contamination for beach closures. Current research being done by McLellan lab is collecting data to determine methods of differentiating sources of *E. coli* by looking at the concentration of differing phylotypes in a given sample and tracing this back to a connected source of contamination or native population. There is currently very little known about native populations of *E. coli* freshwater beach sand, and this research aims to better understand and classify them. Data on populations is gathered through both the collection of direct beach

sand samples throughout the year, as well as long term microcosm study. The collected samples are then processed through Clermont Phylotyping and a multiplex PCR assay which differentiates *E.coli* into one of 8 clades. The samples are then compared to one another to examine how presence and frequency of differing phylotypes fluctuates depending on factor of location and time of year. The long term goal of this research aims to establish a potential baseline model of the changes in *E.coli* populations thought the year.

#### Yuting Lin

Dopamine-Modified Graphene-Based Adsorbent for Antibiotics Removal from Aqueous Solutions

Mentor: Marcia Silva, Freshwater Sciences

Poster Presentation, Easel 113

Antibiotic residues have been found in drinking water and pose serious risks to human health and the environment. According to the Center for Disease Control (CDC), antibiotic resistance is responsible for more than 2 million infections and 23,000 deaths at a direct cost of \$20 billion in the United States only. Traditional water treatment systems used to remove biological contamination from water and wastewater are not efficient for removal of antibiotics. Therefore, develop effective technologies to remove antibiotics from water, specially drinking water. Our research team has developed an efficient adsorbent for removal of antibiotics from aqueous solution. The dopamine-modified graphene-based materials attached to natural porous materials provides a promising solution for antibiotics removal, and possibly other emerging contaminants like Persistent Organic Pollutants (POPs). Dopamine acted as both reducing reagent and adherent (undergoing self-polymerization process at a weak alkaline pH) which ensures the good stability and dispersity of reduced graphene-based materials on the surface of porous materials. The dopamine-modified graphene-based materials was coated four times onto the surface of natural porous materials, and batch adsorption studies were conducted for antibiotics: Ciprofloxacin (CIP) and Tetracycline (TC) and for POPs cationic model compound Methylene Blue (MB). The adsorption behavior was studied for the effect of initial compounds concentration, contact time, pH, temperature and ion concentration and has been demonstrated to be an easy, effective and environmentally friendly method removal of emerging contaminants from aqueous solutions, such as antibiotics.

#### Yuting Lin

ALD-CVD Based Synthesis and Characterization of  $\text{TiS}_2$  2D Crystals

Mentor: Nikolai Kouklin, Electrical Engineering

Poster Presentation, Easel 114

Two-dimensional (2D) materials possess unique and often time superior electronic two-dimensional (2D) materials possess unique and often time superior electronic characteristics compared to their bulk counterparts. In parallel, large surface area and mechanical flexibility

of 2D nanomaterials make them promising candidates for application in batteries, energy conversion, charge storage, and sensors. Among 2D materials, layered transition metal dichalcogenides (TMDCs) have drawn significant attention recently for their potential use in optoelectronics, spintronics, energy harvesting, and information processing. The focus of this study is to fabricate and probe the optical, transport and physical characteristics of titanium disulfide ( $\text{TiS}_2$ ) 2D crystals. A two-step atomic layer deposition (ALD) – chemical vapor deposition (CVD) approach is proposed and being developed to synthesize  $\text{TiS}_2$  2D nano-samples. As a first step, a monolayer of  $\text{TiO}_2$  is grown by ALD. Sulfurization conversion of the as-grown  $\text{TiO}_2$  into  $\text{TiS}_2$  is to be next carried out in a house-built horizontally-oriented, hot-wall CVD reactor purged with Argon gas at 750 C for ~ 10-30 mins. Compared to other high-temperature thermal annealing, wet chemical and mechanical exfoliation techniques, the ALD-CVD method is capable of producing reproducibly a single monolayer  $\text{TiS}_2$  2D films of high purity and crystalline order. The crystal structure, morphology and electronic properties of the  $\text{TiS}_2$  crystals will be subject to further investigations and analysis done by carrying out TEM, SEM, EDX, AFM, RAMAN and PL as well as low noise I-V measurements.

#### Mariah Linske

Use of 3D Neuronal Reconstructions for Carrying Out Morphological Analyses

Mentor: James R. Moyer, Jr., Psychology

Poster Presentation, Easel 115

Numerous studies have attempted to relate variations in cellular structure (i.e., morphology) with variations in electrical firing properties (i.e., function). These cellular properties, such as dendritic complexity or electrical firing characteristics are plastic and can change not only across the lifespan, but also as a function of experience (e.g., learning or other adaptive/maladaptive behaviors). Our laboratory studies how the nervous system changes as a function of age as well as learning/memory. We use a several approaches, including whole-cell patch-clamp recordings (to study electrical properties) coupled with biocytin injections (to study morphology) in order to better understand structure-function relationships of neurons both within and between brain regions. Within the lab, my role has been to take the brain slice from which a recording was obtained and process it to (a) visualize the recorded neuron and then (b) create a digital, 3D reconstruction of the neuron. The purpose of this poster is to describe the procedures used to ultimately obtain a 3D reconstruction and illustrate some of the analyses used to study neuronal morphology. Briefly, the slice is fixed, then washed in various solutions, one of which contains streptavidin, which binds the biocytin molecule. We use a fluorescently-labeled streptavidin, which means that the molecule will fluoresce (or glow) when exposed to an appropriate wavelength of light. Confocal laser scanning microscopy (CSLM) uses laser light of an appropriate wavelength to visualize the fluorescently-labeled neuron. CSLM allows us to obtain a series of

high-resolution image stacks that can then be combined and imported to our NeuroLucida 360 software, which I use to create a 3D image. These images can be analyzed in a variety of ways to quantify the complex neuronal structure. Cells from specific regions and specific cell types can be averaged to help us understand how neurons change with age and experience.

### **Hugo Ljungbäck**

Making the Invisible Visible: Handcrafting in Experimental Cinema  
Mentor: Tami Williams, English  
Oral Presentation, 12:40pm | Union 280

As Joshua Yumibe (2012) and others have shown, the work of coloring films in early cinema was performed by an almost entirely female labor force--women who painted each frame and every release print by hand. Elizabeth Bell (1995) has further illustrated that these gendered labor practices were similarly enacted and reinforced in the emerging animation studios, as women were relegated to coloring the cels in the Painting and Inking Departments at Disney, and later at Hanna-Barbera. This paper considers this labor as a form of handcrafting and puts it in a dialectic with the work of Nazli Dinçel, Carolee Schneemann, Sabrina Gschwandtner, and other women filmmakers of the avant-garde, who have not only painted, but sown, scratched, woven, and baked the celluloid strip in the making of their films and expanded cinema pieces. Through the specific processes of handcrafting, traditionally domestic or “women’s” labor is made visible and deployed to stake a claim for women as cultural producers beyond the home. Dinçel has likened her own practice to the daily rug making work of women in the Turkish countryside, stating that people “process trauma while working frame-by-frame or knot-by-knot.” I argue that the gestures of these artists’ handcrafting practices critique the unrecognized and immaterial labor women perform in film and beyond. I hope to show that their scratching, hammering, and sewing techniques aim to foreground their tactile, intensive, and time-consuming labor as visual spectacle.

### **Anne Lochner**

The Power of Personhood: An Investigation into the Quality and Effectiveness of Eldercare  
Mentor: Ellyn Lem, English, College of General Studies  
Oral Presentation, 1:00pm | Union 344

Age does not discriminate. Many of us have already witnessed the difficulties of navigating the later years of a person’s life. Those of us who haven’t will doubtless someday reach that juncture. The process of how to handle placement and approach to care is not always linear, not always one-size-fits-all. Through reading various academic texts as well as some interdisciplinary investigations on the subject of aging, I have found that in the United States, our approach to the later years is rather dismal. The focus of medical care and attention seems to focus on lengthening a person’s life rather than enabling them to enjoy it. This is a limited view in

which the extension of one’s life is given priority over the essence of what gives one personhood. Such an approach can be the cause of a lot of unnecessary depression and discontent at a time when the elderly are still capable of finding fulfillment. Through volunteering at nursing homes and assisted living facilities, I have found much evidence of this discrepancy between what type of care is provided and what is desired. What is it that we can do to enrich the current model? How can we improve upon the current models of eldercare? How can we encourage creativity, to bring different ages together, to breathe life into facilities? A patient-centered approach focusing on communication about what the patient actually desires seems the most ideal. For the sake of our fate in the future, and for our aging loved ones, the research shows it would behoove us to look at the way we view aging and the end of life in order to maximize our quality of life at the end.

### **Ashley Lopez**

A Systematic Review of Effectiveness of Health Promotion Interventions for Transgender People  
Mentor: Lance Weinhardt, Public Health  
Poster Presentation, Easel 116

This is the first systematic review of articles examining all health promotion intervention programs not related to gender transition that have been tested among transgender people. Included are peer-reviewed, published articles from which intervention effects on participants identifying as transgender (or with a gender identity under the transgender umbrella) were the sole focus or could be separated from other participants in the study. Articles only examining the effects of medical gender transition related treatments (e.g., surgery, hormone treatments) were beyond the scope of our paper and excluded. This paper will present the methodological details and results of 13 studies addressing physical health, 4 studies addressing mental health, and 3 studies addressing both physical and mental health outcomes. These studies targeted HIV and STD risk reduction, substance use, PTSD, depression, anxiety, coping, and resilience. The most important conclusion gleaned from this review is that, given the physical and mental health disparities encountered by transgender people, there is a great need and opportunity for development and testing of a wide range of new, tailored health promotion programs. Future research is needed to test health promotion interventions for physical and mental health such as exercise, nutrition, sexual health education, mindfulness, and community connectedness.

### **Emily Lusiak**

The Zuckerberg Files: Analyzing Mark Zuckerberg’s Discourse on Social Responsibility  
Mentor: Michael Zimmer, Information Studies  
Poster Presentation, Easel 117

The Zuckerberg Files is a digital archive of all public utterances of Facebook’s founder and The Zuckerberg Files is a digital archive of all public utterances of Facebook’s founder and CEO, Mark Zuckerberg,

spanning 2004-2018. Using NVivo data analysis software, over 900 transcripts have been coded and a qualitative analysis will follow, which includes the evolution of Mark Zuckerberg's responsibility to society. The mission of Facebook has shifted over the past 14 years, ranging from "Move fast, and break things" to "Making the world more open." Recently, Mark Zuckerberg has claimed that he has a responsibility to connect people around the world and to give people a voice. While these ideas are not inherently negative, Mark Zuckerberg's discourse surrounding these issues is dangerously optimistic. In regards to the recent violence incited by Facebook in Myanmar and India, Zuckerberg fails to recognize the drastic, international impact of fake news on the Facebook platform. Facebook has inevitably become a part of our Western society. The purpose of this research is to gain a better understanding of the ethical implications and responsibilities of Facebook and CEO, Mark Zuckerberg. This archive allows Mark Zuckerberg to be held responsible for his words and actions, and most importantly, how his company affects the users of Facebook on a global scale.

#### **Abigail Lynch**

How Advocacy Organizations are Addressing Milwaukee's Eviction Crisis: Making Social Change One Case at a Time  
Mentor: Jamie Harris, Urban Studies Program  
Poster Presentation, Easel 21

The city of Milwaukee, redeclared in 2013 as the most racially segregated city in America, suffers from an abundance of inequalities derived from decades of job loss, disinvestment, growing poverty, neighborhood decline, hypersegregation, and racial discrimination. One of the most glaring inequalities is seen in the housing market, particularly for renters. The crisis of affordable housing and evictions in Milwaukee has been well documented, most recently in Matthew Desmond's 2016 book, *Evicted*. A number of organizations in Milwaukee are working to address the eviction crisis and the reasons that lead to it. Legal Action of Wisconsin is one such advocacy group; they started the Eviction Defense Project, which provides pro-bono legal services that allow low-income residents to seek legal assistance or representation for their eviction cases. As part of my service learning, I was able to directly observe the process of an eviction hearing at court through field observations of court proceedings, conducting survey research for UW-Milwaukee, and speaking directly with Milwaukee County residents facing eviction in informal interviews. Through these experiences, I was able to see how the epidemic of poverty that Milwaukee faces intersects with the legal system and advocacy organizations and programs, such as Legal Action and the Eviction Defense Project. By working closely with an advocacy organization for six months, I was able to understand the complexity of the legal system as it relates to eviction cases and the challenges poor families face in a precarious housing market, as well as the importance of advocacy organizations and their contributions toward social change.

#### **Tianshi Ma**

Education of the Future: With Modern Technologies  
Mentor: Christopher Willey, Art & Design  
Poster Presentation, Easel 155

My research focuses on exploring new possibilities and approaches to education which are emerging alongside extended reality technologies. I want to gather and compare efficacy data, then take this knowledge to inform the creation of educational platforms which utilizes these emerging technologies. My hypothesis is that by leveraging extended reality and the power of the internet, education can be more effective, affordable and accessible. In today's world, university is a financial and geographical luxury that only few can afford. Many brilliant and capable individuals do not have access to this resource. With the internet now covering most of the populated world, and extended reality emerging, we have an opportunity to develop a new education infrastructure that matches our emerging technological capabilities.

#### **Riley Mahr**

Knowledge Transfer for Research in the Immersive Media Lab  
Mentor: Christopher Willey, Art & Design  
Poster Presentation, Easel 156

The Immersive Media Lab sees the continuous input of research and documentation by its participants but is entering a new phase where the lab is transitioning out members as they graduate. A company can rely on most employees remaining for extended periods of time which keeps valuable knowledge in the company. An educational institution, however, has a much more limited time to utilize the knowledge of its students and the Immersive Media Lab is approaching this cliff as some of its most active members reach the end of their university career. A more efficient method of storing and transferring knowledge between waves of students will help new students engage in the lab quicker and persist the contributions of former participants past their ability to actively transfer that knowledge in person. Knowledge Management disciplines can help the lab filter data from current students, store and deliver it to incoming students. A document containing observations on student participation will be stored in a database that can be searched by new students. This document will contain tags and associations. In addition, the foundation of a virtual knowledge broker will be integrated into the lab's communication channel to facilitate first contact for students examining a particular topic. A knowledge broker is a resource, traditionally a person, that aims to facilitate the networking of information and act as a resource to find and extract already documented knowledge. This will provide an easier pipeline for students to examine previous documented work and experiences and streamline the process of finding information on a particular material.

**Ryan Majinski & Tory Clearwater**

A Detailed Study of Acid-Catalyzed Reactions of Carbonyl Compounds with Ethyl Diazoacetate  
Mentor: M Mahmud Hossain, Chemistry & Biochemistry

Oral Presentation, 1:20pm | Union 240

The reaction of ketones or aldehydes with ethyl diazoacetate can yield both 3-hydroxyacrylic acid esters and  $\beta$ -keto esters. The former product, though much more difficult to produce, has a wide variety of medicinal and synthetic applications. Already, this reaction has served as a first step in the production of Naproxen and BRL-37959, which have both proven to be effective nonsteroidal anti-inflammatory drugs. In addition to this, we believe the products of this reaction can have countless other applications. Thus, we have set out to analyze the full scope of this reaction while optimizing the reaction yield and product ratio. To do so, we are modifying several reaction parameters, including the duration, temperature, and reagent loading techniques. We are also using various ketones and aldehydes to determine which starting materials will produce which products. This work builds off of previous studies from 2004 within the Hossain laboratory group. Initially, the reaction was believed to have a much smaller scope and was only used with a single type of starting material. Now, we are investigating the reaction further by utilizing different starting material. Now, we are investigating the reaction further by utilizing different starting materials to produce a broader range of 3-hydroxyacrylic acid esters, which we hope will support any number of scientific and medicinal uses.

**Katie Malek**

Fostering Positive Attitudes Towards People with Dementia in Future Healthcare Professionals  
Mentor: Sabine Heuer, Communication Sciences & Disorders

Poster Presentation, Easel 120

Working with older adults is a part of many healthcare careers; however, most training programs do not provide specialized training to prepare students for this population. Specifically, ageism steers students in healthcare professions away from working with older adults and fosters negative attitudes, especially toward those with cognitive impairment such as dementia. Engaging students with people with dementia through service learning may increase comfort and knowledge levels. This study sought to measure changes in the attitudes of students towards PWD before and after their service learning assignments. Participants completed the Dementia Attitudes Scale (DAS) at the beginning of the semester, prior to the service learning experience and again at the end of the semester, after completing the service learning. Respondents included a control group of 42 undergraduate students who participated in service learning with other populations, and the experimental group of 18 undergraduate students who engaged in service learning with people with dementia. A Mann-

Whitney U test revealed no significant changes between the two groups on the DAS pre-assessment ( $z = -.44$ ,  $p = .66$ ) but significant group differences in overall ratings at the post-assessment ( $z = -3.65$ ,  $p < .001$ ). Further, only the attitude ratings for the group who engaged in service learning with PWD increased significantly from pre to post assessment ( $z = 3.44$ ,  $p = .001$ ). Service learning increased comfort and knowledge in those students who completed their experience with PWD. Service learning for undergraduate students with people with dementia is a low-risk, potentially high-yield practice that should be considered for inclusion into our degree programs that prepare students for careers in health care.

**Hilda Martinez Ramirez**

Role of Acid Ceramidase in Xenografted Zebrafish Glioblastoma Model

Mentor: Shama P. Mirza, Chemistry & Biochemistry  
Poster Presentation, Easel 122

Glioblastoma is considered as the most aggressive form of brain tumor with overall survival less than fifteen months after diagnosis, even with multimodal therapy. It constitutes a major percentage of malignant brain tumors, with over 10,000 new cases reported every year in the USA. Comprehensive proteomic study of the disease in our lab has revealed that acid ceramidase is a novel target for possible drug development. Previous *in Vitro* study has found that acid ceramidase inhibitors (e.g. carmofur) have better efficacy than the standard chemotherapeutic drug available. This study aims to identify the role of acid ceramidase in glioblastoma and the efficacy of acid ceramidase inhibitors in suppressing the tumor, which may potentially lead to the development of a new chemotherapeutic agent for treating glioblastoma. Herein, we have worked towards the development of xenografted zebrafish (*Danio rerio*) glioblastoma model. For which, we have developed a zebrafish experimental microinjection protocol, where zebrafish embryos were dechorionated and mounted on agarose gel with a goal of microinjecting glioblastoma cell lines. Development of the protocol consisted of optimizing quality and quantity of embryos, as well as injection site and dosage. We have continued to optimize the microinjection protocol in order to provide the most accurate injection site while performing the less intrusive injection possible. Further work is to develop zebrafish xenografts by injecting GFP transfected glioblastoma cell lines to EK zebrafish strain. This model system will be used to study if acid ceramidase inhibitors can cross the blood-brain barrier, and their role in tumor suppression using imaging microscopy and mass spectrometric techniques.

**Mark McGarry**

An Improved Assay for the Enzyme Cytochrome C Nitrite Reductase

Mentor: Arsenio Pachecho, Chemistry & Biochemistry  
Poster Presentation, Easel 123

Cytochrome c Nitrite Reductase (ccNiR) is an enzyme that catalyzes the six-electron reduction of nitrite ( $\text{NO}_2^-$ ) to ammonium ( $\text{NH}_4^+$ ). This process plays an important role in the nitrogen cycle for microorganisms during anaerobic respiration. In vitro ccNiR's activity is assessed with an assay in which the electron donor is the methyl viologen monocation radical ( $\text{MV}_{\text{red}}$ ). The deep blue  $\text{MV}_{\text{red}}$  oxidizes to a colorless species, which makes it very easy to monitor reaction progress using UV/Visible spectroscopy. One problem with this assay is that  $\text{MV}_{\text{red}}$  actually exists in equilibrium with a dimeric species  $\text{MV}_{\text{red}2}$ , a fact that is typically ignored by users of the assay. While such an oversight is acceptable for routine work, it may have led to some misinterpretations of more exacting analyses in the published literature. Herein we report a study of ccNiR's activity in which the  $\text{MV}_{\text{red}}$  -  $\text{MV}_{\text{red}2}$  equilibrium is explicitly accounted for. Using the improved assay, the dependence of ccNiR's activity on  $\text{NO}_2^-$ , ccNiR and  $\text{MV}_{\text{tot}}$  concentrations was determined for two batches of ccNiR that were prepared using different methods.

**Max McHone**

Spirit of Resistance: the Hukbalahap Rebellion & Anti-Imperialism in the Philippines

Mentor: Rachel Buff, History  
Oral Presentation, 12:20pm | Union 340

The Hukbalahap uprising took place between the years of 1942 and 1954 in the American-occupied territory of the Philippines, and rallied against a blatant suppression of democratic principles by the United States. One of many rebellions which fell under the poorly defined label of “communist” by the United States government, the ideology of the Huks was, in reality, less absolute in nature and emerged primarily out of necessity. The rebellion consisted of two major stages, the first of which lasted from 1942 until 1945, and was comprised of a coalition of Filipino peasants who organized and armed themselves in order to repel the Japanese military, who had occupied their territory in the midst of World War II. The second stage began after the defeat of the Japanese in 1945, and was fought by these same Filipino peasants against the United States and the Philippine government. Prior to and after the U.S. granted the Philippines official independence in 1946, they used claims of aid and reconstruction to implement exploitive trade policies and install a U.S.-friendly administration in the Philippines which the Huks fought against for nearly a decade, eventually succumbing to defeat in 1954. The purpose of this research is to uncover and emphasize the experience of the Filipino peasantry who populated the Huk movement, bringing to light the U.S.-subsidized persecution they faced in their own nation. Ultimately, this project seeks to more accurately portray the motivations and desires of the Huk rebellion, situating this insurgency within a long and proud legacy of anti-imperialist movements in the Philippines.

**Madison Mendoza**

Speech Therapy and How it Affects Real World Participation in People with Aphasia

Mentor: Shelley Lund, Communication Sciences & Disorders

Poster Presentation, Easel 124

Aphasia is an acquired communication disorder impairing a person's ability to understand or express speech due to brain damage. Speech therapy is used to help patients with aphasia regain some of their communication abilities. Our lab has started to explore how speech therapy affects client's participation in the real world and how it affects the lives of their caregivers and family members. The purpose of this study was to explore what clients, caregivers, and family members wanted to get out of speech therapy or thought that speech therapists could do to achieve better outcomes for people with aphasia. Participants in our study were recruited through the University of Wisconsin-Milwaukee speech and language clinic and through aphasia support groups in the Milwaukee area. To participate, patients had to be living in a community setting rather than in a care facility, they needed to be diagnosed with aphasia as a result of a stroke at least 6-months prior, and they needed to nominate their caregiver. In this first cycle, there were three people with aphasia and their spouses. Focus groups took place in Wauwatosa, Wisconsin at Innovation Campus, and included the participants, a facilitator, and a note taker. Grounded theory and phenomenological approaches guided this study. This poster will report the results of the first focus group. The grounded theory approach uncovers social relationships and group behaviors and allows for generating a theory based on the data. A phenomenological approach allows us to capture common experiences among participants. Analyses are pending. This study reasoned that speech therapy is effective at not only improving the communication abilities of aphasia clients, but also at reducing the impact of their communication disorders on their real-life participation.

**Johanna Michlig**

Promoting the Co-Viewing of YouTube Videos with Parents of School-Aged Children

Mentor: W. Hobart Davies, Psychology  
Poster Presentation, Easel 125

The American Academy of Pediatrics (AAP), in their 2016 media use guidelines, encourages parents to co-view media with their children. The AAP defines co-viewing as “engaging in selecting media with your child, through which your child can use media to learn and be creative”. Previous literature indicates that parents have been using some form of co-viewing with their children for traditional books, television, and online storybooks. Co-viewing research looking specifically at YouTube Kids is important to add to the discussion as the current algorithm has allowed for disturbing and inappropriate videos featuring well known kids' characters to be accidentally viewed. The aim of the current study is to evaluate whether a brief parent-child intervention

is effective in making the co-viewing experience more valuable in keeping with the AAP guidelines. Additionally, it is hypothesized that parents will be more confident in co-viewing YouTube with their children, decrease their worries about their child finding inappropriate videos and increase the amount of time they co-view YouTube after the intervention. Thirty parents with children between the ages of 6 and 12 will be asked to co-view YouTube Kids for at least 15 minutes every day for five days. After a pre-survey, parents will fill out daily diaries with prompted questions each day they co-view. A post-survey and one month follow up will also be given to see the effect of the intervention. Data analysis will consist of demographic data as well as the use of the Delphi coding Method for the qualitative responses. These findings will mainly be used to help bring more awareness to this issue as well as to help parents be successful in co-viewing with their children.

#### **Brandon Mikulsky**

Finding a New Treatment in Neuropathic Pain:  
Targetting the GABA(A) Receptor in Microglia  
Mentor: Alexander Arnold, Chemistry & Biochemistry  
Poster Presentation, Easel 126

Glial cells are the most abundant cell type in the central nervous system (CNS), within which they play a variety of physiological roles. One type of glial cell, microglia, have since been found to be the primary immune cells within the CNS. Recent studies showed that microglia have a growing role in neurological disorders, such as Multiple Sclerosis, Alzheimer's disease, and neuropathic pain (NP). Earlier experiments in the Arnold lab demonstrated that imidazobenzodiazepines can reduce lung inflammation in asthma mouse models by selectively targeting the gamma aminobutyric acid type A (GABA<sub>A</sub>) receptors expressed on white blood cells, which share a common developmental lineage with microglia. Our collaborators have shown that targeting GABA<sub>A</sub> receptors on microglia within the spinal cord using imidazobenzodiazepines can reduce neuropathic pain, however details of this mechanism are unknown. Currently, cell cultures of immortalized human and mouse microglia are being maintained in the Arnold lab to investigate the effects of imidazobenzodiazepines. We present the change of intercellular calcium upon stimulation with ATP and the reduction of nitric oxide (NO) in the presence of selective GABA<sub>A</sub>R agonists and measured iNOS expression using rtPCR. These experiments will aid to better understand the anti-inflammatory properties of these compounds and to select potent and safe lead compounds for a more effective NP treatment.

#### **Morganna Milgram, Emily Schneider & Kiana Van Dornick**

Mentor: Robin Mello, Theatre Arts  
Body Talk: Together We Bear It  
Performing Arts Presentation: 12:40pm | Union Cinema

The global phenomenon of body positivity and acceptance is growing, though that growth is slow. In 2018, just over

35% of girls 12 and under had been on a diet at least once in their lives. The difficult conversation we need to have about our relationships with our bodies is just starting, and I wanted to contribute by writing BODY TALK. Before writing, I enriched my perspective as a playwright by conducting interviews with people of varying genders, ages, and walks of life about their experiences of body shame and body ease. These interviews took the form of guided conversations lasting anywhere from one to three hours; this format allowed me to dig deep while maintaining trust, honesty, and comfort with the interviewees. I then created a draft of an experimental play using this new data, which was workshoped and presented as a staged reading in St. Petersburg, Russia under the direction of Tanya Weinstein in January of this year. The interviews and research conducted in the spring and summer of 2018 greatly enhanced the play and led to a remarkable and poignant performance by the director's company. BODY TALK has also been picked up for an additional performance in Europe, this time for a full workshop and production cycle in June of this year. It will continue to be developed for an American audience. I hope to shop it around for a stateside premiere in the future, and contribute to the conversation on body positivity in this way.

#### **Alexandria Miller**

Coaxing Truth from Noise: A Pipeline for Implementing Spatially Aware Filtering Algorithms on Velocity Fields  
Mentor: Roshan D'Souza, Mechanical Engineering  
Performing Arts Presentation, 12:40pm | Union 250

Particle Image Velocimetry (PIV) is an experimental method that uses high-speed imaging and laser-illuminated particles to generate a vector field which can be used to verify mathematical or computational fluid models. However, PIV is very sensitive to optical occlusions and particle density, and in these cases will generate noisy data that can be near useless for verification purposes; these problems become exponentially worse in volumetric (3D) PIV. In order to separate the noise from the truth, several filtering algorithms were developed. The first algorithm processes the images and removes the static image background using Singular Value Decomposition (SVD) in a hands-free approach, the rest of the filters are implemented in 3D and run in sequence; these algorithms can be modified with multiple parameters for best results. The spatial filters are built on the K-Nearest Neighbors algorithm and statistical techniques, each one specializes at removing certain types of spurious vectors. These algorithms were tested on data from brain aneurysm models, where there were many particles stuck to the model walls and stent structures. The initial SVD filter was able to subtract the bright stuck particles, as well as the reflections and discontinuities to reveal the particles in high contrast. The pipeline filters were then able to take the reconstructed randomly sampled vector data and filter out erroneous vectors, this clean data was then resampled into a structured grid that can be displayed in post-processing software. This data was significantly cleaner, and the flow streamlines were co-

linear implying the filters had removed all the data that caused divergence in the flow. This filtering pipeline shows promising results, and could significantly improve the state of the art in PIV experiments where reflections, optical occlusions, or stuck particles become major issues, and also in volumetric PIV where particle density causes serious noise error.

**Anna Miller, Mohammed Alomar, Ahlam Allan & Yer Xiong**

EMG Signals & Kinematic Analysis of Human Upper Extremities During Activities of Daily Living  
Mentors: M. H. Rahman, Mechanical Engineering, Inga Wang, Occupational Science & Technology & Brian Robertson-Dick, Medical College of Wisconsin  
Poster Presentation, Easel 83

Full or partial loss of function in the shoulder, elbow or wrist are a common impairment in the elderly, but can also be a secondary effect due to strokes, sports injuries, trauma, occupational injuries, and spinal cord injuries. This functionality of the upper extremity (UE) is essential to perform activities that contribute to one's independence and quality of life, also known as the activities of daily living (ADL). The purpose of this experiment is to analyze the kinematics and the muscle activities of human UE while performing a variety of ADL. In this pilot study, Avanti EMG electrodes (Delsys Inc.) were used to collect the EMG signals and the kinematic data (joint angle of rotation, velocity, acceleration) from 10 healthy individuals. For each ADL task, the kinematic data and the corresponding EMG activity of muscles were compared to find a relation between the specific ADL with joint kinematics and EMG signals. Future studies will include performing experiments with more healthy individuals and with the subjects suffering from reduced UE function. Ultimately, this data lays a foundation that enables engineers, physicians and occupational therapists to more fully understand patients' injuries and coordinate to effectively developed diagnostic and rehabilitation methods.

**Zachary Miller**

Enhanced Cellular Response to Metallic Implants  
Mentor: Veysi Malkoc, Biomedical Sciences  
Poster Presentation, Easel 127

There is an extensive use of metal and metallic coatings in the medical device industry. Specifically, those devices that are used in vivo have to undergo extensive scrutiny as to what is the most biologically compatible material for their application. The purpose of this research is to test different types of scaffold designs on metallic implants to enhance cellular integration. Observations and data collected will be used to help in the implementation of new material scaffolds that enhance cellular response and biocompatibility of metallic implants.

**Tessa Miskimen, Allison Nickel & Lauren Hopkins**

Materials Associated with Aversive Value  
Capture Attention  
Mentor: Deborah Hannula, Psychology  
Poster Presentation, Easel 128

Recent work from our lab indicates that attention capture is not limited to perceptually salient items but extends to materials that are distinctive by virtue of their learned aversive value. However, aversive items in our original work were onsets – distinctive not only based on learned value, but also by their sudden appearance in the search display. In two new experiments, we eliminate this potential confound and examine whether capture effects persist. Participants in these experiments search for a target stimulus defined by color during a training phase. They are told to make a single saccade to the target location as quickly and accurately as possible. In both experiments, shock delivery was dictated by the color of the target stimulus – e.g., blue = 80% reinforcement, yellow = 20% reinforcement – so that one target (blue) becomes a conditional stimulus (CS+) and the other (yellow) a predictor of relative safety (CS-). Subsequently, in a test phase, participants search for a shape target (e.g., diamond among circles). Occasionally, one of the distractors is either the CS+ or the CS-, but shock is never administered. Results from Experiment 1 indicate that eye movements during test are made in error more often to the CS+ than the CS- and that this occurs even in the absence of explicit knowledge about training phase shock-color contingencies. However, contingency awareness was assessed at the end of the experiment using a post-experimental questionnaire, an approach that may be insufficiently sensitive to low levels of awareness present during training. In Experiment 2, we attempt to replicate these results with participants making button responses to indicate how likely they are to be shocked. This approach will permit us to make more definitive claims about capture with and without awareness after having eliminated any potential concerns about the perceptual salience of aversive distractors.

**Francine Mitsiopoulos**

Understanding the Contributions of Absorbed, Transmitted and Scattered Light  
Mentor: Carol Hirschmugl, Physics  
Poster Presentation, Easel 94

A common method to detect the elements present in a sample is through Fourier-Transform Infrared (FTIR) spectroscopy, which uses infrared light to excite electrons at energies that correspond to a specific element. This technique was used on potassium bromide (KBr) pellets that contained various concentrations of carbon and carbon-oxygen based materials, such as carbon black and graphite. The expected spectra obtained through FTIR absorption should show discrete peaks in intensity, which is linearly dependent on concentration. The results did not directly show this relationship; therefore, we had to consider how each parameter affects the transmittance and absorbance of the light. There were two main



components that may have affected the data: particle size and scattering. To determine how particle size influences the intensity peaks, we would have to grind the carbon black and graphite to specific sizes within the micron range. This would be difficult and time consuming and would mostly likely not have a profound impact on the data. Therefore, scattering is most likely what is causing complications when analyzing the data. Scattering is a phenomenon that occurs when reflected light is split into various paths, which increases the number of peaks in the absorption band. To verify this is the cause, we will be remeasuring the pellets with new equipment that will collect the scattered light, which will hopefully cancel the noise and produce a clean absorption band.

#### **Alexander Moxon**

Modeling the Ideal Paths of Storm Chasers during Tornadoes

Mentor: Paul Roebber, Mathematical Sciences

Poster Presentation, Easel 142

Given the risk to public health and safety and the limited ability to forecast their occurrence, tornadoes are of great research interest to atmospheric scientists. Most importantly, more data is needed to better understand their development and evolution, with the ultimate goal of better predictions. On days in which tornadoes are forecast, storm chasers travel to areas where these storms are expected to develop with the intention of obtaining these data. However, this goal is difficult to accomplish because of timing and location uncertainties, issues that are further complicated by the inherent safety risks that they present. This project uses agent-based modeling techniques to determine the most ideal locations and routes that storm spotters can take during tornadic thunderstorm events in Oklahoma, one of the areas in the United States in which tornadoes are most common. This research will help us to understand whether the emergent behavior of a cluster of storm chasers would be sufficient to satisfy both safety and data collection goals, compared to more traditional, centrally controlled field experiment deployments. Some recent experiences with real tornado events suggest this possibility, and there is a need to test whether such a result was unusual or would be characteristic of this kind of activity. Such a result would influence the design of future scientific field experiments and would be of great interest to the community.

#### **Rafael Munoz-Echavarria**

Impact of Race and Ethnicity on Civic Duty

Mentor: Benjamin Trager, Educational Policy & Community Studies

Poster Presentation, Easel 22

This reflection on my community-based internship (CBI) delves into the impact of race and ethnicity on civic duty. While engaging in community-outreach and reflection, holding a leadership position has created a clear pathway to affect change in my community. Based in the city of Milwaukee, my reflection emphasizes the importance of diversity and inclusion within a community and its

societal implications. For my research I engaged in guided writing reflections, which critically analyzed my role and duties through my CBI. Through dialectic reflection, I compared and contrasted my immersive CBI experience to that of fellow community members. Additionally, a private reflection with other community members immersed in a CBI allowed for further analysis. As a person of color serving the community, a CBI furthered my civic mindedness by highlighting the need for representation in leadership positions. Also, my position enabled a sense of cultural awareness, through dialogue and community-outreach. A CBI allowed for meaningful dialogue and placed me in a leadership position, enabling a person of color to interact and impact their community. Through representation and inclusion, meaningful dialogue emerges, contributing to a healthy community and civic duty.

#### **Kwendo Mwaniki**

Dual Chamber Microbial Fuel Cell

Mentor: Marcia Silva, Freshwater Sciences

Poster Presentation, Easel 129

Due to the poor levels of sanitation in particular areas across the globe, waste management is a huge concern. Technologies today recover this waste as renewable energy. A prime example is a microbial fuel cell. This is a device converting chemical energy from organic material, to usable, electrical energy. The device contains two chambers, consisting of an anode and cathode respectively. Separating the chambers is a proton exchange membrane (PEM). The membrane keeps chambers separate and to prevent an additional unwanted flux from the anode. Each end of the anode and cathode are connected to multimeter in a simple circuit. Selection of the anode material involves considering high conductivity, high surface area, and pore diameter. Based on previous compiled data return activated sludge (RAS) with the addition of a modified porous anode yield the best results of power density.

#### **Joshua Myszewski**

Design of a Performance-Based Feature Selection

Technique for Motor Imagery Based Brain Computer Interface Data

Mentor: Mohammad Rahman, Biomedical & Mechanical Engineering

Poster Presentation, Easel 130

Many of the algorithms for brain computer interface development are both complex and Many of the algorithms for brain computer interface development are both complex and specific to a particular user as the most successful methodology can vary between individuals and sessions, creating significant hurdles in consistent design and development for practical BCI usage. The objective of this study was to develop a simple feature selection algorithm to improve the accuracy of a subject independent BCI algorithm and streamline the process of BCI algorithm development. The data used for this study was collected from the publicly available BCI

competition III dataset IVa. The methods used were a novel performance based additive feature fusion algorithm working in conjunction with machine learning in order to classify the motor imagery signals into particular states. The results of this algorithm was a classification accuracy of 87% for a subject independent algorithm with less computation cost compared to more traditional methods. The conclusion of this study and its significance is that it developed a viable methodology for simple, efficient feature selection and BCI algorithm development, which leads to an overall increase in algorithm classification accuracy.

**Kathryn Neave & Lindsey Skinner**

Measuring the Effect of Multifocal Lens

Spectacles on VOR

Mentor: Dennis Tomaszek, Occupational Science & Technology

Poster Presentation, Easel 132

The objective of this research is to use the BERTEC Vision Advantage system as a tool to examine the relationship between the Vestibulo-Ocular Reflex (VOR) and balance with and without multifocal lens (i.e., bifocals and progressives) spectacles. Vision is closely associated with balance, and impaired vision is a factor for falls, especially in the elderly. Some studies have linked multifocal lens spectacles to decreased vision while walking and impaired balance. The BERTEC Vision Advantage system measures baseline visual acuity, visual processing time, dynamic visual acuity, and gaze stabilization, all important factors of vision while ambulating. We are currently developing a protocol to test patients using the BERTEC Vision Advantage System. This protocol includes testing older adults with the BERTEC Vision Advantage system while sitting and standing. We want to determine if there is an effect on the data whether participants are sitting or standing. Our team has developed a test protocol, incorporating tests of vision, including the BERTEC Vision Advantage system, the Freiberg Visual Acuity Test (FrACT) to test contrast sensitivity, and the Howard Dolman Test of depth perception, as well as dynamic and standing balance, using the Timed up and go (TUG) Test, and the Berg Balance Scale. The specific aim of our project is to test older adults both with and without multifocal lens glasses to determine their effect on vision, depth perception, VOR, and their relation to balance.

**Paul Newcomb & Sydney Friess**

Documenting the Deportation Crisis in Wisconsin

Mentor: Rachel Buff, History

Poster Presentation, Easel 133

The Documenting Deportation taskforce started as an internationally coordinated effort after the election of Donald Trump to document deportation in the media by collecting press accounts of deportation in all fifty states during the calendar year 2017, and this phase was completed over the summer. After the completion of the initial project, our international partners did not

wish to continue the project; however, the Documenting Deportation taskforce at UWM recognized that immigration and deportation were becoming even more hotly contested issues, and so we have decided to continue the project. This year's continuation of the project includes three components: ongoing documentation of immigration rhetoric and deportation in Wisconsin, a collaborative oral history project; and assisting deportation defense lawyers with a Northern Triangle Research project. Our main project for the past semester has been documenting and analyzing Wisconsin press accounts of deportation and immigration. By storing related press accounts in the Internet Archive, we are beginning to build a database of press that is searchable via keywords or tags. This is an ongoing process, and the mission of this project is to offer people the opportunity to see how media's rhetoric can shape the general public's opinion of the contemporary refugee and migrant crisis. Our main priority going forward is conducting oral history interviews with migrant activists and their allies because it is of a time-sensitive nature. This is because the migrant activists we will be interviewing are primarily elderly or sick. Our mission with these interviews is to preserve memories of experienced migrant activists by speaking to them about their migration experience, life in the United States, and their relationship to migrant rights organizing and migrant rights organizations.

**Austen Norberg**

Analysis of Penetration of Colloidal Carbon (India Black Ink) in Blood Clots by Light Microscopy

Mentor: Julie Oliver, Biological Sciences

Oral Presentation, 12:00pm | Union 240

Ischemic stroke occurs when the blood flow to the brain is reduced or blocked, usually by a thrombus, or blood clot. The only FDA-approved treatment for ischemic/thrombotic stroke patients is the administration of the drug tissue plasminogen activator (tPA). tPA targets fibrin, the protein component of blood clots. While it can reopen the blocked vessel, it can also prevent effective clotting elsewhere, potentially leading to excessive bleeding and brain hemorrhaging. Because of these side effects, there is great need for a new treatment. We are investigating a technique that targets platelets, the cellular component of blood clots, using fibrinogen-conjugated nanoparticles. Our goal is to develop a rapid screening procedure that will allow us to compare how these nanoparticles interact with samples from different blood donors. Clots were formed using various amount of thrombin in both platelet-rich plasma (PRP) and whole blood (WB) from three donors in our normal pool. We hypothesized that over a range of physiologically relevant doses of thrombin, we will see differences in the clot structure as a function of the dose of thrombin, as revealed by the penetration of colloidal carbon (India Black ink) into the clot as a substitute for nanoparticles. These clots were soaked in ink, frozen, cryosectioned and analyzed by light microscopy. Images of each clot were collected and analyzed in ImageJ using the threshold option. Preliminary results indicate that our procedure

detects differences in clot structure, but it remains unclear whether the differences depend on the thrombin dose or on donor-to-donor variability. Testing additional blood donors will help us determine how effective this technique will be as a means of examining clot structure.

**Mark Nosonovsky & Rosalba Huerta**

“Off-spec” Fly Ash in Concrete Applications

Mentor: Konstantin Sobolev, Civil &

Environmental Engineering

Poster Presentation, Easel 134

Coal combustion residuals (CCR) are the solid residues generated by coal-burning electric utilities, which are commonly used in concrete applications. These consist primarily of fly ash (Class C or F) that is commercially used in a variety of concrete applications to improve performance. Landfilled or impoundment fly ash with high carbon content and spray dryer absorber ash (SDA) containing high concentrations of sulphates represent two major off-spec CCR materials that need to be addressed. High carbon contents can lead to problems with durability such as permeability and accelerated freeze/thaw degradation. At the same time high sulphate levels can result in low sulphate resistance and structural decomposition due to sulphate attack. Current research indicates that combining these two off-spec materials helps to offset the unfavorable effect of high concentrations of sulphates and carbon. It is also an potentially efficient and green solution because it may be able to replace up to 70 percent of the portland cement, which is a significant contributor to global carbon emissions. Presented herein are the results of selected research results obtained using cement pastes, mortars and concrete mixtures with different formulations. The results include fresh properties (e.g., flowability, setting time heat of hydration and density) and hardened properties (e.g., compressive/flexural strength, permeability and visual signs of decomposing or dimensional distortion). Also presented is an overview of the test methodologies and procedures used to obtain these results.

**Uchechi Nwosu**

The Potential Health Communication Benefits of YouTube for People with Autism Spectrum Disorders

Mentor: Celeste Campos-Castillo, Sociology

Poster Presentation, Easel 135

Communicating about symptoms with others has direct and indirect effects on health. This is the case when communicating with others who are experiencing similar symptoms. The advent of social media opens opportunities to benefit from communicating with others about symptoms because individuals can take their time responding to posts. However, there is a potential for negative experiences on social media. This study examines how people who identify falling on the autism spectrum disorder discuss their symptoms with others on YouTube. The study team sampled over 40 YouTube videos posted by individuals with ASD and 11,000 comments posted in response to the videos. The

comments are coded into categories. First the comments are coded independently, then the research assistants meet to reconcile discrepancies in coding. Results show that 17.2% of the comments are of people sharing their symptoms. Also 21.8% of the comments are of people explaining their symptoms. For example, individuals with ASD would post comments explaining their symptoms. Later, another individual would relate to the original commenter by explaining their symptoms as well. Social support can improve a patient’s emotional well-being by promoting connectedness with other individuals. It can provide opportunities to elaborate on challenging situations. Building social support on YouTube can affect physiological processes by overturning the effects of overactivation of the hypothalamic-pituitary axis and psychologically induced immunomodulation. Social support on YouTube can also provide resources and engagement in attaining access to health services. Accordingly, YouTube is a beneficial source of health communication for people with ASD.

**Ryan O’Connor**

Immersive Glitch Art

Mentor: Christopher Willey, Art & Design

Poster Presentation, Easel 157

My research started with achieving a baseline understanding of the concepts, aesthetics, and processes of ‘glitch art’ theoretically as well as technically. My research takes ‘glitches’ (digital or analog errors and irregularities) from old technology and displays them through new emerging technologies. Glitches commonly lurk around old programming and analog technology. This presents an inherent problem for the progression of glitch art as a practice. Due to constant updates, immersive experiences are extremely polished on the outside. Glitch is only starting to be realized in new spaces of technology, specifically in immersive Augmented Reality and Virtual Reality platforms. By showing prior glitches in new technologies and by breaking into the codes of emerging platforms, I am able to explore and experience the methodical process of system failure in a new way.

**Kelsey O’Hara**

Mate Preference Function Variation Throughout the Life of Female *Enchenopa binotata* Treehoppers (Hemiptera: Membracidae)

Mentor: Rafael Rodriguez, Biological Science

Oral Presentation, 12:20pm | Union 240

The fundamental process of finding a mate varies among species and can include a variety of mating signals, displays, and courtship rituals. Mating decisions arise from the interactions of both mate preference functions and choosiness. Preference functions rank the attractiveness of a given potential male’s trait to an individual female; while choosiness is the effort a female will expend in obtaining a preferred mate. In this study, we test the hypothesis that mate preference functions vary with female age to help ensure reproductive success. We analyzed the vibrational mating responses of

females of *Enchenopa binotata* (Two-Marked treehoppers) weekly from reproductive maturity until their deaths. By presenting the females with playbacks simulating male signals and varying their dominant frequency (140-240Hz), we were able to determine the phenotypic traits the females found 'attractive'. We implemented a function-valued approach to analyze lifetime variation in mate preferences in terms of four main traits describing the functions: peak preference, overall responsiveness, tolerance, and strength.

#### **Emily Oldehoeft**

Among-Female Assessment Variation & Male-Male Spacing in Eastern Gray Treefrogs (*Hyla versicolor*)  
Mentor: Gerlinde Höbel, Biological Sciences  
Poster Presentation, Easel 136

Female preferences have been widely researched as a source of sexual selection on male mating signals. The complexity of mate choice in an anuran chorus entails 1) female call assessment, 2) acoustic variation in male displays, and 3) male-male spatial dynamics. While calls and preferences are well characterized in Eastern Gray Treefrogs, assessment and localization of closely perched males is not. We explored female response to isolated and clustered artificial calls in a four-speaker playback design. Using a repeated-measure design that forces females to select a mate based on the attractiveness of a call and its proximity to other males of varying attractiveness, we examined among-female variation in dense-chorus choice scenarios. We found very strong preference against the lone call in all scenarios, while choices made among clustered calls differed between females. Many individuals were repeatably able to localize an attractive stimulus centered within a meter of multiple other inferior calls. Interestingly, these females expressed choice significantly faster. Lengthier choice times of less discriminant individuals seems to indicate that "confusion" can be observed in the expression of active preference. We also present unexpected evidence of spatial habituation; females appeared to remember the orientation of the cluster across trials. This study provides greater insight into the real-world mate choice dynamics of multi-signal assessment in a treefrog chorus.

#### **Molly Olson & Samantha Ashley**

Testing Equivalencies of Revised Strain Index Scores: A Pilot Study  
Mentor: Jay M. Kapellusch, Occupational Science & Technology  
Poster Presentation, Easel 82

The Revised Strain Index (RSI) is a distal upper extremity (DUE) physical exposure (PE) assessment model based on the parameters of: intensity of exertion, frequency of exertion, duration per exertion, hand/wrist posture and duration of task per day. The RSI model yields a score which is designed to be proportional to DUE PE. The objective of the study was to determine if subjects perceived similar levels of DUE PE when differing RSI parameters yielded similar RSI scores. Three subjects

participated in this pilot study. Subjects performed isotonic gripping tasks in three groups, each with similar RSI scores: Low RSI scores (3.0 to 3.4), medium RSI scores (10.5 to 12.0), and high RSI scores (30.0 to 34.3). Within each RSI score group there were four tasks and each task had varied levels of intensity of exertion (% of maximum voluntary contraction), frequency of exertion (efforts per minute), and duration per exertion (seconds of exertion). Subjects performed trials in random order and were provided 2 minutes of rest between trials to prevent undue fatigue. Following each trial, subjects rated their perceived level of PE using the Borg CR-10 scale. RSI scores and Borg CR-10 ratings were correlated (R-square = 0.81). ANOVA analyses showed that Borg CR-10 scores differed between RSI categories (low vs. medium vs. high) ( $p < 0.05$ ), but not within RSI category ( $p > 0.05$ ). These results suggest that comparable RSI scores reflect comparable levels of PE and that increasing RSI scores reflect increasing levels of PE. This study produced statistically significant results despite its small sample size, but nevertheless further studies with larger sample sizes are warranted to determine if these preliminary results are repeatable and generalizable to larger groups.

#### **Ellen Olszewski**

Academic Performance of Children with Neurofibromatosis Type 1  
Mentors: Bonita Klein-Tasman & Kristin Lee, Psychology  
Poster Presentation, Easel 136

Neurofibromatosis type 1 (NF1) is a genetic disorder that can contribute to a variety of challenges including visuospatial, motor, and cognitive difficulties. Poor academic performance remains a common difficulty reported by parents. Areas of academic deficits include reading comprehension, spelling, and mathematics. The purpose of the study is to examine the academic performance of children with NF1. Forty school-aged children (ages 9-13) were assessed using subtests from the Wechsler Individual Achievement Test - Third Edition (WIAT-III). WIAT-III evaluates a variety of subject areas including reading comprehension, math problem solving, sentence composition, word reading, pseudoword reading, numerical operations, and spelling which we will be utilizing to assess academic achievement. Using t-tests, the academic performance of children with NF1 will be compared to a normative sample. We will also examine the percentage of children performing at least one standard deviation below the mean on academic tasks. Since poor academic functioning has been consistently found across previous studies, we expect to see the participants differ from the normative mean and a high percentage of children falling one standard deviation below the mean. Academic performance should be a priority so that steps can be taken towards intervention, given that there is evidence that learning disabilities lead to decreased quality of life.

**Easton Orlopp & Fernanda Gonzalez**

Nature Education Organizations' Use of Twitter for Public Engagement

Mentor: Taisik Hwang, Journalism, Advertising & Media Studies

Oral Presentation, 12:40pm | Union 340

In the age of digital and social media, technology-empowered individuals are increasingly gaining control over communication messages disseminated by organizations, institutions, and businesses. Given the shifting nature of communication environment, this study attempts to discover how leading nature education organizations utilize social media to effectively reach and build relationship with their audiences. Specifically, it employs a content analysis to examine how the United Nations Educational, Scientific and Cultural Organization (UNESCO), U.S. National Park Service (NPS), and National Geographic (NG) take advantage of Twitter to better communicate with their external publics. Out of a total of 6,289 tweets sent by these organizations for a six-month period from January to June 2018, a random sample is used for quantitative analysis. This study will uncover various key engagement patterns that emerge from non-profit organizations' social media activities as communication increasingly take place on social media platforms. The expected outcomes include the importance of visual-based messages, the strategic use of informational and action-oriented messages, and the different levels of engagement by the three organizations (i.e., UNESCO, NPS, and NG). The current study will benefit other non-profit organizations by revealing ways in which these organizations purposefully use social media to fulfill their mission, including practical guidelines to strategic communicators in public-sector organizations.

**Maren Orłowski**

Sourcing In and Out: The Competitive Position of Small & Medium Scale Entrepreneurs

Mentor: Avik Chakrabarti, Economics

Poster Presentation, Easel 138

Much of our society's well-being today is centered around commerce: reducing frictions from interactions between people and businesses keep our economy running and ensure that consumers quickly receive the goods and services that they need. As the world becomes increasingly fast-paced, firms are augmenting their production capacity by outsourcing parts of their business processes to outside contractors in order to reduce operating costs and increase efficiency. A vast and growing body of economics literature continues to examine the causes and consequences of outsourcing. With this scholarship, I examined the role of outsourcing in Wisconsin, using firms operating in the medical industry as examples. In order to picture how and why Wisconsin medical industries outsource, I have focused on analyzing three representative firms that have used, and/or currently use, offshore outsourcing in order to expedite some of their tasks. My research methods include interviewing each company's associates who initiated decision(s) to

outsource, as well as evaluating profit and productivity data from each firm before, during, and, in one instance, after outsourcing in order to assess how each company's business activities were affected by the addition of outsourcing processes. I found that while outsourcing can significantly improve a company's output capacity, the success of outsourcing implementation is strongly correlated with the scope of the contracted firm's involvement in the internal activities of the owner firm. If the owner firm does not maintain strict monitoring over what activities the contracted firm is and is not responsible for, and, similarly, if the owner firm does not maintain sole control over its own core internal activities, outsourcing can lead to costly errors. This led me to conclude that outsourcing can indeed represent a worthwhile investment for Wisconsin medical firms, provided the owner firms clearly define and monitor the tasks and expectations of the contracted firm.

**Maria Ortiz**

MLC Resource Library

Mentor: Candance Doerr-Stevens, Curriculum & Instruction

Poster Presentation, Easel 139

The overall purpose of this project is to develop a library that is accessible and furthers the work of the Multiliteracies, Languages, and Culture groups in the School of Education, also known as the MLC Committee. This committee is a consortium of programs and disciplines interested in the nexus of cultures, languages, and literacy in schools and in learning. This resource library also extends the School of Education's commitment to urban education by making available teaching resources to support multicultural and multilingual teaching and learning practices. This MLC library has the potential to impact students' readiness in the field of teaching and promote culturally engaged teaching and learning. As these curriculum resources are assembled into a new, shared space, it is necessary to inquire what resources are needed, and what type of services, and organization structures will make the MLC Resource Library most accessible to all interested programs. To address these questions, we have designed and administered a questionnaire to MLC-related students and faculty in the School of Education; including teacher candidates, practicing teachers, and graduate students. The survey will be no more than 20 questions with the expectation of 100 responses from varying disciplines. Feedback from the questionnaire will provide data to inform possible resource allocations, library layouts, book collections, hours of service, and workshops. Considered collectively, this feedback will guide the future organization and operation of the MLC library to provide learning experiences that will contribute to the mission of improving education and teaching literacy.

**Olivia Overturf, Josh Passon, Andrew Harter,  
Nate Stewart & Mary Widener**

The World After Us

Mentor: Nathaniel Stern, Art & Design

Visual Art, Table 13

The World After Us is a new series of media sculptures that materially speculate on what our devices – phones and tablets, batteries and displays, etc – might become, over thousands or millions of years. Through research, experimentation, and craft, our team has tried (and failed) to turn phones into crude oil, coal, or other fossil fuels – and plan to put the results on exhibit, in beakers and tubes. We attempt to mimic geological time, as pressure and heat – through chemical interactions or specialized machinery – on laptops and tablets, and will display where that potential lies, as petrified-like LCDs or mangled post-exploded batteries, on pedestals in a gallery. We turn “dead media” computers into efficient planters for edible goods, food for mold, or seeds of their own growth – and show both those experiments, and their results, as images, videos, and sculptural forms. We have also turned ground phones into usable supplies, for example color for ink and pulp for paper, and put these to use in these new forms, as fine art prints. It is impossible for humans to truly fathom our planet on an Earth scale, or conversely from the perspective of bacteria. But we can feel such things, through art and storytelling – making our aesthetic encounters both conceptually and ethically vital toward new futures. At stake, whether in our everyday interactions or on a larger scale, are the (digital) relationships between humans and the natural world on the one hand, politics and commerce on the other.

**Mirko Pavlovic**

Mathematically Modelling of the Mechanical Response of GFP Inside Protein Hydrogels

Mentor: Ionel Popa, Physics

Poster Presentation, Easel 143

Here we report a mathematical model to study mechanical response of protein hydrogels made from single domain Green Fluorescent Protein (GFP). Protein hydrogels are a new type of biomaterial made from purified proteins which are covalently cross-linked. These materials retain the unique properties of proteins, such as elastic response and fluorescence. The first step of our model is to produce single domain based hydrogels using random diffusion of molecules and accounting for the aggregate size. Once the hydrogel network is formed, we apply various force protocols and model the unfolding of GFP based on the tethering points. This model gives a faster way to predict the mechanical response of protein hydrogels made from single domain proteins as a function of various cross-linking parameters and provides the ability to test various polymerization parameters and reduce the number of trials when aiming to produce hydrogels with specific elasticity. Understanding the mechanical properties of protein hydrogels at the molecular level through computational work and computer simulations could likely lead to a greater understanding of the mechano-chemistry

of protein-based hydrogels, which may lead to new applications for cartilage replacement, tissue engineering, and controlled release of drugs and therapeutics.

**Samantha Pearson & Payne Counihan**

Confluence: The Meeting of Rivers and Community

Mentor: Jessica Meuninck-Ganger, Art & Design

Poster Presentation, Easel 23

During travels through the Midwest (regionally), South Korea, Japan, Italy, and India, Jessica During travels through the Midwest (regionally), South Korea, Japan, Italy, and India, Jessica Meuninck-Ganger and her students have been studying traditional craft practices from master artisans with the distinguished designation of “National Treasure of Intangible Crafts.” They have observed the preservation of culture and community-building through mentorships that facilitate bridges between generations and backgrounds. Through the arts, these diverse groups celebrate tradition, value sustainability, and recognize that actively sharing skills is an effective method for connection, unification, and fostering innovation. SURF assistants have been working with her and renowned Brooklyn artist, Mary Miss, on the City as Living Laboratory: Sustainability Made Tangible through the Arts (CALL) and Water Marks projects -- partnerships with the Global Water Institute, the Milwaukee Dept of Public Works, 16th Street Community Health Center, and the Kinnickinnick River Neighbors in Action. Their involvement includes a series community events and activities associated with the Kinnickinnick riverbed re-naturalization project. Over the past year and moving forward, they have been researching traditional papermaking and printmaking practices that utilize natural pigments and plant fibers, identified sustainable artmaking practices based on traditional craft practices, and are now experimenting with new technologies that bridge these practices and emerging technologies. Spring programming will include research, community workshops, and creative activities to produce visual representations of water and our impact on Milwaukee’s rivers, health, and ecology.

**Kathryn Pecha**

Framework for End-of-Life-Cycle Assessment for Electronics using Fuzzy Logic

Mentor: Wilkistar Otieno, Industrial & Manufacturing Engineering

Poster Presentation, Easel 144

Environmental sustainability is gaining greater momentum in the sector of manufacturing and business due to increased recognition of climate change. In an aim to steer the population to be more environmentally sustainable, consumer goods are re-evaluated not only to become more profitable, but to decrease their environmental footprint. One technique to accomplish this is analyzing a products’ life-cycle. Life-cycle assessment is rapidly being used by companies to understand the explicit and implicit inputs and outputs of a product or system. Life cycle assessment for products is an important step for

ensuring a circular economy, where manufacturers and consumers alike are aware of the front-end and back-end environmental implication of what they make and consume respectively. This research project will explore the end-life of electronic products by creating an end-of-life-cycle framework using fuzzy logic. Fuzzy logic formalizes human reasoning by mathematically webbing out factors going into a decision process to produce a crisp value that aids in decision making. The life-cycle assessment of an electronic, specifically its end-life, requires the complex capabilities of fuzzy logic which considers conditional, subjective and less predictable deterministic behaviors. The future of a product is very much dependent on its consumer, the economics, the society and producer-consumer relationship. The goal of the research project is to use fuzzy logic to determine the degree of membership for numerous factors that play into the end-of-life-cycle assessment of electronics. The broader goal of this research project is to work toward developing a decision support tool that can assess the environmental sustainability for a plethora of products.

**Annie Peterson, Katelyn Altmann & Amanda Laabs**

Between Form & Formlessness: Reimagining

Architecture of Body in Space

Mentor: Maria Gillespie, Dance

Performing Art: 1:00pm | Union Cinema

Our research project with Associate Professor Maria Gillespie focuses on the investigation of our research project with Associate Professor Maria Gillespie focuses on the investigation of corporeality as it is experienced, perceived, and constructed in space and architecture. We are conducting movement research that questions how meaning, power, and desire are made legible and palpable when the body and its relationship to space emphatically impact each other. This project deconstructs and then reconstructs the body in space through movement that co-exists with sculpture, sonic, and spatial gestures. The potentials and limitations of architecture and material lead us to find both poetic and political resonance in the dance making and performing experience. Our research is based on two movement experiences defined by structures and sculpture, demonstrating how bodies make space. In our embodied practice, we find spatial and kinesthetic methods utilizing rope and plexiglass to create a tactile relationship between the moving body and architectural structure. Harnessed by ropes, we suspend from the ceiling and each other, finding strategies that create a freedom and virtuosity that was not possible before. This harnessed relationship to gravity provokes the compositional complexity of navigating the duality of form and formlessness and durability and impermanence. We collaborated with UWM Professor of Sculpture Glenn Williams who designed and created a seven-foot ramp made of plexiglass and steel. This sculpture both reveals and contains our bodies to forefront the desire of viewing juxtaposed with the vulnerability of performing. The ramp also shapes and expands our movement beyond quotidian use, gesturing towards human potential. Our

choreographies explore the possibilities and limitations revealed when the assumption of the ephemeral body is complicated by the “permanence” of architecture. The research has manifested into a site-specific performance installation titled, *Between Constructions of Desire*, premiering April 5th and 6th at the Kenilworth Jan Serr Studio, featuring original sound composition by C. Olivia Valenza.

**Kim Phan**

Impact of CenteringPregnancy

Mentor: Teresa S. Johnson, Nursing

Poster Presentation, Easel 145

Wisconsin has one of the highest infant mortality rates for Black infants. Racine, an urban community located within Wisconsin had the highest statewide Black infant mortality rates, at 3x higher than the national average. To address this disparity, many community-wide programs were implemented to decrease the rate of prematurity, a leading cause of infant mortality. Breastfeeding and care delivery interventions were also implemented to decrease infant mortality. CenteringPregnancy (CP) is a model of group prenatal care where women are provided with prenatal care in groups of women with similar due dates. In this clinical setting, women must “opt out” of CP if they do not want to participate in group prenatal care. The ongoing evaluation of pregnancy, birth, and infant outcomes is conducted through written evaluations as well as perinatal data that is entered into Peridata.net, a large data base that allows us to monitor and report outcomes. The outcomes are reviewed from 1/1/2013-12/31/2017 (1st 5 years of program data). When CP outcomes were first presented in 2016 with fewer years of data, breastfeeding initiation increased to 89.5% and prematurity was at 4% (less than the national level of 12%). The results this time were very different. First there were significantly higher percentages of stillbirths (1.5 vs. 0.8%), preterm infants (30.1 vs. 22.4 %), and NICU admissions (17.4 vs. 13.2%), and lower percentages of breastfeeding (50.3 vs 73.4%) among women who participated in CP. While this might seem counter-intuitive, a higher percentage of African-American women, who have a higher risk for fetal and infant mortality are participating in CP at > 30%, which is higher percentage of African-American women than receive prenatal care at this institution (19-25%). Sound decisions about appropriateness of this model for specific populations must rest on well-formulated and rigorously conducted research.

**Sarah Philippi**

The Role of APOE Genotype, Sex, & 17β-Estradiol

in Memory Consolidation in a Mouse Model of

Alzheimer’s Disease

Mentor: Karyn Frick, Psychology

Poster Presentation, Easel 119

The APOE4 genotype is the leading genetic risk factor for Alzheimer’s disease (AD), and women APOE4 carriers are more likely than women without APOE4 and men

of any APOE genotype to develop AD. APOE4 status, combined with estrogen loss after menopause, places women at greatest risk of developing AD. Our lab and others have previously shown that the potent estrogen 17 $\beta$ -estradiol (E2) enhances memory in young and aging female mice. However, the interactions among APOE genotype, sex, and estradiol are not well characterized. To address this, two studies were performed. First, to examine effects of sex and APOE genotype on memory, 6 month-old gonadally-intact males and females expressing 5 familial AD mutations (5xFAD-Tg) and human APOE3 (E3FAD) or APOE4 (E4FAD) were trained on object recognition (OR) and object placement (OP). In both tasks, male E3FAD mice exhibited intact memory, whereas E3FAD females and E4FADs of either sex did not, suggesting preserved memory in E3FAD males and impaired memory in E4FAD mice of either sex. To test the extent to which E2 mediates memory consolidation in E3FAD and E4FAD females, ovariectomized female E3FAD and E4FAD mice were trained in the OR and OP tasks. Mice received a post-training infusion of E2 into the dorsal hippocampus and then tested after a 4 or 24-hour delay. In both tasks, E3FAD females receiving E2 had advanced memory but E4FAD females did not. Current studies are characterizing the effects of APOE genotype, sex, and E2 treatment on hippocampal cell signaling and dendritic morphology.

#### **Claire Pichowski**

The Biopsychosocial Model of Pain: How a Provider's Approach Can Impact the Perception of the Patient  
Mentors: Hobart Davies & Eva Iglar, Psychology  
Poster Presentation, Easel 146

The biopsychosocial model of pain incorporates the physiological and psychosocial factors that contribute to pain. The present study aims to illustrate how a provider's approach can impact the perception of the patient. Scenarios and questions were presented to two groups; parents and emerging adults. For parents, they either heard a dismissive or appropriate patient-provider scenario. Emerging adults either read a dismissive or appropriate explanation of chronic pain and stress. Each group was asked to rate various aspects of either the patient-provider scenario (parents) or the provider's explanation of stress and chronic pain (emerging adults), and qualitatively answer questions about their feelings towards the interaction, if they would've said anything to the provider, and if they've had a similar experience. Delphi's, or categories, were created individually while reviewing responses from each group. Collaboration between undergraduate and graduate students was used to create encompassing categories for all responses. To correctly code a response into a category, the majority of our team had to agree on the placement of the response, which meant 80% of the team. Regarding the parent survey, results found that parents were significantly more likely to provide a negative description of the provider ( $\phi=.38$ ,  $p<.001$ ) and report that they would seek a second opinion ( $\phi=.14$ ,  $p<.05$ ) when presented with the dismissive scenario. Regarding the emerging adults,

qualitative responses suggest a variety of reactions to the explanations of chronic pain and stress including negative reactions to the provider in the scenario and negative emotional reactions to the language used. This study has provided research that dismissive language by a medical provider negatively effect patients. To better care for patients, medical providers must use language that better reflects the biopsychosocial model of pain. To further this research, a similar approach should ask medical providers about their perceptions of pain.

#### **Mark Poe**

Probing the Interstellar Medium by Monitoring Millisecond Pulsar Brightness  
Mentor: Joe Swiggum, Physics  
Poster Presentation, Easel 147

This research relies on the detection of radio signals emitted from millisecond pulsars, incredibly dense neutron stars that beam light from their magnetic poles as they spin hundreds of times per second. The signals are detected as regular pulses, corresponding to a pulsar's emission region crossing our line of sight as it spins. The North American Nanohertz Observatory for Gravitational Waves (NANOGrav) works to examine millisecond pulsar (MSP) signals from a variety of sources in order to detect gravitational waves, using the Green Bank telescope and Arecibo Observatory in West Virginia and Puerto Rico, respectively. I measured flux densities (effective brightness) from NANOGrav's 11-year data set to construct a database for 23 MSPs and generated probability distribution functions (PDF) for each source's set of flux densities. In each case, chi square distributions described by three parameters were fit to the measured flux densities. Included on the poster are a full set of flux density PDF parameters. Moving forward, I plan to investigate correlations between the PDF parameters and observables such as spin period, position, and dispersion measure for the purposes of millisecond pulsar population modeling.

#### **Emily Polinske**

How Has My Community Based Internship Helped Me Feel What it's Like to be Different?  
Mentor: Benjamin Trager, Educational Policy & Community Studies  
Poster Presentation, Easel 24

My research question is "How has my community based internship taught me what it's like to be different?" The purpose of this research is to explore and showcase how it feels to stick out in a setting. My research is through my experience at my community-based internship where I am almost always the only white person in a room filled with African Americans. My research also comes from my reflections of my experiences at my work site. Through my work I have experienced all of the aspects of being different than those around you, including differences in appearance, jargon, and overall attitude. Although I feel misplaced in my community based internship, it is still very rewarding. I have made a lot of positive relationships



through my work, and I have the ability to promote good sportsmanship, athletics, attendance, and academics in the children at Milwaukee Public Schools. I also work at a juvenile detention center where I promote the same things, and try to help them see that they can still have a normal and happy life after this stage of their lives has passed. I have also made very meaningful relationships with the inmates, and I plan on keeping them even after they are out. Through this research, I now know what it is like to be different from the people you are surrounded by, and how important it is to treat others that are different to you as equals.

#### **Airielle Pritchett**

Maternal Use of the Baby Box in the Early Postpartum Period  
Mentor: Jennifer Doering, Nursing  
Poster Presentation, Easel 27

The purpose of this study is to evaluate maternal use of a baby box in the early postpartum. Baby boxes, decorative cardboard boxes containing a mattress and fitted sheet, are being distributed by several health systems in Milwaukee. Baby boxes are intended to encourage safe infant sleep; however, little is known about the rates of reported use in early postpartum. A baby box program was initiated where nurses offered a baby box to all mothers who gave birth at an urban Midwestern hospital. Postpartum nurses were provided education on teaching box safety. During a routine postpartum follow-up phone call at 2-3 days after discharge, mothers were asked two additional questions to determine if the box was being used and where the infant would be sleeping if not in the box. Mothers (n = 1,312) who gave birth at a tertiary urban Midwestern hospital over 13 months (Oct 2017-18). Results were coded and analyzed using descriptive statistics. Of 1,312 responses received, 62% of respondents reported using the baby box and 14% reported they were not using the box. Of those who indicated they were using the baby box, nine percent reported having no other safe sleep space, such as a bassinet, etc. Box use could not be assessed in 24% of mothers due to NICU hospitalization, non-English speaking, etc. Baby boxes appear to be well accepted in this sample with more than half of mothers who received a baby box reporting the use of the box early postpartum. For some mothers, the baby box served as the sole safe sleep space for the infant. When considering the utility and safety of baby boxes, future work should consider the role of baby boxes to support safe sleep in vulnerable mothers and infants.

#### **Nikolaus Prusinski**

Galactic-Scale Star Formation-Driven Outflows at  $1 < z < 1.5$  in the 3D-HST Survey  
Mentor: Dawn Erb, Physics  
Poster Presentation, Easel 140

Intense star formation in galaxies results in powerful, galactic-scale outflows of gas. Because stars form from gas, these outflows have a strong effect on the evolution of galaxies, but the intricacies of the process

are still unknown. We investigate the connection between galactic outflows and the structure of galaxies using two independent data sets covering a sample of galaxies in the early universe. The Wide Field Camera 3 grism on the Hubble Space Telescope (HST) provides high spatial resolution spectroscopy yielding maps of the extent and strength of star formation, while absorption line spectra from the Keck Telescope at Mauna Kea provide the intensity of and velocity of the outflows. We present the correlations between star formation rate and outflow velocity, and how the outflow properties relate to the structure of the galaxies.

#### **Ashley Quisler**

Effect of 670 nm Photobiomodulation on Retinal Function & Energy Metabolism in Aging Mice  
Mentor: Janis Eells, Biomedical Sciences  
Poster Presentation, Easel 148

Metabolic dysfunction is a common hallmark of aging. Recent studies have established the metabolic footprint of aging in the mouse. Aging has been shown to reduce retinal function and modify mitochondrial metabolism and redox homeostasis. Photobiomodulation (PBM) with far-red to near infrared (NIR) light has been demonstrated to improve/restore mitochondrial function and improve redox homeostasis in mammalian and drosophila models of aging. We tested the hypothesis that PBM would protect against the loss of retinal function and modify the metabolic footprint of aging in C57/BL mice. Experiments were conducted in 12-month old C57BL/6 mice. Baseline full-flash electroretinograms (ERGs) were recorded and animals were divided into two treatment groups: PBM and Sham. Mice were treated daily for 4 weeks with 670 nm light at a dose of 4.5 J/cm<sup>2</sup>. Sham-treated animals were restrained, but not exposed to 670 nm light. Mice were euthanized following the recording of post-treatment ERGs. Tissues (retina, brain, liver, kidney and skeletal muscle) were harvested, flash-frozen in liquid nitrogen and stored at -80C until analyzed for metabolites. The difference between post-treatment and baseline ERG b-wave responses at 10,000 mcDs/m<sup>2</sup> in sham treated animals was -191  $\mu$ V. In PBM-treated animals it was -72  $\mu$ V. These data indicate that 670 nm PBM protects against the loss of retinal function in aged C57BL/6. We have begun to analyze the effect of PBM on metabolites reported to be significantly depleted in aged tissues in the C57/BL mouse including cytochrome c-oxidase, transcription factor A (TFAM), and Bax. This study was designed to improve our understanding of PBM on metabolic aging. Moreover, the identification of biomarkers of aging may spur the rational design of strategies to attenuate the decline in key metabolic networks and prevent accelerated aging.

**Chase Ranicke**

3D Printing with Magnetostrictive Composites

Mentor: Chiu Law, Electrical Engineering

Poster Presentation, Easel 149

This study focused on the production of the magnetostrictive filaments and the 3D printing with them. The research goals were to improve filament quality and magnetostrictive responses by finding more efficient ways for creating filament and developing optimal methods for 3D printing. For the fabrication of magnetostrictive filaments, Terfenol-D (a giant magnetostrictive material) powders were incorporated into an acrylonitrile butadiene styrene (ABS) thermoplastic matrix. The resulting filaments inherited the magnetostrictive properties of Terfenol-D with enhanced mechanical properties of ABS as well as improved alternating current responses owing to the reduction of eddy current by the ABS matrix. A new procedure for producing filament was developed based on lessons learned from previous methods and led to better control of filament properties and a higher success rate of fabricating quality parts with the modified 3D printer. Since the 3D printing process has shown improved magnetostrictive particle alignment, new printing patterns were developed to take advantage of this feature. Products printed with this composite shall also display the Villari Effect. Using the new filament, 3D printers can print smart tools with multiple functions and sensing capabilities.

**Madeline Rech**

Fixation on Irregular Skin Stimuli in Individuals with Pathological Skin Picking

Mentor: Han-Joo Lee, Psychology

Poster Presentation, Easel 150

Pathological skin picking (PSP) is considered a behavioral addiction due to an excessive and reoccurring urge to pick, scratch, or rub one's skin to the point of scarring or lesions. Individuals with PSP seek to correct perceived flaws on their skin and report relief from tension, anxiety, or stress after conducting the behavior. The study aimed to investigate the relationship between eye tracking indices and their influence on urges to pick and emotional symptoms (i.e., depression, anxiety, and stress). It was hypothesized that greater average fixation duration (AFD) to irregular skin stimuli would be significantly correlated with (1) higher reported urges to pick, and (2) greater reports of emotional symptoms (i.e., worse emotional symptoms). We recruited subjects (n=32) with PSP to participate in this study from the University of Wisconsin-Milwaukee with an average age of 22.44 (SD=4.43) and they were predominantly female (n=29). The relationships were investigated using eye-tracking, self-report questionnaires (SPS-R, DASS-21) and a behavioral assessment task (BAT) measuring the reported urges to pick. Stimuli on the eye-tracking task included two images of skin (normal and irregular) and two of wood (smooth and rough). Participants were instructed to freely view the stimuli on the screen during each trial, while their fixations were recorded. Using a Pearson's

r correlation, results indicated that increased AFD was significantly correlated with higher scores on the BAT, thus supporting our first hypothesis. However, increased AFD was not correlated with increased reports of emotional symptoms. The findings suggest that irregular skin stimuli may provoke urges to pick, but not emotional symptoms. The results provide valuable information about the implicit processes underlying PSP. Future research may investigate how eye-tracking indices and BAT scores change after an intervention is implemented (e.g., therapy).

**Joshua Reed**

Quantifying Microstructure Development in Small-Scale Shear Zones in Gabbro

Mentor: Dyanna M. Czeck, Geosciences

Poster Presentation, Easel 151

The Grassy Portage Sill (GPS), located in the Rainy Lake region of northwestern Ontario, is an approximately 2.7 billion year old gabbroic intrusion that was caught within a major deformation zone related to granite-greenstone terrane formation. Previous research indicates regional deformation consisted of both right-lateral and shortening components. This deformation was accommodated in a variety of ways by different rock units. Strong rock units like the GPS generally are void of penetrative foliation, but have localized cmscale ductile shear zones. We are analyzing one shear zone within a GPS metagabbro that is approximately 1 cm in width. It contains strong hornblende, biotite, and chlorite alignment inside the shear zone compared to isotropic mineral fabric outside of the shear zone. Understanding the microscopic structure and mineralogy of small shear zones like this one will provide a better understanding of shear zone dynamics. For analysis, our sample was prepared into petrographic thin sections that span the deformation from outside the shear zone gradually into the shear zone. Changing mineralogy and microstructure were quantified across the strain gradient by point counting. The analysis shows that our samples consist of plagioclase and hornblende, with minor amounts of biotite, chlorite, pyroxene and quartz. Plagioclase concentration decreases and quartz and hornblende concentrations increase towards the shear zone. Quartz appears in veins that indicate fracturing and fluid intrusion. Plagioclase microstructures including undulose extinction, bulged grain boundaries, fracturing, recrystallized edges and subgrain boundaries all increase in occurrence towards the shear zone indicating deformation by dislocation creep and brittle fracturing. Within the shear zone the plagioclase is completely recrystallized. Quartz grains also show some instances of undulose extinction, which increase towards the shear zone. Together, the microstructures indicate that deformation was accommodated by ongoing ductile dislocation creep processes with intermittent embrittlement likely due to fluid infiltration.

**Isaac Repinski & Nia Keranova**

Comprehensive Analysis of the Performances of  
Finger-Style Guitarists at the 1969 and 1970 Ann Arbor  
Blues Festivals

Mentor: John Stropes, Music

Oral Presentation, 12:20pm | Union Cinema

The Ann Arbor Blues Festivals of 1969 and 1970 were historic cultural events that are now understood as pivotal moments in American music. They brought together the leading electric blues guitar players of the time and many of the seminal acoustic blues guitar players who were still touring. In this period of cultural reconfiguration, this music was interesting to a wider, curious audience. This research builds on work which began in Fall 2017: the accession, digitization, and integrations of materials (color slides, audio recordings, programs, photos, and other ephemera) related to the 1969 and 1970 Ann Arbor Blues Festivals. Set lists have been established, and tunings and other distinctive characteristics of each performer have been recorded. Selected passages of compositions by Robert Pete Williams, Johnny Shines, John Jackson, and Big Joe Williams have been transcribed and typeset. Analytical tools such as Melodyne and Sonic Visualizer software have supplemented the painstaking work of transcription. A strategy using social media to bring together blues scholars and enthusiasts around the world who share an interest in this topic has been implemented, and materials from private collections have fueled our work. Monographs for publication in both print and digital formats have been developed which are supported by photography, audio, and video, and include state-of-the-art transcriptions of musical passages that illustrate the unique approach of each performer along with comprehensive information on discography, set lists, tunings, and other details significant to each performer. The positive response from blues periodicals in the US and Europe confirms that this work will receive a broad popular reception. With the inclusion of state-of-the-art transcriptions of performances, this research breaks new ground in ethnomusicological studies.

**Madeline Rettmann**

Structural Determination & Function of

*Streptomyces Griseofuscus*

Mentor: Nicholas Silvaggi, Chemistry & Biochemistry

Poster Presentation, Easel 152

The enzyme MppP from *Streptomyces wadayamensis* is the prototype of a family of pyridoxal 5'-phosphate (PLP)-dependent enzymes that use dioxygen to perform a 4-electron oxidation of L-Arg to 4-hydroxy-2-ketoarginine in the biosynthesis of L-enduracididine (L-End). L-End is a non-proteinogenic amino acid found in several peptide antibiotics, such as mannopeptimycin. MppP homologs exist in different genomic contexts and thus likely have different biochemical roles. For example, a group of MppP-like enzymes that are associated with an NADH-dependent reductase produce 4,5-dehydro-D-arginine rather than the hydroxylated product. Another MppP homolog was found in an uncharacterized gene cluster

from *Streptomyces griseofuscus*, along with a hypothetical protein predicted to be a proclavamate amidinohydrolase (SgrAH), a putative iron- and S-adenosylmethionine (SAM)-dependent methyltransferase (SgrMT), a predicted N-acetyltransferase (SgrNAT), a homolog of hydroxyphenylacetate 3-monooxygenase, and two proteins with no significant homology to proteins of known function. Here we show that SgrMppP has the same catalytic activity as the prototypical enzyme from *S. wadayamensis*. Initial activity tests show that SgrAH does not possess argininase, agmatinase, guanidinopropionase, or arginine deiminase activities when tested against agmatine, L-Arg, 2-ketoarginine, or the SgrMppP reaction product, 4-hydroxy-2-ketoarginine. The structure of SgrAH was determined and strongly suggests that it is a true amidinohydrolase. Given the lack of SgrAH activity in the preliminary tests, it is likely that SgrMT acts on the MppP product, and this methylated compound is the substrate for SgrAH. SgrMT does bind both iron and SAM. We are currently focused on finding the substrate for SgrAH, determining the structure and activity of SgrMT, and expressing SgrNAT.

**Haley Richards**

Decaying Cinema: Celluloid Film & the

Female Cinema

Mentor: Tami Williams, English

Poster Presentation, Easel 31

Over the course of the year my research has focused mainly on the preservation of film history, specifically celluloid film. Film is important because it captures the culture of society at the time in which it's made. Celluloid film gives us a key look into the history of global culture, and also plays a vital role in the study of modern and future cinema. Through two main projects I was able to focus on restoring celluloid film to repair and maintain this very history. My first main project has been to repair a collection of 16mm films within the Film Studies department, I spent time cleaning and splicing various prints to get them in a working condition for proper screening. This restoration process promotes future use of these films inside and outside of the classroom, allowing them to serve as artifacts of the teachable history in which they exist within. My second major project has been to work with Professor Tami Williams on an upcoming 'Women Pioneers of Silent Film' Festival. This project allowed me to take part in reshaping the history of early women film directors by showcasing their films and inviting female scholars to discuss the works. Often these pivotal characters of early cinema are glossed over or forgotten, their important films forever lost. This project will bring these films to the public eye so that these women and their achievements can be celebrated. Women are frequently left out of history, and this is a part of the movement to change that. The restoration of celluloid film allows for the preservation of cinema history that reveals important global cultural changes, as well as the contributions of women in the industry that might have otherwise been undiscovered.

**Mark Richter**

Visibility Graph Analysis  
Mentor: Brian Schermer, Architecture  
Poster Presentation, Easel 181

I am working with Professor Brian Schermer through the School of Architecture and Urban Planning, to develop a computer based strategy for measuring ideas around visual connectivity, integration, and step depth. In addition, I have been making comparisons in relation to spatial qualities of particular building types. My primary focus is on the development of student unions. This is because there is an immense amount of people who use the union, and large amount of destinations within this particular building type. Using the 3D visibility graph analysis program, I have made connections and began to discover important destinations within the student unions. With unions being so large and complex, I have been figuring out how to make unused, and sometimes limited spaces, a more aware and important destination for students.

**Bronwen Risse-Connelly**

Using Community Internships to Learn About Public School Communities  
Mentor: Ben Trager, Educational Policy & Community Studies  
Poster Presentation, Easel 25

The community-based internship program at public higher education institution combines service learning, community study, internship, and reflection for an all-encompassing learning experience. This program allows undergraduate university students into public school districts in communities to help schoolchildren with math and reading. An important component of the internship program is to develop resolutions about community and personal perceptions. Through observing the environment of the classroom -interacting with teachers, students, and parents - and collaborating with peers, university students have observed how the school community impacts the elementary school students. First, they have learned that when school communities are smaller, it gives children a support system that they may not have otherwise. When the small class sizes are included with cultural events, children gain knowledge of their cultural backgrounds that they may not have otherwise had. Lastly, when people from outside of the community enter, it creates a cultural exchange between students, staff, and non-community members. As the internship continues, a greater sense of community will be established and the university students will gain more knowledge about the interaction between a school community and its surroundings.

**Mariah Robbins & Ryan Menning**

Concentration and Ionic Strength Effects on the Formation of Tetramethyl Rosamine Aggregates in Aqueous Solutions.  
Mentor: Guilherme Indig, Chemistry & Biochemistry  
Poster Presentation, Easel 153

The formation of non-fluorescent H-type dye aggregates in subcellular compartments can negatively affect the overall quality of fluorescence microscopy data. These aggregates can also decrease the limits of detection of desirable targets in a variety of biological imaging procedures, including the case of fluorescence-guided delineation of tumor margins in surgical oncology. This study focuses on the analysis of how, and to which extent, concentration and ionic strength affect the aggregation tendencies of the mitochondrial fluorescent dye tetramethyl rosamine (TMR) in aqueous media. TMR was found to show significant tendencies to form H-type dimers in aqueous media. The equilibrium constant for the formation of TMR dimers in pure water was found to be of the order of  $2.3 \times 10^3 \text{ M}^{-1}$  at 25 °C. In addition, ionic strength was also found to have a quite large effect on this monomer-dimer equilibrium, with the respective equilibrium constant increasing by up to three orders of magnitude upon going from pure water to aqueous NaCl solutions with increasing ionic strength (up to 4 M). Last but not least, initial studies dealing with the effect of temperature on the respective equilibrium constant, as characterized in pure water and also in NaCl solutions of different ionic strengths, have indicated that upon increasing temperature from 25 °C to 55 °C the equilibrium is always shifted to the side of the dye monomer. Further analysis of our experimental data will provide for the evaluation of standard values or reaction free energy ( $\Delta G^\circ$ ), reaction enthalpy ( $\Delta H^\circ$ ) and reaction entropy ( $\Delta S^\circ$ ), both in pure water and also in aqueous sodium chloride solutions, and permit a more detailed analysis on how and to which extent the hydrophobic effect and changes in entropy may affect dimer formation.

**Kelsey Robinson**

NEXT.cc  
Mentor: Mark Keane, Architecture  
Poster Presentation, Easel 154

As an online design education nonprofit organization, NEXT.cc is a free resource that students and educators can access across the globe. With a web of hundreds of lessons and activities that span topics from package design to solar energy, NEXT helps to teach what design is and why it is important. The site emphasizes the scope of design education and design thinking by offering activities at nine scales: nano, pattern, object, space, architecture, neighborhood, urban, region, and world. Topics are broken down into “journeys”, which feature an overview, several activities, review questions, and links to additional free resources for students to access. UWM, the School of the Art Institute of Chicago, and many other organizations sponsor NEXT, helping it to grow and find its way into schools where teachers

are incorporating it into their classrooms. My work for NEXT.cc has consisted mainly of contributing to this growing web of activities by creating new lessons and updating older ones. I work at the research/writing stage, where I plan out lessons and find additional resources for students to access, as well as the visual development stage, where I create graphics and icons that correspond to lesson topics and activities. Since starting last year, my projects have included translating first-year SARUP projects into NEXT journeys, working on environmental lessons, and helping to develop workshops in which students collect data from the Chicago River.

### **Riley Rockford**

Comparing Ancient and Modern Residential Structures in Peru's Casma Valley Using ArcGIS  
Mentor: David Pacifico, Art History  
Poster Presentation, Easel 166

This project examines the differences and similarities between modern structures and ancient residential structures in the Casma Valley of Peru with respect to room area, overall structure area, and morphology. These comparisons help us identify and interpret the changes in living conditions, household wealth, and perhaps family structure and status over time. This comparative project contributes to the Casma Hinterland Archaeological Project, which examines the long-term environmental and social impact of urbanization in the late pre-Hispanic period. The Casma State was active in Peru during the Late Intermediate Period (CE 700-1400) and was a highly urbanized, coastal, pre-Hispanic civilization. Casma State settlements typically placed administrative and elite structures at the base of the Andean foothills above the irrigable river valleys, while commoner residential structures terraced up into the mountain flanks at the valley margins, like today's favelas in Brazil. Commoner residences take a number of forms defined by the Casma Hinterland Archaeological Project, forms that correspond to family structure, status, and specific functions. These ancient structures are visible as subtle changes in the color and texture of satellite images of the valley. Adjacent modern structures are easily visible in satellite imagery. When observed in the satellite images, modern and ancient structures are digitized using ArcGIS Online, a web-based Geographic Information System. Once digitized, modern and ancient structures can be categorized, their areas can be calculated, and they can be compared before the results are ground-truthed in the field. These remote data and analyses streamline subsequent fieldwork and constitute a digital record of remains that are threatened by new building projects, agricultural activities, mining, and environmental factors.

### **Aimee Roekle**

A Comparison of the Production of /t/ Sounds in Child-Directed vs. Adult-Directed Speech  
Mentors: Jae Yung Song & Robin Fritche, Linguistics  
Poster Presentation, Easel 118

While much research has been conducted on the relationship between a mother's use of different phonemes (separate sounds that change the meaning of the word) and who she is speaking to, adult or child, little research exists on a mother's use of allophones (systematic variations of a phoneme that do not change the meaning of the word as in). The present study compares a mother's use of certain allophones of the alveolar stop /t/ in the presence of her child versus the presence of another adult. To study this, 13 mothers were recorded twice, once to an adult and once to their children, reading two pre-written stories containing a high amount of selected target words. The recordings were analyzed in the audio analysis program Praat for four patterns of /t/ allophones: use of glottalization (as in but ton), use of flaps (as in water), release of word-final /t/ (as in cat), and duration of aspiration of the word-initial /t/ (as in star). Current analysis shows that there is little to no correlation between a mother's use of flaps, aspiration, or releases and the presence of her child. However, glottal stops were found to be used significantly less often in child-directed speech in favor of fully pronouncing the /t/. These results could aid in understanding the ways mothers' speech patterns change in the presence of children, as well as how children develop speech patterns through influence of their mothers.

### **Haley Rohr**

How has my Community-Based Internship (CBI) Impacted My View on the Amount of Public Funding that a Large Urban School District Receives?  
Mentor: Ben Trager, Educational Policy & Community Studies  
Poster Presentation, Easel 32

How has my community-based internship (CBI) impacted my view on the amount of public funding that a large urban school district receives? From working at a handful of public schools within the metro area, through a CBI program offered at a large public urban university, as well as through service-learning, I have noticed many differences in the opportunities students receive amongst the various schools. As I compare my personal experience, at a rural public school in Northern Wisconsin, with those at large urban school district, I notice an even greater gap in quality. Based on local property taxes, and possible outside donors, I realize that the characteristics of these schools differ from each other for a reason. This creates a divide between the amount of opportunities students are able to experience. These realizations contribute to my changing views as to how I believe public funding should be disbursed. In my experience, I believe that the public schools that I work at rely on CBI programs funded by the federal government to aid students in areas where teachers cannot be financially supported. These diverse

low income areas simultaneously experience larger levels of trauma amongst the students- issues that a limited staff cannot always support. As the amount of public school funding continues to diminish, there's not enough opposition to defect that local socioeconomic status plays a determining factor in school funding, which directly influences educational opportunities a child will receive. Being that all children should have the right to an equal and prosperous education no matter the economic status. It is clear that public funding directly affects the wellbeing of inner-city students, a wellbeing that may be overlooked.

### **Megan Roshak**

Relationships in High Definition: An Analysis of Media Influence on Connection

Mentor: Barry Liss, Arts & Humanities, College of General Studies

Oral Presentation, 1:20pm | Union 340

The research analyzes current media forms and their impact on interaction; Specifically, the communication and culture of relationships are explored. Both online dating applications and virtual reality, girlfriend experiences have a stake in current media. According to Price Waterhouse Coopers, virtual reality growth has the most force behind it compared to even streaming technology. Dating applications have also seen their incline; it is the third most likely way for heterosexual couples to meet. Relationship media is a growing industry that begs acknowledgment. The implications of these media are explored. First, dating applications and virtual reality are analyzed under a McLuhan lens using his four laws of media. Next, these four categories are more deeply researched. Each media form is given its chance and is exposed for what it does. Online dating applications can make real interaction disappear, and virtual reality, girlfriend experiences can undermine consent. At the same time, online dating can widen inner circles, and virtual reality can increase cognitive load. These are only a couple of the many implications found. Awareness of the implications is promoted through the research. The research began with a background in media studies. The works of McLuhan, Carpenter, and Ong were explored. "Old media" works are intertwined with "new media" analysis through the study to better round the approach. The research shows predictions of Marshall McLuhan and others in practice. The global village is here, as well as secondary orality, so how do we negotiate with media? Especially with media, that is close to the heart?

### **Augustine Rouamba**

Barriers & Disparities of Diabetic Retinopathy Screening in Minorities

Mentor: Sandra Millon-Underwood, Nursing

Poster Presentation, Easel 121

Diabetic retinopathy is a major complication of diabetes that causes vision loss in the working age population if left untreated. Numerous studies have linked the increased glucose levels caused by diabetes as the primary cause for the dysfunction of retinal vascular cells. Tight

regulation of glucose levels has been proposed as a beneficial strategy to reduce complications of diabetes. In addition, early diagnosis and treatment decrease the risk of severe vision loss by 90 percent. Unfortunately, in many cases tight regulation of glucose is difficult to achieve. In racial and ethnic minority patients are more likely to have poor glycemic control and are less likely to be screened for diabetic retinopathy than their white counterpart. It is important to understand the barriers and disparities of the screening behavior. The study identifies and address the disparities and barriers associated with diabetic retinopathy screening. We evaluated the social-ecological framework to help identify the barriers that affect the eye screening by the interaction between the individual, the community, the physical, social, and political environments. The data was collected using a 23-item survey which included item regrading vision impairment, access and utilization of health care from the CDC Behavioral Risk Factor Surveillance System. The data revealed that the people that are in greatest need of eye screening are the individual who had a history of health care, eye problem and had not been seen by a health care provider in the past year. Most of those people live in low socio-economic neighborhoods. The study will help identify the reasons of the lack of screening. That will help develop and test interventions to overcome the barriers. The goal is to reduce vision loss from diabetic retinopathy in communities that have limited access to eye screening.

### **Valerie Rubalcava**

Microstructural Analysis of the Acebuches Metabasites from the South Iberian Shear Zone

Mentor: Dyanna Czeck, Geosciences

Poster Presentation, Easel 158

Fault zones at depth are not widely investigated in situ because the area of interest is too deep and expensive to probe. At depth, increased heat and pressure cause the style of deformation to change from brittle fracturing to ductile flow, and faults that flow ductilely are referred to as shear zones. Subsequent erosion can cause ancient shear zones to be exposed for study and used as analogues for contemporary faults at depth. One of these exposed zones is the South Iberian Shear Zone (SISZ), which formed due to continental collision following the closing of the Rheic Ocean in the late Paleozoic. The SISZ exposes deformed Acebuches metabasites (north of the shear zone) and Pulo do Lobo schists (south of the shear zone). In this study, we examined the fluid-rock interactions of the Acebuches metabasites. To do this, we analyzed seven Acebuches metabasite samples spanning 188 meters along the Almonaster transect of the shear zone for mineralogy, grain size, and microstructures including solution seams, veins, and undulose extinction. Mineralogy is dominated by amphiboles and plagioclase. Grain size decreases towards the shear zone. Amounts of plagioclase decrease as amphiboles increase closer to the shear zone. Veins and solution seams show no patterns in their location or abundance indicating that fracturing and fluid interaction were dispersed. Undulose extinction

is ubiquitous in plagioclase throughout the transect, but becomes more prevalent in the amphiboles towards the shear zone. This indicates that 1) amphiboles are stronger than plagioclase and 2) crystal-plastic deformation increases towards the shear zone. The combination of veins, solution seams, and crystal plastic features indicates that deformation was accommodated by ductile processes of diffusion and crystal-plasticity with episodic brittle deformation, likely caused by fluid infiltration.

#### Emily Ruder

Are Dark Throats Selected for in Eastern

Gray Treefrogs?

Mentor: Gerlinde Höbel, Biological Sciences

Poster Presentation, Easel 159

Sexual dimorphism in morphology (physical differences between the sexes) or color is Sexual dimorphism in morphology (physical differences between the sexes) or color is widespread in the animal kingdom, and this pattern is frequently accentuated during the mating season. Male frogs reaching sexual maturity generally develop a vocal sac, which is primarily involved in the mechanisms of call production. However, in many species the throat area is also pigmented and conspicuous, suggesting that the vocal sac might act as a visual signal as well. We examined vocal sac coloration in Eastern Gray Treefrogs (*Hyla versicolor*). We found that throat pigmentation of Eastern Gray Treefrogs is a sexually dimorphic trait that varies among males. This suggests that it could have a function in social communication and mate choice. Our hypothesis is that males are selected for the darkness of their throats. If this is true, then successful males will have darker throats than unsuccessful males. We took pictures of the throats of males in amplexus (successful) and males that did not mate (unsuccessful) to find the darkness and area of their throat pigmentation. We used ImageJ software to find the average grey value and size of each throat. We found that unsuccessful males have darker and larger throat areas when compared to successful males. Our hypothesis was unsupported by this data. In future field seasons we might duplicate this experiment to see if it was not the cold weather during this particular season that caused pressure to breed. If the frogs were constrained, there may not have been strong selection.

#### Olivia Rush

WaTA Heavy Metal Absorbent

Mentors: Marcia Silva, Freshwater Sciences & Mohsen

Manjili, Materials Science & Engineering

Poster Presentation, Easel 160

Generations of industrial pollution left many fresh water sources awash with harmful contaminants. The main contaminants include heavy metals such as mercury and lead, bacteria, and suspended solids. Current methods for water treatment use chlorine to kill bacteria but do little to remove heavy metals. Having high concentrations of heavy metals in drinking water is especially dangerous due to their ability to inhibit brain development and cause chronic illness. The purpose of the Silva group at

WaTA (Water Technology Accelerator) is to identify and remove fresh water contaminants efficiently. Zeolite is a sand-like, porous, composite with the ability to absorb heavy metals when functionalized. Functionalization requires thorough cleaning, sonication with chemical additives, and repeated heating and cooling steps. After fabrication, the functionalized zeolite is ready to be tested with variable lead and mercury batches. There are five parameters considered when creating the solutions; temperature (4-40°C), initial concentration (10-50 ppm), time (.5-24 hours), molecule size (75-1000 microns), and pH (3-7). To measure the filtration efficiency, the initial solution is compared with the final solution. Comparison between batches is necessary to know exactly how much mercury and lead absorption is possible. Zeolite is already known to be able to remove heavy metals from water, but to what extent? The overreaching goal is to refine zeolite filtration, share the findings with industries and ultimately make effective and inexpensive water filtration available to the public.

#### Matthew Ryther

Invasive Mussel Colonization and Composition in Lake Michigan

Mentor: Russell Cuhel, Freshwater Sciences

Poster Presentation, Easel 161

Biological invasive species are one of the main issues that both freshwater and marine ecosystems face. There have been 79 known invasive species in Lake Michigan that have established reproductive populations. Of these species, the most infamous and detrimental invasion was that of the zebra and quagga mussels (*Dreissena polymorpha* and *Dreissena bugensis*). These species are natives of the Caspian Sea and were introduced to Lake Michigan via transoceanic trade ships around 1989. First, the zebra mussels made headlines since they thrived in near shore and rocky environments. This caused beaches and shallow areas to be completely colonized and proved to not only affect people but also phytoplankton availability in the water column. In 2002 quagga mussels were observed in deep water and nearshore environments; virtually wiping out zebra mussels and eventually colonizing the majority of Lake Michigan's benthic environment. Through the benthification of Lake Michigan caused by both dreissenid species, the composition of the ecosystem has moved from a eutrophic to an oligotrophic environment. This transformation is a fisherman's nightmare and a diver's paradise. By analyzing dreissena colonies from different areas of the lake, trends have been established pertaining to their growth patterns and chemical composition (via CHN analysis). The relationships between size frequency and distribution and components such as mussel length and composition help to understand the direct impacts that these invaders have had on the nutrient availability and trophic interactions in Lake Michigan.

**Simone Safian & Caleb Peavy**

LGBT+ History Project Film  
Mentor: Jenny Plevin, Film  
Film: 1:20pm | Union Cinema

This project is a collaboration between doc | UWM and the Milwaukee Pride organization in Milwaukee, Wisconsin. Through filmed interviews, archival photos and other visual techniques we aim to show how the community has changed over time in the Milwaukee area. Our interview subjects include drag queens, writers, bar owners and other community members who have contributed to the history and culture of this city. One subject we've been focusing on, BJ Daniels, has been performing at drag shows in and around Milwaukee since the 1970s. BJ has been a great resource of knowledge for us and through BJ we've been able to learn more about how the scene has evolved through the past few decades as well as what people were going through during the AIDS crisis of the 1980's and onward. Our goal with this video is to mix archival photos from Milwaukee's past with interviews and other visuals from the present. We hope to spread empathy and inform the viewer on how the community has survived and evolved through the years.

**Hannah Sallmann & Sofia Mattson**

Threat of Shock Reduces Working Memory Capacity:  
An ERP Study  
Mentor: Christine L. Larson, Psychology  
Poster Presentation, Easel 162

An abundance of research has demonstrated that anxiety adversely affects cognition. Working memory, a domain of cognition involving the active maintenance of information over a brief interval of time, can be negatively impacted by anxiety. Current theories propose that anxiety leads to an overall reduction in working memory capacity, which is due to the inability to filter out task-irrelevant threatening stimuli from entering working memory. Based on this prior work, we investigated the effects a threatening condition has on working memory capacity and the ability to filter task-irrelevant neutral task-based stimuli. One event-related potential, the contralateral delay activity (CDA), indexes the quantity of items retained in working memory, thus serving as an electrophysiological index of working memory capacity. Forty-six undergraduate participants completed a change detection task while electroencephalography (EEG) was recorded. The task was completed in two conditions: Threat of shock and safe. The change detection task consisted of three set sizes: Two targets, two targets and two neutral distracters, and four targets. The two targets and two neutral distracters condition was incorporated to calculate the ability to filter task-irrelevant distracter stimuli. CDA was calculated by computing the difference between contralateral and ipsilateral waveforms for occipital/parietal channel clusters. Results found that CDA was reduced under the threat of shock condition compared to the safe condition. However, there were no differences in filtering efficiency CDA for both conditions. These results suggest that working memory capacity is reduced under threatening contexts, but individuals may still maintain the ability to filter distracting information from working memory.

**Giorgio Sarro**

An Investigation of Intensity, Structural, & Timing  
Extremes for Extratropical Transition  
Mentor: Clark Evans, Mathematical Sciences  
Poster Presentation, Easel 163

Extratropical transition (ET) is a poorly studied subject with large impacts on several developed countries. As defined in previous research, ET is the process by which a tropical cyclone transforms into a non-tropical, or extratropical, cyclone after it encounters frontal systems and reduced sea-surface temperature at higher latitudes. A notable example of the direct impacts of ET is Hurricane Sandy. Sandy underwent ET just before hitting the eastern United States with a major storm surge and expansive wind field. In this study, we focus on improving understanding of the atmospheric conditions associated with different ET outcomes. Previous studies examined only a limited number of storms, yet the results are cited extensively. The primary goal of this research is to increase the number of analyzed storms. In doing so, it will confirm or deny the conclusions of previous studies and will develop new understanding. In this research, we focus on the Atlantic basin and analyze all the storms that undergo ET since 1995. Storms are divided into three categories: storms that became stronger, weaker, or did not change intensity after ET, based on the maximum surface wind speed. Because land significantly impacts storm strength, we remove cases that made landfall in the three days prior to ET completing. Next, all cyclone tracks, as well as atmospheric fields from the ERA5 Reanalysis, are obtained, and a phase-based diagram is used to more precisely document ET timing. Future work will consist of deeper analysis to note atmospheric patterns associated with distinctions during and after ET: post-ET intensity, ET duration, and does the storm have a purely non-tropical or a hybrid tropical/non-tropical structure post-ET.

**Jayson Schalk**

Intrahippocampal Infusion of G-protein Coupled  
Estrogen Receptor Agonist Increases CA1 Spine  
Density & Enhances Memory Consolidation  
Mentor: Karyn Frick, Psychology  
Oral Presentation: 12:40pm | Union 344

Little is known about the role of G-protein-coupled estrogen receptors (GPER) in hippocampal synaptic plasticity and memory consolidation. G-1 is a GPER agonist that mimics the memory-enhancing effects of 17 $\beta$ -estradiol (E2), a potent estrogen. However, the mechanisms through which G-1 enhances memory remain unclear. Here, we examined the effects of dorsal hippocampal infusion of G-1 on memory consolidation and CA1 dendritic spines. In Experiment 1, ovariectomized mice received bilateral dorsal hippocampal infusion of G-1 (4  $\mu$ g) or vehicle immediately after training in the object recognition and object placement tasks. Compared to vehicle, G-1 significantly increased the time spent with the novel or moved objects, indicating an enhancement of hippocampal-dependent object recognition and



spatial memory. In Experiment 2, ovariectomized mice received DH infusions of vehicle or G-1, and then brain tissue was collected 40 minutes later for Golgi staining and dendritic spine analysis. Compared to vehicle, G-1 significantly increased apical dendritic spine density on pyramidal neurons in the CA1 region of the hippocampus. Further analysis showed that G-1 specifically increased the number of mushroom spines, but not thin or stubby spines. These findings suggest that G-1 may enhance hippocampal-dependent memory by increasing mature apical dendritic spines in CA1.

### Shelbi Seefeldt

Exploring Fatigue & Physical Activity Patterns in Young Adult Women with Breast Cancer

Mentor: Jeanne Erickson, Nursing

Poster Presentation, Easel 164

Breast cancer is the most common form of cancer in women. Fatigue is a common symptom during chemotherapy which results in decreased physical activity. The purpose of this research is to explore fatigue and physical activity in young women over 3 months of chemotherapy. This study is a segment of a larger study. Women were recruited at the start of chemotherapy treatment. The clients participating in the study are ages 27-39, average age is 34. Involvement is for 12 weeks, no follow up is conducted after the 12 weeks are completed. The women using the accelerometers wore them the first and last week of the study and filled out a PROMIS survey about fatigue. Data were managed in Excel using descriptive statistics. 18 women were enrolled in the study (mean age 33.7 years), 2 withdrew and 1 is still completing the study. All the participants were married, most (13/18) were Caucasian, 14/18 had 1-5 children. Accelerometer data was collected on 11 women and average fatigue self-reports for 17 of the women. The average amount of moderate activity was 17.8 minutes/day at the beginning of the study. The national expectation is to have moderate physical activity for 21 minutes a day. After three months, the moderate exercise average was 17.6 minutes/day and 4,690 steps/day. The average PROMIS Fatigue T-score at average was 17.6 minutes/day and 4,690 steps/day. The average PROMIS Fatigue T-score at baseline was 52.6, and after 3 months, the score was 53.4 with the healthy representative being 50.0. The data in the study would ideally be viewed individually to show variation in the participants. When looking at average data, these women were near the national average for physical activity and fatigue. In the future, this data could look at the women/populations at risk for poorer fatigue and physical activity in a larger study of chemotherapy clients.

### Gaelle Sehi

Within-Population Spatial Genetic Structure of the Bull Kelp, *Nereocystis luetkena*

Mentor: Filipe Alberto, Biological Sciences

Poster Presentation, Easel 165

Fine spatial genetic structure studies of sessile organisms have the capacity to indirectly unravel cryptic aspects of their life history such as dispersal and mating systems. The Bull Kelp, *Nereocystis luetkena*, is a large brown alga (kelp) forming a canopy in cold temperate coastal reefs in the Northeast Pacific. Concerns about population health of this ecosystem foundation species have been raised in the Salish Sea (US/Canada) and in Northern California in relation to Global Change and coastal development. We recently conducted a distribution-wide genetic differentiation study that allowed to characterize gene-flow and population connectivity at large spatial scales. However, little is known about dispersal and mating system at smallest scales, within a Bull kelp forest. We sampled 40-50 individual kelps in two kelp beds in the Juan de Fuca, WA area. We collected individual spatial coordinates to study the association between pairwise spatial distance and genetic kinship, estimated from microsatellite genetic markers. Our results on the mating system and small-scale dispersal of Bull Kelp will be used to properly design conservation measures.

### Sara Seidita

Lifetime Variation in Choosiness in Female *Enchenopa Binotata* Treehoppers (Hemiptera: Membracidae)

Mentors: Rafael Rodriguez & Bretta Speck,

Biological Sciences

Poster Presentation, Easel 167

In nature, mate choice is an important cause of natural and sexual selection. Mate choice decisions arise from the interactions of preference functions and choosiness. Preference functions specify the attractiveness ranking of potential mates to individual females; and choosiness is the effort that a given female will expend to obtain a preferred mate type. As individuals age, their choosiness is expected to decrease, in order to help ensure some reproductive success. We tested this hypothesis with *Enchenopa binotata* treehoppers. These insects communicate with plant-borne vibrational signals. We presented females with vibrational playbacks of attractive and unattractive male advertisement signals and recorded their responses to each (*Enchenopa* females establish duets with males they prefer and aid them in mate location). We tested females weekly from the time of reproductive maturity until their death. We measured choosiness by subtracting unattractive duet length from attractive duet length. The results support our prediction that female choosiness decreases with age. We also measured female mass weekly and found that it did not change with age, indicating that it did not influence the change in choosiness. Choosiness plays a significant role in mate choice decisions throughout the female treehoppers' lifetime. The decrease in choosiness gives an increased availability in mate selection which is important for biological fitness in nature.

**Dante Serrano**

Nitric Oxide Trapping of Carbon-Centered Radicals in an Enzyme Active Site

Mentor: Nicholas Silvaggi, Chemistry & Biochemistry  
Poster Presentation, Easel 168

The non-proteinogenic amino acid L-enduracididine (L-End) is a component of several potent antibiotic peptides. L-End biosynthesis in *Streptomyces wadayamensis* begins with a unique pyridoxal-5'-phosphate (PLP) dependent L-Arg oxidase. This oxidase, MppP, uses only the PLP cofactor and molecular oxygen to catalyze the 4-electron oxidation of L-Arg to 4-hydroxy-2-ketoarginine. Hydroxylation of an unactivated methylene carbon is an unprecedented reaction for a PLP-dependent enzyme and this laboratory has set about developing a detailed understanding of the enzymatic mechanism. L-Arg reacts with PLP in the MppP active site, just as seen in other PLP-dependent enzymes. However, unlike most other PLP-dependent enzymes, MppP is able to stabilize electron-rich quinonoid intermediates for an astonishing length of time. These quinonoid intermediates are capable of 1-electron reduction of molecular oxygen to generate superoxide. These studies seek to determine whether the mechanism proceeds through a formal substrate radical, and if so, where on the substrate does the radical form. We have performed MppP reactions in the presence of a nitric oxide generator in an attempt to trap any organic radicals that form in the active site. The resulting NO adducts were detected by ion trap-time-of-flight (IT-TOF) mass spectrometry, and fragmentation patterns were used to deduce the structures.

**Brielle Shortreed**

Modeling the Kinetics of *Emiliana huxleyi* CCMP 274 & Coccolithovirus EhV207

Mentor: David Talmy, Microbiology, The University of Tennessee Knoxville

Poster Presentation, Easel 169

Relatively little is known about the kinetics behind viral infection even though marine viruses impact oceanic biogeochemical cycles. We developed a mathematical model of *Emiliana huxleyi* CCMP 374 infected by EhVs under changing phosphorus conditions. The model has six parameters that represent host growth rate, clearance rate, lysis rate, burst size, viral decay, and chronic release. Model parameters were optimized to experimental population data using the Metropolis-Hastings algorithm. When grown under phosphorus-limited conditions, hosts grow at comparable rates whether infected or uninfected. It is speculated that host growth is similar under these conditions because without enough phosphorus available, viruses are defective and cannot inhibit the growth of their host due to virus' large nucleic acid, and thus phosphorus, requirements. The addition of a chronic release parameter also significantly increases the accuracy of our model fit, which before the inclusion, underpredicted viral concentrations. This translates to a hypothesis that viral particles are escaping their host early in the infection process. Thus, through the modeling of this host/virus interaction, one can gain more detailed insight into the dynamics of viral infection.

**Rachel Slaby & Mai Xee Yang**

Quantification of Acid Ceramidase Inhibitor (ARN) in Rat Plasma Using LC-MS/MS & its Application for Pharmacokinetic Studies

Mentor: Shama Mirza, Chemistry & Biochemistry  
Poster Presentation, Easel 170

Glioblastoma (GBM) is the most common malignant primary cancer of the central nervous system. Glioblastoma (GBM) is the most common malignant primary cancer of the central nervous system. Despite the conventional therapy, life expectancy is less than two years. GBM is a spontaneous tumor formed mainly in the brain, usually characterized by infiltrating cell growth, and able to form in two ways; ninety percent develop from normal glial cells by multistep tumorigenesis (primary), while the other ten percent are from low grade tumors (secondary). Thus far, treatments are limited. Due to its high proliferative activity, it is capable of infiltrating surrounding tissues, which makes it difficult to completely resect, even with MRI or CT guidance. Previous studies on our lab showed promise in inhibiting acid ceramidase as a potential therapeutic regime to kill GBM cells. Thus, we are testing acid ceramidase inhibitors as potential drugs for the treatment of GBM with efficacy. The goal of this study is to develop a simple, specific and reliable LC-MS/MS method for quantifying and analyzing the pharmacokinetics properties of acid ceramidase inhibitor (ARN) in rat plasma. This work will provide further understanding of ARN metabolism and disposition in-vivo and also validating the method for quantitative determination of ARN in rat plasma. This research opens up more knowledge on a possible drug for GBM towards widening alternative treatments for this disease.

**Marina Slawinski**

The Effects of Ethanol Concentration & Buffer pH on the Nanostructure and Mechanical

Response of Hydrogels

Mentor: Ionel Popa, Physics

Poster Presentation, Easel 171

The porous structure formed by the filaments of specifically engineered hydrogels resembles the extracellular matrix (ECM), providing an environment for cells to grow and the engineering of artificial tissues. The examination and fine-tuning of the nanostructure and mechanical response of bovine serum albumin (BSA) protein hydrogels provides insight into developing a hydrogel scaffold better equipped to serve as a medium for artificial tissue growth. Here, we synthesize BSA hydrogel samples through a photoactivated reaction. These hydrogels are treated with different concentrations of ethanol from 20% to 100% and subjected to buffers of varying pH. We use scanning electron microscopy (SEM) to investigate the nanostructure of the hydrogels and force-clamp rheometer to measure their mechanical behavior. SEM images showed that ethanol treatment can induce nanofiber formation. Force-clamp rheometer measurements show a stiffening of the hydrogels in the presence of ethanol and partial unfolding in acidic

environments. These findings are the first step toward establishing a cell growth substrate that not only matches the stiffness of the ECM, but also its nanostructure.

**Adriana Smith & Toluope Akande**

Impact of Maternal Obesity on Pregnancy, Birth, & Infant Outcomes

Mentor: Teresa S Johnson, Nursing

Poster Presentation, Easel 172

Being obese during pregnancy can negatively impact the pregnancy in its entirety, delivery, and development of the fetus and newborn. Maternal obesity is associated with birth defects in addition to macrosomia, fetal death and long-term health effects on the offspring such as asthma and diabetes. Pre-pregnancy obesity and excessive weight gain also increase a woman's risk of postpartum weight retention. Chronic conditions associated with obesity such as diabetes and hypertension increase the woman's risk of a preterm birth. In addition, studies have shown that African-American women have a higher percentage of infants born preterm and their infants have three times the risk of their infant dying before the infant's first birthday than a white infant in this community. The purpose of this research is explore the impact of obesity on pregnancy, birth and infant outcomes in a small, urban community in southeastern Wisconsin with a high rate of infant mortality for African-American infants, using data collected from 1/1/2013 to 12/31/2017. The variables that are analyzed using this data are diabetes, gestational diabetes, hypertension, preeclampsia, race, ethnicity, length of gestation, maternal age, and gestational weight gain. The data demonstrated significant relationships between obesity and diabetes, gestational diabetes, hypertension, very-low birthweight, age (35+), race, and gaining more weight than recommendations based upon body mass index. Although pregnancy is not the time to begin a weight loss program, women spend a great deal of time with their health care providers, thus is a good time to focus on long-lasting healthy behaviors. Strategies need to be developed and implemented in concert with communities to support healthy activities to attain and maintain a healthy weight before and between pregnancies to decrease the risk of co-morbidities that are associated with obesity during pregnancy, and can increase risk of adverse outcomes during pregnancy, birth and during infancy.

**Hannah Smith**

Police Brutality & Crime Clearance Across the Midwest

Mentor: Aki Roberts, Sociology

Poster Presentation, Easel 173

In the United States, less than half of violent crimes are solved; only 45.6% of violent crimes in the U.S. were cleared in 2017 according to the FBI's Uniform Crime Report. As rates of crime clearance drop in the United States, it is necessary to locate the reasoning behind this. This study examined the relationship between incidents of police brutality and crime clearance. It

was hypothesized that the greater number of police brutality incidents there were, the less trust there would be between law enforcement and the community and that would be reflected through a lower crime clearance rate. 62,331 murders, kidnappings, robberies and sexual assaults across 11 Midwestern states were reviewed through a logistic regression analysis. It was found that the less trust the community held in law enforcement, demonstrated by a higher number of police brutality incidents, the less likely law enforcement was able to solve kidnappings, sexual assaults, and robberies. However, there was not a significant relationship between trust reflected through police brutality incidents and clearance of murders. Additionally, victim and incident characteristics influenced crime clearance with incidents involving a contact weapon, a concomitant offense, and a non-black victim increasing the probability of clearance. Overall, this analysis demonstrated the importance of the community in the crime solving process: with less trust comes less cooperation. There is a need for realistic and applicable reforms that could include training to prevent acts of police brutality, healing efforts after an incident of police brutality has been committed, and more effective communication between communities and law enforcement.

**Natalia Sotelo**

The Association of Coping Strategy with Marijuana and Ecstasy Use in Adolescents and Young Adults

Mentors: Kyle J. Jennette & Krista Lisdahl, Psychology

Poster Presentation, Easel 174

Coping is the process by which an individual makes a conscious effort to solve personal or interpersonal problems to reduce distress. Two general coping styles with three main factors have been identified. An engaged coping style is characterized by the use of problem-solving, while a disengaged coping style is characterized by coping through emotional and social support or total avoidance of the stressor. Adolescent and adult substance users have been found to have coping strategies associated with anger, helplessness, and avoidance. MJ users have been found to have anger and avoidant coping characteristics, while adult ecstasy users have a social/emotional coping style. Comparatively few studies have assessed the association of dose-dependent substance use on coping style in adolescents and young adults. 129 adolescents and young adults MJ, ECT, and ETOH users were recruited from the community and completed The Ways of Coping Questionnaire to assess coping characteristics and style and a Timeline Follow-Back semi-structured interview to assess recent and historical substance use. Multiple regression analysis was run to assess the association of dose-dependent substance use with subscales of the Ways of Coping Questionnaire (WoC). Increased MJ use was associated with decreased planful problem-solving style ( $p = 0.06$ ) and increased confrontive coping style ( $p = 0.10$ ). Increased ETOH use predicted increased escape-avoidance style ( $p = 0.10$ ). There were no significant associations between ECT and subscales of the WoC. We found a dose-dependent relationship between

marijuana and alcohol use with traditionally disengaged coping styles; a finding consistent with previous research. However, no significant findings were observed for ecstasy use and coping style. Limitations include the high comorbidity of ecstasy use with marijuana and alcohol in our sample.

#### **Nicholas Stamates**

Nixon & the Chief: Quakers, Indian Policy & Nixon's Indian

Mentors: Wallace J. Newman, Journalism, Advertising & Media Studies & Michael Wilson, English

Poster Presentation, Easel 175

President Richard Nixon would remark in relation to his domestic policy that it was “building outhouses in Peoria” when compared to his foreign policy objectives. However, one notable “outhouse” from this foreign policy president was the one Nixon and his administration built for the people who lived in what is today the United States of America before anyone else: American Indians. The Nixon Administration charted a new course in Indian affairs by ending termination and ushering in the current era of federal American Indian policy. This policy change was accomplished through the work of White House officials in attorney Leonard Garment and his executive assistant Bradley H. Patterson among others but also because of a man who had touched the President's personal life deeply in Wallace “Chief” Newman. Chief Newman was the football coach of Whittier College, a small Quaker institution, when a young Richard Nixon was a student there in the early 1930's. Newman left a lasting impact in the small Quaker town of Whittier, California and was a second father to the men who played under him. Outside of coaching, Newman was a tribal leader active both in his own La Jolla Band of Luiseno Indians and the California American Indian community more broadly. The Nixon legacy on Indian Affairs can not be understated and with thanks to the Nixon Presidential library in Yorba Linda, California, this presentation will walk you through the accomplishments and personal relationships that manifested itself in lasting political change.

#### **Thomas Stancato**

Identification of Basal Tissue Folds in the Developing Gastrointestinal Tract of the Early Vertebrate Embryo

Mentor: Jennifer Gutzman, Biological Sciences

Poster Presentation, Easel 176

In order for organs to function properly, they must undergo structural changes during development, and without proper structure, disease can occur. We first discovered basal tissue folding and basal constriction in the highly conserved midbrain-hindbrain boundary (MHB). After discovering mechanisms that mediate this tissue fold, we hypothesized that other organs also undergo basal tissue folding and basal constriction in order to change their structure. Research shows that during early vertebrate development, the gut tube and neural tube that gives rise to the brain and spinal

cord share similar structural characteristics. Both the neuroepithelium and the intestinal epithelium are lined on their basal side by a basement membrane. The epithelial sheets in the gut give rise to villi which are anchored to the basement membrane. We hypothesize these villi undergo basal folding and constriction similar to the MHB. Using the zebrafish as a model organism, we have initiated our investigation into the potential basal folding in this gut tube. By labeling cells with phalloidin and labeling the basement membrane with fluorescent laminin antibodies, we imaged larvae with confocal microscopy. Our preliminary data suggest that basal folding occurs during villi formation. We are currently performing experiments using Green Fluorescent Protein (GFP) to live image larvae intestinal epithelium at single-cell resolution in order to examine cell shape, particularly basal constriction.

#### **Georgije Stanisic**

Fabrication of a Dielectrophoretic Particle Trap

Mentor: Woo Jin Chang, Mechanical Engineering

Poster Presentation, Easel 177

There have been many methods discovered in recent years on how to trap and manipulate individual particles. Processes such as atomic force microscopy and filtration are examples of those, but the problem is that they all require mechanical control of the cell, which is undesirable. Dielectrophoresis uses non-uniform electric fields to trap individual cells, instead of using a probe or other method of mechanical control, which limits the damage to the cell. Dielectrophoresis (DEP) is a phenomenon in which a force is exerted on a dielectric particle when it is subjected to a non-uniform electric field. The particle can be neutrally charged, and the force will still be exerted. The goal of this research was to fabricate dielectrophoretic chips that would allow particles to be injected into the chip and be subject to dielectrophoresis. After fabrication, the efficiency of the traps was tested. DEP will play a big role in both cancer and stem cell research due to the advantage of being able to examine a single cell at a time without damaging the cell.

#### **Cierra Stessl (UW-Milwaukee)**

Analysis of an Unprovenanced Collection of Native American Beads

Poster Presentation, Easel 51

Material culture analysis can link different people and places through time and space. The Anthropology Laboratory at UWM@Waukesha has a unique collection of Historic Era Native American Trade beads. A careful analysis of this collection can contribute to the ongoing and priceless tradition of the archaeological scientific study of beads and other ornaments. This collection of broken beads is examined by categorizing, measuring, and analyzing their composition, production, and cultural significance. One can combine these analyses with what is already known about Native American and Euro American trade relations as they relate to beads and begin to understand this specific collection's role

and potential origins. These beads are organized first by color, shape, and size, and continue to be refined with detailed measurements and by weights and raw materials including, glass, bone, rock, and shell. They are classified by type using a standardized system that is commonly used in the analysis of Historic Era Native American Trade beads. So far, I am identifying clear patterns that continue to provide new insights into the collection in terms of typology, technology, and style, which compliments existing data from earlier studies. The simple array of solid colors in a majority of white and blue is consistent with historical Native American trade and use preferences. The inclusion of bone and shell may imply the collection is from an earlier time in the bead trade, before Native American populations began to prefer bright uniform colors and glass seed beads. The size and colors indicate that the majority of this collection served ceremonial purposes and were used in necklace making. Further research will uncover more about this collection's cultural history, and this research will aid future students in their studies of Native American cultures and history.

#### **Omar Suárez Sacramento**

Hospital Segregation & Neonatal Infant Mortality in Los Angeles County

Mentor: Marcus Britton, Sociology

Poster Presentation, Easel 206

This study focuses on the extent of and the relationship between racial and ethnic segregation of neighborhoods and hospitals and their impact on neonatal infant mortality in Los Angeles County for blacks, whites, and Latinos. This is considering a contested and changing healthcare system and a changing demographic composition of the United States. We will explain the relationships of interest using place stratification theory and the evenness and isolation dimensions of segregation. Place stratification theory assumes that groups in power actively work to maintain separation from lesser groups. Moreover, the evenness index measures segregation's complexity by measuring how even or uneven groups are distributed in comparison to one another. The isolation index measures the probability that two members of a minority group will interact with one another. Multilevel logistic regression models will allow us to assess the relationship between metropolitan-level indices of hospital segregation, hospital-level measures for patient racial composition, and the health outcomes of focus. The anticipated findings of this study are expected to support the idea that hospital segregation contributes to health disparities and that residential segregation is a precursor. This study will update the now dated information on hospital segregation as well as add information on Latinos to the existing literature. This information is of importance to state and local policymakers, healthcare administrators, and healthcare professionals tackling the persistent issue of segregation and racial disparities.

#### **Brianna Suggs**

Caregiving Policy & Program: Lack of Attention

Paid to Young Caregivers

Mentor: Melinda Kavanaugh, Social Work

Oral Presentation, 12:00pm | Union 344

With a population of approximately 1.4 million youth caregivers under the age of 18, youth caregivers often provide an array of care task to either a parent or a family member. Caregiving can have a substantial negative impact on the caregivers overall well-being, therefore caregiver policies and programs are an essential support to alleviate the burden of caregiving. Caregiving programs and polices offer caregivers numerous services including respite care, informational resources, family support and research. This project reviewed caregiver programs across the U.S., assessing for inclusion of children and youth caregivers. Programs were divided by state and included both government and not for profit. Programs were assessed for caregivers served as defined by age- those over 18 and those under 18. Implications for the inclusion of youth caregivers in directed federal and state caregiving policies and programs are emphasized. If programs are not inclusive of children and youth under the age of 18, then youth will continue to experience negative outcomes affecting their long-term health and academics.

#### **Megan Sullivan & Madeline Ely**

Simple & Efficient Home Health Monitoring using

Spatiotemporal Data

Mentor: Dennis Tomashek, Occupational Science

& Technology

Poster Presentation, Easel 180

With recent technological advances, there are many new opportunities for home monitoring technologies. Some activity tracking methods that have been tested include: embedding sensors in the home to create a "smart-home" environment, activity logs, and asking individuals to wear body tracking sensors. While these home monitoring technologies exist, they tend to be invasive, high cost, and require significant technological setup in the home. We aim to create a prototype system to track activity in the home using simple time and location (spatiotemporal) data. This prototype will use a smartphone platform, be unobtrusive, be low cost, and have respect for personal privacy. Methods for this project include producing simulated daily schedules that track a person's day in real-time to be used in a computer learning algorithm, creating a protocol for gathering daily time use data from real people using interviews, and work with computer scientists to create algorithms to identify the spatiotemporal variables of activities including sequence, frequency, and duration and location. We hope to confirm the success of our prototype in the lab and in real homes as well as use smartphone technology and personal inquiry to confirm the deductions of the spatiotemporal algorithm, conduct in-home usability and operational testing, and administer clinician and patient focus groups to confirm interpretations of the data.

**Jacob Surch**

Examining Knowledge Organization Systems:  
The Pokédex

Mentor: Laura Elie Ridenour, Information Studies  
Poster Presentation, Easel 182

This project analyzed the Pokédex, which is an encyclopedic knowledge organizational system for the fictional game series, Pokémon. The Pokédex is a geographically organized encyclopedia of Pokémon, which are fictional creatures from the Pokémon series of games. Analysis was focused on the Pokémon Red and Pokémon Blue games in the in-game region known as Kanto. In the games, the Pokédex treats each Pokémon as a unique entity. Each entity has up to two classes called “types” (e.g. fire, water, grass). For this analysis, an entity’s names, classes, and total number of locations each entity was found in each game were recorded in Excel. This was analyzed by creating pivot tables to study the correlation of classes, and the number of locations each entity was found. The results of this showed that certain classes were correlated than others and that the combination of classes were not reciprocal. For example, the primary class “grass” and secondary “poison” collocate nine times, but the opposite combination does not occur. The analysis also showed that Pokémon found in the most areas are also those ranked towards the top of the encyclopedic order, while Pokémon with fewer areas are found towards the later parts of the encyclopedic order in the Pokédex. In conclusion, the Pokédex follows the linear journey mapped out for a player in an ordering system called “routes,” that represent new ecosystems in which each Pokémon to appears. If the player were to record every entity in a route, all the entities should be close to one another in their proximity of the Pokédex list order. And as the player travels in game, the ecosystems become more distinctive from one another, giving the player distinct geographic areas in which Pokémon can only be found.

**Nathan Swanson**

Magnetostrictive Response of Cellulose  
Nanofibril Composites

Mentor: Chiu Law, Electrical Engineering  
Poster Presentation, Easel 183

Previous research has been performed on cellulose nanofibril (CNF) Terfenol-D (T-D) magnetostrictive composites to determine the optimal volume fraction of T-D in CNF to achieve peak magnetostriction values similar to those of monolithic T-D. The volume fraction for T-D in CNF was theoretically determined and then experimentally measured via angular deflection. However, these tests are only able to measure the relative strain and not true strain of the composite. This research project aims to validate the previous experiments by measuring the composite’s true strain in a magnetic field at varying volume fractions to find the experimental optimal volume fraction. These tests will help determine other magnetomechanical properties, such as the magnetomechanical coupling factor, and the material

properties of the composite. The optimal volume fraction for magnetostriction and the magnetomechanical coupling factor will be investigated, and composite properties at this fraction will be compared to those of monolithic T-D. Knowledge of these properties will determine the feasibility of this composite for applications involving piezoelectric laminate sensors and low-field magnetic sensors. An industry application of these sensors could be used in sensing stray magnetic fields coming from MRI machines during operation or could be used in energy harvesting fins. The processing of the composite samples into adhered layers with and without an embedded wire has been successful. Currently, material properties have been found by tensile testing the composite, but these results still need to be validated by using an embedded fiber Bragg grating (FBG) sensor. The FBG will also be able to measure the true strain of the composite under magnetic field, which will help validate the previous research. After tests with the FBG are completed, the next step will be to model the composite with a multiphysics simulation package, such as COMSOL, to explore the design of new experiments and to test new applications of the composite.

**Allison Sweere**

What Does Community Development Look Like?:

Making Social Change on Milwaukee’s Northwest Side

Mentor: James Harris, Urban Studies

Poster Presentation, Easel 26

Milwaukee, like many northern tier, rustbelt cities, has experienced decades of job loss and disinvestment, hypersegregation, growing poverty and neighborhood decline. A number of community development organizations are working to address these challenges, one such organization is Havenwoods Economic Development Corporation (HEDC), located on the northwest side near Silver Spring Dr. and 64th street. Within the large, bustling city of Milwaukee, lies a unique community. Currently a community struggling from the effects of disinvestment, HEDC and other local groups have taken the opportunity to implement social change. Signs of new investment and development can be seen by Projects like the City of Milwaukee Housing Authority’s new Westlawn Gardens development and nonprofit organizations such as Growing Power that are helping to boost the social and economic well-being of the area. Through a service-learning opportunity at HEDC, I experienced the promise and challenges of community development work. From serving as the liaison for the community and city programs to producing and distributing a neighborhood paper, The Havenwood Herald, HEDC goes beyond just the economic and financial development of the community. These community development efforts face specific barriers and are constrained by the larger social and economic forces that can impede social change. Through field observations, interviews and secondary sources, it has become prevalent that community development is not purely about economic well-being but should be crafted to enrich the diversity of the different races, cultures and lifestyles of Milwaukee’s Northwest side.

**Nathan Tennies**

An Underwater Plant and Quagga Mussels, Will It Root?  
Mentor: John Janssen, Freshwater Sciences  
Poster Presentation, Easel 185

*Potamogeton foliosus* is an aquatic vascular plant (AVP) common throughout North America and a native AVP in the Milwaukee Estuary. The Estuary is highly impacted due to its industrial past, and there is a lack of connectivity between fish habitat, which plants can provide. During fish spawning surveys summer 2017, *P. foliosus* was found growing on quagga mussels (*Dreissena bugensis*) on top of a bolder in the Summerfest Lagoon in Milwaukee. Research did not provide examples of similar behavior in literature or any knowledge about it from local experts. This is interesting for two reasons: *P. foliosus* seemed the only local species displaying this behavior, and this could change habitat distributions in association with *D. bugensis*. An application would be to increase the connectivity of fish habitat in Milwaukee. The feasibility of this was studied during August 2018. Four cinder blocks established by quagga mussels in the lab were hung off a dock at the School of Freshwater Sciences in early August. Specimens of *P. foliosus* were removed from the Summerfest Lagoon and tied to the cinder blocks a few days later with fishing net twine. The plants were left in the water for four weeks and checked for visual signs of rooting until no plants were alive. No rooting was observed during this time. After placement in water, plants were quickly covered in *Cladophora*, a local algae. Specimens started to die off quickly, which may have been from *Cladophora* shading, abiotic factors, and transplant stress. While there was no observation it, it would be interesting to redo this earlier in the growth season to try and establish rooting. Growing AVPs outside of their local confines in Milwaukee seems difficult due to multiple factors, which could be an issue for future efforts to expand habitat.

**Andrew Thompson**

Bacteria Hand-Held Sensor  
Mentors: Marcia Silva & Thomas Hansen,  
Freshwater Sciences  
Poster Presentation, Easel 184

Water quality testing typically indirectly measures the amount of *Escherichia coli* (*E. coli*) in water by measuring the Fecal Indicator Bacteria amount. This study introduces a sensor that improves upon the stated testing process by directly testing for bacteria of all types by having a computer program view and count the biotic and non-biotic particles in water using Digital Inline Holographic Microscopy (DIHM) with blob detection. The results show a correlation between the bacteria concentration of *E. coli* provided to the sensor and counted through traditional methods to the number of particles counted by the sensor. The relationship shows that the sensor is effective. With the time to acquire results being less than 20 minutes, versus waiting 18 hours to perform a colony count using the United States of America's Environmental Protection Agency (EPA) Method 1603, and with the sensor's cost of less than 300 USD, the sensor is effective, fast, and affordable.

**Andrew Thompson**

Detection of *Cryptosporidium* using Digital Inline Holographic Microscopy  
Mentors Marcia Silva & Thomas Hansen,  
Freshwater Sciences  
Oral Presentation, 12:20pm | Union 250

The parasite *Cryptosporidium* and along with it the disease Cryptosporidiosis can cause major problems if introduced into a water supply. Not only does *Cryptosporidium* affect humans but other mammals as well. The EPA rules that *Cryptosporidium* should be tested when *E. coli* levels are too high. Sampling for lab testing is then done and if there are signs of a high concentration of *Cryptosporidium*, the second sample may not be taken until six years later. Not only is that slow but it can be inaccurate and expensive. What is proposed is a digital camera system using Digital Inline Holographic Microscopy (DIHM). By using software reconstruction, particles can be tracked and counted. Since *Cryptosporidium* are not single celled and can be around 5 micro meters, they are easily detected with the digital microscope even at different depths within a cuvette. As this sensor improves, software could pick up behavior of movement and sizes of particles which could help identify if it is *Cryptosporidium*. A significant advantage of this technique is requiring parts that cost significantly less than a laboratory test and other potential technologies that may be used today in identifying *Cryptosporidium* in a water source. Agricultural communities could afford to test water sources for *Cryptosporidium* and prevent livestock and themselves from falling ill. The sensor is a stellar alternative to current methods in detecting *Cryptosporidium*.

**Elpiniki Tianis**

The Impact of Community  
Mentor: Peter Blewett, English  
Oral Presentation, 12:20pm | Union 280

As a freshman, I spent a majority of my first semester exploring my new home of Milwaukee. This exposed a deep rooted dichotomy to me that was not as apparent until I began researching the history of Milwaukee in class. I felt a connection to the city, but learned the downfalls, I grew concerned. There are a multitude of systemic issues that have affected Milwaukee citizens for decades and many new issues arising daily. In the midst of this I began volunteering at an organization called Our Next Generation. Within this organization I saw the power of empowering the individual, with an undertone of a solid support system. Igniting a spark, I began to contemplate the changes that each individual can make to contribute to their community.

**Mackenzie Tubridy**

Beyond Nationalism: The Estonian Popular Front's  
Visions for a New Estonia  
Mentor: Christine Evans, History  
Oral Presentation, 1:00pm | Union 340

Established in 1988, the Estonian Popular Front was one of the first major opposition movements in the Soviet Union to emerge during perestroika. Initially, the Popular Front advocated for decentralization of the Soviet economy and greater autonomy for the republican governments, as well as for the democratization of the political system. But over time, the Popular Front embraced larger narratives of national independence and self-determination which were treated as incompatible with the Soviet model. By looking at the thematic structure of the Popular Front's Russian-language newspaper *Vestnik*, this paper will examine how it presented these nationally-oriented narratives to the public. First among the themes continually featured in *Vestnik* was the formulation and reformulation of Estonian national and historical identity, which worked to frame the past as both present and future. These identities were placed within the broader scheme of Europeaness as a way to distinguish Estonia from the more "eastern" Soviet republics, namely the Russian SFSR. Second, as a Russian-language newspaper, *Vestnik* expressly addressed the issues relating Estonia's Russian diaspora, many of whom had become increasingly concerned about their status in a potentially independent Estonia. Finally, *Vestnik* served as a venue for broader collaboration between nationalist and opposition movements spread throughout the Soviet republics, whereby programmatic and organizational framing came to represent a model of fraternal coordination among the movements. Through examining the repetition and renewal of these themes, we discover that the Popular Front was not nearly as nationalistic as critics argued, nor was it always as subversive as its proponents may suggest. In fact, as the Popular Front continually constructed visions of a newly independent Estonia, it remained politically pragmatic in its approach, and at the same time, promoted a message of historically-rooted, supranationalism.

**Anika Van Rossum**

A Reflection on Non-Profit Interactions  
Mentor: Benjamin Trager, Educational Policy &  
Community Studies  
Poster Presentation, Easel 35

My hybridized high-impact practice has encouraged me to learn more about the non-profit community within Wisconsin. A hybridized high-impact practice is a practice meant to teach undergraduate students through real world experience. The research methodology used in this process is service-learning reflection. Service-learning reflection is an educational exploration of the real world. A non-profit is an organization dedicated to furthering a social cause without making a profit. Non-profits within Wisconsin rely on other non-profits for support. Whether it be through money or item donation,

the Wisconsin nonprofit community receives support through fundraising events, ensuring Wisconsin citizens who utilize these non-profits, the services they rely on. An important example of this occurs with in medical non-profits. Through my hybridized high-impact practice I have made many interactions with medical non-profits. Such non-profits provide research, education, support and advocacy for those involved. Without the non-profit communities support for each other, non-profits may not have the funding to carry out the services that citizens rely on. This is the main idea I will be reflecting on throughout my research.

**Rebecca Van Thiel**

Analysis of Commercial Plate-Fin Heat  
Exchanger Designs  
Mentor: Kevin J. Renken, Mechanical Engineering  
Poster Presentation, Easel 186

Heat exchangers are devices that transfer heat between two or more fluids (gases or liquids) without the fluids having to come in direct contact or being mixed together. The fluids are usually separated by a solid surface to prevent the mixing. Heat exchangers are widely found in most chemical, electrical, and mechanical systems to serve as a means of acquiring or rejecting heat. One of the more common types of heat exchangers are "plate-fin" heat exchangers. This type of heat exchanger uses thin plates and finned passages to transfer heat between fluids. Figure 1 provides a schematic of a common plate-fin heat exchanger. Figure 1: Schematic of a plate-fin heat exchanger (Enggyclopedia, 2011). The UWM Energy Conversion Efficiency Lab (ECEL) is analyzing various fin designs to identify optimal-performance for commercial plate-fin heat exchangers. The analysis involves a comparison between numerical results obtained from simulations using ANSYS-Fluent software and experimental measurements. The physical and thermomechanical effects of the laminar fluid flow on the fin samples is documented. The performance indices of the fins are based on the thermo-hydraulic characteristics such as the convective heat transfer coefficient ( $h$ ), pressure drop ( $D_p$ ), wall temperature ( $T_w$ ), friction factor ( $f$ ), as well as the Colburn factor ( $j$ ).



**Erin VandenBosch**

Mixture Distribution Analysis Reveals Interactions between Visual Perception and Object-Based Attention  
Mentor: Adam Greenberg, Psychology  
Poster Presentation, Easel 187

Object-based attention (OBA) allows for a preferential processing of information contained within object boundaries. Our previous research has shown that shifting attention within objects (while searching for a target) is impacted by the vertical and horizontal meridians of the visual field: horizontal shifts across the vertical meridian are more efficient than vertical shifts across the horizontal meridian (a shift direction anisotropy; SDA). Recently, we further tested these meridian effects by parametrically manipulating the visibility (i.e., contrast) of a line drawn on the horizontal meridian through four levels: 100% visible, 66%, 33%, and 0% (invisible). Results showed that the SDA (a) is statistically extinguished at 100% visibility, and (b) shows a stepwise numerical decrease (albeit, not statistically significant) from 0% to 33% to 66% visibility. We wondered whether this linear reduction in SDA could be explained by an increasingly larger number of participants perceiving the horizontal meridian as visibility increased. Using a mixture distribution analysis, we tested response times during the 33% and 66% visibility conditions to determine whether there is evidence for either a single, or dual, basis distributions. Evidence of dual distributions would support the hypothesis that two underlying groups of subjects experienced different percepts of the horizontal meridian; whereas evidence of a single distribution would argue against this account. These results will shed light on important sources of variability between subjects while engaged in object-based selective attention. Furthermore, this analysis will provide evidence for the influence of visual perception in guiding attention to objects.

**Amaya Varela**

My Baby's Sleep: Testing Acceptability of a Safe Sleep Intervention  
Mentor: Trina Salm Ward, Social Work  
Poster Presentation, Easel 38

Every year in the United States, about 3,500 infants die from sleep-related causes such as Sudden Infant Death Syndrome (SIDS) and accidental suffocation. Some families have difficulties following the American Academy of Pediatrics (AAP) recommendations for a safe infant sleeping environment, especially African American families living in poor neighborhoods. My Baby's Sleep (MBS) is a 4-session in-home coaching program designed to support families and address barriers to following safe sleep recommendations. Participation in MBS begins during the pregnancy and continues until the baby is 3 months of age. The purpose of this pilot study is to test acceptability of MBS and to further refine the program. Participants will include 8 women who meet the following criteria: (a) identify as African-American, (b) 6-8 months pregnant, and (b) available over the next 7 months. Women will be excluded if they are receiving other formal programming for safe infant sleep.

Women identify at least 1 co-caregiver to participate in the program. Surveys are completed at baseline, at each visit, and after the intervention on perceived maternal support from co-caregivers, cooperation, knowledge and attitudes about infant sleep, perceived maternal control and self-efficacy, and infant sleep practices. Process data are collected from safe sleep coaches. All visits are audio or video-recorded. As of February 2019, three families are enrolled. Families have reported some improvements in knowledge and attitudes about AAP recommendations such as back to sleep, separate sleep surface, and no soft items. Comments from families also indicate that the sessions are generally helpful and informative. At this time, MBS appears generally acceptable to families. Additional data will be collected and used to revise MBS.

**Amaya Varela**

Professional Development in a Community-Based Internship Program  
Mentor: Benjamin Trager, Educational Policy & Community Studies  
Poster Presentation, Easel 37

The community-based internship program (CBIP) I am apart of is a mixture of hybridized high-impact educational practices. The purpose of this study is to identify professional skills developed during the CBIP through a large public urban university and achieved outcomes of the CBIP. Students in the CBIP engage in personal and group reflection, both in-action, and on-action based on their experiences in the internship. The course combined with the complementing work experience is aimed at the development of critical thinking and effective communication skills as well as a sense of intercultural competence and individual, social, and environmental responsibility. The goal of the program is not only to provide students with an opportunity to earn their work study award at a non-profit or school, it also seeks to provide a learning experience that develops civic responsibility and prepares students for their future careers. Through this community-based internship program and the supplementary course, I was able to develop professional skills such as communication, team work, leadership, and flexibility. Additionally, through the CBIP objectives I was able to develop a sense of civic responsibility, better preparing me for a career in Social Work. The goal of the program is not only to provide students with an opportunity to earn their work study award at a non-profit or school, it also seeks to provide a learning experience that develops civic responsibility and prepares students for their future careers. My experience at my community-based internship has achieved this goal.

**Megan Vélez, Caity Grubich & Maddie Prokop**

Embodying Milwaukee Communities: Explorations at Sherman Park  
Mentor: Simone Ferro, Dance  
Oral Presentation, 12:40pm | Union 260

This research is a continuation of Professor Simone Ferro's three year ethnographic study of various districts

in Milwaukee exploring the interdisciplinary forces of community studies and dance. Each year, undergraduate researchers venture to different misrepresented locations in Milwaukee and perform case studies by engaging with the diverse population. Concentrating on the Sherman Park neighborhood, the research conducted during the 2018-2019 academic year was attained through analytical and experiential means. The first method involved analyzing scholarly texts ranging from social issues regarding minority oppression, site-specific performance, and community engagement through movement. The experiential approach entailed direct engagement through interview conduction and communication with residents as well as site-specific modern dance performances. Discussions concerning ethical principles determined that entering a foreign community with the intention of disturbing it with movement required developing a comprehensive understanding of the society to approach the community in an educated and respectful manner. Improvisations were performed at the Tricklebee Café, a local pay-what-you-can restaurant. Inspiration for movement was influenced by the physical environment and was later transcribed along with the participant's intrinsic internal and external experience. The information acquired from our field research was then utilized to guide movement generation that manifested in a full length concert performance. The assessment of these findings concluded that despite the negative portrayals of certain regions of Milwaukee in the media, it doesn't define those individuals. By providing them with a voice and relaying their stories through movement, we are working to transform perceptions. Our engagement with community members allows us to bring dance and arts to the community, working to alter its connotation as an elitist art. These findings were synthesized and then transposed to a website allowing a concise documentation of research findings to one platform.

#### **Nicole Vigon**

Temporal-Spatial Gait Characteristics in Youths with Hypermobility Ehlers-Danlos

Mentor: Brooke Slavens, Occupational Science & Technology

Poster Presentation, Easel 189

Hypermobility Ehlers-Danlos Syndrome (hEDS) is an inherited connective tissue disorder that is caused by defects in a protein called collagen. Symptoms include overly flexible joints that can dislocate, creating joint instability which leads to early-onset osteoarthritis. There is currently a lack of knowledge on the effect of these symptoms on the gait of youths with hEDS. This study aims to fill that gap by quantifying temporal-spatial parameters of gait in youths. Three participants, with a mean age of 13 years old, with hEDS, were recruited from the Genetics Center at Children's Hospital of Wisconsin. The subjects underwent motion analysis using a 15 camera Vicon system and 14 retro-reflective markers following the Vicon lower-extremity Plug-in Gait model. The subjects walked for multiple trials at a self-selected, fast and slow pace along a 30-ft walkway. Data

was labeled, filtered, and modeled using Vicon Nexus software. The temporal-spatial parameters, including stride length, cadence and walking speed were calculated for 8-11 gait cycles per subject for each task. The mean self-selected walking speed results for these parameters were  $1.40 \pm 0.054$  meters,  $57.31 \pm 1.86$  strides/minute and  $1.34 \pm 0.081$  meters/second. When compared to healthy gait the averages fell within normal ranges. Identification of differences between those with hEDS and healthy individuals may provide insight to the development of pain and injury increase over time, leading to higher risk for early-onset osteoarthritis. With this knowledge physical therapists may be able to work with hEDS patients to effectively decrease their risk of early-onset osteoarthritis. This study is a part of a larger ongoing project to define the biomedical phenotype in youths with hEDS to increase our understanding of the disease to improve diagnosis and treatment planning.

#### **Izabelle Villafuerte**

Heat Mapping Health Information

Mentor: Jacques Du Plessis, Information Studies

Presentation: Table 141

In the United States, we are given access to results of water quality tests, however, the information is hardly utilized for the following reasons: It is dispersed among multiple sources, mainly targeted to professionals in the field the data represents many variables tested for and to the uninitiated consumer of this information, it is too complex to be meaningful. Through this research, we look to develop an interface on web and mobile platforms, directed at all water consumers. The objective is present the most current critical information that matters to health. The app will use GIS technology and express heat mapping to virtually illustrate water systems depending on the access location. We are exploring the illustration of flagging contaminants, heavy metals, and water-borne pathogens. In a broader scope, and at a more advanced iteration of this development, this technology could also implement data on other health and safety related contexts such as to heat map air quality to populations affected by the flu virus or coping with asthma etc. We are hoping this app will strengthen the reasons for the open data initiative, and as a result we will see a change in population habits due to increased awareness of their environment. What is of interest to us, is through the rendering the most current data to all consumers, to then bring an improved understanding of water safety factors to the general population. This could inform the population about where water is safe to drink, and it could impact the choice to refill versus the option to purchase bottled water. In cases where there are elevated levels of contaminants, the significant difference will be that with this information consumed by many in the general population, it will elevate the need to address the cause of contamination, and thus greatly support the mission of those in government trying to ensure safe water in our water supply, as well as in our rivers and lakes.

**Chelsea Volpano**

Response of Lake Michigan Beaches & Bluffs to a High-Magnitude Storm

Mentor: J. Elmo Rawling III, Geosciences

Poster Presentation, Easel 190

Recent high-water levels in Lake Michigan are causing erosion along the Lake Michigan shoreline and are a concern for beach managers at Point Beach State Forest. Drone-mounted cameras and Structure-from-Motion (SfM) photogrammetry software provides an opportunity to construct high-resolution digital elevation models. The purposes of this study were: 1) To adapt established methodology used for bluff surveying and identify the suitability of these techniques for a beach environment 2) To characterize the spatio-temporal changes to beach morphology and compare these to contemporaneous changes to coastal bluffs. Surveys were carried out before and after a significant storm event using a drone to collect aerial photographs of the site. For each survey multiple Ground Control Points were collected, using either Real Time Kinematic or Differential GPS units, and post-processed to allow for centimeter-scale accuracy in the final model. Agisoft PhotoScan was used to run SfM algorithms and construct a 3D model of the site. ArcGIS was used to create Digital Elevation Models and run difference calculations. The results of this study indicated several differences in methodology for image acquisition required for beach environments. Additionally, this method was not ideal for characterizing changes to the nearshore due to strong interference signals from periodic wave run-up or very shallow water. Ground observations made during the survey showed significant changes to the nearshore that were not readily characterized in the digital models. Despite these limitations, drone-based surveying using SfM provides a relatively inexpensive way to survey shoreline environments that can be deployed quickly, allowing for the frequent characterization of shoreline evolution.

**Elizabeth Wanninger**

Investigating Diet through a Social Media Lens: An Explorative Study

Mentor: Raymond Fleming, Psychology

Poster Presentation, Easel 191

Past research has found connections between social media use and mental health (Barry, Sidoti, Briggs, Reiter, & Lindsey, 2017). Less is known about links between social media and physical health factors, such as diet. This survey focused on how social media may impact perceptions of food. We investigated whether pictures of food were perceived differently when posted on Instagram than when they were not. We also aimed to identify other factors, such as personality and gender, that may predict food perception. Finally, we explored internet use related to food. In the survey, participants completed psychological measures including the Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003). After, participants viewed 25 food images from Instagram featuring healthy, unhealthy, or neutral foods.

In one condition, we removed all evidence of Instagram, while the three other conditions included varying degrees of evidence that the photo was from Instagram. For each photo, participants rated how healthy they perceived the food to be and how likely they were to eat it. Following the photos were questions about participants' internet use to access recipes. We used a 2x4 multivariate analysis of variance to test gender and condition differences in healthiness ratings of foods pictured. Results showed a significant main effect of gender,  $F(3, 167) = 2.60$ ,  $p = .05$ ; Wilks'  $\lambda = .954$ . Follow-up univariate tests revealed that compared to women ( $M = 2.04$ ,  $SE = .06$ ), men ( $M = 2.45$ ,  $SE = 0.15$ ) rated unhealthy foods as being healthier,  $F(1, 169) = 6.46$ ,  $p = .012$ . Bivariate Pearson's correlations showed conscientiousness was positively correlated with participants' likelihood of eating healthy foods  $r(180) = .173$ ,  $p = .02$ . Finally, 95% of participants reported using the internet to find recipes. Our findings suggest that individual differences may impact food perceptions, and internet use related to food should be further studied.

**Daniel Webb**

Towards the Synthesis of an Intrinsic Fluorescent Ligand for the Vitamin D Receptor

Mentor: Alexander Arnold, Chemistry & Biochemistry

Poster Presentation, Easel 192

The vitamin D receptor (VDR) is a nuclear hormone receptor that regulates cell proliferation, cell differentiation, and calcium homeostasis. VDR is a transcription factor that can be found in the cytosol and the nuclei. Upon binding to 1,25-dihydroxyvitamin D (calcitriol) and other vitamin D active metabolites, VDR localizes in the nuclei where it interacts with coregulators (coactivator and repressor) and DNA. Universal tool compounds to further elucidate the expression and localization of VDR are not available. Therefore, an intrinsic fluorescent VDR ligand will be synthesized to produce the expression and location of VDR in vitro and in vivo. Here, we present the first part of the synthesis of the ligand.

**Daniel Wells**

Factors Associated with Reduced Muscle Strength & Function in Continuing Care Retirement

Community Residents

Mentor: Murad Taani, Nursing

Poster Presentation, Easel 28

Poor muscle strength and function is a major source of disability among older adults and leads to negative health outcomes including falls and fractures. Limited data are available regarding characteristics of muscle strength and function among older adults living in Continuing Care Retirement Communities (CCRCs). It is crucial to determine the specific factors that may affect muscle strength and function among CCRC residents. The objective of this study is to explore the characteristics of muscle strength and function and the relationship between self-efficacy for exercise and goal congruence for protein and Vitamin D intake and muscle strength and function in CCRC residents. At the beginning of the study, each participant completed the Physical Activity Assessment Inventory and Goal Congruence questionnaires. Each participant performed Short Physical Performance

Battery (SPPB) and Timed Up and Go (TUG) tests. Data collection is ongoing. To date, the study has enrolled 39 participants. The participants were predominately female (85%) with a mean age of 84 (SD=7.7). All of the men and 42% of the women had low grip strength. Sixty-two percent of the participants performed poorly on the SPPB and 26% performed poorly on the TUG. Self-efficacy was correlated with SPPB while goal congruence for protein and Vitamin D intake was correlated with grip strength. The results demonstrate that CCRC residents have poor muscle strength and function. The findings also support the necessity for goal congruence and self-efficacy enhancing strategies to be built into self-management support interventions. Such interventions may help older adults maintain or improve their muscle strength and function and delay the transfer to more restrictive living environments such as nursing homes.

#### Jennifer Wendlick

The Role of Laminin in Shaping the Cells that form the Midbrain-Hindbrain Boundary

Mentor: Jennifer Gutzman, Biological Sciences

Oral Presentaion: 12:40pm | Union 240

Congenital brain defects can lead to physical or mental disabilities and are among the most common birth defects, occurring in 1 to 2 out of every 1000 live births. Determining how the brain acquires its shape during development is critical for elucidating the etiology of these defects. To understand formation of brain structure, we use the zebrafish model to study the mechanisms that regulate the first fold in the neuroepithelium; the highly conserved midbrain-hindbrain boundary (MHB). Laminin-111, a critical component of the basement membrane, is the primary laminin found along the developing neuroepithelium. It is a large protein composed of globular and rod-like domains arranged in a three-arm formation. Its unique structure makes it capable of anchoring epithelial cells to the extracellular matrix, as well as binding and signaling to other molecules within the basement membrane. Using live imaging, we found that the gamma chain of laminin-111 (*lamc1*), is required for proper MHB morphogenesis. However, the role for the other laminin chains, alpha1 (*lama1*) and beta1 (*lamb1*), in mediating cell shape changes remains unknown. Here, cell shape was analyzed in bashful (*lama1*) mutant embryos by live confocal imaging following membrane GFP-injection. We developed a new morphometric technique to analyze cells in 3D using digital sectioning, and uncovered a role for *lama1* in mediating anisotropic cell shape to fold the neuroepithelium. Future experiments will investigate the role of the beta1 chain in mediating cell shapes required for MHB formation, and examine other basement membrane proteins such as agrin and collagen.

#### Tashea West

What Do Sudents Think They Can Learn from their Teachers.

Mentor: Christopher Lawson, Educational Psychology  
Poster Presentation, Easel 193

Past research has examined how 4 to 7 year old students think about teachers, teaching, knowledge and who to learn from. There is a lack of research about what 4 to 7 year old students think they can learn from their teachers. This is important because once we understand this, we can use certain approaches to teach students and improve their learning. I asked 4 to 7 year olds students 26 questions. Academic questions were “If you wanted to learn about math would you ask your teacher or parent?” (e.g., reading, math, colors, writing, and shapes). The following questions had the same format, but were personal questions (e.g., tying shoes, healthy snacks, crossing the street, and sharing toys) and unknowable answer questions (e.g., stars in the sky, names, thoughts in a day, and animals). This method is influenced by Danovitch & Kyle (2004) and Atance & Caza, (2017). Danovitch & Kyle (2004) conducted a study to examine the development of the cognitive division of labor which is deciding who to ask for a certain thing for example “who do you ask to fix to your car mechanic or doctor?” In Atance & Caza, (2017) experiment they asked if children, if adults would know unknowable things such as “How many stars are in the sky”. This is important because it provides us with information on where children believe they can get their information from.

#### Christine Wiese

Evidence of Insect Syntax: Bout Level Processing in the Communication System of *Enchenopa binotata*

Mentor: Rafael L. Rodríguez, Biological Sciences

Oral Presentation, 1:00pm | Union 240

The arrangement of syllables and words is very important in human language and the communication systems of some mammals and birds. Recent research shows that *Enchenopa binotata* treehoppers, insects that communicate with plant-borne vibrational signals, have combinatorial signal processing analogous to human phonology (rules concerning the combinations of signal elements that are acceptable). If insects have some level of phonology then they may have syntax, whereby processing is at the scale of signal bouts rather than single signals. To test this we presented vibrational playbacks of male signals to females and recorded their responses. We designed three synthetic playback including the natural order, which has four signals of increasing amplitude, a reversed order, with four signals of decreasing amplitude and a staggered order, with the two highest amplitude signals first followed by the two lowest amplitude calls. Our results show that the order of the bouts significantly affects the female responses and the treatment only has marginal affects: females respond more to the staggered and normal bouts than to the reserved order. These effects display evidence of syntax in *Enchenopa binotata*, and suggest that complex forms of combinatorial processing may be more widespread among animals than currently appreciated.

**Dominique Wilkerson**

Our Mothers' Gardens & Tables: Transculturation, Food Cultures Andmigration in the Making of Black Milwaukee

Mentor: Aims Guinness, History  
Poster Presentation, Easel 33

This research assesses the process of transculturation that occurred during the black migration (1910s-1970s) between African American Southern traditions and Northern traditions in Milwaukee, Wisconsin. While initial examinations of the black migration have focused exclusively on black male migrants, an investigation of black women's experiences is lacking. This is problematic because it tells a single story of communities that still exist. This project reveals that black women played a paramount role in the "merging and converging" of Southern and Northern values through food cultures such as urban gardening and cooking. Additionally, it situates women into this narrative of African American migration through culture. An examination of written narratives, archival documents, and research articles used in this study show that Milwaukee's black culture was indeed influenced by the black women who migrated there. These sources also hint at the discrimination they faced when doing so, as not only women and African Americans but also as Southerners. Moreover, this study shows how even in the face of certain prejudices migrant women were still able to transform their then new homes into the Milwaukee one see's today.

**Rebecca Willer**

Do People with Dementia Have a Voice in Decisions Regarding Their Care? Current Clinical Assessments of Quality of Life

Mentor: Sabine Heuer, Communication Sciences & Disorders

Oral Presentation, 12:20pm | Union 344

Recent changes in the health care funding industry have the potential to shift service delivery in long-term care from a medical to a person-centered care approach. Person-centered care is based on promoting choice, dignity, respect, self-determination, and purposeful living. In contrast, based on the traditional medical model, the patient is the passive recipient of care provided by medical professionals (e.g., SLPs). It is often assumed that due to cognitive impairments, people with dementia (PWD) are incapable of making choices and completing assessment procedures that require their active participation. In order to implement person-centered care, it is critical to use measures that reflect critical tenants of this approach – self-determination and decision making. The purpose of this literature review was to determine whether current clinical practice of assessment of quality of life (QoL) reflects person-centered care principles in terms of assessment methods (proxy, observational, or self-assessment) and assessment content. A literature search was conducted using PsychInfo, CINAHL, and PubMed databases, yielding 25 studies that were included in the literature review. Based of those, 55 assessment

tools were reviewed. Twenty-four addressed some aspect of QoL: engagement, interactions, depression, health-related QoL, emotional well-being and/or overall well-being. Of those 24 outcome measures, 16 were observational, 4 were self-report, and 4 were either self-report or proxy-report. While there was a large number of observational outcome measures reported, there were only few self-reported outcome measures that directly assessed QoL in PWD. Thus, reported outcome measures for QoL do not reflect the changing health care delivery model. While there are confounding factors to using self-reported outcome measures with PWD that might affect validity and reliability (such as cognitive-linguistic deficits), research has shown that there are feasible and reliable ways to promote self-report of PWD and to involve them in all aspects of their care.

**Hella Willis**

Fiber Optic Magnetic Field Sensor Based on Terfenol-D  
Mentor: Chiu T. Law, Electrical Engineering

Poster Presentation, Easel 194

A fiber optic magnetic field sensor based upon the actuation provided by expansion of Terfenol-D in a magnetic field is developed. A light source with wavelength around 1550 nm is sent through the tip of a single mode fiber and its optical power is coupled to the tip of a second single mode optical fiber. Both tips are located inside a block of epoxy resin acting as their guiding interface. The proximity of the two tips, i.e. the gap between them, can be inferred by the optical power transmitting through the second fiber. Preliminary data indicated that the transmitted power was inversely related to the gap size and some sensitivity to an external magnetic field was achieved when one of the fiber tips was mounted on a Terfenol-D piece. However, subsequent trials showed that some additional effects on the coupled power rely on the influence of the capillary tube as an optical cavity and possible fiber misalignments, yielded inconclusive results. Further testing will determine which guiding interface will reduce the fiber misalignment difficulties over greater distances. Additionally, the design of mounting platforms for fiber tips is evaluated for noise reduction.

**Naomi Wilson**

Milwaukee Sign Language Elementary School: Quality of Education in ASL/English Public Bilingual Schools  
Mentor: Erin Wiggins, Exceptional Education

Poster Presentation, Easel 195

American Sign Language (ASL) is a visual and gestural language that uses signs for the brain to process linguistic information through the eyes (National Association of the Deaf). However, few studies have addressed the socioeconomic factors that influence the quality of deaf and hard-of-hearing elementary school education. This qualitative research proposal examined the teaching methodology of the only Deaf teacher at Milwaukee Sign Language Elementary School (MSLS) and analyzed peer-reviewed articles on teaching methodologies in Sign

Language/English bilingual public elementary schools. Findings from this qualitative case study indicated that the Total Communication ASL/English teaching model, school funding, and the current learning environment may be limiting the academic and social learning opportunities for deaf and hard-of-hearing children.

#### **Hailey Wirtz**

The Relationship between Adipose Tissue and Executive Functioning in Adolescent and Young Adults  
Mentors: Krista Lisdahl, Alexander Wallace & Christine Kaiver, Psychology  
Poster Presentation, Easel 196

Currently, 36% of young adults and 21% of adolescents are affected by obesity. Previous studies have shown that larger volumes of visceral fat (VF) are associated with lower executive functioning (EF) in adolescents, and subcutaneous fat (SCF) greatly affects cognitive health. The current study predicted that higher levels of VF and SCF would be associated with worse performance on EF measures. Seventy-four adolescents and young adults aged 18-26 (M=21) who were predominantly male (62%) and caucasian (65%) participated in the study. After three weeks of abstinence, participants completed a neuropsychological battery, consisting of the CPT-II D-KEFS, and CVLT-II, measuring working memory, processing speed, and inhibition, and an abdominal MRI scan to measure VF and SCF levels. Linear models were run looking at how visceral and subcutaneous fat percentiles predict EF performance while controlling for past year alcohol use. Results indicated that visceral and subcutaneous fat were not predictive of EF performance. Trends of lower subcutaneous fat was associated with better psychomotor speed, cognitive control, and working memory, and higher subcutaneous fat was associated with better selective attention. The current study examined the relationship VF and SCF had on executive functioning, while controlling for alcohol use. Contrary to previous literature, our findings show that neither VF or SCF are associated with worse performance on EF measures. Previous literature found that increased VF was related to worse performance on executive functioning tasks. However, substance use and other confounding variables were not accounted for in the studies, which could be driving these effects. Future longitudinal studies are necessary to provide a casual relationship between adipose tissue and executive functioning. In conclusion, different types of fat do not have an effect on cognition.

#### **Nathaniel Wojcicki**

Fall Phenological Development in Downer Woods  
Mentor: Mark D. Schwartz, Geography  
Poster Presentation, Easel 197

The Fall Phenological Development project in Downer Woods involves recording ground-based visual assessments of autumn phenological (the study of cyclic and seasonal natural phenomena) development of 100 marked trees in Downer Woods. Leaf coloration and leaf loss are the two phenophases (an observable stage

or phase in the annual life cycle of a plant) that are observed in autumn. Phenophases are observed three times a week during the change in phenophase levels and are given a percentage regarding the completion of their individual category. At the end of the season, phenophase percentages are compiled and displayed on a graph, which shows their variance throughout the course of their growth. Fall phenological development is conducted to better understand the environmental drivers of phenology, to bridge the differences between satellite-derived and assessments of phenology; to analyze the development of models that simulate phenological development and assess changes in phenological timing among a population. It is important to determine the response of autumn phenology to climate change in forest ecosystems, as phenological variations affect carbon balance, forest productivity, and biodiversity (variety of life in an ecosystem). Monitoring phenology is critical for determining the switchover dates of carbon dioxide assimilation/fixation (the conversion process of carbon dioxide to organic compounds by living organisms) and facilitating the calculation of primary productivity and the characterization of land surface physical processes and biochemical cycles. The observations can provide more complete and detailed information on leaf phenological development between and within species and between different phenophases during phenological progression. Major components of life such as food supply depend on the timing of phenological events. Evaluating the changes in phenological development with the trees of Downer Woods allow us to draw similarities with the climate change that is affecting our world today.

#### **Noah Wolfe**

The Inductive Benefit of Being Far Out: How Spatial Location of Evidence Impacts Diversity-based Reasoning  
Mentor: Christopher Lawson, Educational  
Poster Presentation, Easel 198

Inductive reasoning, using previous evidence to come to new conclusions, is something all humans utilize every day. Humans tend to about a key principle of induction, the diversity principle – the tendency to make stronger inductive generalizations when provided with diverse samples of evidence rather than homogenous samples of evidence. For example, if you were tasked to identify the overall quality of hundreds of pounds of green coffee being shipped overseas, it would be more beneficial to take samples of green coffee from a diverse sample of green coffee (different bags, different parts of the ship, etc.) rather than taking from homogenous samples (same bag, bags next to each other, etc.). People pay attention to what is included within samples. Here we examined whether the method of presenting evidence influence their attention to diversity: Does how evidence is presented matter? In two experiments, participants were presented with spatially distant evidence and spatially near evidence. The first experiment utilized photos of animals, while the second experiment utilized typed labels of animals. We found that in both experiments, participants made stronger inductive generalizations

when the evidence presented was diverse and spatially distant. In addition, participants made stronger inductive generalizations when evidence was homogenous and spatially near. These findings add to a growing and existing discussion about the effects and variables of inductive reasoning within adults.

#### **Miri Yoon**

Factors Associated with E-Cigarette Use Among Young Adults by Gender: Are Females More Susceptible to Social Influence?

Mentor: Joshua Gwon, Nursing  
Poster Presentation, Easel 199

This study used a descriptive correlational design using paper-and-pencil questionnaires and online surveys collected cross-sectionally. A total of 893 UWM students participated in the study. Descriptive statistics and chi square test were used to analyze the data. A total of 883 individuals between age 19-38 participated in this study. In male participants, there were significant differences in ENDS use by age, race, friends who smoke, siblings who use ENDS, friends who use ENDS, and frequencies of exposure to promotions in vape shops depending on ENDS use. In female participants, significant differences were found in age, parents who smoke, parents who use ENDS, friends who smoke, friends who use ENDS, siblings who use ENDS, frequencies of exposure to promotions in vape shops, and on the internet or social media depending on ENDS use. Friends who smoke and friends who use ENDS were significant factors associated with ENDS use among both genders. However, each gender had exclusively significant factors that counterpart did not have. In males, race (white vs. non-white) was the significant factor associated with ENDS use while it was not in females. Interestingly in females, parental smoking and ENDS use, siblings' ENDS use, and frequencies of exposure to promotions on the internet or social media were the significant factors associated with ENDS use while these were not in males. Literature has reported that women's tobacco use behavior is more susceptible to social effect and that young women are more influenced by appearance of tobacco products on the internet or social media. The findings of this study are in accordance with the literature. These days, young generations are exposed to a great deal of visual marketing materials via their mobile phones and the internet. We only used bivariate analyses given the level of undergraduate research capabilities. Future studies need to consider advanced statistics to control for the other variables' effect. There is also a need to explore why females are more vulnerable to social influence in this newly emerging health-risk behavior phenomena. Policy makers may need to consider using different strategies to promote nicotine-free and vape-free behavior by gender.

#### **Patrick Zastrow**

Regeneration and Reuse of Natural Porous Filter Material Following the Capture and Recovery of Phosphate Ions

Mentor: Marcia Silva & Mohsen Manjili,  
Freshwater Sciences

Poster Presentation, Easel 78

Nutrient pollution in the way of phosphate contamination has become one of the largest and most widespread environmental concerns of the past few decades. A variety of human sources have led to contamination of waterways, lakes, and coastal regions, causing excessive amounts of phosphates to contribute to the eutrophication of the aquatic environments. Nutrients such as nitrogen and phosphate support the rapid growth of large amounts of algae and aquatic plants which can suffocate animal life due to lack of useable oxygen. Toxins and bacterial growth due to eutrophication also affects human and animal health for individuals who come into direct or indirect contact with the contaminants, adding to the adverse effects caused by this complex and economically costly challenge. Of the filtration methods proposed, the utilization of natural porous materials is a promising option due to their crystalline porosity and large capacity for ion-exchange through adsorption. Though naturally occurring porous material is an abundant and low-cost option, there have been challenges in regenerating the material after contaminant saturation. To provide an effective, low-cost solution to the challenge of environmental phosphate contamination, the natural porous material must be able to be regenerated several times to become viable for any largescale filtration or remediation effort. Through research trials of methods for freeing and recovering phosphate ions from the material's activation sites, it is expected that the material may be able to be regenerated and reused as many as 10-times. By creating a method for regeneration of the porous material for reuse in filtration, as well as recovering the captured phosphate ions, we hope to create a circular economy which removes and prevents contaminants from entering the environment, finds uses for the recovered phosphate, and creates a low-cost solution to a large source of environmental nutrient pollution.

#### **Rachel Zdero**

Bacteriophage Recognition of *Flavobacterium johnsoniae* *sprB* Mutants

Mentor: Mark McBride, Biological Sciences  
Poster Presentation, Easel 200

*Flavobacterium johnsoniae* is a Gram-negative, rod-shaped bacterium belonging to the phylum Bacteroidetes. It moves by a mechanism termed gliding motility and secretes extracellular proteins out of its novel type IX secretion system (T9SS); both gliding motility and the T9SS appear to be confined to the phylum. *F. johnsoniae* uses cell surface adhesion protein, SprB, to adhere to and move over surfaces. SprB is propelled by a motor around the cell on a helical track, resulting in cell movement. Deletion of *sprB* results in defects in gliding motility. The

mutant cells form nonspreading colonies instead of the spreading colonies formed by wild type cells. Wild-type *F. johnsoniae* cells are susceptible to lysis by bacteriophage that recognize SprB protein on the cell surface. Bacteriophage (phage) are viruses that infect bacteria. Deletion of *sprB* results in complete resistance to lysis by some phage (Cj1, Cj13, and Cj23), and partial resistance to another (Cj29). Other phage (Cj28, Cj42, Cj48, and Cj52) still infect and lyse the *sprB* mutant cells, resulting in plaques. It is not yet known which parts of the SprB protein are required for phage recognition on the cell surface. This study aims to identify the sensitivity of 12 distinct *sprB* mutants to 8 different bacteriophages (Cj1, Cj13, Cj23, Cj28, Cj29, Cj42, Cj48, and Cj54). Each phage type will be spotted on the various mutants grown in rich media. Bacteriophage recognition of *sprB* mutants will present as clearing zones (plaques), and indicate the ability of phage to bind to and infect the respective *sprB* mutant. The results will highlight the roles of individual regions of SprB in phage infection. Our results may inform strategies to use phage to control diseases of animals or humans caused by bacteria of this phylum.

**Pablo Zertuche Flores & Kuldeep Mann**

Advanced Surface Alloying of Mild Steel to Stainless Steel Composition for Improving Corrosion & Wear Resistance

Mentor: Pradeep Rohatgi, Materials Science & Engineering  
Poster Presentation, Easel 201

The objective of assigned research project under SURF is to produce advanced surface alloyed coatings of stainless-steel composition on mild steel to improve corrosion and wear resistance of water industry components. Samples will be produced at the UWM Foundry Lab and their advanced characterization such as microstructural analysis, hardness measurements, wear and corrosion resistance will be demonstrated to evaluate coating thickness and its performance. Additionally, advanced characterization including X-ray diffraction, SEM (Scanning Electron Microscopy) imaging and EDS (Energy-Dispersive Spectroscopy) will be performed to understand its mechanism, coating composition, thickness and its structure. Moreover, the anticipated and preliminary conclusions that have been drawn are the demonstration of higher coating thickness, higher corrosion resistance, improved surface hardness and wear resistance compared to mild steel. This research findings of this work will be directly used in the water industry to produce high corrosive resistance coatings on components at low cost and low embodied energy.

**Can Zhong**

Residual Capsule Networks

Mentor: Lingfeng Wang, Electrical Engineering  
Poster Presentation, Easel 202

Artificial neural network systems have excelled in classification, decision-making, and prediction tasks because they can effectively learn representational relationships by processing large amounts of examples. In order for NNs to be applicable and widely accessible, architectures must be developed which decreases the time required to train, cost, and amount of data needed. The most prominent architecture in use are convolutional neural networks which learn shared “concepts” throughout the data for a given example. CNNs excel at understanding the hierarchical properties of information yet one of the challenges is keeping perspective independent from the learned features. Capsule networks are an expansion of CNN which consider perspective or pose independent of learned features. This architecture can be done with less parameters but still requires a lot of computation. I propose an architecture which uses additional residual information passed through the layers of a capsule network in order to reach convergence faster and to provide avenues to explore the possible use of ODE solvers to determine the proper weight matrix of each capsule in all layers. It is feasible to utilize ODE’s to calculate the activation output of the higher layer capsule given the current activation value of the layers prior.