Eastern Michigan University
2022 Graduate Research Conference
Abstracts, listed alphabetically

Adam Acker
Psychology - General Clinical [M.S.]
The Impact of Disability Accommodations on College Academic Performance
Mentor: Dr. LaMarcus Howard

As students with disabilities navigate their transition from a secondary to a postsecondary environment, research has indicated that many face academic and non-academic barriers in their quest to degree completion. In 2016, approximately 19% of undergraduate students reported having a disability (U.S. Department of Education, 2021). As of 2019, students with disabilities displayed a college persistence rate 18% less than students without disabilities (New England Secondary School Consortium, 2019).

This study seeks to learn if students referred to the Disability Resource Center (DRC) by the student tracking and referral software Starfish successfully persist. This study will use Starfish to examine the academic outcomes of students referred to the DRC over the course of one calendar year. Specifically, retention and changes in student GPA will be compared between students referred to the DRC who received accommodations and referred students who did not receive accommodations. It is expected that students who follow-through with their referrals and receive accommodations will show greater academic improvement and higher retention rates than those who do not, displaying the importance of identifying students in need and providing them with appropriate accommodations.

Adrienne Golles
Special Education [MAT]
Cultural Experiences of Arab Americans Raising a Child with a Physical Impairment
Faculty Mentor: Dr. Jacquelyn McGinnis

The purpose of the study is to begin to understand the cultural experiences of Arab American parents who are raising or who have raised a child with a physical impairment. The study will also explore common themes to assist school systems and help better support the Arab American community. There is a tremendous lack of research on the experiences of Arab American families with a child who has a disability. The goal of the research is to increase family involvement, knowledge due to seeking out support and services, and overall positive collaboration between families and schools. Participation in this study involves surveys and/or interviews. The results of this research are pending.

Aishwarya Upadhye
Polymers and Coatings Technology [M.S.]
Advanced 3D Printing Materials Based on Dual-Cure Chemistry
Faculty Mentor: Dr. Vijaykumar Mannari

While 3D printing (Additive Manufacturing) technology is rapidly growing, there are a

number of technical challenges that prevent it from expanding their applications. The parts printed by layer-by-layer assembly, developed in the current systems (SLA, DLP, inkjet), have an inherent limitation of lower mechanical strength due to a large number of weak interfaces between the layers. This research has focused on developing a novel resin system with dual-cure chemistry. The two distinct cure mechanisms involved are a rapid curing UV-initiated super-base catalyzed Michael-Addition (MA) chemistry and a slower moisture-initiated condensation-curing of organo-silanes. It is hypothesized that a properly formulated thin resin layer upon exposure to UV source would rapidly achieve sufficient "green strength" by MA curing in the X-Y plane allowing application of subsequent layers. The UV-exposure would also hydrolyze, using ambient moisture, generating silanol groups. The silanol groups thus formed would slowly crosslink (Dark curing) not only within the X-Y plane but also in the Z direction – between the layers. Thus, using two unique chemistries with kinetic control inter-layer crosslinking is accomplished that would significantly reduce interfacial energies and improve mechanical properties of the printed part. The mechanical properties and inter-layer adhesion tests of prototype systems will be presented.

Alecia Beggs
Athletic Training Combined [BS + MATR]
Surgical MCL Reconstruction Reduces Injury Recurrence and Long-Term Outcomes in College Football Players
Faculty Mentors: Jodi Schumacher, Dr. Aaron Struminger

This study considered the efficacy of surgical and non-surgical treatments for Grade II-III medial collateral ligament (MCL), specifically in relation to sprain reoccurrence and the long-term outcome(s) (LTO).

Studies have shown that MCL surgical reconstruction is effective in decreasing the laxity of ligaments. It is also shown that joint stability, specifically valgus stability, is significantly improved with MCL surgical reconstructions. Currently there is little data regarding outcomes of a non-surgical conservative treatment, such as physical therapy, specifically reinjury. There is some documentation that suggesting non-surgical approaches have previously led to chronic medial knee instability.

This study involves 20 male Division I college football players with a clinically diagnosed Grade II-III MCL tear with at least two years of playing eligibility. Ten of the athletes will go through reconstructive surgery and ten will go through the exact same conservative rehab therapy.
The same return-to-play protocol applies to all participants throughout the two-year project period. Each month they must report any symptoms or issues, up to the potential need for an MRI for serious injury. The long-term outcome(s) (LTO) will conduct a final analysis of data using the Knee Injury and Osteoarthritis Outcome Score (KOOS), a self-questionnaire designed to assess pain, activities of daily living, sports/recreation, and quality of life. Overall results inform the estimation of LTO for each patient.

We hypothesize that surgical reconstruction will reduce the likelihood of sprain recurrence versus non-surgical treatments because the ligament reconstruction re-establishes the integrity of the ligament and improves joint stability. We also hypothesize that the LTO's post-surgery will

be improved involving their MCL injury alone after two years. However, we also hypothesize that post-traumatic arthritis will increase post-surgery.

Alexandra Gross
Teaching English to Speakers of Other Languages / TESOL [Graduate Certificate]
Culturally Responsive Teaching with K-12 English Language Learners
Faculty Mentor: Dr. Wendy Wang

This paper explores pedagogical approaches to culturally responsive teaching (CRT) with K-12 English Language Learners (ELLs). A review of several studies from various educational contexts suggests that there is no one-size-fits-all approach to using CRT with ELLs. Successful implementation generally involves the following best practices: commitment from critically reflective educators and school leaders; family engagement and support; culturally inclusive curriculum; and the valuing and inclusion of students' home language at school. Educators seeking to implement CRT face certain challenges, including state curricula and testing requirements that can run counter to culturally responsive approaches. Given the inherent cultural diversity of ELLs, experienced ELL educators may have much to contribute to our understanding of how-to best practice CRT when teaching English to multilingual students.

Alexandra Miller
Ecology, Evolution and Organismal Biology [M.S.]
Kin-recognition and Cannibalism in subsocial tarantulas (Theraphosidae: Hysterocrates spp.)
Faculty Mentor: Dr. Cara Shillington

Although most spiders are solitary, aggressive, and cannibalistic, at least 50 spider species exhibit sociality. Social behaviors include cooperative prey-capture, feeding together, cooperative brood-care, and cooperative web-building. Advantages of sociality include higher life expectancy, increased protection from predators, and, possibly, reduced metabolic rates. The evolution of spider sociality is thought to have derived from subsocial spiders. In fact, all social spiders have close relatives who are subsocial i.e., species where spiderlings remain with their mother for extended periods after emerging from egg-sacs. Kin-recognition is also important in subsocial spiders as the ability to differentiate siblings from non-siblings can aid in prolonging this social phase. Hysterocrates gigas, a subsocial tarantula, is known for high levels of mutual tolerance, while the closely related Hysterocrates crassipes does not show a similar degree of subsocial behaviors. In this study, we compared cannibalism rates and kin-recognition behaviors in two closely related tarantulas, H. gigas and H. crassipes, with varying degrees of subsociality. We hypothesized that species with a high level of mutual tolerance likely exhibit fewer agonistic behaviors, and that therefore H. crassipes will display higher rates of cannibalism than H. gigas. In addition, kin-recognition was determined in an open-arena behavioral assay. We compared the amount of time each species spent in an arena when half of it is covered in chemical cues from a sibling and the other half is not. We predicted the subsocial species, H. gigas would prefer cues from siblings while H. crassipes would show no preferences. These data provide insights on differences in behaviors that may arise with subsociality.

Amanda Johnson

Biology - General [M.S.]
Assessing Genetic and Epigenetic Contributions of Bold and Shy Behavior in Zebrafish
Faculty Mentors: Dr. Uli Reinhardt, Dr. David Kass

Like humans, animals in the wild have unique personality traits that guide their behavior such as boldness or shyness. This study used a novel tank diving test to assess the genetic basis for such behavioral traits in zebrafish. Certain genes, such as delta-opioid receptors, are more highly expressed in bold fish, suggesting correlation between genetic disposition and behavior. The hypothesis is that epigenetic changes, the cause of which are unclear, also correlate with variations in animal behavior. The expectation is that epigenetic modifications of DNA, e.g. changes in methylation at certain sites, are involved in behavioral change. The sites are collections of CpGs, linear sequence of DNA in which a cytosine nucleotide is followed by a guanine nucleotide and the two are separated by a single phosphate group; the collections are referred to CpG Islands (CpGIs) and are known to regulate gene expression. The study identified “bold and shy” zebrafish, which were dissected and extracted DNA from the brain matter. The DNA was treated with bisulfite to create a polymerase chain reaction, which amplified segments of gene regulatory regions of CpGIs. That DNA, now with unmethylated promoters, is compared to levels of DNA methylation within four genes known to demonstrate altered expression between bold fish and shy fish. The objective is to better understand the connection between epigenetic changes and variations of animal behavior.

Andrew Garcia
Philosophy [M.A.]
Silencing and Object-Level Ignorance: Being Sensitive to Other-Oriented Hermeneutical Injustice
Faculty Mentor: Dr. Jill Dieterle

How we frame others can affect our perceptions of them. If distorted, such perceptions lay the groundwork for rule sets that misrepresent these others, often leading to harmful results. This paper defends a picture of a version of this kind of other-oriented hermeneutical injustice: silencing of ethical considerations through inappropriate linguistic framing. I begin my analysis by discussing what Paul-Mikhail Podosky attributes to Miranda Fricker a "self-oriented" conception of hermeneutical injustice. I conclude by discussing the workings of how our distorted framings contribute to what Charles Mills calls a "conceptual array" and Jose Medina's concept of the "social imaginary," and how other-oriented hermeneutical injustice of this kind contributes to the corruption of both of these in practice.

Anista Subri
Orthotics and Prosthetics [M.S.]
Clinician Perception of 3D-Printed O&P Devices
Faculty Mentor: Frank J. Fedel

3D printing dates back to the 1980s and was introduced into the healthcare field in the 1990s. In the orthotics and prosthetics (O&P) field specifically, 3D printing has been utilized since the late 1990s and some of its perceived benefits are decreased fabrication time, decreased waste, and cost effectiveness. However, implementation of 3D printing technology has been slow, and its use is not prevalent in the field. The purpose of this study is to explore the current perceptions of 3D printed devices used by O&P clinicians and explore factors

that may indicate barriers to adoption of 3D printing technology. An online survey was conducted by recruiting potential respondents through email using the orthotics and prosthetics LISTSERV as well as Linkedin. Results are provided based on analysis using SPSS.

Ari Ahmad McCaskill
Africology and African American Studies [M.A.]
A Case Study of Stella Wright Homes and Tenant Management of Public Housing
Faculty Mentor: Dr. Peter Blackmer

In 1959, the city of Newark's housing authority constructed one of its last high-rise public housing projects. The housing project was built to replace the demolished neighborhood adjacent to the new site and heralded for its modernity. This thesis will research how the residents of Stella Wright Homes organized by mostly black women, on a grass-roots level, were able to stage a rent strike and subsequent tenant management in response to the deteriorating living conditions. The motivation that informed the tenant activism at Stella Wright was informed by greater activism in the city after the 1967 Newark Rebellion. After the demolition of Stella Wright, one that represents the end of progressive era housing policy, housing disparity has increased nationally. Currently, the COVID-19 pandemic has exasperated housing disparity and reintroduced the conversation of the viability of public housing on a national level. This thesis will examine the history and contemporize legitimacy of tenant-led activism and management of public housing in the 21st century.

Ashton Havens
Chemistry [M.S.]
DFT Analysis of Catalyst Deaggregation and C-C Bond Formation in a Re-Catalyzed Alkylation of Phenols
Faculty Mentor: Dr. Maria Clelia Milletti

A rhenium-catalyzed alkylation of phenols has previously been reported in the literature. Unlike traditional methods of aromatic substitution, this reaction features excellent regio-specificity, and an exclusive preference for mono-addition. While exceptional in terms of product yield and atom economy, the high temperatures required to drive conversion limit the reaction's efficiency and scalability. Recently published mechanistic studies generally agree that the rate-limiting step in the catalytic cycle involves the cleavage of a catalyst resting-state complex, though the specifics of this fragmentation are not well understood. Interestingly, these experimental reports differ in their proposals for the mechanism of C-C bond formation. Using density functional methods, we compare the energetic profiles of each of the proposed reaction pathways and investigate possible mechanisms of catalyst resting-state cleavage. A better understanding of the reaction mechanism, specifically the steps involved in the rate-limiting step, will contribute to the development of a more efficient catalytic system.

Audrey Lama
Higher Education Student Affairs (HESA)[MA]
How Are Colleges Combatting Discriminatory Policies Through Institutional Acknowledgement?
Faculty Mentor: Dr. Ronald D. Flowers

During the founding of higher education institutions, these institutions set discriminatory policies limiting women and minorities from receiving an education. As

recent as the 21st century, colleges and universities are finding it difficult to deny the truth of the ideologies their campus was built upon. Mainstream movements, like the Black Lives Matter movement, are fighting for nationwide recognition of the oppressive, patriarchal past and how it has affected minority communities. Students, faculty, and staff are calling for higher education establishments to recognize their past to help create a more inclusive future. Many institutions are engaging in the renaming of buildings named after prejudiced people, financial reparations, and campus-wide research to acknowledge the foundations of their wrongdoings. This research will focus on what institutions are and are not doing in the present day to combat their once discriminatory policies.

Ayowale Soyemi
Technology [Ph.D.]
Bisphenol-A (BPA)-Free Sustainable Epoxy Resins for Coatings
Faculty Mentor: Dr. Vijaykumar Mannari

Epoxy resins are beneficial thermosetting polymers that function in a wide range of applications, from adhesives to composites to protective coatings, because of high adhesive strength and outstanding chemical and heat resistance properties. However, researchers have not been able to successfully replace the toxic Bisphenol-A (BPA) employed in the production of epoxy resins while retaining the end-use properties. The awareness of BPA toxicity, combined with the volatile cost of fossil resources and the non-recyclability of thermosets, implies necessary changes in the field of epoxy networks. Thus, replacement of BPA has spurred a growing number of studies both from the academic and industrial sides. Recently, many bio-based resources have been tested as potential candidates for replacing BPA in epoxy resins, but very few of them have reached the commercialization step.

This research focuses on developing BPA-free epoxy resins using bio-based raw materials with focus on green technology. We have developed BPA-free epoxy resins using sorbitol polyglycidyl ether (SPE) modified with benzoic acid, a bio-based rosin, and isophthalic acid. These BPA-free epoxy resin coatings will be characterized by physicochemical properties, thermo-mechanical properties, and corrosion resistance properties compared with BPA-epoxy resins as reference. The initial study shows that it is possible to develop BPA-free epoxy resins by optimizing their chemical composition and functionality. These new BPA-free epoxy resins have the potential to replace BPA-epoxy resins in many commercial applications.

Becca Frey
Athletic Training Combined [BS + MATR]
The Risk Of Osteoarthritis Generated For Active Serving Military Tactical Athletes Increased Opposed To Military Reserve Tactical Athletes
Faculty Mentor: Jodi Schumacher

The purpose of this study is to look into the relationship between the workload of a tactical athlete and the rate at which tactical athletes are diagnosed with osteoarthritis. This study will also include the ratio of osteoarthritis in individuals that are/were active serving military versus individuals that are/were in the military reserves. Osteoarthritis is degeneration of joint cartilage and the underlying bone. This degeneration causes pain and stiffness in joints. It can cause activities of daily living

to be more difficult and have a negative effect on the quality of life of an individual with osteoarthritis. A tactical athlete is an individual who trains for combat readiness using a comprehensive athletic approach. The term tactical athlete is not only for military personnel, but police and firefighters as well. All of these athletes use strength, power, speed and agility for their work and perform at a high potential during training and combat. Due to their regular exposure to risk factors associated with osteoarthritis, there may be elevated cases in active-serving tactical athletes. Participation in this study involves completing an online survey. The survey collects data on age, branch of military, years served in military, and medical information, such as formal diagnosis from a physician and joint replacement or waiting for surgery, in regard to osteoarthritis. It is hypothesized that active serving military, both current and veteran, will have an increased risk of osteoarthritis compared to military reserve personnel.

Brittany Anteau
Athletic Training [MATR]
Anxiety Level Difference in Athletes in Anaerobic and Aerobic Sports
Faculty Mentor: Dr. Aaron Struminger

Awareness around mental health has increased in the past 5 years, especially with the issues associated with the Covid-19 pandemic. Anxiety can have an impact on daily living and health because it leads to concentration deficits, panic attacks, and deliberation when making life choices. One thing people use to reduce feelings of anxiety and depression is physical activity/exercise. However, the mechanisms behind how aerobic and anaerobic activity impacts the body may influence how well certain types of physical activity reduce symptoms of anxiety and depression. Anaerobic exercise is classified as an activity with short, strong bursts of energy. Examples of anaerobic exercise are sprints, jumping, or shot-put. Aerobic exercise is classified as an activity that lasts over a period of time. Examples of aerobic exercise are jogging, swimming, or dancing. Both aerobic and anaerobic exercise stress the cardiovascular system and create more blood flow throughout the body. However, aerobic activity places more stress on the cardiovascular system than anaerobic activity, thereby potentially decreasing feelings of anxiety more than anaerobic activity. The purpose of this study was to determine whether athletes who play anaerobic sports have higher levels of anxiety than those who play aerobic sports? It is hypothesized that participation in sports with higher aerobic cardiovascular stress will decrease anxiety more than participation in sports with primarily anaerobic stresses.

Callie Waldrep
Communication Sciences and Disorders [M.A.]
COVID-19: How has the Pandemic Affected Elementary Based Speech Pathology: A Triangulated Case Study
Faculty Mentor: Dr. Sarah Ginsberg

The COVID-19 pandemic forced speech-language pathologists and educators to reconsider how to deliver support and education to children who were no longer sitting in school buildings. The worldwide crisis forced SLPs to get creative and think outside of their therapy box in a way only an event like COVID-19 could. The institution-wide changes that have been brought about through this period might have had unknown impacts, for better and for worse, on the therapy process for

school-aged children and their therapists. This study seeks to explore how the COVD-19 pandemic affected elementary speech pathology service delivery from the perspective of clinicians.

Casey Miller
Literature [M.A.]
Archival Elision and the Poem as (Analytic) Process: Muriel Rukeyser and Frances G. Wickes
Faculty Mentor: Dr. Elisabeth Däumer

While scholarship on twentieth-century writer Muriel Rukeyser has seen a resurgence in recent years–work bolstered by an expansive, untapped archive– one significant longtime correspondence has been neglected: Rukeyser's relationship with child educator and Jungian psychologist Frances G. Wickes. Rukeyser and Wickes wrote many letters over the course of what Clive Bush calls a "life-long friendship" but the exact nature, extent, and timeline of the relationship is still a mystery. The archive introduces unanswered questions about the nature of Wickes and Rukeyser's relationship–affectionate letters suggest a sexual or romantic relationship at some points, and Rukeyser's poems and other correspondences indicate she was engaged clinical psychanalytic work–but also sheds light on the complicated professional and financial relationship between Rukeyser and an aging Wickes. Rukeyser agreed to help Wickes with a memoir, edited and introduced reprints of her psychological texts, and was named literary executor upon Wickes passing. Complicated questions around payment, finances, and transference rise up around Rukeyser's documentation of their professional relationship, and only increase in mystique against her poetry in the same era. I consider Body of Waking (1958) and its deeply psychoanalytic themes alongside The Life of Poetry, Elegies, and select other poems dedicated to Wickes against the history presented in the Rukeyser archive. Rukeyser references some psychoanalysts explicitly over the course of her life–we know from The Life of Poetry she read Karen Horney and Otto Rank, and Anna Freud's work is directly appropriated and rearranged in 1949's Elegies–but her personal relationship, correspondences, and what I theorize as transference onto Frances Wickes penetrates a new dimension of our understanding of Rukeyser's poetics and closes significant relational and emotional gaps in the current knowledge of Rukeyser's biography and close relationships.

Chelsea Van Buskirk
Chemistry [M.S.]
Characterization of Residue from an Egyptian Old Kingdom Mummy from the Michael C. Carlos Museum
Faculty Mentor: Dr. Ruth Ann Armitage

Mummification in Egypt has been observed as early as the prehistoric period (4500-3350 BCE) and as late as the Copto-Byzantine period (395-645 AD). However, innovation and experimentation defined mummification in Egypt during the Old Kingdom, which spanned from 2613-2181 BCE. Even though mummification practices have changed over time, typically some combination of waxes, plant oils, animal fats, and resins were used in the mummification balms. While very few surviving examples of Old Kingdom mummies exist and even fewer studies have been conducted of said mummies, analysis is critical in order to understand what materials were available during that time period which can, in turn, also be used to examine the changes in mummification practices over time. Michael C. Carlos Museum at Emory University has North America's only Old Kingdom mummy in its

collection, presenting a unique opportunity to understand what materials may have been used in the mummification process during that period. Characterization of an organic residue as well as debris from the mummy was undertaken using complementary analytical techniques including gas chromatography-mass spectrometry (GC-MS) and direct analysis in real time mass spectrometry (DART-MS). These methods have shown the presence of a drying oil and cholesterol as well as the potential presence of volatile components by headspace solid-phase microextraction (HS-SPME). The results will provide insight into the processes of Old Kingdom Egyptian mummification. Such scientific studies provide a link between anthropological and chemical research that seeks to use molecular remains to better understand human activities in the ancient past.

Christina Daguanno
Interior Design [M.S.]
The Collective
Faculty Mentor: Linda Mason

The purpose of the interior design project called the Collective is to show how an adaptive reuse renovation can fulfill the triple bottom line approach to sustainable design. Such design considers the environment, the economy, and society. The goal of the Collective is to meet the needs of the present without compromising the needs of future generations. To do this, the Collective will feature a variety of retail spaces that enhance the surrounding urban community. As an adaptive reuse structure, retaining parts of the original construction will help to reduce the overall cost of the project, while also limiting the disruption to the surrounding environment. Likewise, reusing existing elements of the building will decrease waste to landfills and fewer resources will be taken from the environment for building construction, furniture, finishes, fixtures, and equipment. The Collective will be a mixed-use building that will honor the historical value and design of the original building while calling on modern inspiration to enliven the interior spaces and invite a variety of guests. The Collective will be a one-stop-shop for lodgers and guests to purchase goods and services. The design will incorporate elements of neotraditionalist and contemporary styles throughout the building.

Clarneisha Burnside
Chemistry [M.S.]
Detection and Identification of Possible Use Residues in Archaeological Ceramics by Direct Analysis in Real Time Mass Spectrometry
Faculty Mentor: Dr. Ruth Ann Armitage

Organic residues in archaeological ceramics offer a unique window into past human behavior, providing evidence for what people consumed as food, beverages, or even ritual drinks. In the southeastern United States, a beverage called “black drink,” prepared from the leaves of various species of holly (Ilex sp.), was an important part of many rituals and is characterized by the presence of caffeine, along with lesser amounts of theobromine and theophylline. In addition, cacao, the plant from which we obtain chocolate today, was used in Mesoamerica and may have spread as far as the American Southwest. Theobromine dominates in these residues, with the other methylxanthines present in much lower amounts. The use of tobacco by Native Americans dates back more than 12,000 years and spans across the continent. While macro botanical remains are often the best indicator of tobacco use, the presence of

nicotine and related oxidation products in ceramics may also be informative, depending on the storage and handling of the objects in the past. Identifying the presence of these plant-based residues requires analytical approaches that are sensitive and selective. This work focuses on the use of direct analysis in real time mass spectrometry (DART-MS), along with gas chromatography mass spectrometry (GC-MS) and high-performance liquid chromatography (HPLC), to study the composition of residual material found inside a variety of different ceramic vessels. These solid residues, not absorbed into the ceramic matrix, are the best case for identifying the previous contents of the vessels, though they have likely changed and decomposed over time. We present here our results on black encrustations on Hopewell ceramics from a site in the Midwest, as well as residues discovered inside of vessels from Central and South America in the collections of the Michael C. Carlos Museum at Emory University.

Cody Makinson
Applied Statistics [M.S.]
Predictability of Breast Cancer Outcomes with Classification and Logistic Regression Model
Faculty Mentor: Dr. Khairul Islam

Breast cancer is the most prevalent cancer for women and the number two killer among women in the world. Having the ability to diagnose breast cancer outcomes (benign and malignant) earlier can help with appropriate treatment strategies. Therefore, the accuracy of prediction is of the utmost concern to medical practitioners. In this study, we explore predictability of breast cancer outcomes using a logistic regression model and classification technique. We utilize public use data in reference to breast cancer prediction given a set of possible predictors such as compactness, size, and shape, and identify the best set of predictors to classify if the tumor is benign or malignant. Univariate logistic regression analysis and adjusted logistic regression analysis suggest the average radius, standard error of symmetry, and the texture of the tumors are significant factors. We plan to explore more via classification technique so as to improve the accuracy of the prediction.

Connor Prow
Philosophy [M.A.]
On Naturalness and Meat Eating
Faculty Mentor: Dr. Jill Dieterle

Meat consumption is often defended on the grounds of it being natural. Implicit within these arguments is the claim that doing what is natural is connected to doing what is morally correct. In order to respond to these claims, I first explore what the concept "natural" is usually taken to mean, then evaluate whether there is any connection between naturalness and moral permissibility. I ultimately find there to not be a connection between these two concepts. If naturalness is abandoned as a guide, however, a framework must be established for determining the ethical permissibility of dietary practices. Additionally, this ethical framework must consider both the interests of nonhuman animals and the health of the ecosystem broadly. Regardless of the ethical framework adopted, eating meat may be necessary in some cases, but it will require the interests of both humans and nonhuman animals to be weighed and will depend on contextual considerations. Toward this goal, I advance a framework that requires a drastic cut back on the amount of meat most people consume; I argue that eating meat is ethically permissible only when necessary

for the continuance of individual human lives.

Dallas Haselhuhn
Ecology, Evolution and Organismal Biology [M.S.]
Directionality in Movement of Tarantulas (Theraphosidae) when Presented with a Novel Environment.
Faculty Mentor: Dr. Cara Shillington

The term 'migration' has undergone several redefinitions. Migration was once defined as including five set criteria. This definition was based on observations of the movement of birds and flying insects from breeding sites to feeding and wintering sites. Most recently, a more holistic approach to the definition of migration has emerged. There is an understanding that there are many different kinds and degrees of migration. There have been calls to look into outlier cases of migration, specifically those that blur the lines between ranging and migration. Strategies that potentially integrate migration with other forms of movement allow for stopovers in the overall migratory trajectory.

Tarantulas as a family are not known for their long-distance dispersal techniques since they are slow moving and prefer to occupy burrows throughout much of the year. Yet, throughout most areas where tarantulas are found, local tarantula 'migrations' occur. These seasonal events see large clusters of male tarantulas crossing highways and roads as they move from their home burrows to search for female tarantulas. We collected male tarantulas during the mating season from a field site in Colorado. In the lab, we tested directionality in movement with a video tracking system. A circular arena was divided into segments representing compass directions in the software. We recorded distance traveled and time spent in each segment of the arena. Preliminary data suggests a preferred directionality during activity.

Daniel Gieselman
Orthotics and Prosthetics [M.S.]
Ankle and Foot Measurements in Military Recruits: A Cross-Sectional Study
Faculty Mentor: Rebecca Spragg

There is currently research on the impact of flat feet and other structural abnormalities on lower extremity overuse injuries, the burden on recruits and the military from these injuries, and the impact of custom foot orthoses on preventing those injuries. However, there is no research on the current prevalence of the structural abnormalities which have been shown to be associated with these injuries. Due to this lack of accessible data, I aim to perform a cross-sectional study to note prevalence of different factors that are linked to flat feet within military recruits by using both quantitative and qualitative measurements. This in turn will provide baseline data that are not currently accessible. This can also serve effectively in furthering the argument for the practicality of using custom foot orthoses in military recruits to prevent overuse injuries of the lower extremities. Knowledge of the prevalence could also provide reasoning for the military to screen for these issues, as well as pursue preventative measures such as custom foot orthoses.

Dean Karkut
Orthotics and Prosthetics [M.S.]
The Relationship Between Body Powered or Myoelectric Prosthesis and Quality of Life in Upper Extremity Amputees
Faculty Mentor: Frank Fedel

Replicating the function of an upper limb with a prosthetic device is more challenging than in lower limbs. Upper limbs require both gross and fine motor skills as well as more complex movements that are nearly impossible to replicate with a prosthetic device. This difficulty results in unique changes in the patient both physically and psychologically when adjusting to their prosthesis. Two main categories of upper limb prostheses currently exist: body-powered, and externally powered (myoelectric). Both of these categories have their own indications, contraindications, advantages, and disadvantages. The purpose of this study is to explore the relationship between these types of upper extremity prostheses and quality of life. To determine this relationship data will be obtained using an online survey validated for prosthetic users. Developed by the Department of Psychology at Trinity College Dublin, the Trinity Amputation and Prosthesis Experience Scales Revised (TAPES-R) is a self-administered questionnaire that comprises psychosocial adjustment, activity restriction, and prosthetic satisfaction in amputees. Participants will be recruited through various online and social media platforms. Descriptive and correlational analyses will be performed. With the help of the TAPES-R survey the desired results could allow quality of life to be considered when determining what prosthesis is best for each person.

Diala Dagher
Educational Studies [Ph.D.]
Challenges Teaching the Middle Eastern Region in American Colleges/Universities
Faculty Mentor: Dr. Joe Bishop

For more than a century, the Middle East region has been portrayed negatively in textbooks, especially those that are in wide use in the public-school system in the United States, such as social studies and area study classes. The purpose of this study was to illuminate how the continuously negative image of Arabs and Muslims in textbooks and academic writing has created a major challenge to instructors who have taught a Middle Eastern college-level course in an American college or university. Existing literature has found some accurate information in textbooks and academic writing about Arabs and Muslims, but the majority of the narratives have biased facts regarding controversial subjects. From the literature four themes have emerged: a) The image of Arabs and Muslims in American textbooks and academic writing, b) challenges with teaching Middle East college-level courses, c) overcoming confrontations in classes, and d) dispelling misconceptions about the Middle East region in textbooks and schools/universities. This work suggests mentioning accurate information about the Middle East region in textbooks, enhancing critical thinking, and including Arab and Muslim American contributions.

Donya Odom
Educational Leadership [Ph.D.]
In It and Of It: A Black Principals' Self-Examination of Anti-Blackness and Critical Leadership Praxis
Faculty Mentors: Dr. Rema Reynolds, Dr. Clyde Barnett

This case study, involving a principal and a college professor, includes details of a principal's journey to liberate herself and her school community. The authors narrate the ways in which Principal Odom changed her practice in response to the theoretical frames she learned while participating in the Eastern Michigan University (EMU)

Leadership Program. This manuscript should inspire inquiry, including unrepresented questions posed by scholars and practitioners alike to further this research. This co-authored paper also explores how education has been influenced by critical leadership theories related to inclusion, equity, and access.

Expeditions of humanizing pedagogies that school principals cultivate, and employees can add to contribute to the literature on leadership. Empirical studies rely on practitioners' examinations of themselves, their peers, and their communities. This case study focuses on one principal's professional and personal journey for robust, actionable re-imaginings of schools suppressing students' and families' experiences. Taking accountability for one's deficit practices is a challenging task.

Dylan Burrows
Special Education [M.A.]
Evidence-Based Approaches to Classroom Behavior Challenges
Faculty Mentor: Dr. Sally Burton-Hoyle

Childhood trauma has the potential to impact school performance, impair learning, and cause a student to display disruptive behaviors. Disruptive behavior in a classroom setting is detrimental to the success of an individual student and the classroom as a whole. While educational professionals are trained to address these problematic behaviors through a variety of procedures and strategies, the typical classroom isn't always equipped to support a student with severe behavioral challenges. Students who exhibit such behaviors may qualify for Special Education Services and an Individualized Education Plan. In extreme cases, students may be placed in a self-contained classroom to support their individual emotional and academic needs. Self-contained classrooms have the ability to provide intensive behavioral support and meet students' individual academic needs, but unfortunately, are not inclusive. In this setting, it is critical to use evidence-based practices to teach students the skills they need to cope with their emotions and achieve the standards of their peers. The primary goal of the evidence-based practices used in a self-contained classroom is to gain the skills needed to succeed in a general education classroom. This paper reviews the literature on evidence-based practices used to address and improve students' behavior. I then discuss how I used specific evidence-based practices in my self-contained elementary classroom. A multi-student case study involves a deeper look at how particular practices were implemented with former students with behavioral challenges to achieve inclusion and success in a general education classroom.

Emily Murphy
History [M.A.]
Industrial Removal Office: Jewish Women as the Gatekeepers of Detroit's Jewish Community
Faculty Mentor: Dr. Ashley Johnson Bavery

In the winter of 1911, young social worker Miriam Hart walked across the dusty shop floors of Ford's Highland Park automotive plant. Only a few years away from the moving assembly line, it was probably difficult to ignore the noise of bustling workers assembling Ford's Model T. Hart was there to speak with hiring managers and shop owners, hoping to secure employment for incoming Jewish immigrants coming to Detroit. Hart was employed as an agent for the Industrial Removal Office (IRO), and

her job duties included investigating potential employment in factories across Detroit. In the late 19th and early 20th centuries, Detroit was a growing industrial center with economic opportunities in various industries, including stoves, railcars, ships, and automobiles. Detroit was highly favored by the IRO headquarters in New York City because of its wide variety of economic opportunities and small family neighborhoods. The IRO office in New York was a Jewish philanthropic organization seeking to relocate Russian Jews who had come to the United States seeking refuge from political challenges, poverty, anti-Semitism, and violent pogroms in Eastern Europe. Agents were on the ground following the job market and searching for homes for incoming immigrant families. Hart was not alone in this work. She worked alongside two other Jewish women, supported by Jewish philanthropic organizations. This paper follows their stories working for the IRO settling immigrant families in a growing industrial city. This paper will illustrate how Jewish women continued to shape Detroit's immigrant community, setting major trends for immigration to the Midwest in the 20th century. It will also analyze their work in the IRO as salaried employees in a male-dominated field that continued to place them in male urban spaces and pushed the boundaries of women's roles in the early 20th century.

Erik Brown
Mathematics [M.S.]
Correlation of Student Characteristics and Math Course Outcomes at Jackson College
Faculty Mentor: Dr. Khairul Islam

This study includes 45,765 student outcomes from Fall 2011 to Winter 2021 at Jackson College (JC). It explores the impact of demographic characteristics on the academic performance of JC students enrolled in mathematics courses. In particular, we investigate how gender, race, age group and method of instruction are related to students' success. We analyze data using descriptive statistics and chi-square tests. Initial bivariate analyses results suggest that gender, race, age-group, and instruction method are significantly related to students' success in the course. In order to perform adjusted analyses, we wish to perform model-based analysis to see how a given predictor impacts students' success when other predictors remain fixed.

Erik Wilder
Teaching English to Speakers of Other Languages / TESOL [M.A.]
Teaching Communicative Competence in World Englishes: A Cross-Cultural Approach
Faculty Mentor: Dr. Wendy Wang

While the English language is often used as a lingua franca (ELF) for communication across cultures, strategies for effective cross-cultural communication, and the ELF forms and functions in which cross-cultural communication takes place, rarely factor into English language teaching (ELT). In fact, ELF and cross-cultural communication have seldom been addressed together in ELT. What strategies facilitate cross-cultural communication, and what might these strategies look like? This presentation reviews the development of theories of cross-cultural communication and explores pedagogical approaches for meeting the evolving needs of sensitive and effective cross-cultural communication in Englishes today.

Fotini Irini Callis
Early Childhood Education [M.A.]

The Impact of the COVID-19 Pandemic on Academic Achievement: Gaps in Summative Assessments
Faculty Mentor: Dr. Lisa Sturges

Educators acknowledge the educational achievement loss in students due to the length of summer breaks. In times of a pandemic when schools are mandated to close and the enforcement of virtual learning, there could be tremendous adverse effects on a child's educational achievement, especially in reading. This paper uses professional studies and data from two districts that demonstrate a different return to school option.

Garrick Loewen & Dennis Hoekzema
Orthotics and Prosthetics [M.S.]
Considerations for Design and Fabrication of Custom Sledge Hockey Seating
Faculty Mentors: Frank Fedel, Nate Kearns

Sledge hockey is an adaptive sport for athletes with lower body disabilities. Sledge hockey was invented in the 1960s in Sweden and made its Paralympic debut in 1994. The sport is played under similar rules to stand-up hockey; however players are seated in buckets mounted to metal rails with ice skate blades on the bottom, and they use short hockey sticks with metal teeth on the ends to maneuver. Although the majority of sledges employ non-custom seats, custom seating can offer potential benefits to players in the areas of comfort, safety, and performance. Most orthotic and prosthetic clinics have the resources available to fabricate custom buckets yet lack the necessary instructions. Custom-made sledge hockey buckets are difficult to obtain, primarily due to the small number of facilities that make them. This presentation will outline the technical process of fabricating both carbon fiber and copolymer sledge hockey buckets that were made at one of these facilities.

Gia Born
Social Foundations and Community Education [M.A.]
"He Uses My Body!": Transgender Women's Plight for Visibility, Accessibility, and Recognition in South Africa
Faculty Mentor: Dr. Joseph Engwenyu

This paper is a revisionist reappraisal of the current scholarship, literature, and research on the visibility, acceptance, recognition, and access to resources for transgender women in South Africa. It is based on scholarly research and reports on the experience of transgender women, a memoir from a transgender woman, and a collection of narratives from transgender women on how they navigate through systems of oppression and support in post-Apartheid South Africa.

South Africa is often seen as one of the most progressive countries in the world through the constitutional protections it provides transgender people. Indeed, South Africa is the only country in Africa to do so. However, these protections have not granted transgender women acceptance and freedom from discrimination. Thus, this paper explores: how discrimination is rooted in the very laws that are intended to protect discrimination, the perception of transgender women, and an evaluation of how discrimination shows up in physical violence, the workplace, and religious communities.

The study concludes that South Africa does not recognize, provide visibility, or accept transgender women entirely. Rather, when it comes to the recognition of transgender

women, South Africa in its laws and societal perceptions, only recognizes one kind of transgender woman, the cis conforming trans woman, and only provides protection to passable or cis conforming trans women, leaving all other transgender women open to discrimination, attacks, and violence. The lesson of the study appears to be that state legal protection alone is insufficient for the well-being of marginalized minorities. We need more democratic mobilization from the bottom-up for human rights, and change of attitudes towards transgender communities.

Haley Gmutza
Ecology, Evolution and Organismal Biology [M.S.]
White-nose Syndrome and Survival of Hibernating Little Brown Bats at Tippy Dam
Faculty Mentor: Dr. Allen Kurta

White-nose syndrome is a fungal disease that has decimated populations of hibernating bats across North America since 2006. Tippy Dam, a novel hibernaculum located in Michigan, was hit by the fungus in 2014, but the little brown bats (Myotis lucifugus) that hibernate there have not experienced the decline that occurred elsewhere. Small ventilation holes within the dam's spillway allow light and bats in, and I hypothesize that the light filtering through the openings is sufficient for hibernating bats to stay on a circadian rhythm, and that these bats will arouse together, in groups, which is less energetically expensive. High-resolution thermal cameras were placed within the spillway to monitor arousals in two rooms from October 2019 to April 2020. Videos were time lapsed, and the frame images were analyzed for the contour outlines of awake bats. Preliminary results suggest that most bat arousals occurred during the nighttime, indicating that the bats are following a circadian rhythm.

Haley Rohde
Psychology - General Clinical [M.S.]
Problematic Smartphone Usage and Depression: The Moderating Role of Parental Involvement
Faculty Mentor: Dr. Catherine Peterson

The present study examined associations between problematic smartphone usage, depression, and parental influence, or "helicopter parenting," in a sample of college students. There is substantial research establishing a relationship between problematic smartphone usage (PSU) and psychopathology. Rates of psychopathology and suicide have been increasing precipitously since 2011, without any consensus as to what is driving this increase (Hidaka, 2012). With smartphone usage common in today's society, researchers found that smartphone dependence is infiltrating various parts of people's lives, including work and school (Zhitomirsky-Geffet & Blau, 2016), and social media use via technology may be one explanatory factor for high rates of psychopathology (Hidaka, 2012). Furthermore, an emerging theory suggests a relationship between overinvolved parenting styles and depression (Haidt & Lukianoff, 2019). Therefore, the present study sought to investigate the association between perceived parental overinvolvement, or "helicopter parenting,"" and depression in college students. Researchers also analyzed the potential moderating role of helicopter parenting on the relationship between PSU and depression. Researchers collected complete data from 84 students who were currently enrolled in an introductory psychology course. Researchers utilized a cross-sectional design to administer

self-report measures of depression, smartphone addiction, and parenting style. Participants completed the Patient Health Questionnaire-9 (Kroenke et al., 2001), Smartphone Addiction Scale-Short Version (Kwon et al., 2013), and Helicopter Parenting Measure (Luebbe et al., 2018) via Qualtrics. Analysis revealed a significant correlation between PSU and greater depression ($r(84) = .391$, $p < .001$, and a significant correlation between helicopter parenting and greater depression ($r(84) = .392$, $p < .001$. However, a moderation analysis found that parental influence did not significantly influence the relationship between PSU and depression, $F(3, 80) = 8.5961$, $p < .001$, $R^2 = .2438$. These findings could help researchers further understand the impacts of PSU and helicopter parenting on psychopathology in the emerging adult population.

Hallee Ellefson
Athletic Training Combined [BS + MATR]
Prevalence of Burnout in Adolescent Youth Sport Athletes With and Without Access to Athletic Trainers
Faculty Mentor: Dr. Courtney Lewis

Physical activity and sports are important for adolescents' physical and physiological well-being. Exposure to intense training and competition can lead to overuse injury and burnout, which can have many negative outcomes including mood disturbances and impaired health. This creates a great concern for athletes, parents, coaches, and those within the sports medicine community. Athletic trainers are healthcare professionals who specialize in prevention, diagnosis, and treatment of medical conditions and athletic injuries. Because of their expertise, athletic trainers have the potential to help decrease burnout and overuse injuries in adolescent sports. Experimental research is needed to determine if access to an athletic trainer can prevent burnout in youth athletes. The purpose of this study is to discover if psychological and physical burnout is more prevalent in adolescent sport athletes with or without access to an athletic trainer. Two questionnaires will be developed and sent to high school and club team coaches (to be completed with the athletic trainer, if applicable) and athletes for three consecutive years. The questionnaires will measure aspects of burnout and assess if access to an athletic trainer will have an impact on these aspects. It is hypothesized that adolescent sport athletes with access to an athletic trainer before, during, and after practices and competitions will have a lower prevalence of burnout compared to athletes who do not have access to an athletic trainer.

Hollie Mincone
Orthotics and Prosthetics [M.S.]
Exploring the Environmental and Cultural Effects on the Durability of Prosthetic Feet in Multiple Resource Limited Countries
Faculty Mentors: Nate Kearns, Frank Fedel

Around the world, 80% of individuals living with an amputation live in resource limited countries while 95% of those people do not have proper access to necessary prosthetic devices (Steen, 2006). Without providing these amputees with a prosthesis that will allow them to function within their environments, prosthetists are not helping patients restore their functional capabilities and return to their daily activities such as their vocation. With the foot being the most critical aspect of a prosthesis, it is important that feet are developed according to the factors that will make a successful prosthesis within the setting of these countries. This study consists of performing a Delphi survey

technique to gain clinical perspective on the provision of prosthetic feet in resource limited countries. Their responses will be analyzed to provide future researchers with a better perspective on how to focus the design of prosthetic feet in relation to the environment they will be used in. The subjects must be currently practicing and certified for at least four years and have been on one or more prior trips to a resource limited country where they worked with patients and their prostheses. Rounds of surveys will continue until a consensus between participating CPOs of at least 50% is reached. The results of the survey responses will be collected and divided into the following resource limited region categories: Top three environmental factors affecting prosthetic foot, Top three cultural factors affecting prosthetic foot, Prosthetic foot provided, and Success of prosthetic foot. The goal of obtaining these results is to categorize prosthetic feet options according to the resource limited country they are appropriately suited for based on the region's environmental and cultural factors. These results will address the gap in research regarding the suitability of currently developed prosthetic feet for specific resource limited regions.

Huda Yasan
Teaching English to Speakers of Other Languages / TESOL [M.A.]
TESOL Teachers' Linguistic Identities on Pedagogy
Faculty Mentor: Dr. Wendy Wang

Teachers of English to speakers of other languages (TESOL) are often characterized by whether they are native speakers (NSs) or non-native speakers (NNSs) of English. Yet, this simple NS/NNS dichotomy of linguistic identity tends to privilege the NS teachers against the NNS teachers in various educational contexts. Drawing on research studies that explore the linguistic identities of teachers through personal narratives, linguistic autobiographies, and interviews, this paper examines how teachers' linguistic identities inform and shape their pedagogy. The results of this study show that engaging teachers in critically reviewing their linguistic identities can empower the professional development of all TESOL teachers. Furthermore, this study shows that NNS teachers can use their linguistic identities as valuable pedagogical tools in their classrooms to promote learning.

Ian Cook
Teaching English to Speakers of Other Languages / TESOL [M.A.]
Enhance English Language Learning in Communities of Practice
Faculty Mentor: Dr. Wendy Wang

International student-athletes in the U.S. are a unique group of English language learners. Compared to non-athlete international students, they are reported to enjoy more success in developing English language skills while aiming at their athletic success. This paper analyzes the situated learning experiences of international student-athletes in light of Wenger's three characteristics of successful Communities of Practice (CoP). By investigating how international student-athletes are able to develop their English language skills within a community of practice, some broader implications are drawn about how to enhance the educational experience of international students.

Ian Jurica
Mathematics [M.S.]
Investigations into Autonomous Vehicle Development and Implementations
Faculty Mentor: Dr. Andrew Ross

This is a research project focused on the mathematical methods used for self-driving vehicles to plan their trajectories. This will not focus on route planning, horizon forecasting, or other such functions that take place over minutes or hours. Rather, the focus will be on individual, immediate actions performed by the self-driving vehicle. The primary action investigated is the act of turning at an intersection. In addition to literature research, experiments will be performed in order to better understand how the self-driving vehicle performs this action.

Ian O'Banion
Applied Statistics [M.S.]
Casual Statistics for Undergrads
Faculty Mentor: Dr. Andrew Ross

We present a few methods of Causal Analysis of particular data. Our goal is to provide an approachable introduction to this sub-field for undergraduates with an interest in statistics. Based on the work of J. Pearl, M. Glymour, and N.P. Jewell, we provide an accessible introduction to Structural Equation Modeling and Causal Inference, two useful techniques that are rarely taught at the Master's or Bachelor's level. The initial idea is presented, then analysis is done both in broad strokes and in detail with R code.

Jace Briggs
Orthotics and Prosthetics [M.S.]
Survey On O&P Professionals Perspectives on Patient Education In Orthotics and Prosthetics
Faculty Mentor: Frank Fedel

Introduction:
Certified prosthetist orthotists (CPO), certified orthotists (CO), and certified prosthetists (CP) conduct the evaluation, fabrication, and custom fitting of orthoses and prostheses. They are also responsible for patient education (PE) regarding orthotic and prosthetic (O&P) devices and services. The goal of this project was to gain insight into O&P professionals' perspectives on PE as well as provide information regarding PE.
Method:
Apparatus: Online survey consisting of 11 demographics questions and 24 patient education questions. This survey received IRB approval. A consent form was placed at the start of the survey.
Subjects: A total of 119 respondents completed the survey.
Procedures: The survey is a modified version of the Nurses' Patient Education Questionnaire.
Data Analysis: Descriptive statistics (means and proportions) and correlations will be provided.
Results:
Of the 119 respondents, 30 listed time as a barrier to providing optimal PE to patients in orthotics and prosthetics (Figure 1). 10.1% of respondents strongly agreed to the statement that says most orthotic and prosthetic practitioners put high priority on patient education, where 34.5% were neutral about the statement (Figure 2). 74.8% of respondents report that PE is an important O&P practitioner responsibility. 70.6% of respondents strongly agree to the statement that says it is important to adapt PE to meet a patient's unique needs.
Discussion:
A preliminary review of the responses to this survey suggests that more focus should be put on addressing barriers to providing quality PE. It also provides insight on how much O&P professionals prioritize education.
Conclusion:
Literature from O&P governing organizations and the perceptions of O&P

professionals in this survey indicate that PE is an important and necessary component of O&P practice.

Jacob Schulte
Chemistry [M.S.]
Synthesis and Analysis of a Sterically Hindered Biradical Compound
Faculty Mentor: Dr. Gabriel Rudebusch

The purpose of this study is to synthesize and study biradical compounds, molecules that have two unpaired electrons. Most biradical compounds are very unstable due to the nature of unpaired electrons and thus biradical compounds have not been able to be studied to their fullest degree. This is unfortunate because biradical compounds have interesting electronic properties that should allow them to be a suitable replacement for expensive metals in semiconductors. We aim to synthesize a biradical compound that is stable enough to be studied in a laboratory and find use in future applications. We hope to accomplish this by creating a compound with a large conjugation path as well as large, sterically bulky groups along the outside of the molecule to deter degradation paths. Resultant data reveals synthetic progress toward this biradical compound, findings that could eventually lead to use of biradical compounds in both industrial and commercial products to save time and cost.

Janet Leppala
Gerontology [Graduate Certificate]
Motivations for Coming Back to School: Older Adult Students at Eastern Michigan University
Faculty Mentor: Dr. Cassandra Barragan
College campuses have seen a steady increase of older learners since the 1970s (National Center for Education Statistics, n.d.). While there is a wealth of research highlighting the ways in which universities can become age friendly (Pstross et al., 2017; Talmage et al., 2016; among others), there is a scarcity of research assessing older learners' motivations to come back to universities in the first place. The current study surveyed 248 older learners at Eastern Michigan University. The students were all 40 years and older. Participants were asked about factors which motivated their return to school. Both intrinsic (love of learning, personal challenge, etc.) and extrinsic (money, job, etc.) factors of motivation were explored. Consistent with previous research on the topic, our survey results point to two big factors for older learners coming back to school: they need more education for career purposes, or they simply love to learn. These results can inform the university on ways to attract and retain older learners.

Janet Leppala
Educational Studies [Ph.D.]
Linguistic Support for International Students at Eastern Michigan University: Where Does One Go for Help
Faculty Mentor: Dr. Robert Carpenter

International students are important to American universities both culturally and financially (Banjong, 2015). As such, it is crucial to support the success of foreign students. Research has repeatedly shown that English language ability ranks among the highest concerns for international students in relation to their academic and social success (Banjong, 2015; Cao et al., 2014; among others). This survey study aims to investigate the relationships between English proficiency, social interactions, use of campus resources, and academic success. To investigate possible correlations among these variables, international students at Eastern Michigan University were invited to participate in a survey regarding their

English language ability, social and academic integration, and scholastic achievement. The survey results showed professor's office hours to be the most impactful campus service for helping them with their language skills. Additional campus services were underutilized by these students, and therefore did not impact their English skills, or academic achievement. The results of this survey can be used to enhance campus support services for this important population of students.

Jared Unger
Orthotics and Prosthetics [M.S.]
Confidence of Nursing Students in Caring for Acute Post-Operative Patients After Amputation
Faculty Mentor: Rebecca Spragg

Nurses play a vital role in the care and rehabilitation of patients after an amputation. In a study conducted by Long Et Al., (2002) 64% of nurses state that their pre-registration education was only a basic introduction to rehabilitation for amputees and had not provided them with the skills and knowledge that they needed to ensure appropriate and effective care to the patient. Improper education and use of postoperative dressings and garments provided by the prosthetist may lead to increased trauma, infection, pain, delayed healing, contracture deformities, and poor effects on emotional wellbeing. All of these may lead to delayed prosthetic fitting for amputees, longer hospital stays, and decreased chances for successful rehabilitation (Kelly, 2008). The aim of this study is to determine if, and to what degree, hands-on demonstration, and education with postoperative care for amputees impacts the confidence in care for nursing students. 28 Eastern Michigan University School of Nursing Students obtaining their BSN participated in this study. 22 of them completed both the pre and post survey. The Physiotherapist Self-Efficacy Questionnaire (PSEQ), is adapted for postoperative amputee care. 15 questions were asked regarding confidence in regard to their postoperative care and the interaction with the prosthetist. Subjects then received an educational presentation on post-operative amputation care including hands-on exposure. Participants were able to practice using post operative garments (rigid dressings, socks, and shrinkers) on model residual limbs. After the educational session, participants completed the PSEQ again. Paired independent t-tests were conducted due to the anonymity of this study as well as to compare the means of the pre- and post-survey questions.

Jeff Bond
Chemistry [M.S.]
Validating Plasma-Chemical Oxidation Sample Preparation for AMS Radiocarbon Analysis of Known-age Materials: Comparison with Combustion
Faculty Mentor: Dr. Ruth Ann Armitage

Rock paintings, found on every continent except Antarctica, are often the only evidence of past human activity; thus, many archeologists are interested in determining their age. Applying radiocarbon dating to samples from rock paintings is complicated by the presence of other components like soil humic acids and the underlying limestone substrate, which can potentially lead to an erroneous age determination. Because complete combustion at high temperature is the standard method of preparing charcoal-pigmented rock paintings for accelerator mass spectrometric (AMS) radiocarbon dating, it is necessary to remove these undesired contaminants first. Plasma-chemical oxidation (PCO) is an alternative method for preparing carbon

dioxide from such samples that does not decompose the limestone substrate, requiring only base pretreatments to remove humics. This study explores whether the various pretreatments used in conventional combustion sample preparation affect the sample yield and accuracy of the dates obtained from the PCO-AMS. Reference samples were prepared from known-age materials, including charcoal from the Mashteuiash site in Quebec, Third International Radiocarbon Intercomparison Ellanmore humic acid, and limestone. A variety of different acid and base pretreatments aimed at removing one or more of the contaminants were applied, which were then subjected to both PCO and combustion before being dated by AMS. Samples treated for the removal of humic acid with an NaOH solution and samples treated for the removal of limestone with HCl under vacuum conditions provided ages consistent with the known reference samples. Additionally, samples treated with HCl show partial removal of humic acid in addition to the intended removal of the limestone. The results help validate PCO-AMS as an alternative process for dating rock painting samples by evaluating the effects of these pretreatments, and to help establish the amount of sample needed for reliable measurement of the age of microsamples collected from such paintings.

Jennifer Bennett
Educational Studies [Ph.D.]
Climbing for Resilience: The Relationship between Self-Efficacy and Risky Play
Faculty Mentor: Dr. Robert Carpenter

Play is serious business to kids. While having fun, children learn about themselves and the world, but not all play is equal in its ability to help kids grow. Research suggests that play involving risk is particularly supportive of healthy development. Risky play, such as activities involving heights, speed, tools, space, and natural elements, can build children's resilience by helping them gain confidence in their ability to overcome challenges. This study contributes to the research in education and psychology by specifically examining the benefits of risky play as they relate to resilience. The goal of this study is to answer the question: What is the relationship between participation in risky play and a young child's self-efficacy and resilience?

This study used a mixed-methods approach, including surveys and one-on-one interviews. The sample was parents of children between the ages of 3 and 5-years-old. Surveys were used to examine the relationship between parent-reported measures of resilience and self-efficacy and participation in forms of risky play. Interviews explored parents' perspectives regarding the ways risky play supports their children's growth and learning. Analysis focused on correlations between children's participation in risky play, resilience, and self-efficacy. Findings related to the most commonly reported types of risky play were also explored. Open-ended questions and interviews helped illustrate how parents make decisions about risky play and the ways they see their children benefiting from these activities. Conclusions focus on ideas for promoting risky play and its benefits for children and recommendations for further research.

Joely D. Reznik
Psychology - General Clinical [M.S.]
Parent Impulsivity in Child Emotion Regulation: The Moderating Role of Age
Faculty Mentors: Dr. Jamie Lawler, Dr. Angela Staples

High levels of impulsivity from parents have substantial implications for their children, including the development of emotion regulation. Impulsivity may impact parent-child interactions, which play a large role in the development of child emotion-regulation (ER). Identifying the characteristics of dyads in which parent impulsivity is particularly related to children's ER could help to accurately target interventions for families. We hypothesized that younger parent age would be associated with a stronger relation between parent impulsivity and child emotion regulation.

Participants (N=394; 69.5% women) were aggregated from multiple studies, including in-person and online studies. Parents completed surveys about their level of impulsivity (SUPPS-P; Cyders et al., 2014) and their child's ER (ERC; Shields & Cicchetti, 1997), which included lability/negativity (L/N) and ER subscales.

Study data suggested that parent impulsivity is associated with poorer child ER and greater L/N. While parent age did not moderate the relation between parent impulsivity and child ER, impulsivity did significantly predict L/N suggesting that a child's ER may be impacted by their parent's impulsive behavior. Therefore, implementing interventions for parents with high levels of impulsivity may improve their child's ability to regulate their emotions resulting in better child outcomes.

John Ballard Pecora Literature [M.A.]
Paradigm Quake: Muriel Rukeyser's *Mirror of Ambiguity and the Elusive Sacred Bond*
Faculty Mentor: Dr. Elisabeth Daumer

The ambiguity of Muriel Rukeyser's words, phrases, relationships among, between, and ranging across her language in her 1949 collection of poems, Elegies, is undeniable. When swimming through the myriad allusions seeking something concrete to save them, the reader may at once discover that all they were convinced they knew is but delusion, The reader may suddenly discover that while they thought they knew something, all along what they "knew" was part of the delusion. Thus, they find themselves thrashing about in a cesspool of intellectual paralysis. Rukeyser described those who are "lost" and are unable to change their own orbit. They are "raging and suffering and hoping to take shape." Using this tool of a textual mirror of ambiguity, Rukeyser reflects to her readers the epistemological inheritances that can only lead to tragedy and annihilation. We, the readers, then, are called to action: Perhaps to use all that we know to let go of all that we know—to get lost in the connections only to be found in the connections through annihilation of the autonomous self. It is in this apprehension of existing within the connections that bind us all—where unbound unity may be found. This is a realization of reality so profound as to be labeled 'sacred.' As Rukeyser notes, "It is in the relations alone that objectivity must be sought; it would be vain to seek it in beings considered as isolated from one another." Our inheritance is one of superiority and separation. This is a murderous and tragic epistemology. It is this lack of unity, of bond, of connection of humans to not only each other, but to the full complement of the living world, that Rukeyser exposes in her mirror of ambiguity.

Joseph Olson
Communication [M.A.]
Substance Use Disorder: Stigma, Disclosure, and Recovery
Faculty Mentor: Dr. Jeanette Kindred

Individuals in recovery from Substance Use Disorder (SUD) must navigate a challenging social terrain when incorporating their newfound sober identity into their lives, especially when disclosing their recovery status to others. This interdisciplinary literature review examines how the stigma associated with SUD influences disclosure practices among individuals in recovery. SUDs are among most stigmatized conditions globally, making those suffering from the condition less likely to seek and maintain treatment. Individuals in recovery must make critically important decisions regarding the disclosure of their condition in professional, academic, medical, and social settings as the disclosure of such information may result in termination from employment, substandard healthcare, prejudicial treatment, and social rejection. Findings from a review of communication, psychiatry, and public health research examining individuals in recovery indicate that there is no universally effective or preferred method of disclosure among this population. These individuals are tasked with selecting a method of disclosure that best fits the situation and the associated risks. This outcome is supported theoretically by Communication Privacy Management (CPM), an evidence-based theory that examines how individuals reveal and conceal private information. Public-Private Dialectical Tension, a key component of CPM, expands upon the tension associated with choosing to reveal or concealing private information, and disclosure's relationship with relieving this tension. Theoretical implications aside, stigmatizing attitudes and behaviors in modern society are the largest influencers of disclosures in the context of SUD. While progress regarding the discussion of addiction has been made in recent years, the language used to identify those living with SUD is still outdated and is in turn keeping traditionally discriminatory perspectives alive.

Joseph Tu
Clinical Psychology [Ph.D.]
Predicting Changes in Nonlinear Indices of Heart Rate Variability by Anxiety Sensitivity Dimensions
Faculty Mentor: Dr. Ellen Koch

While anxiety sensitivity (AS) and heart rate variability (HRV) have both been identified as transdiagnostic components, there is little research that has evaluated their relationship. Evaluations of nonlinear indices of HRV is also promising and understudied. Our sample (N = 120) underwent physical, cognitive, and social stress challenge paradigms while heart rate was monitored across these counterbalanced conditions, along with baseline. Multilevel analyses revealed that the assessed subscales of the anxiety sensitivity index (ASI-3) at baseline did not significantly predict within-individual change from baseline in Sample Entropy and α1 nonlinear indices of HRV, though an interaction of small effect was found to predict α1. Higher cognitive AS predicted more rigid HRV during the cognitive paradigm, whereas higher physical AS predicted less rigid HRV during cognitive and social paradigms. Findings suggest different methods of emotional control depending on the stressor, while confirming the need for replication and consideration of more variables across longer periods of time.

Julia Moore
History [M.A.]
"Aren't you a mother?" and Other Questions of Polish Femininity: An

Analysis of Wanda Wasilewska's The Rainbow
Faculty Mentors: Dr. Jesse Kauffman, Dr. John McCurdy

Immediately post World War II, Poland was left in a state of limbo. Destroyed by war, its people had fought hard for independence and found themselves under Soviet Control, feeling betrayed by Allied promises. Polish women, throughout the history of the 20th century, embodied unique, feminine characteristics of national sentiment and were arguably the backbone of Polish nationalism. This paper is a piece of greater analysis to be included in a thesis on the role femininity played in the creation of a Polish socialist state and its support or denial of such state. Wanda Wasilewska was a Polish fiction author living in Stalin's USSR, who expressed her belief that socialism was the answer for the Polish people in her books and political publications. Her novel, The Rainbow, though a fictional account of a Ukrainian village under German control, is reflective of her beliefs and the unique experience of Polish women who believed in socialist politics.

Julia Moore
History [M.A.]
Fashion as Dissent: African Women and the Politics of Dress
Faculty Mentor: Dr. Joesph Engwenyu

Fashion and the study of fashion has mostly been done from an Eurocentric paradigm, established around the idea that the clothes people choose to adorn themselves in are representative of their identity and cultural beliefs. From this premise, African culture in general is assumed to be static on fashion. It was, perhaps, African Art History Professor, Dr. Victoria Rovine whose 2015 revisionist publication African Fashion Global Style most effectively began to depict African women and fashion as more versatile-- innovative, gendered, defensive and at times, confrontational. This paper uses fashion as a category of analysis to illustrate the innovative nature of African women. Using an intersectional approach, the study draws on three concrete examples from Angola [Pano], Namibia [Erapi] and Nigeria [Alhaji] to show that African women marked their fashion identities socially, nationally and generationally. Moreover, these markers were not static. They intersected with each other, created, and still create tension and dissent in colonial and post-colonial African society.

Justice Carlton
History [M.A.]
Thomas Jefferson, The American Founding, and the Separation of Church and State
Faculty Mentor: Dr. John McCurdy

The purpose of this research project is to examine the impact of Thomas Jefferson's religious beliefs on his political decisions and the subsequent development of ideas surrounding the separation of church and state in America. Jefferson's adherence to deism and rejection of standard Christian theology contributed to his advocacy for religious freedom from governmental influence. The study focuses on a few key questions, namely: why was Thomas Jefferson deist, how did Jefferson allow his religious preferences to impact his decisions throughout his political career, and to what extent are modern conceptions and legislative decisions concerning the separation of church and state dependent on Jefferson's contributions during his lifetime? The assessment relies on arguments of previous historians, as well as interpretations of multiple primary sources to determine

satisfactory answers to these inquiries. Jefferson's deism was prevalent throughout much of his personal life and permeated his political career. He was devoted to the separation of church and state before his presidency, and modern American legislative precedents continue to reflect his steadfast commitment to the preservation of religious freedoms. Jefferson sincerely believed that religion or its absence was a deeply personal matter that should not be subject to the desires or concerns of public or political interference or interest.

Justice Carlton
History [M.A.]
Brewing Up Trouble: Heretics, Jews, and Witches
Faculty Mentor: Dr. Ronald Delph

The purpose of this research project is to examine the cultural impact that elite intellectuals and religious leaders in late fifteenth century Europe had on popular conceptions of witches. Ideas about witches as contributing members of local communities were quickly replaced by concerns synonymous with ancient fears regarding the propensities of Jewish and heretical groups to engage in improper behavior. The study focuses on a central question, asking why elite ideology began to so strongly associate witches with cannibalism and immodesty? Witchcraft's alleged perversion of Christianity facilitated the ease with which Europe's Christian populace was made to condemn their former neighbors.

Kai-ling Coleman
Chemistry [M.S.]
Differences in the Levels of ProBDNF and Mature BDNF in A549 and H1299 Human Lung Cancer Cell Media
Faculty Mentor: Dr. Hedeel Evans

Brain-derived neurotrophic factor (BDNF), a member of the neurotrophin family, has been linked to various steps involved in carcinogenesis and shown to promote tumorigenesis. Here, we explore the relative abundance of pro-brain-derived neurotrophic factor (proBDNF) and mature BDNF (mBDNF) in A549 (p53 wild-type) and H1299 (p53-null) lung cancer cell media. Higher proBDNF levels were detected in the media of A549 cells than in H1299 cell media. Using inhibitors, we show that the levels of proBDNF and mBDNF in the media are likely regulated by PI3K, AKT, and NFκB. However, MMP2/9 inhibition resulted in the largest change in these levels. Blocking p53 function in A549 cells led to increased mBDNF and decreased proBDNF, suggesting a role for p53 in regulating these levels. The ratio of proBDNF/mBDNF increased in the media of both cell lines upon knockdown of MMP9 but was not affected by MMP2 knockdown. Downregulation of either MMP2 or MMP9 by siRNA showed that MMP9 siRNA treatment of either A549 or H1299 cells resulted in decreased cell viability and increased apoptosis, an effect diminished upon the same treatment with media immunodepleted of proBDNF, suggesting that MMP9 plays a role in regulating the cytotoxic effects induced by proBDNF in lung cancer cells.

Kailey MacDonald
Psychology - Clinical Behavioral [M.S.]
Examining and Improving a Multiple-Choice quiz on Knowledge of Medical Decision-Making Capacity.
Faculty Mentor: Dr. Claudia Drossel

The current study examined the validity of a 15-item multiple choice quiz designed to assess public knowledge about medical

decision-making capacity. Ceiling effects detected in an initial educational intervention project raised questions about the validity of the results and necessitated this secondary data analysis. The application of test-development procedures to the data set identified a large number of non-functional distractors (66%) and an inequitable distribution of answer choices. Answer choice "b" was associated with the correct answer 47% of the time. Based on results thus far, it is expected that increased difficulty of questions and more equitable distribution would increase validity of test results. Test revisions will be piloted in the future to assess whether the revised test represents a more accurate reflection of the public's knowledge of decision-making capacity.

Kaleigh Neely
Orthotics and Prosthetics [M.S.]
Using Virtual Reality to Supplement Orthotics and Prosthetics Education
Faculty Mentor: Frank Fedel

Virtual reality systems are seeking to narrow the gap between training and performing in medical education by providing an effective and reusable modality for practicing both technical and non-technical skills. VR programs already available in the medical field include immersive educational models and virtual or simulated patient interactions across multiple disciplines and levels. This study aims to begin exploration of the utility of virtual reality in educating future orthotics and prosthetics (O&P) clinicians. A virtual reality program was created in collaboration with an existing software developer to support the education of future O&P clinicians on various elements of transtibial prosthesis benchtop alignment. Students participating in the study were given a pretest on the subject matter before being provided a brief online lecture. Subjects were divided into a control and experimental group through a randomized matched pairs design to control for pre-intervention knowledge level. Both groups were given three days to study the lecture material. The intervention group was provided access to the virtual reality program and encouraged to use it as much or as little as desired to help learn the material. A post-test was administered to both groups. Results of this study include statistical analysis and comparison in learning outcomes and study engagement between the control and intervention test groups. VR can provide students with more exposure to clinical skills for low cost to the programs and with low risk for patients and learning practitioners. Transtibial socket alignment is just one of many areas in which virtual reality could be used to increase understanding in orthotics and prosthetics education.

Karalyn Anderton
Public Administration [M.P.A.]
Joint Fact Finding for Renewable Energy Policy in L'Anse Township, Michigan
Faculty Mentor: Dr. Shu Wang

L'Anse Township, on the shores of Lake Superior in the Upper Peninsula of Michigan, has recently passed an ordinance to amend the Township's Zoning Ordinance regarding Wind Energy Conversion Systems (LWECS). The ordinance specifies districts where LWECS are allowed, and changes setbacks, spacing, density, and noise requirements. This ordinance sets requirements more stringent than what is recommended in the state of Michigan, thereby disincentivizing sustainable development. To offer a solution to ongoing turmoil over the community's stance on wind energy and to facilitate a more open

mindset toward renewable energy, this paper proposes that L'Anse Township use Joint Fact Finding before making future changes to planning and zoning for wind energy. Joint Fact Finding, or JFF, is a process that involves stakeholders in creating and analyzing information used in new policy decisions. This paper discusses advantages and disadvantages of the Joint Fact Finding Procedure using examples of its use in other communities, outlines a plan of action for implementing JFF in L'Anse Township, and describes a plan for evaluation of the JFF procedure.

Kat Naish
Educational Studies [Ph.D.]
Is There a Shelf-life in Special Education? Special Educators' Reflection on Burnout & Secondary Trauma
Faculty Mentor: Dr. Joe Bishop

Is there a shelf-life for educators in the field of special education? Special educators navigate difficult classroom scenarios that are products of oppressive societal systems that families in the United States experience. Additionally, the structure of special education, inclusive of its legal rigor and secondary traumas, can be arduous for special educators to navigate and may lead to attrition and burnout across the field. The purpose of this study was to understand special educators' experiences from their stories and to further understand the reasons behind special education teacher attrition and burnout. The results show that teachers feel overburdened with the tasks demanded of them in special education and never feel like they are doing enough. Additionally, this impacts their ability to continue in the field of special education because the sustainability of the role is difficult to navigate in current circumstances.

Kayla Reardon
Orthotics and Prosthetics [M.S.]
The Reliability and Validity of Kinovea Software Analysis for the Measurement of Cervical Range of Motion in Infants
Faculty Mentor: Rebecca Spragg

Cervical range of motion (CROM) can be measured in several ways, but there is a need for a reliable and valid method for measuring cervical range of motion in infants. According to the literature, the use of video analysis, such as Kinovea Software, can be more accurate than the use of a goniometer of CROM device. This study aims to test Kinovea intrarater reliability and validity specifically with infants, and when measured in the coronal and transverse planes. Videos of each subject's CROM will be downloaded into Kinovea software for analysis. Marker placement and calculations of each subject's CROM within the Kinovea software will be done three separate times to examine intrarater reliability. Marker placement and calculations will also be done 48 hours apart to avoid bias. Measurements collected from the researcher will then be compared to the measurements taken by a physical therapist to test for validity. The researcher hopes to find that Kinovea Software is a reliable and valid measurement method when measuring cervical range of motion in infants, and that it may be used in future research studies.

Kelcy Rolak
Communication Sciences and Disorders [M.A.]
AAC Use by Adolescents with ASD and their AAC Co-Pilots
Faculty Mentor: Dr. Sarah Ginsberg

Parents of children who are users of Augmentative and Alternative Communication (AAC) play a crucial role in

the daily functioning and maintenance of their children's communication devices, yet their perspective in regard to matters of AAC implementation, employment, and overall success is largely under-explored in the current literature. By exploring the experiences and perspectives of these parents, deemed "AAC co-pilots" in this study, we can further explore and understand the preferences and individuality of those who use such devices. This will allow for continued development of AAC and inform what makes for successful daily AAC use.

This study sought to answer the following research question: What are the perspectives of parents on the implementation, use, and overall communication success of augmentative and alternative communication by their child with Autism Spectrum Disorder (ASD)?

Eligible parent participants were those whose child has ASD, has been a user of AAC for at least a year, and whose AAC use is documented in their Individualized Education Program. Parents participated in semi-structured interviews that explored both their child's AAC use and their own personal perspectives with the aim of garnering comprehensive insights into the experiences of both the parent and child. Results will consider the extent of the role of the parent as a co-pilot in their child's AAC use.

Keleigh Norman, Parker Wilson, Gates Domier, Andi Pontiff
Creative Writing [M.A.]
Elevating the Voices of Incarcerated People through Collaboration and Poetics of Abolition
Faculty Mentor: Dr. Rob Halpern

Panelists will share the story of a creative partnership with incarcerated women at the Women's Huron Valley Correctional Facility, examining the problems and relationships within and around the prison industrial complex. Panelists engaged with the women at WHV and worked to build solidarity in a number of ways, including creating a collaborative anthology. We will share excerpts from our collaborative project with women at WHV, what it means to re-humanize incarcerated men and women, and how to build solidarity through poetry and correspondence.

Kelly Mack
Clinical Mental Health Counseling [M.A.]
Client Satisfaction of Tele-mental Health Counseling Through Covid 19 Pandemic
Faculty Mentor: Dr. Devika Choudhuri

The therapeutic alliance between client and therapist is known to be a significant component of successful therapy. Through this alliance, the client connects with the therapist and recognizes the genuine and authentic interest the therapist has in client success.in. Prior to the global pandemic (COVID 19) much of counseling was done in an in-person fashion, allowing for therapist and client to build this rapport with one another in a face to face. The arrival of COVID 19 turned much of the world on its head and forced professions to become creative in how to best provide services. Counseling was no different. During this time, many counselors restationed from seeing clients in person to meeting virtually with clients over the internet. This posed the question; would clients receive the same quality of mental health care and be equally as satisfied with virtual services compared to in person services? I hypothesize that the rate of client satisfaction with telehealth counseling is equal to the rate of client

satisfaction within person counseling. I will examine this further by analyzing satisfaction surveys compiled by the Counseling Training Clinic at Eastern Michigan University. Satisfaction survey results from semesters prior to COVID 19 (in person) will be compared to semesters after COVID 19 (virtual). Findings that reveal similar satisfaction rates from students who received treatment before with those who received virtual service after would suggest equal success and quality between the two modalities**.**

Kelsey Ruiz
Clinical Mental Health Counseling [M.A.]
Pandemic Parents
Faculty Mentor: Dr. Irene Ametrano

The COVID-19 pandemic has impacted the entire globe, but it has had a severe effect on parents. Parents who are also working and attending classes may be struggling more than we know. This study aims to understand the experience of those who are juggling all three roles through qualitative methods. The researcher will share a survey across the school asking parents who are enrolled at EMU to describe the hardest aspects of the pandemic for them. The researcher anticipates that childcare and finances have been the biggest obstacles for these students during the pandemic.

Kendra Blount
Clinical Mental Health Counseling [M.A.]
Patriarch: The Myth of the Ideal Patriarchal Nuclear Family, and its Place within the Black Community
Faculty Mentor: Dr. Devika Choudhuri

The purpose of this study is to explore the traditional patriarchal nuclear family and its role within the African American community. By analyzing "community-wide" generational trauma and ancestral experiences, I address the relational strain between African American men and women. I also identify and discuss the steps and processes that can be taken to work towards healing and understanding within the community.

I conducted an in-depth analysis of existing scholarly literature dealing with the traditional nuclear family model, African American family dynamics, and African American patriarchy. The result of this literary analysis highlights the historical and societal impact that slavery, racism, and generational trauma have all had on the relationship dynamics between African American men and women.

Kendra Perkins
Ecology, Evolution and Organismal Biology [M.S.]
Influence of Nutrient Consumption on Metabolic Rate and Growth Trajectory in Curly Hair Tarantulas
Faculty Mentor: Dr. Cara Shillington

Sexual size dimorphism (SSD) is a physiological phenomenon in which individuals within the same species vary in size, with one of the sexes being predominantly larger. This variability between sexes can be attributed to differences in resource allocation, growth rate, behavior, and metabolic rates. Tarantulas are sexually dimorphic, making them model animals for investigating the role of diet on growth rates and metabolic rates (MR). While much is known about the short-term effects of different nutrient consumption, such as increased MRs and varied growth trajectories, the effects on long-lived invertebrates is less understood. We collected data on 62 curly hair tarantulas, to determine the relationship

between sex, nutrient intake, and standard metabolic rates (SMR). The SMR is the minimum energy expenditure of an individual at rest. It is a helpful indicator in the evaluation of the organism's response to the variability within its environment and is influenced by factors such as body mass and sex. We know that SMRs are higher in mature males in comparison to females, but it is not clear exactly when this change occurs. This study investigates the potential for a significant correlation between SMR, growth rates, and prey diet between the sexes. Males and females of the same age were randomly split into two groups, one of which was fed prey on a nutrient-rich diet and the other a nutrient-poor diet. The nutrient level of that diet is controlled via the diet of their prey, crickets. To provide adequate time for digestion, the crickets were placed on their own specialized diet for 7 days, prior to becoming prey. Our analyses provide insight into the development of physiological differences between sexes. With tarantulas being a basal arachnid group as well as a popular pet species, understanding their physiology and how nutrients impact their metabolic rate and growth rate, is crucial.

Kristina Sweet
History [M.A.]
On the Power of 18th Century Indigenous Women
Faculty Mentor: Dr. John McCurdy

This paper seeks to answer this question by reconstructing the life of Marie Madeleine Réaume L'Archevêque Chevalier (1711-1784) and her use of different social spaces. It examines how Native women understood space and social relationships with Euro-American men and Indigenous men. I ask questions surrounding how Native women understood space and social relationships in the colonial period and ask why Native women were able to have such different social relationships with Euro-American men and Indigenous men? I also explore how those relationships allowed them to build significant agency and protection for their community's greater interests. Marie Madeleine was born to an Illini tribe but ended her life connected to the Odawa bands at Fort Michilimackinac and Fort Detroit, she would have had to move between these colonial trade centers acting as an interpreter, mother, and trader within her lifetime. She married twice and left a lineage of eight children who would also accumulate power in similar ways because of their mother's connections. Analyzing the social and spatial movements of Marie Madeleine and her family help to provide a scope for understanding the ability of Native women to accumulate power and influence through kinship relations, work, and cultural activities. This paper integrates maps and marriage records of the Mackinac region to illustrate spaces and situations where Marie Madeline would have accumulated power and interest and how Euro-American and Indigenous colonial parties would have viewed and interacted with that space. Ultimately, this paper argues that Native women in the Great Lakes Region played an important role in maintaining the power and agency of Native spaces in the presence of colonial powers by using kinship circles, workspace, and trade networks.

Kristopher Kilgallon
Communication Sciences and Disorders [M.A.]
The Perspectives of Non-Native Speakers of English on Accent Modification Services
Faculty Mentor: Dr. Ana Claudia Harten

Accents are considered innate components of speech; not one accent is measurably or inherently superior to another (American Speech-Language-Hearing Association [ASHA], n.d.). Accent modification service is a type of language pronunciation training intended to, among other things, help speakers improve their pronunciation when speaking a non-native language (ASHA, n.d.). However, accent modification services have recently become a controversial topic in the field of speech-language pathology (Gray, 2021). Some practitioners and scholars in the field examine those services under sociolinguistic lenses, and, as such, highlight its potential role as accessory to unjust social pressures regarding the burden placed on non-native speakers during communication (Chiou, 2020; Gray, 2021; Yu, 2020). In contrast, there are those who consider accent modification to be dissociated from the intent to change one's accent and identity, but instead to increase pronunciation skills and awareness for more readily conveyed, clearer, and intelligible speech (McKinney, 2019; Gray, 2021). The purpose of the current study is to explore the perspectives of non-native speakers of English who have received accent modification services. More specifically, this study uses interviews to gather insight on their experiences related to accent, accent training, language, identity, and culture. The data gathered in this study can be used to guide the practice of professionals who provide accent modification training and foster the provision of culturally responsive services.

Kylar Chandler
Public Administration [M.P.A.]
Plan Cincinnati: Affordable Housing, Policy Reflection, and Alternate Perspectives
Faculty Mentor: Dr. RJ Koscielniak

In 2012 the City of Cincinnati unveiled its first comprehensive plan in almost thirty years, Plan Cincinnati. Planning professionals from across the country lauded the document — as the plan touted lofty goals surrounding equitable housing development. As the ten-year anniversary of Plan Cincinnati draws near — the traditional methods used by Cincinnati's planning department to provide such affordable housing have come into question. This report explores the expectations set forth by Plan Cincinnati, discusses the reality of affordable housing development since 2012, and analyzes the potential of the recently failed public referendum, issue 3, as it would have drastically shifted the way Cincinnati approached affordable housing.

Kylar Chandler
Public Administration [M.P.A.]
Blight in Technicolor: Federalism Exemplified through the Detroit Land Bank Association
Faculty Mentor: Dr. Barbara Patrick

Blight remediation or fixing the physical or functional deterioration of properties so they are no longer a detriment to the occupants nor surrounding parcels, has become a staple administrative tool for the City of Detroit and a mainstay of Detroit politics. Over the past decade the Detroit Land Bank Association (DLBA), the entity best equipped to handle blight, has been utilized to its fullest extent — at one point holding 25% of all parcels of land within Detroit. However, the financial infrastructure provided by external government entities that once allowed such high involvement in city planning has dwindled away and the future of the DLBA is unknown. This report explores relevant literature, analyzes the DLBA, and Detroit City Council quarterly

performance reports in order to examine shifts in intergovernmental relations. It also outlines improvements that could be made so that the DLBA can thrive in an optimal political environment. Findings include federal government absence, equal parts state cooperation and hindrance, and phenomenal cooperation between the City of Detroit and the DLBA. Such research may function as a roadmap for other land banks as similar funding issues as a result of shifting intergovernmental relations are occurring to land banks across the country.

L Swain
Women's and Gender Studies [M.A.]
The Diary of a Prison Wife
Faculty Mentor: Dr. Elizabeth Currans

Care work is a form of labor that women and feminine-identifying people are socialized to perform from a young age due to gendered socialization. This care work can involve cooking, cleaning, and raising children, and occurs on top of the economic work they ordinarily perform. In a sense, this work becomes like multiple jeopardies. But what happens when one spouse is incarcerated and subject to a particular disability? My interest lies in the relationship between care work and incarceration within heteronormative relationships. That is, when male partners have been incarcerated, feminine-identifying spouses are left to manage the affairs of life alone; navigate the prison-industrial complex to advocate for their partners; face discrimination and patriarchal backlash from the prison staff; and finally navigate their mental health crisis from the harm the prison industrial complex has caused them. To conduct my research, I have chosen to use an autoethnographic method to conduct my study. To do this, I reflected on my instances as a prison wife and my interactions with the prison industrial complex while my partner has been unjustly held by this system. My research includes navigating disability, gender, and sex within an incarcerated relationship.

Lara El Khouri
Teaching English to Speakers of Other Languages / TESOL [M.A.]
Arab English Language Learner's Language Analysis: Common Errors in English Speaking and Writing
Faculty Mentor: Dr. Ildiko Porter-Szucs

This case study evaluates the English speaking and writing of a female Arab Non-Native English Speaker (NNES). The study presents an analysis of the NNES's common speaking and writing errors, particularly errors in pronunciation and written grammar. It discusses how Arabic as a native language influences learning English as a foreign language. The case study compares the transcribed phonemic features of the NNES to those of a native English speaker. It also analyzes the grammatical strengths and weaknesses in writing samples and relates them to common grammatical errors that NNESs from the same native language have. Finally, suggestions are given for various intervention methods to help Arab NNESs improve their written grammar and pronunciation in the English language.

Larisa Martinez
Curriculum and Instruction [M.A.]
The Need for Student Access to Natural Reader within the Disability Resource Center
Mentor: Dr. LaMarcus Howard

The National Center for Educational Statistics (NCES) indicates that approximately 11.1% of college students

reported having a disability in the 2011-2012 school year (NCES, 2015). Recent trends suggest that students with disabilities often lack access to accommodations that provide additional ways to learn outside of the traditional classroom setting. More specifically, textbook and hand-out material accessibility is typically limited to a singular format of visual print with no option of visual or auditory modification options. The completion rates of any postsecondary education by students with disabilities is more than 10% lower than for students without disabilities (52%) (Newman et al., 2011). The purpose of this study is to determine if students who self-identify as having a disability through the Eastern Michigan University Disability Resource Center and receive Alternative Media Natural Reader accommodations report higher academic success rates. This study also seeks to explore additional ways to support students who qualify for Alternative Media accommodations.

Leah Hall
Orthotics and Prosthetics [M.S.]
Pediatric Accommodative Shoes
Faculty Mentor: Rebecca Spragg

There is a lack of currently available children's accommodative shoes that are affordable and that address the specific needs of the pediatric orthotic population. Due to the design nature of this project, a majority of commercial information is not discussed in scientific literature. The purpose of this project is to survey parents of children who wear lower limb orthotic devices in order to gain a better understanding of what gaps there are in the current market for pediatric accommodative shoes. Using this data, a novel design of an accommodative shoe that fills this gap will be created.

Leeann von Korff
Orthotics and Prosthetics [M.S.]
Qualitative and Quantitative Analysis of Student Education on 3D Scanning Techniques
Faculty Mentor: Nathan Kearns

No research has been done to determine the importance of educating students on scanning technology before beginning their residency and working for a company that may require the use of newer technology as opposed to traditional casting methods. The purpose of this study is to determine if students are able to use a scanner on an artificial limb model with little instruction and if they feel comfortable and confident using it. This research topic is important because it will help educators determine the importance of teaching students how to use a wide variety of tools that are used by clinicians after graduation. These findings will help to guide the curriculum of the Orthotics and Prosthetics master's program. Participants will be asked to watch a short video that demonstrates how to use the Spectra 3D scanner (Vorum, Vancouver British Columbia). They will then be asked to use the Spectra 3D scanner to scan an artificial limb model that simulates an amputee's limb. After they have completed the scan, participants will be asked to complete an electronic survey (TAM survey) that asks questions related to perceived usefulness and perceived ease of use of the scanner. It is expected the findings will show participants find learning how to operate and master the scanner easier when compared to standard casting methods. In conclusion, the results of this study will provide information that may be used to guide future curricular development.

Lindsey Clifford
Communication Sciences and Disorders [M.A.]
Speech and Language Assessment of Internationally Adopted Children
Faculty Mentor: Dr. Sarah Ginsberg

More than 275,000 children have been adopted in the United States through international adoption and the vast majority of these children lived in orphanages prior to their adoption. Research has shown that residing in institutionalized care settings is detrimental to children's overall development, but specifically impacts their speech and language development. This explains why language disorders are disproportionately present in children who are internationally adopted. Speech language pathologists (SLPs) are tasked with assessing internationally adopted children for a speech or language disorder, but this can prove to be challenging for a multitude of reasons. Although there is a standard of care recommended by the American Speech-Language-Hearing Association (ASHA) on how best to assess these children, it is unknown what methods SLPs are currently using in practice.

Lisa Emery
Educational Leadership [Ph.D.]
Help Wanted: Attracting More Women Leaders to Enrollment Management
Faculty Mentors: Dr. Rema Reynolds, Dr. David Anderson, Dr. Carmen McCallum

This research considers the need for transformative change in higher education admissions policies and student success initiatives in the wake of significant impending changes in the demographics of the college-going population. The role of the Chief Enrollment Management Officer (CEMO) was examined for its potential to shape policies around access and equity within an institution. It is predicted that there could be hundreds of vacant CEMO positions within the next few years, creating an opportunity for more women to step into this executive-level role. In this causal comparative quantitative study, data was collected from 211 current CEMOs to understand the challenges and highlights of the role and provide recommendations for reshaping the role to attract transformative women leaders. Structural equation modeling was used to examine the relationship between demographic and work-life factors on job satisfaction, morale, and intention to stay, leveraging a framework used in previous studies on mid-level managers in Student Affairs (Rosser & Javinar, 2003). The findings suggest that career support, recognition for competence, and favorable working conditions were significantly correlated with higher morale, while recognition for competence and having the resources to meet goals were significantly correlated with higher job satisfaction. Career support was also significantly correlated to job satisfaction for women. The results found that morale was a significant predictor of a CEMO's intention to stay in their current position. The amount of responsibilities within the position and having a mentor were also explored and found to have no significant differences in job satisfaction or morale.

Mac Neaville
Philosophy [M.A.]
Clarifying the Role of Implicit Bias in Epistemic Injustice
Faculty Mentor: Dr. Jill Dieterle

In this paper, I provide an analysis that clarifies the role of implicit bias in epistemic

injustice and epistemologies of ignorance. I begin by evaluating the relationship between epistemic injustice, which occurs when an epistemic agent is harmed in her capacity as a knower, and epistemologies of ignorance, which are epistemic practices and shared conceptual resources maintained by structurally dominant social groups that sustain their epistemic and material power. I find that epistemic injustice and epistemologies of ignorance form a positive feedback loop. The epistemic injustice of attributing a member of a marginalized group less credibility than they deserve, as well as marginalizing groups from shared conceptual resources, sustains harmful ignorance. In sustaining ignorance in dominant social groups, epistemologies of ignorance sustain epistemic injustice, and these epistemic practices lead the structurally powerful to justify attributions of credibility deficits and exclusions of marginalized groups from creating shared conceptual resources. Seeing this as a vicious system, I then evaluate the role of implicit bias in maintaining this system of epistemic injustice and epistemologies of ignorance. I identify six distinct ways implicit bias can intervene on epistemic practices: (1) the situations we are in, delimiting what perception we have access to, (2) what we perceive in situations we have access to, (3) what other people say and do in situations one is in, (4) what identificatory features we notice, (5) how we take those features to be salient in the situation, and (6) how we interpret the situation retrospectively. This suggests implicit bias is deeply entangled in systematic epistemic injustice. Looking to real-world cases, we will be able to evaluate the structures of power underlying these injustices. Accordingly, any strategies for ameliorating epistemic injustice must target the system it contributes to and is sustained by itself.

Maddison Santoro
Orthotics and Prosthetics [M.S.]
How Orthotic and Prosthetic Programs are Addressing Communication with Patients Who are Deaf/deaf/HOH
Faculty Mentor: Nathan Kearns

Communication in the medical field is just as important as clinical skills, if not more important, especially in the field of orthotics and prosthetics where practitioners are constantly communicating and practicing techniques that are less intuitive to their patients. Currently, patients with complex communication needs are generally not being communicated with effectively in the medical field. This has adverse effects on practitioners and patients. From the literature, research suggests that familiarization with patients' communication needs is the best way towards progress. In the orthotic and prosthetic field, it is unknown what efforts are being taken to familiarize students with communication between themselves and patients who are hard of hearing/deaf/Deaf.

The current study is designed to elucidate practices in orthotic and prosthetic programs designed to address communication with patients who are Deaf/deaf/HOH. The proposed study will collect data from program directors of orthotic and prosthetic clinician programs. The data will provide a better understanding of orthotic and prosthetic program measures that address communication with patients who have complex communication needs.

Madison Ciccaglione & Anna Stark
Orthotics and Prosthetics [M.S.]

The Impact of Coronal Plane Socket Alignment on the Comfort of Patients with Transtibial Amputations
Faculty Mentors: Frank J Fedel, Nate Kearns

Correct alignment of a prosthesis is important for function, health, comfort, and stability in patients with transtibial amputation (Boone, 2013; Kobayashi, 2013). Existing literature suggests that patients utilizing a prosthesis may feel socket reaction moments directly through pressures in the socket interface (Kobayashi, 2013). Literature called for studies to investigate how alignment changes impact both the loading on the residual limb and how socket reaction moments relate to socket comfort.

We are conducting a single-case study to investigate the relationship between patient comfort and socket reaction moments. In this study, data will be collected during walking trials in which the subject wears a duplicated socket fit and is aligned to them. The subject walks at each of 7 alignment conditions at a self-selected speed on flat ground for approximately 2 minutes. The 7 alignment conditions are nominal; 5-, 10-, and 15-mm medial translation; and 5, 10, and 15 mm lateral translations. These alignment conditions were selected based on previous research.

After walking with each alignment, the subject fills out a brief questionnaire about socket comfort for that trial. A unique survey was created by the investigators specifically for this study and acts as an expanded and enhanced version of the validated Socket Comfort Score survey, which evaluates patient-reported pain.

The results of this study are limited by the single-case study design but provide initial insight into the correlation between socket reaction moment data and patient comfort data. The results can be used to inform future work and begin to identify the clinical significance of socket reaction moment values.

Madlyn Golden
Interior Design [M.S.]
The Collective
Faculty Mentor: Linda Mason

The Collective is a mixed-use building located in the heart of Ann Arbor Michigan, just off the campus of the University of Michigan. This 32,000 square foot adaptive reuse renovation aims to honor the historical value of the original building by using a neotraditional aesthetic, while at the same time drawing on contemporary ideas for furniture, finishes, and layouts to enliven the interior spaces. The Collective is designed as a one-stop-shop for guests to purchase goods and services, exercise, eat, study, relax, and connect. The first-floor features retail spaces such as a convenience shop, a souvenir shop, a snack stand, a gadget repair shop, a yoga studio, and a spa. While each retail business has its own distinct function, the design for the entire first floor has a cohesive color palette with consistent materials and finishes that flow from one space to the next. The second floor features a variety of unique AirBnb suites of different sizes. These spaces offer a unique opportunity for lodgers to experience the urban community of Ann Arbor, while being within walking distance of the retail amenities below.

Maikel Mulet
Philosophy [M.A.]

Linguistic Epistemic Injustice, Equity, Differentiated Instruction, and The Overhaul of Philosophy Curricula.
Faculty Mentor: Dr. Jill Dieterle

In this paper, I argue that lack of language awareness in the philosophy curriculum causes linguistic epistemic injustice against the second language philosophy student. Epistemic injustice refers to forms of unfair treatment related to issues of knowledge, understanding, and participation in communicative practices. According to Miranda Fricker, it is a wrong done to someone specifically in their capacity as a knower. Linguistic epistemic injustice then is a wrong done to someone in their capacity as a knower due to their accents/or improper language use. I will also argue that a feasible solution to avoid linguistic epistemic injustice (and similar injustices against minorities) will be a complete redesign of the philosophy curriculum implementing equity and differentiated instruction.

Mair Edwards
Molecular/Cellular Biology [M.S.]
Temperature Response of Photorespiratory Aminotransferases in Arabidopsis thaliana
Faculty Mentor: Dr. Aaron Liepman

Photorespiration is a metabolic pathway that recycles phosphoglycolate, produced due to the oxygenase activity of RuBisCO, into phosphoglycerate, which can enter into the Calvin cycle. An estimated 25% of CO2 fixed by RuBisCO is released via the photorespiratory pathway, thereby decreasing theoretical photosynthetic productivity. CO2 release via photorespiration increases with temperature because the ratio of O2:CO2 fixation by RuBisCO increases, but there is also evidence that additional CO2 may be lost due to alternative pathways at warmer temperatures. As part of a larger study aiming to understand the temperature responses of all core photorespiratory enzymes, this project characterizes the temperature responses of photorespiratory aminotransferases GGT1, GGT2 and AGT1 from the model plant species Arabidopsis thaliana. These photorespiratory aminotransferases have been expressed as recombinant proteins in E. coli, chromatographically purified and kinetically characterized using coupled spectrophotometric assays. Experiments over the range of 25-45℃ thus far have indicated the Km values for substrates of GGT1 and GGT2 were consistent while Vmax increased with temperature. These data will be useful for improving metabolic models of photorespiration that may be used to improve the efficiency of this important pathway.

Marie Sarnacki
History [M.A.]
Save the Child and Honor the State: The Midwestern Origins of Progressive Child Welfare Policy
Faculty Mentor: Dr. Mary-Elizabeth Murphy

Scholars of the Progressive Era and its attendant reforms have long focused on the activities of major figures in the Northeast. However, this approach leaves much of the story untold. Prior to the start of the traditionally defined “Progressive Era,” reformers in Michigan developed and implemented an entirely novel child welfare system. Passed in 1871, Michigan’s child welfare law was the first piece of legislation that established a democratic government as the legal guardian of needy children. The “Michigan System,” as it would come to be called, inspired child welfare reform across the nation over the course of the late

nineteenth and early twentieth centuries. That Progressive activists advocated for the system across the United States suggests that this method of child welfare reform was a heretofore unacknowledged plank of the Progressive agenda. The system even formed the basis of federal recommendations for reform at the 1909 White House Conference on the Care of Dependent Children.

By tracing the policy history of the Michigan System and reconstructing activist networks, this research lays the foundation for a new history of government-run child welfare systems in the United States. This social safety net for dependent and neglected children originated not in the major cities of the East Coast, but in the heart of the Midwest.

Marin Kempen
Clinical Mental Health Counseling [M.A.]
Current Therapeutic Strategies and the Need for Holistic Approaches for Transgender and GNC individuals
Faculty Mentor: Dr. Patrice Bounds

The primary goal of this presentation is to analyze the existing literature on evidence-based therapeutic strategies that are currently used for Transgender and Gender Non-Conforming (GNC) individuals. I will also outline the need for more holistic mental health care for Transgender and GNC Individuals. According to McCann and Sharek (2016) there is a lack of knowledge in regards to the specific mental health service needs of transgender people. Mental health issues for transgender (and GNC) individuals have often been viewed through the lens of a "gender identity disorder" diagnosis or, more recently, a "gender dysphoria" diagnosis. This often leads to pathologizing an individual's unique life experiences and can limit both the effectiveness of counselors and treatment options (McCann and Sharek, 2016). Gender dysphoria is defined by the World Professional Association for Transgender Health (2012) as "discomfort or distress that is caused by a discrepancy between a person's gender identity and that person's sex assigned at birth (and the associated gender role and/or primary and secondary sex characteristics). The issue is that only some GNC, and Transgender individuals, experience gender dysphoria at some point in their lives, but not all of them do (WPATH, 2012). If the focus has been to diagnose Transgender and GNC individuals and view them through that lens, what are other strategies we may use in counseling the individual, as a whole? Based on the findings from this literature review, I will highlight any gaps in existing literature and provide recommendations for mental health providers on how to implement more holistic techniques in their practice(s). Hopefully, this proposal will encourage mental health professionals to practice more trans-affirming therapeutic strategies with their respective clients, both in private practice and community mental health settings.

Matthew Angelosanto
Ecology, Evolution and Organismal Biology [M.S.]
Does Group-living Provide an Energetic Benefit to the harvestman Vonones sayi?
Faculty Mentor: Dr. Cara Shillington

Group-living is a phenomenon prevalent throughout the animal kingdom. Its widespread occurrence has garnered considerable interest in many different contexts. A significant portion of this attention has been focused on benefits and costs associated with the behavior and

understanding its ecological significance and evolutionary underpinnings. While more than 99% of arachnid species are solitary, harvestmen appear to be more social than most of their arachnid counterparts. Many species of the Opiliones order show a tendency to form aggregations, which are groups of three or more motionless individuals, spread 0-5cm apart with their legs expansively overlapping. However, observations of group-living in harvestmen are mainly anecdotal, and little is known of the ecological and evolutionary pressures that caused it to arise. One hypothesis for sociality in harvestmen is the benefit it may confer to their physiology. Group-living has been shown to present benefits to the energy expenditure of other organisms across a variety of contexts (e.g. web-building in spiders, cost of flight in birds, swimming in fish). Evidence of this relationship in harvestmen is scarce, with only one study available in the literature. In the current study, we analyzed the metabolic rates of the harvestman Vonones sayi both individually and in groups to determine whether group-living in the form of aggregations presents an energetic benefit. Data between groups of different size and solitary individuals are compared and described.

Mehdi Alipour
Applied Statistics [M.S.]
Risk of Diabetes Prognosis Due to Certain Patients' Characteristics
Faculty Mentor: Dr. Khairul Islam

Diabetes is a chronic health condition that leads to serious illness including heart disease, kidney disease, loss of vision, and nerve damage. A recent study suggests that roughly 425 million people are suffering from diabetes globally, and the number is expected to rise to 628 million by 2045. The increasing prevalence of diabetes is related to the fact that most patients do not know about their disease until it gets worse. An early detection, along with better management and care, can help control the disease to a greater extent. Using a sample of female patients with diabetes, this study attempts to analyze the risk of diabetes due to certain patient characteristics including the number of pregnancies, BMI, insulin level, age, and so on. We utilize data by the National Institute of Diabetes and Digestive and Kidney (NIDDK) Diseases, made available in the public domain via Kaggle. For an analytical tool, we employ a multiple logistic regression model with continuous and categorical predictors, which provides risk of a predictor for the disease outcome measured by odds ratios, adjusted for other predictors.

Melissa Brooks-Yip
Educational Studies [Ph.D.]
Examining Teacher Identity: Implications for Professional Learning, Student Achievement and Teacher Retention
Faculty Mentors: Dr. Paul Ramsey, Dr. Robert Carpenter

A healthy teacher identity with a sense of self efficacy, autonomy and professionalism. These characteristics positively impact teaching and learning in the classroom and leads to longer teacher retention. Exploring more recent research, this paper aims to define teacher identity, explain how a healthy teacher identity can be fostered in professional learning, show the impact it has on student achievement, and how it can influence teacher job satisfaction and retention. Review of the research on this topic is of particular importance today as public education experiences a teacher shortage crisis, starting before and becoming more urgent during the COVID pandemic.

Micah Ludwig-Borycz
Computer Aided Engineering [M.S.]
Using VBA to Create BOM Applications to Improve Efficiency and Productivity
Faculty Mentor: Dr. Tony Shay

Manufacturing is the process of turning raw materials into finished products through the use of tools, human labor, machinery, and various processes. In manufacturing, a bill of materials (BOM) is a necessary element that lists the raw materials, parts, and quantities of each material to manufacture an end product. It is an essential document for engineers and manufacturers alike. For a simple product, manufacturing processes can be done with simple tools and a hand-written BOM. As products and manufacturing processes become more complex, there is a need to improve the consistency and efficiency of BOMs. The purpose of this study is to organize a company's various BOMs from an individual style, a different BOM from each engineer to a standardized format that can be used and understood by everyone in the company. This is accomplished by implementing an innovative computer application. Visual Basic Application (VBA) was deemed appropriate for developing this application since the company uses Excel to generate BOMs. This study shows the benefit of implementing BOM generation in VBA code. When using the developed code, engineers are able to construct a more coherent BOM. This also enables manufacturers to become familiar with uniform BOM structure. Productivity and communication, as a result, increase between manufacturers and engineers in the company.

Micah Ludwig-Borycz
Computer Aided Engineering [M.S.]
Organizing the Construction of a Bill of Materials Through Coding
Faculty Mentor: Dr. ony Shay

In manufacturing, a bill of materials (BOM) is a necessary element that lists requisite parts to construct a product. It is the document from engineers telling fabricators what they will need to fabricate a product. At first, manufacturing used to be done by hand with simple tools, and the BOM was hand-written. As fabrication has gotten more complex, there is a need to improve BOMs' consistency and efficiency. One of the main reasons manufacturing has gotten so complex is computers. Since computers help so much with the enhancement of parts made, they must be able to help organize other aspects of constructing parts. So, to better the construction of a BOM, a coding language was used, VBA code, to make a program which was able to organize the parts required for a BOM. After using the code, the engineers were able to construct a BOM in about five minutes. This was anywhere between ten to thirty minutes faster than before the code was written. After the BOM was used there was less time taken to find all the parts needed to put into a BOM. Instead, simple numbers and other pieces of information were the only things required. Productivity and communication, as a result, increased between the shop and the engineers in the company.

Michael Seitter
History [M.A.]
Brewing a Pot of Resistance: South African Women and Beer in the Twentieth Century
Faculty Mentor: Dr. Joseph Engwenyu

Across history, African women have played active roles in how their societies functioned, often performing tasks vital to

the support and continued operation of their communities in a variety of forms. In South Africa during the first half of the 20th century women found a path to personal independence, economic freedom, and a way to resist their own oppression through the act of brewing a traditional Zulu alcoholic beverage known as “kaffir Beer” to the whites and Utshwala to the African consumers of the brew. But whilst beer brewing was one of the most lucrative occupations for women, it was soon declared illegal by the South African government under the policies of Segregation and Apartheid.
This paper analyzes how women within South Africa used a skill originally from their traditional role in Zulu society as a form of independence for themselves, a means of accumulating capital, and a means of resistance. The paper chronicles the history of the origins and skills of traditional beer brewing, side by side with the competition and tension between traditional beer, and the other exotic brews, breweries, and pubs run by the government, under the Municipal Beer Hall system. Thus, in the popular uprisings of 1929 and 1959 women took to the streets to resist control by the municipal government that deprived them of their livelihood. They also reminded their husbands and other male heavy drinkers that, unlike the nutritious traditional African beers, government municipal booze were bad brews intended to dull their senses. And the women did research and apparently found out that profits from government run Municipal Beer Halls were being used to perpetuate white oppression by tightening laws against non-whites. This was war between the women’s traditional local breweries and the government run Municipal Beer Hall system!

Mitchell DeVore, Jenni Heup, Sierra Morrissey, Christian Perez
English Linguistics [M.A.]
Exploring Regional and Generational Variation in English Speaking Jewish Women
Faculty Mentors: Dr. Eric Acton, Dr. Veronica Grondona

The Jewish Life and Language in Southeast Michigan (JLLSM) project has recently documented a generational shift in the vowel pronunciations of Jewish women in Greater Detroit. An analysis of the speech of 10 local Jewish women born 1938-1995 reveals that younger Jewish women are moving away from vowel pronunciations characteristic of Greater Detroit and their older counterparts toward a more ""General American"" accent. This raises the question of whether local younger Jewish women are moving away from the speech style of their older counterparts more generally. Our present work shows that while younger Jewish women are shifting away from a speech style that is distinctly characteristic of Greater Detroit, they appear to be retaining the Jewish ethnolinguistic repertoire of older generations.

We have expanded this research beyond vowel pronunciation to include lexical items, discourse style, and syntactic structure. Additional data comes from a nationwide online survey on Jewish linguistic style. We filtered Benor's data for non-Orthodox Jewish women from Wayne and Oakland counties to align with our existing research, yielding a dataset of 315 respondents.

Our preliminary analysis suggests that on multiple linguistic dimensions (lexical, syntactic, etc.), younger Jewish women are very much retaining linguistic features

associated with Jewish American English and, in some cases using such features even more frequently than their older counterparts. We find, for instance, that younger speakers are more likely than older speakers to use the Yiddish word ""shul"" in referring to a Jewish place of worship rather than the more commonly known ""synagogue."" In addition, only the youngest participants reported that they would use ""shul"" in talking to non-Jewish interlocutors. We thus find that generational changes in the speech of local Jewish women are dynamic and vary according to different aspects of their heritage and identities."

Monioluwa Ogunleye
Women's and Gender Studies [M.A.]
Resilient Women: The Yoruba Women in Nigerian Economy and Society
Faculty Mentor: Dr. Joseph Engwenyu

The Yoruba people are one of the largest ethnic groups in the southwestern region of Nigeria in West Africa. Compared to other patriarchal societies in Nigeria, Yoruba women have historically enjoyed significant autonomy and opportunities to engage in the Nigerian economy and society. Despite this, general misconceptions persist from critics, feminists, and non-feminists alike. This misconception is because the women do not dominate the formal economy and are not favored by the current World Bank and IMF priorities, thus they tend to uncritically be branded as powerless, marginalized, and dependent on their husbands for survival. Also, very often, the critics do not trace their narrative from continuities of the past. Indeed, that historical past shows that the Yoruba women commanded great influence, not just as daughters, wives, and mothers, but also as productive citizens. Marital status, age, and fertility did not, and currently do not, severely constrain them from participating as an important segment of the labor force in their communities. And their contributions intersect across agriculture, trade, marketplace regulations, and the informal sector.

This paper reinforces the argument that the Yoruba women have historically been resilient and active participants in the development of their state and Nigeria at large. Their contributions span the pre-colonial, colonial, and post-colonial periods. Firstly, the women have been active contributors to economic development as producers and entrepreneurs. Secondly, the economic power of Yoruba women has also been translated into social and political power. Resilience comes with challenges. Thus, thirdly, the paper ends by highlighting the various challenges the Yoruba women have been facing economically in the current post-colonial era, the factors responsible for this, and some recommendations for more empowerment.

Natalia Anderson
Philosophy [M.A.]
Lakatosian Research Programs and Closing the Loop
Faculty Mentor: Dr. W. John Koolage

Improvement of pedagogic practices is crucial when it comes to increasing student learning. In particular, I will focus on the practice sometimes called 'closing the loop' in continuous improvement. Imre Lakatos provides a model of scientific research programs that is a fruitful way of directing efforts to improve pedagogic practices in just this way. Lakatos' model can be applied to teaching and learning efforts, permitting us to see some interesting conditions on 'closing the loop.' Lakatos describes scientific research programs as having two

parts: an unchanging hard core and a responsive protective belt. This distinction allows us to zero in on where continuous improvement is to be located within a particular teaching and learning structure and provides us the tools for judging what is an 'improvement' and what is not. Utilizing a method known as closing the loop, teachers look at their assessment data from a particular learning experience and then adjust their learning activities to produce stronger student learning relative to some desired learning outcome. I argue that loop closing is essential to progress within these teaching and learning research programs. This invites us to think about what it means to effectively close the loop or achieve stronger learning by students. Applying Lakatos' model of the sciences to student learning, I demonstrate that we can identify 'ad hoc' versus 'improvement directed' changes to learning activities and pedagogic decisions. This model could also help us to judge the relative merit of various pedagogic decisions. Further, if we expand Lakatos' model in line with some more current suggestions by Adrian Currie and Allison Wylie an argument for pedagogic decisions informed by other research programs reveals itself - this is a fortuitous connection and permits us to rethink (and expand) Lakatos' model as well.

Neda Hayeri
Polymers and Coatings Technology [M.S.]
Paint Recycling – The Current Status, Challenges, and Proposed Solutions
Faculty Mentor: Dr.Vijaykumar Mannari

The United States generates over 80 million gallons of leftover architectural latex paint annually. This hazardous waste could end up in landfills if not appropriately treated or handled and can eventually contaminate groundwater sources. Thanks to the American Coatings Association's PaintCare program, more than 50 million gallons of this leftover paint is recycled. By seeking input from recyclers, both from PaintCare participating and non-participating states, the current project aims to investigate the role of the PaintCare program, its effectiveness, and the barriers to extending this program all across the United States. This research also dives into exploring challenges in the recycling of paints other than latex-based architectural paints and identifying potential solutions. By creating awareness of the benefits of paint recycling among end-users and policy makers, and through legislative actions and collaborative action plans by all the stakeholders, a sustainable solution can be achieved.

Patricia Lasutschinkow
Clinical Psychology [Ph.D.]
Examining the Moderating Effect of Age on Relationships Between Motor Engagement Factors in Children
Faculty Mentor: Dr. Jin Bo

Research on motor engagement in children shows synergistic relationships between four factors: actual and perceived motor competence (MC; PMC), physical activity (PA), and physical fitness (PF). While models theorize these relationships strengthen with development, few studies have examined the impact of age.

This study examined the moderating effect of age on relationships between factors. It was hypothesized that as age increased, relationships between factors would strengthen. Children (N=61, Mage = 10.75 ± 6.25 years) and caregivers completed measures of MC (DCDQ), PMC (RPSCS), PA (PAQ), and PF (FitnessGram, BMI). Moderation analyses were conducted with

age as moderator, PF as the independent variable, and PMC, PA, or MC as outcomes.

The addition of age in a model of PF (BMI) and PMC resulted in significant change in the model's explanatory power ($\Delta R2 = .049$, $p < .001$); older children had significant relationships between PF and PMC ($b = 0.61$, $SE = 0.26$, $p = .02$) but younger children did not. In a model with PF (FitnessGram) and PMC, including age resulted in significant change ($\Delta R2 = .099$, $p = .005$); older children had significant relationships between the factors ($b = 0.70$, $SE = 0.20$, $p < .001$). A similar pattern was found between PF (BMI) and MC ($\Delta R2 = .090$, $p = .019$), suggesting the effect was significant in older children ($b = 4.43$, $SE = 1.96$, $p = .028$).

These results suggest that relationships among PA, MC, PMC, and PF were strengthened with development for older children, which is consistent with models of motor engagement. For younger children, such relationships were not clear and negative correlations between PA and PF were surprising. More research is needed to explore these findings, particularly in relation to interventions aiming to increase motor engagement.

Rachel Flickema
Athletic Training Combined [BS + MATR]
Examining How Perceived Stress in Athletic Training Students Can Lead to Burnout After Certification
Faculty Mentor: Dr. Courtney Lewis

As allied healthcare professionals, athletic trainers are often faced with high demands and increased stress in both their educational and professional environments. Current research indicates that certified athletic trainers experience a high level of burnout related to the levels of stress experienced in their professional environment. This study seeks to understand if the high levels of burnout in certified athletic trainers are related to the levels of stress experienced by athletic training students in their clinical and didactic education. A longitudinal study will be performed over the duration of athletic training students' education and post-certification work-life. It is hypothesized that athletic training students who experience high levels of perceived stress during their education will have higher burnout rates once they obtain their certification and an entry-level job. In contrast, athletic training students who experience lower levels of perceived stress will have decreased burnout rates after obtaining their certification and an entry-level job.

Rachel Summers
Orthotics and Prosthetics [M.S.]
The Relationship Between Self-Esteem and Orthotic Treatment Compliance in Children with Adolescent Idiopathic Scoliosis
Faculty Mentor: Rebecca Spragg

In orthotics and prosthetics, patients may be emotional about their condition, including those with adolescent idiopathic scoliosis (AIS). Mental health is a vital part of a patient accepting and being consistent with orthotic treatment. With any orthotic device, the success of treatment depends on the patient wearing the orthosis in compliance with the recommendation from the orthotist.There is little evidence available throughout literature that looks at the relationship between AIS, patient self-esteem, and compliance. Multiple studies on compliance and the effectiveness of orthotic treatment on AIS have been

completed and have shown higher compliance leads to better outcomes. There have also been studies that suggest scoliosis bracing may lead to decreased self-esteem and confidence. It is still unclear whether compliance with scoliosis bracing, and self-esteem have any relationship. This is an exploratory study that uses the BSSQ questionnaire to determine adolescent patient's self-esteem associated with a scoliosis brace. Three additional questions about the time of wear are used to determine compliance. The questionnaire is an online form, so no in person contact or identifying information from the participant is necessary. To be included in the study, participants must be diagnosed with AIS, have had a scoliosis brace for at least three months, and be between ten to seventeen years old. Since the participants are minors, parental consent is required to be included in the study. The hypothesis is based on information gathered by previous research studies: low self-esteem leads to low compliance with the spinal orthosis. It is important to understand possible reasons for why adolescents are disregarding wear recommendations in order for the healthcare provider to adequately address patient needs and give the best possible outcome for the patient. Data for this study is currently still being gathered.

Rebecca Barnett
Communication Sciences and Disorders [M.A.]
SLPs on the Autism Spectrum: Clinical Perspectives
Faculty Mentor: Dr. Lidia Lee

The purpose of this study was to survey the demographics, clinical preferences, client relationships, and knowledge & attitudes about autism of autistic SLPs versus non-autistic SLPs. Demographics were analyzed in phase I, using mass sampling of CCC-SLPs in Ohio, Michigan, and Wisconsin. All other variables were analyzed using phase I and phase II data, which included direct recruitment of autistic SLPs from other states. Results from phase I showed 2.98% of SLPs identified as being on the autism spectrum. Autistic SLPs exhibited demographic differences in gender makeup ($p < 0.05$) and use of disability accommodations ($p < 0.05$). Results from phase II showed significant differences in preference for some ASD assessments ($p = 0.059$), interventions ($p < 0.05$), and views of client-centeredness ($p < 0.05$), indicating differences in clinical preferences between the groups. There were no observed differences between the groups when it came to their clinical relationships, as measured by self-reported rapport and progress with clients. When it came to anti-ASD stigma, autistic SLPs were also more likely to disagree with the negative statements ($p < 0.05$). The implications of these differences will be discussed within the broader context of the field of speech-language pathology, and recommendations will be made to better support autistic clinicians and provide services for autistic clients.

Renee Dollard
Ecology, Evolution and Organismal Biology [M.S.]
Re-establishment of Legumes in Restored Prairies May Depend More on Herbivores Than rhizobia symbiont
Faculty Mentor: Dr. Emily Grman

Rapid land conversion for urban and agricultural use has resulted in a significant decrease in biodiversity. Restoration seeks to curb the loss of biodiversity by converting

degraded land back into functioning ecosystems; therefore, increasing biodiversity is one of the primary goals of land managers in restoration. Unfortunately, the reintroduction of species into degraded environments requires plants to surpass a myriad of barriers such as temperature variation, moisture level, seed dispersal, etc. Legumes are often difficult to establish in restored Tall Grass Prairies. Legumes form symbiotic relationships with nitrogen-fixing bacteria called rhizobia, in which the plant receives fixed nitrogen in exchange for carbon. One barrier to the establishment of legumes may be their ability or inability to find suitable rhizobia symbionts. Over the summer of 2022, we monitored the survival and seed production of 405 individuals of Chamaecrista fasciculata inoculated with different strains of rhizobia and transplanted into a prairie restoration. We found that 63% of plants experienced herbivory over the season indicating that in this field, herbivory may be a more important factor in determining establishment than rhizobia symbionts.

Sadie Baker
Ecology, Evolution and Organismal Biology [M.S.]
Investigating Sources of Microplastics and Their Effects on Biofilm Function in the Huron River
Faculty Mentor: Dr. Kristin Judd

Plastics are a global environmental threat due to mass production and consumer demand. As there are 320 million tons of plastic produced annually, it is imperative to address the long-term effects of plastic pollution - many of which are unknown. Microplastics are plastics less than 5mm in size and are easily transported in the environment through wind or rain events. The majority of microplastic research has been conducted in marine environments, while less is known in freshwater ecosystems. The objective of this research is to determine sources of microplastics in the Huron River and how they may impact aquatic life. We investigated if urban areas are main contributors of microplastics by taking water samples at different sites along the Huron River. Further, we evaluated if plastic surfaces alter biofilm function by growing biofilms on plastic substrates and ceramic substrates. If urban runoff significantly contributes to microplastic loads, then we expect microplastic loads to be greater downstream from Ann Arbor and Ypsilanti. Additionally, if plastics provide a new niche environment, we expect to see distinct functional capacity and functional diversity on plastic substrates. The findings of this research will add to the few studies conducted on microplastics in freshwater environments and may serve as fuel for policy change and mitigation efforts of plastic pollution.

Samantha Mahan
Chemistry [M.S.]
Scents of the Past: Characterizing Ancient Perfume Residues of the Greco-Roman Age from the Michael C. Carlos Museum
Faculty Mentor: Dr. Ruth Ann Armitage

Unguentaria, ancient glass or ceramic vessels, are commonly found artifacts in Mediterranean archaeological sites. These vessels are believed to have stored ointments, balms, oils, cosmetics, and perfumes. The standard style of unguentarium is the simplistic single barrel version. Double unguentaria differ from this common type in that they have two elongated barrels, are smaller in size, and tend to have a higher degree of adornment. As the longer barrels would reduce evaporation and adornments imply value,

archaeologists theorize that double unguentaria were used to contain perfumes. Ancient perfumes, while well documented in historical texts from people such as Pliny the Elder, are seldom studied in modern times as their volatile nature makes them especially vulnerable to decomposition and degradation. By analyzing the composition of residues found in double unguentaria, a greater understanding of the specific use of the vessel type and perfumes of that time can be found. To distinguish if the source of the residue originated from an ancient perfume, the two main perfume components must be identified: a matrix or base, such as an oil or fat, and an aroma component, such as a flower or herb. Gas chromatography-mass spectrometry (GC-MS) is the industry standard for residue analysis and was used in combination with direct analysis in real time-mass spectrometry (DART-MS) to identify organic compounds in the residues, with a focus on the possible perfume base. As the aroma component of a perfume is volatile by nature, headspace solid-phase microextraction (HS-SPME) was applied and combined with both GC-MS and DART-MS to identify the volatile organic components. As several of the residues had uncommon colors, scanning electron microscopy-energy dispersive X-ray spectroscopy (SEM-EDS) was utilized to characterize possible inorganic colorants.

Sara M. Muchmore
Educational Studies [Ph.D.]
Finding What Matters in Teacher Education
Faculty Mentors: Dr. Iman Grewal, Dr. Amanda Maher

The US education system is currently at a crisis point. Schools across the country are having trouble with staffing as qualified, experienced teachers left the field at record levels while enrollment in teacher preparation programs declined pre-pandemic. While the full effects of the pandemic remain to be seen, it's important now to investigate valuable strategies for recruitment and retention of teacher education candidates. The purpose of this proposed study is to determine the value of non-curricular aspects of education programs, including investigating the effects of students' sense of belonging, identity, and voice in the university environment. It is the expectation that the researcher will identify a positive correlation between humanizing elements found within a program and the level of student retention and student satisfaction. To study this phenomenon, a mixed method approach is proposed, with a quantifiable aspect looking at enrollment and retention patterns and a qualitative analysis of student support systems, including student interviews. When this study is conducted, the researcher hopes to find and share implications for best practices for teacher education programs.

Sarah Schrader
Biology - General [M.S.]
Does High Prey Availability Extend the Gregarious Phase of Hatchling Curly-hair Tarantulas (Tliltocatl albopilosus)?
Faculty Mentor: Dr. Cara Shillington

Tarantulas lead a primarily solitary life. There is a transient subsocial period where hatchlings coexist in the maternal retreat during their first post-hatching instar, after which they disperse. Few studies have examined the facets of social tolerance in tarantulas, but in true spiders (Araneomorphs) high prey availability has been shown to extend this period of conspecific tolerance. One study did look at how group size affects growth in juvenile

tarantulas but had conflicting results in social tolerance levels. To address this question in an unrelated species of tarantula, hatchling Tliltocatl albopilosus were split into groups of three spiders (n=95). All spiders came from a single egg sac and resided together until group formation. Groups were counted and fed once every three weeks with live crickets. All groups were given one more cricket than the number of spiders in the group to minimize conflict over prey. All spiders were weighed at every other feeding. Between group formation and the first feeding, 81% of the groups had lost at least one spider and 50% of the groups had been reduced to a single individual. By the second feeding, 86% of the groups were down to a single member. At the first feeding, molts were found in groups with and without cannibalism, so this suggests that the spiders were past the age when they would have dispersed in the wild. From these preliminary results, the phase of tolerance does seem to be extended to a degree but the data does not suggest that food abundance alone can create a shift toward long-term social tolerance in this species.

Sarah Thomas
Orthotics and Prosthetics [M.S.]
Treatment of Congenital Muscular Torticollis when Paired with Moderate to Severe Deformational Plagiocephaly
Faculty Mentor: Rebecca Spragg

Congenital muscular torticollis (CMT) is an abnormal tightness in one of an infant's sternocleidomastoid muscles leading to limited cervical range of motion. CMT is often coupled with deformational plagiocephaly (DP), a craniofacial asymmetry. In these cases, a Cranial Remolding Orthosis (CRO) is recommended to treat the asymmetry by encouraging skull growth in the appropriate directions, while the other treatments remain to separately address the muscular issues. Many of the torticollis treatments must be done with the CRO removed, which can decrease the efficacy of both treatments. One proposed option is to expand the function of a CRO to incorporate a built-in extension (CRO-E) designed to provide a gentle, continuous stretch for 23 hours per day. This design would allow for concurrent treatment of the plagiocephaly and torticollis, and increased treatment times for both. With this study, we will implement the use of a CRO-E in conjunction with physical therapy and track patient outcomes monthly alongside a control group. Subjects between the ages of 3-18 months with dual diagnoses of CMT and DP and prescriptions for physical therapy and a CRO will be included in the study. They must not have a diagnosis of synostotic plagiocephaly or any other diagnosis that will result in developmental and growth delays. Subjects will report every four weeks to their physical therapist for cervical range of motion testing and cephalic measurements. This data will be used to chart the resolution rates of CMT and DP and will be used to compare the different rates of resolution between experimental and control. We hope to demonstrate that the CRO-E has potential to serve as an effective treatment for both plagiocephaly and CMT, and that it has the potential to shorten treatment duration for these conditions.

Savannah Lyons
Physics [M.S.]
Irradiance Source for Exoplanet Atmospheric Spectra
Faculty Mentor: Dr. David Pawlowski

The quantity and diversity of the known exoplanets have grown in recent years. This

has brought about a need for more efficient methods of narrowing down the list to those exoplanets most likely to sustain life. The Atmosphere in a Test Tube project, which began at the University of Padova, Italy, is accomplishing this in a laboratory setting through examination of exoplanet atmospheric responses to photosynthetic bacteria under simulations of the irradiance conditions of a planet's host star. The goal of this project is to design and construct a second-generation apparatus at Eastern Michigan University. We have focused on an irradiation source consisting of an interface of LED light channels with differing chromatic emissions controlled by software that allows for the tuning of each LED channel to match a variety of spectral outputs. This presentation will demonstrate the progress made on the design and preliminary data that have been collected.

Savannah Roberts
Athletic Training Combined [BS + MATR]
Blood Flow Restriction Therapy and the Return to Play Timeline for Lower Body Injuries
Faculty Mentors: Dr. Courtney Lewis, Jodi Schumacher

The purpose of this study is to understand the effects of Blow Flow Restriction Therapy (BFR) on lower body injuries and determine if BFR impacts the return to play timeline following injury. Utilizing standard rehabilitation techniques, an individual suffering from an anterior cruciate ligament (ACL) tear can take anywhere from 8 to 10 months to recover. A major component of the recovery process is regaining strength and this process cannot begin until the athlete is able to bear weight on their injured limb. BFR in combination with low-load resistance training has been shown to prevent muscle atrophy by acutely increasing proximal muscle strength while reducing the amount of stress placed on the recovering limb. This study aims to understand if the use of BFR in ACL rehabilitation protocols would aid athletes in returning to play within a faster time frame. The participants of this study will be collegiate athletes diagnosed with an ACL tear. The participants will be split into two groups. The experimental group will use BFR in conjunction with strengthening rehabilitation exercises, while the control group will use a placebo BFR cuff in conjunction with the strengthening rehabilitation exercises. The results of this study hope to find that BFR therapy in combination with traditional strengthening rehabilitation exercises will decrease the amount of time it takes for an athlete to return to play following an ACL tear.

Shannon Everly & Sophia Mancini
Orthotics and Prosthetics [M.S.]
Enhancing O&P Education with Unlimited Access to Gait Analysis Using Virtual Reality
Faculty Mentor: Frank Fedel

Observational gait analysis is an important skill in Orthotics and Prosthetics. Becoming competent in gait analysis typically takes years; however, it is important in achieving positive patient outcomes. Barriers to practicing gait analysis include constraints of time (lab-based gait analysis typically requires hours of preparation, and subjects can become fatigued from walking - limiting observation time) and space (students need to be present to observe gait from multiple angles).

Inertial measurement units (IMUs) are a reliable way to capture human motion such as gait. Motion data can be applied to 3D

avatars designed with features specific to the subject to make the captured gait more realistic (e.g., individuals with trans-tibial amputations, lower leg orthoses, etc.). These animated models can be viewed from any angle after being imported into a virtual reality (VR) setting, allowing students to practice gait analysis repetitively using standardized motion data.

Methods:
Motion capture data was recorded using the Perception Neuron 3 IMU system and Axis Studio software. A workflow was developed for exporting motion data in a format suitable for importing into Unity (a VR development tool) then applying the data to a custom avatar to create an animated 3D model. A prototype VR app was designed and built for the Oculus Quest headset to allow loading of animated models and replaying of recorded motions, viewed from any angle.

Results:
A functional prototype app suitable for use with the Oculus Quest VR headset was created and allows the user to observe any set of motion analysis data captured using the workflow we developed.

Conclusion:
With a standardized, digital "gait library" available for students to use with a VR headset, the constraints of access to patients, as well as limitations of time and space for students to observe gait can be resolved.

Sharon Hopkins
Educational Studies [Ph.D.]
Teacher's Conception of Student Voice in Urban Schools
Faculty Mentor: Dr. Joe Bishop

In education there have been many reforms over the years that have asked teachers to be self-reflexive about their pedagogical practices as well as to develop their own articulation of the true purpose of education. One such reform has been centered around the term "student voice." While there are many different theoretical interpretations and practical implementations of the term, this study sought to identify how teachers in an urban setting conceive of the term, as well as how they described their own facilitation in practice. This was particularly important for traditionally marginalized students who often feel disempowered in school. Using Critical Discourse Analysis (CDA) as an analytical framework, the researcher interviewed three urban high school teachers and found that teachers reported a belief in student voice having a larger purpose beyond the classroom, a belief that student voice requires strong teacher-student relationships for success, is necessary for student learning outcomes to be met, and involves student choice and student-led discussion to be realized.

Tasfia Bari
Technology [Ph.D.]
The Influence of Various E-Learning Techniques Upon Technology Acceptance and Student Engagement in Differing Classroom Environments
Faculty Mentor: Dr. Munther Abualkibash

The impact of technology is becoming increasingly relevant in its everyday use amongst a variety of industries and practices. This most prominently includes educational systems and services. As a direct result of the on-going COVID-19 pandemic, the majority of students and educators have had to relocate to online platforms. Therefore, the implementation

and acceptance of such technological resources has become widespread in its outreach. Through the understanding and usage of predictive theories presented in Technology Acceptance Models (Davis, 1989), research review processes suggest that student acceptance, engagement and retention of such essential technological tools varies based upon factors adjacent to motivation. The influence of motivation and interest to partake in the technology presented to them as well as balance in activities and opportunities made available to them can directly impact a student's perception of their capabilities and subsequently their performance within a learning environment. Understanding the factors which directly impact and influence a student's motivation and perception towards education can allow educators and creators to structure educational technologies and tools for students of all educational levels, backgrounds and capabilities in the future.

Taye Capron
Biology - General [M.S.]
The Level of Antibiotic Production is Dependent on Pre- and Co-Fermentation Conditions
Faculty Mentors: Dr. Paul Price, Dr. Anne Casper

According to the World Health Organization, infections caused by antibiotic-resistant microorganisms are threatening all aspects of modern medicine. At the same time, the discovery of novel antibiotics capable of treating such infections has stagnated due to scientific and economic hurdles. Most of our current antibiotics were originally derived from soil microorganisms, but genomic data suggest that soil microorganisms have the potential to produce many more antimicrobial compounds than we see in the lab. Competition between microorganisms results in the production of antimicrobial compounds, but very few studies have determined whether competition conditions affect antibiotic production. This study determined the antibiotic activity of various bacterial strains that originate from different media and are grown in monoculture or co-culture fermentation conditions. Strains were pre-grown in a variety of solid media and then subcultured as monocultures or co-cultures to determine their ability to produce antimicrobial compounds. This study determined that there are clear differences in antimicrobial activity when strains are pre-grown on different media or in monoculture or co-culture fermentation conditions.

Victoria Heckenlively
Orthotics and Prosthetics [M.S.]
Design and Fabrication of Dynamic Model of Hip Joint for More Effective Learning
Faculty Mentor: Frank Fedel

The resources for anatomy classes are limited to activities like lectures, 2D images, inflexible static models, and cadavers when resources allow. These traditional methods have led to an overdependence on memorization to learn the material which has resulted in lower long-term retention. Using 3D printing and nitinol (an alloy of nickel and titanium) wire springs, I am developing a physical interactive model to demonstrate the dynamic movements of the muscles that cross between the femur and the pelvis. Nitinol has a thermomechanical property that allows it to "remember its shape." In conjunction with a specific voltage, this property allows the nitinol wire to return to its trained shape if distorted. The thermomechanical property allows nitinol to be used to mimic muscle contractions. The

voltage potential from a power source represents the action potentials in the muscle. These properties in tandem can allow for the development of a unique model to allow for a potentially more effective learning modality for anatomy courses. The objective of this project is to explore materials that could be utilized for new educational modalities for anatomy students.

Wendy Lawrence
Educational Leadership – K-12 Administration [M.A.]
Spanning Boundaries with Duoethographic Dialogue to Create a Transformative Polytheoretical Leadership in K12 Schools
Faculty Mentors: Dr. David Anderson, Dr. Iman Grewal, Dr. Rema Reynolds, Dr. Davis Clement

Organizational boundaries, systemic barriers, and hierarchical structures prevent leadership from being a polyvocal process that allows multiple ways of knowing to influence our futures. What if boundary-spanning conversations could open up paths for diverse ideas to affect leadership decisions and for leadership itself to become a process of dialogue and debate?

This study uses various qualitative methods to answer its guiding question: How can critical, self-interrogative boundary-spanning dialogue , based in the traditions of duoethnography and currere, create pathways for a new kind of polytheoretical leadership in K12 schools? Qualitative network analysis and photo voice first examine connectedness and marginalization in a school community. Pairs of dialogic partners are then chosen to engage in two conversations about the meaning and future of education, each of which reflect one of Friere's ingredients of a true word: reflection and action. The first conversation (reflection) focuses on educational past and purpose and is based in the tenets of duoethnography, including self-reflexivity, narrative disruption and (re)storying, differences, currere, and critical theory. The second conversation (action) focuses on diverse educational futures based in the multiple ways of knowing identified in the first dialogue. Partners also complete two surveys describing their connectedness to each other, the school, and the greater community. Dialogues are coded and analyzed to better understand these boundary-spanning events, looking for the kind of information that passes through these boundaries, how it passes, and how this kind of dialogue might inform a polytheoretical leadership.

Boundary-spanning dialogue creates new paths for ideas. A series of boundary-spanning dialogues, carefully constructed with an attention to power and critical theory, may create pathways for a polytheoretical leadership process to redefine the future of K12 environments.

William Joysey
Physics [M.S.]
Precursor Soliton Observation Using Dusty Plasma
Faculty Mentor: Dr. Surabhi Jaiswal

Optimized use of soliton interaction with a charged body is beneficial to the study of space and atmosphere, yet currently out of reach as the phenomenon is not well understood. In order for solitons to be used in practical applications such as detecting space debris, their fundamental properties must be firmly established. In our theoretical calculation/simulation we will solve a set of fluid equations to extract the properties of

soliton interaction. Later, we will model this equation using a nonlinear evolution equation called Korteweg–de Vries (KdV). We will then simulate specific conditions that cause a precursor soliton and and study how a precursor soliton reflects and transmits through a potential barrier. By studying their formation properties, we can understand what classification of debris can form solitons and by studying their reflectance and transmission properties we can understand how to detect them and how they move through the upper atmosphere.

Yan Zhai
Applied Statistics [M.S.]
IBM Employee Attrition Analysis and Prediction
Faculty Mentor: Dr. Andrew Ross

Attrition means loss of employees as well as talent. The management team and human resources (HR) administrators are greatly interested in reducing turnover in the organization in such a way that it will contribute to the maximum effectiveness, and progress of the organization because employees are the most treasured assets of an organization.
IBM has created a fairly complete overview that contains the data of the average HR Information System (HRIS) combined with a full engagement survey that facilitates study of underlying reasons for employee attrition. Reasons can be common within organizations but are also often complex. Analysis of the IBM dataset will inform development of a final model of attrition using a regression method, although a linear model and logistic regression can be used. The goal is to identify and evaluate variables that should be included in a model to produce the most accurate results. We then do the prediction based on the final model and calculate the accuracy.

Ying He
Applied Statistics [M.S.]
Factors Affecting Sleep Disorders: Evidence from the Health and Retirement Study
Faculty Mentor: Dr. Khairul Islam

Sleep disorders are conditions that lead to the lack of sufficient or restful sleep, which cause daytime consequences such as fatigue, attention deficits, and mood instability. Adequate sleep is important for good physical and psychological health. Several classifications of sleep disorders exist in literature: difficulty falling asleep, difficulty maintaining sleep, early morning awakening, non-restorative sleep, excessive daytime sleepiness, etc. Published epidemiological surveys indicate that about 30 to 40% of adults in the general population chronically suffer from at least one sleep disorder symptom. In this project, we assessed factors affecting sleep disorders using the 2018 interview data (wave 14) from the University of Michigan Health and Retirement Study (HRS). A total of 17,089 responders were included in this cross-sectional study. Initially, we explored some demographic characteristics of people with sleep disorders, and then attempted to explain the risk of people with sleep disorders due to health and lifestyle factors.