

*MSU AGEP: MSU's premier graduate education learning
community for diversity, equity and inclusion*



2023 AGEP Student Success Conference

Student Oral & Poster Abstracts

The Graduate Hotel in East Lansing, Michigan

November 9-11, 2023



GRADUATE SCHOOL

Student Oral Presentation Abstracts

Kedzie Room A Facilitator: Dr. Amy Radford-Popp

Niouma Semega
New York University

A Solar Powered Immersive Heavy Metal & Nitrate Filter for Bodies of Water

Water pollution has been one of the most dangerous environmental risks resulting in negative health outcomes worldwide, especially amongst underrepresented communities. Although there are interventions to reduce pollutants from entering waterways, there aren't solutions to remove pollution when the damage is already done. The purpose of this project is to create a device that would extract harmful pollutants from bodies of water using an immersive two-step filtration system. It's been reported that more than 600,000 children in the U.S alone are born with mercury blood levels at high measurements linked to low IQs and birth defects (Ocean Health Index 2018). Nitrate contamination has been increasing exponentially, in three states, 90% of the communities have elevated levels. Excessive nitrate compounds have been linked to carcinogens that evoke cancer risk and respiratory problems. According to the data collected from the test strips, the mercury decreased by 100%. The test strips indicated that, before filtering the ocean water, the water was contaminated by 0.005ppm. According to the test strip, the maximum US EPA contaminant level is 0.002. The percentage of the nitrate was calculated by using the test strip. The maximum nitrate level on the chart is 160 ppm. Before testing the ocean it was 20 out of 160 ppm- which is also over the limit for the rules and regulation of nitrate contamination. After filtering the ocean water, it decreased to 5.0ppm. This means, the nitrate was initially 12.5% and decreased to 3.125%, therefore, the percent decrease is 9.375%.

Keywords: Environmental justice, environmental equity, equal access to natural resources, public health, resilience
Social Impact: Environment

Devyn Hill
Florida A&M University

Nanoparticle-aided enrichment of Salmonella from various turkey parts

MICHIGAN STATE
UNIVERSITY

Salmonella causes 1.35 million infections annually in the United States, including 26,500 hospitalizations and 420 deaths. One way to reduce the rate of infection is by detecting Salmonella in food such as turkey meats. Salmonella is detected using the culture method and polymerase chain reaction (PCR)-based methods; however, these methods rely on time-consuming and sometimes labor-intensive enrichment on selective media that can take days to finish. Nanoparticles are being extensively investigated as a potential alternative to current harmful food pathogen enrichment. In this study, glycan-coated magnetic nanoparticles (GMNPs) are employed to enrich Salmonella cells from turkey meat samples. The method works based on the ability of the GMNPs to attach to the surface of bacterial cells in the sample, and upon application of a magnetic field, the GMNPs, together with the bacterial cells, can be recovered and concentrated. Results showed that GMNPs were successful in enriching Salmonella from all the turkey meat samples tested, except ground skin, based on the calculated concentration factors. This experiment will help improve the process of detecting Salmonella in turkey products, resulting in better food safety and sanitation.

Keywords: food safety, bacteria detection, nanoparticle
Social Impact: Healthcare

Monique N. Noel
Michigan State University

Investigation of (001), (010), and (110) surfaces of AMg₂Sb₂ (A=Mg, Ca, Sr) Zintl

Thermoelectricity is the conversion of a heat gradient into useful electricity, and vice versa. The efficiency of this phenomena is of critical importance to the future of power generation. Zintl phases are a class of polar intermetallic compounds that combine ionic and covalent bonding to form charge neutral structures, leading to semiconducting properties. Mg-containing Zintl compounds with the CaAl₂Si₂ structure type have shown promising thermoelectric performance with reasonable optimization. In the present study, we use first principles calculations to study various surface orientations of AMg₂Sb₂ (A=Mg, Ca, Sr) Zintl compounds to understand the effects of different cations on surface energies and surface reconstruction. We investigated surfaces with three different crystallographic orientations: (001), (010) and (110). To retain the overall AM₂X₂ stoichiometry, 2x2x5 slabs were created and surface cations were selectively removed in various grid-like patterns. Measuring the A-Sb and Mg-Sb bonds at the surface allows us to quantify the degree of surface reconstruction, which is dependent upon orientation and cation species. The electron localization function (ELF) is employed to investigate changes in interatomic bonding at the surfaces. Work function calculations will also be conducted to investigate electron behavior of these materials at the surface. Our preliminary results show the Mg₃Sb₂ retains the lowest surface energy for the [001] direction.

Keywords: power generation, materials design

Social Impact: Workforce Development

Sofia Sanchez Lemus, Ufana Riaz and Darlene Taylor
North Carolina Central University

2-D Intercalated Structures Based on Hybrids of V₂O₅ with p-Phenylenes

The present work reports solid-state intercalation of p-phenylenes in the interlayer space of vanadium pentoxide with a view to study the effect of space confinement on the optoelectronic properties of the conjugated oligomers as well as vanadium pentoxide. The organic-inorganic nanohybrids were characterized using, FTIR, UV-visible, X-ray diffraction (XRD) and scanning electron microscopy (SEM), atomic force microscopy (AFM). Bandgaps were determined using the UV-visible data and were found to show variation with the length of p-phenylene oligomer which varied in size from n=1-3 repeat units. The study could be helpful in designing next generation solar cells with controlled properties.

Keywords: Vanadium pentoxide; nanohybrid; solar cells ;bandgap; morphology

Social Impact: Workforce Development

Taylor Eppard, Dr. Carlee Resh
Siena Heights University

Zebra Mussels and their effects on water quality in a rural freshwater ecosystem in Michigan

There have been many scientific articles that have tested and shown the negative correlation of how zebra mussels, Dreissena polymorpha, affect the environment that they have been introduced to in the state of Michigan. Because zebra mussels have been known to reproduce and expand exponentially, they throw off the life cycle of the native species and unbalance the environment. The unanswered question that seems to be a common theme amongst the literature is if zebra mussels can create benefits in an ecosystem. Zebra mussels are considered filter feeders and could potentially improve the water quality in the environment around them. These results have potential benefits to bioremediation efforts because if there is evidence of improvement in their current environment, the money used to deplete their populations could go to someone where it is needed more urgently.

Keywords: bioremediation, invasive species, filter feeders, introduced

Social Impact: Environment

Natalie Fisher and Krishanthi Weerasinghe
Siena Heights University

Curcumin and its Derivatives for Photodynamic Therapy Application Using Density Functional Theory Study

The number of individuals developing cancer is increasing at an alarming rate worldwide. Although there are treatments available such as chemotherapy, radiation, and surgery. Medical research must find superior treatment options for individuals diagnosed with cancer. Photodynamic therapy (PDT), discovered a long time ago, is now being deeply researched as a therapy for cancer treatment. PDT uses a photosensitizer (PS), light, and oxygen to terminate cancer cells. Curcumin is currently being studied as a PS along with its derivatives. Curcumin is a natural compound from Turmeric which has already been proven as an effective treatment for several different medical needs. Computational calculations using the Density Functional Theory (DFT) study is an important strategy to determine which derivative(s) of Curcumin is the most promising. Calculations will be performed through the Gaussian 16 Software to explore the properties of Curcumin and its derivatives to determine anticancer characteristics within the molecules.

Keywords: Photodynamic Therapy, Density Functional Theory, Curcumin, and Gaussian

Social Impact: Healthcare

Blanca Straub

Siena Heights University, Adrian College

Automotive User Experience Design and Advanced Driver Assistant Systems

Looking into the rising field of user experience, the demand for research centered around this career has increased. One of those sectors is that of the automotive industry focusing on the design context. In the literature on automotive user experience design in connection with advanced driver assistant systems, there are six key sub-topics. These consist of methods used in user experience, the universally vague user experience context, cognitive load, user needs and expectations, advanced driver assistant system, and limitations in user experience design. From the collection of literature, the methodology will take a mixed methods approach for data collection. Quantitative data will consist of a minimum of 15 participants, 18 + years old, who will track their drives for a week recording their areas of concern from the CarPlay infotainment system. The infotainment system is made for users to receive information and entertainment through audio and visuals through various applications. When gathering participants there will be a pre-survey regarding the consent form, dimensions of their infotainment system, and thoughts on Michigan's phone regulations. Qualitative data will consist of interviews with at least 2 automotive user experience designers from at least 2 automotive companies. This could provide an understanding of the method utilized in developing an infotainment system, and a design perspective on the regulation in Michigan, which can impact user experience. In the end, there could be an understanding of the user's primary concern when operating the infotainment system, automotive user experience design methods, and perspectives on the phone regulations.

Keywords: User Experience Design (UXD), Advanced Drivers Assistant System (ADAS), Non-Driver-Related-Tasks (NDRT), Human-Machine-Interaction (HMI), Infotainment System, Holistic Theory, Cognitive Quality Development, Data-Driven Development, Pattern Approach, User-Centered

Social Impact: Workforce Development

Erika Lee Vallejo
Michigan State University

Working-Class State Legislative Campaigns: Are They Successful?

Does the presence of a working-class background—as it intersects with race, ethnicity, and gender—among political candidates influence the likelihood of winning primary and general elections? Further, who are the candidates that come from working-class backgrounds and are they more likely to be women, women of color, and/or racial and ethnic minorities? In this paper, I examine the working-class occupational backgrounds of candidates, specifically blue- and pink-collar, for the 2020 and 2022 state legislative election cycles. Specifically, I evaluate whether working-class candidates, despite their vast under-representation, can run successful campaigns and win elections. These findings highlight candidates that come from working-class backgrounds are more likely to win primary elections, but it is not clear whether they are successful during general elections.

Keywords: political candidates, working-class, intersectionality, race, ethnic, and gender politics, elections

Social Impact: Workforce Development

Shaila Jackson
North Carolina Central University

Modification of Polyaniline with Carbon Nanodots for Enhanced Optoelectronic Properties

The present work reports the synthesis of polyaniline (PANI) using interfacial polymerization and formulation of nanohybrids with carbon nanodots (CNDs). Carbon nanodots (CND) were loaded in different amounts to investigate the change in the fluorescence properties of these polymers upon addition of carbon nano-dots. The pristine materials, as well as nanohybrids, were characterized using FTIR, UV-visible, scanning electron microscopy (SEM) with elemental mapping and X-ray photoelectron spectroscopy (XPS). The nanohybrids hold potential application in designing smart packaging materials.

Keywords: PANI, CND, SEM, UV-visible, XPS and FRIR

Social Impact: Environment

Student Oral Presentation Abstracts

Kedzie Room B Facilitator: Dr. Heather Hill

Dalton vasBinder
Siena Heights University

Iodine in Indigenous Diets: Determining Methods to Find Iodine Content in Plants Found Within Historical Indigenous Diets of the Keweenaw.

Due to glacial scraping, the Upper Peninsula has insufficient iodine content in its topsoil that caused European settlers to develop illnesses such as goiters. Knowing that indigenous populations lived in this area long before the arrival of Europeans, it raises the question of how indigenous populations were able to introduce iodine into their diets. This research will carry out chemical testing to find the iodine content of tamarack needles, acorns, and wild rice that grow in the Keweenaw, and determine which method is best to obtain a known value of iodine found in these plants. Also, extensive literature work will be used to determine what species are the most probable sources of iodine.

Understanding how iodine has been implemented in the past, such as adding saltwater aquatic plants in diets, it is most likely, but not limited to, autochthonous plant life. When developing a comparative analysis between the foodways of indigenous people and European settlers, this research brings into question modern understanding of historical and cultural aspects of the indigenous peoples found in the Upper Peninsula. Very few studies have been conducted to understand the diets in areas where iodine is a scarce commodity. Doing so may help us better understand the people that lived in these harsh environments. This research may shed light on an area that has been previously overlooked by academia. This work may have medical, anthropological, and historical applications that could be significant in understanding not only foodways but change our modern understanding of iodine intake.

Keywords: Iodine, Diet, Foodways, indigenous populations, Upper Peninsula, Keweenaw

Social Impact: Environment

Christen Ruiz
Siena Heights University

Treatment selection for MDRO infections in neutropenic cancer patients

Given the high mortality rates of multidrug-resistant organism (MDRO) infections in immunocompromised cancer patients, selecting appropriate treatments for MDRO infections in this population is critical to survival. This study will investigate the factors involved in treatment selection from the oncology provider's perspective, as well as the provider's opinions about the effectiveness of MDRO treatments. The study will follow a qualitative approach using structured interviews of oncology, oncology/hematology, or infectious disease providers from a combination of university and community cancer centers in a Midwestern state. It is hoped that the findings of this study will increase the understanding of current factors influencing treatment selection for MDRO infections in immunocompromised cancer patients and the effectiveness of those treatments from the provider's perspective.

Keywords: multidrug-resistant organism (MDRO)

Social Impact: Healthcare

Victoria Pilon
Adrian College

Influence of the YLR179c Gene in Yeast and the CWI Pathway

Saccharomyces cerevisiae has been the ideal model organism for the eukaryotic genome due to its similarity to other eukaryotic cells and its conserved sequences and homologs to other genomes. Despite its quality as a model organism, there are still 900 genes with unknown functions within *Saccharomyces cerevisiae*'s genome. In this paper, gene YLR179c, a gene with an unknown function will be put in different conditions to hopefully reveal its function. Gene YLR179c gene seems to be within a stress pathway and have homologs with two other known functions of genes, but by way of knockout we hope to show the final function of the gene. Homologs include TFS1 and YIL053W which both are involved in DNA synthesis, specifically with spindle formation and stress pathways of the cell cycle. Since these two genes are homologs, this provides us ideas of what the YLR179c gene function is. These homologs suggest our gene lies within the stress pathways, which narrows the experimental research to reveal the function. By doing research beforehand and by doing experiments that follow the previous genomic research, we hope to find the function of the YLR179c gene and contribute to the yeast genome.

Keywords: Future cancer and disease research

Social Impact: Healthcare

Makenna Meisenbach, Nicholas Mortensen
Siena Heights University

The Effect of Different Music Genres on Running Performance during the Astrand Treadmill Test

Music has been part of our culture for millennia, especially for athletes. Research has illustrated that music can increase heart rates, improve various performances, and cause mood fluctuation in individuals. This research proposal will investigate if music influences student athletes' overall performance and health. Participants will be instructed to run two separate Astrand treadmill tests and each test will present a different genre of music while the investigator analyzes different variables. Examining these results adds to the data on the topic of music-based performance and may glean insight into the athletes' own performance as related to different genres of music. A total of at least ten student/student-athletes from Siena Heights University above the age of 18 will be involved in this study. In random order, each participant will be assigned one trial presenting fast-paced music, and the other trial with slow-paced music, and both trials have the same Astrand treadmill test protocol. Their heart rates, rate of perceived exhaustion, and running time will all be recorded and analyzed. The data will be compared between the two sets of an individual's data as well as compared to all the participant's data. This data will be used to see if the different genres of music within the trials affected the variables being recorded during the Astrand treadmill test. Quantitative data will be analyzed by using a paired t-test to analyze and showcase the data.

Keywords: Heart Rate, Athlete, Astrand Treadmill Test, Beats per Minute (BPM), Rate of Perceived Exhaustion (RPE), Music

Social Impact: Healthcare

Najar'ye Ivey
Savannah State University

Elements in Influent, Biosolids, and Effluent from Eight Wastewater Treatment Plants in Savannah, Georgia

Influent, biosolids, and effluent waters were collected from eight Wastewater Treatment Plants in Savannah, Georgia. Our study suggests that one has to be careful in reusing the treated biosolids and/or effluent for land application to avoid cross contamination of heavy metals and microbes from these sources.

Keywords: Wastewater

Social Impact: Environment

Kye Nash
Tuskegee University

Deep Eutectic Solvent Synthesis Method for Nitrogen-Doped Carbon Dots: A Simpler and Safer Synthesis Method

Nitrogen-doped carbon dots have proven extraordinarily useful for bioimaging, biosensing, and drug delivery. Their biocompatibility, low toxicity, water solubility, and low cost make them ideal for biological applications. The challenge is to find synthetic methods to produce large quantities of nitrogen-doped carbon dots that are consistent in composition and properties. Nitrogen-doped carbon dot synthesis using deep eutectic solvents offers the promise of achieving this goal. We have compared nitrogen-doped carbon dots made from tryptophan and citric acid using both deep eutectic solvents and a hydrothermal method. As a result, we've determined using the deep eutectic solvent method is more convenient and safer as we can use simpler, more affordable equipment for a far more consistent product. Thin-layer chromatography and column chromatography were used to separate and purify the nitrogen-doped carbon dots. We have preliminary characterization data on the nitrogen-doped carbon dots using ultraviolet-visible spectroscopy and dynamic light scattering. The components will be fully characterized by infrared (IR), ultraviolet-visible (UV), Raman, and photoluminescence spectroscopy and both scanning electron microscopy (SEM) and transmission electron microscopy (TEM). We are beginning the process of studying the properties of these solvents using Nuclear Magnetic Resonance (NMR).

Keywords: Carbon Dots, Deep eutectic solvents

Social Impact: Healthcare

Pragya Saxena
Michigan State University

Compound 48/80 increases bladder wall mechanical compliance via activation of MMP-2 and MMP-9

Alteration in wall stiffness and bladder compliance can disrupt normal bladder function and lead to lower urinary tract symptoms (LUTS). Urinary bladder fibrosis due to inflammation is implicated in many clinical cases of LUTS. Mast cell activation represents a great target to understand the fibrotic inflammatory pathways within the bladder wall. Our lab has previously shown that mast cell activation using Compound 48/80 increases mechanical compliance and detrusor contractility. Prostaglandins and matrix metalloproteinases (MMPs) released from mast cells can directly alter the mechanical properties of the bladder wall. Blocking the release of prostaglandins blocks the increase in both mechanical compliance and detrusor contractility; however blocking the activation of MMPs only blocks the increase in compliance. Thus, in this study we pharmacologically investigated the role of specific MMPs in driving the increase in compliance upon mast cell activation. We hypothesized that MMP-2 is present in the urinary bladder wall and when activated drives an increase in mechanical compliance. Whole mouse bladders from C57Bl/6 (wild-type) mice were dissected and mounted in a custom designed pentaplanar reflected image macroscopy (PRIM) system for simultaneous measurement of transient pressure events, intravesical pressure, bladder volume, wall stress, and wall stretch during ex vivo bladder filling. Wall compliance was derived as a measure of the stress versus stretch relationship using the pressure-volume curves and associated imaging data. To test our hypothesis, bladders were exposed to either vehicle, Compound 48/80 (10 µg/ml) alone, Compound 48/80 in presence of JNJ0966 (1 µM, MMP-9 inhibitor) or Compound 48/80 in presence of ARP-100 (500 nM, MMP-2 inhibitor) during ex vivo filling. MMP-2 content in the bladder wall was also determined using western blot analysis. JNJ0966 completely abolished the increase in compliance caused by Compound 48/80 however it had no effect on the increase in amplitude of transient contractions. ARP-100 also blocked the increase in compliance brought about by Compound 48/80 but the increase in amplitude of transient contractions remained unchanged. Western blot analysis showed that MMP-2 and MMP-9 is present in the bladder wall in both detrusor and urothelium layers. These findings solidified our hypothesis that effects of mast cell activation via Compound 48/80 are dual in nature. Mast cell activation causes a release of prostaglandins that directly alter detrusor contractility and activate MMPs to increase wall compliance. Future studies can be done to investigate the activity of MMP-2 using zymography assays and determine other MMPs that may be involved in this mechanism.

Keywords: Lower Urinary tract symptoms, Overactive bladder, inflammatory fibrosis

Social Impact: Healthcare

Ky'Sonna Won
Siena Heights University

Dentist Strategies for Dental Fear and Anxiety (DFA) in Pediatric Patients

Dental Fear and Anxiety, also known as DFA, refers to the fear and anxiety associated with dental care or dental clinics (Gao et al., 2013; Modabber et al., 2022). DFA is a common problem in pediatric dentists and can hinder dentists' ability to provide proper care to their patients. Without adequate care, children may experience poor oral health, leading to immediate and gradual negative effects. The purpose of this research is to learn the strategies that dentists employ to mitigate Dental Fear and Anxiety (DFA) in pediatric patients. Potential participants will be contacted, and those selected will be interviewed either in person or online. The main purpose of the interview will be to learn about their personal strategies to mitigate DFA in their patients and the most effective strategies they implement. Similar strategies will be grouped together, and the overall most effective strategy will be determined. These findings will contribute to the improvement of Dental Fear and Anxiety management in pediatric clinics, enhancing dental procedures and treatments. Additionally, this research will have a positive impact on the oral health and quality of life in children.

Keywords: Dental Fear and Anxiety (DFA), oral health, fear management, children, interview, dentists

Social Impact: Mental Health

Collins I. Ijale

Fisk University

Mental Health and Sleep in Women With HIV

Background: Despite improvements in health and lifespan with modern antiretroviral therapy, people living with HIV (PLWH) still exhibit poor sleep quality. Sleep quality is linked to higher rates of mental health disorders in men living with HIV; however, there is limited understanding of this relationship in women living with HIV (WLWH). We aimed to explore the associations between sleep, mental health, and HIV disease status in WLWH. We hypothesized that Viremic WLWH would display worse sleep quality and mental health outcomes.

Method: We compared 152 WLWH on antiretroviral therapy and 151 demographically similar HIV-negative women enrolled in the Women's Interagency HIV Study (WIHS). Mental health was assessed using the Center for Epidemiological Studies – Depression (CESD) scale, the Perceived Stress Scale-10 (PSS-10), and the PCL-Civilian PTSD Score. Sleep quality was measured subjectively using the Pittsburgh Sleep Quality Index (PSQI) and objectively using wrist actigraphy. Univariate comparisons were performed across HIV-serostatus and viremic status.

Results: Depression (CESD Total > 16) was more common in WLWH (23%) compared to HIV-negative women (13%), $p = 0.039$. Viremic WLWH were more likely to report taking sleeping medication ($p = 0.046$) and to experience more objective wake bouts (median [IQR] = 40 [35 – 46]) compared to aviremic WLWH (median [IQR] = 33 [28 – 41]), $p = 0.012$.

Conclusion: Our cohort of WLWH experienced greater levels of depression than HIV-negative women, and viremic WLWH were more likely to report sleep disturbances than their aviremic counterparts. Future studies are required to determine possible causal relationships and to identify biological mechanisms that link HIV, mental health, and disturbed sleep.

Keywords: Mental health, sleep quality, women with HIV, quality of life, antiretroviral therapy

Social Impact: Mental Health

Kye Nash
Tuskegee University

*Deep Eutectic Solvent Synthesis Method for Nitrogen-Doped Carbon Dots: A Simpler
and Safer Synthesis Method*

Nitrogen-doped carbon dots have proven extraordinarily useful for bioimaging, biosensing, and drug delivery. Their biocompatibility, low toxicity, water solubility, and low cost make them ideal for biological applications. The challenge is to find synthetic methods to produce large quantities of nitrogen-doped carbon dots that are consistent in composition and properties. Nitrogen-doped carbon dot synthesis using deep eutectic solvents offers the promise of achieving this goal. We have compared nitrogen-doped carbon dots made from tryptophan and citric acid using both deep eutectic solvents and a hydrothermal method. As a result, we've determined using the deep eutectic solvent method is more convenient and safer as we can use simpler, more affordable equipment for a far more consistent product. Thin-layer chromatography and column chromatography were used to separate and purify the nitrogen-doped carbon dots. We have preliminary characterization data on the nitrogen-doped carbon dots using ultraviolet-visible spectroscopy and dynamic light scattering. The components will be fully characterized by infrared (IR), ultraviolet-visible (UV), Raman, and photoluminescence spectroscopy and both scanning electron microscopy (SEM) and transmission electron microscopy (TEM). We are beginning the process of studying the properties of these solvents using Nuclear Magnetic Resonance (NMR).

Keywords: Carbon Dots, Deep eutectic solvents

Social Impact: Healthcare

Student Oral Presentation Abstracts

Kedzie Room C Facilitator: Dr. Pamela Martin

Briana Lamont

Siena Heights University

Emergency Displacement within a small-rural community

People who experience being forced to move abruptly due to emergency situations are likely to end up without food, water, hygiene, and in most cases houses. An estimated 70.8 million people are forcibly displaced from their homes because of persecution, violence, and/or natural disasters worldwide. Most displaced persons live in urban slums or camps, which are characterized by inadequate environmental health conditions and services, such as poor sanitation, exacerbated by overcrowding (Shackelford et al., 2020). This qualitative study interviews people who have been displaced to learn about their experiences within a small rural community. Thematic coding will be used to identify themes in responses and to analyze the data for consideration in discussion, including future research. For this study, based on existing literature, data may reveal limited resources available in small communities, and participants will add insight into how to address this gap (Gin et al., 2021; Jayakody et al., 2022; Zufferey (CZ) et al., 2022).

Keywords: Emergency displacement; post-disaster housing; temporary housing; resilience; recovery; experiences.

Social Impact: Social Equity

Jenika Scott

University of Michigan

Unity & Bridges: Empowering Refugees through Understanding Police Interactions & Rights in the U.S.

Jenika Scott, MSW'23, guided by Dr. Odessa Benson, spearheads the workshop titled "Empowering the Refugee Community: Workshop on Racism, Police Violence, and Conflict Resolution in the United States." This initiative, in collaboration with the Grand Rapids-based, refugee-led organization, Alliance, emerges in response to the tragic death of Patrick Lyola at the hands of police. The workshop aims to bridge the understanding gap between the refugee community and law enforcement, focusing on enhancing refugees' interactions with the police. Participants delve into the U.S.'s racial history and dynamics of police violence, their rights as refugees, de-escalation techniques, and local community resources for support. Set in Grandville Public Library, this 1.5-hour interactive session blends informational content with engaging activities, such as quizzes and role-playing. It addresses the refugees' perspective on police and historical police violence against marginalized groups and promotes respectful interactions with law officers. The workshop's efficacy was measured through pre and post-surveys, which indicated a significant rise in participants' understanding.

While primarily targeting the refugee community in Grand Rapids, an upcoming session adopts a train-the-trainer approach, preparing community leaders to disseminate this training further. To cater to the participants, many of whom are English learners, the workshop utilized simple, slow-spoken English. Additionally, a \$1200 social justice grant has been secured for the leader-training session, ensuring resources for transportation, materials, and support for four community leaders. The long-term vision entails cultural sensitivity training for police officers, fostering a harmonious relationship between the police and the refugee community.

Keywords: Empowerment, Community Engagement, Police-Refugee Relations, Cultural Sensitivity, Education & Awareness, Conflict Resolution

Social Impact: Criminal Justice Reform

Nayana Turner
Northeastern Illinois University

The Impact of Relevance-Supportive Strategies on Motivation and Engagement in Middle School Science Classrooms

The ability of children to feel connected to the content they are learning is essential for their academic motivation. A construct that has been used to describe students' connection to content is relevance. One of teachers' roles in the classroom should be to make content as relevant to students' interests and experiences as possible. Beyond that, teachers can endeavor to make content culturally relevant and sustaining (Linnenbrink-Garcia, L., Patall, E. A., & Pekrun, R. 2016). Relevance emphasizes how crucial it is for educators to authentically engage with students' interests and perspectives within course content. This is a strategy that can guarantee that all students achieve academic, social, cultural, and civic success via the framework of Culturally Relevant Pedagogy(CRP).CRP is "a way of teaching that fosters student achievement while helping students to accept and affirm their cultural identity, as well as develop critical perspectives that challenge societal inequities."(Paris,2012). The aim of the present research is to examine how teachers engage in relevant pedagogical practices in the classroom and how those interactions are culturally relevant/sustaining within their classrooms specifically. Using classroom surveys and video data, we examine the number of instances when middle school educators enact relevance in diverse classrooms to gauge how often or if teachers apply relevance-supportive strategies throughout their lessons. Students deserve classrooms that highlight their identities to promote the connection between students and what they are learning, and that the use of relevant content supports that. The study design for this project is a modified secondary thematic analysis. Through watching and thematically coding videos of middle school science lectures, we investigate the practices of two teachers in two different lessons in order to identify and analyze specific instances of relevant interactions and strategies used in the classroom.

Keywords: Academic Motivation, Culturally Relevant Pedagogy

Social Impact: Family Relations

Marcus Ward
Alabama State University

The Role of Family Communication in Slovene Adults' Romantic Relationship Satisfaction and Resilience

The goal of this paper is to understand the relationships between family communication patterns and how it is associated with romantic relationship satisfaction and resilience in Slovenia. For this study we surveyed 95 Slovenia adults and considering people in Slovenia often have more access to parental assistance than adults in the United States, this study focuses on women in Slovenia. Families high in conversation orientation often involve parents who encourage their children to develop and express their thinking (Ritchie, 1991). In other studies, pluralistic families (families with high conversation and low conformity) are shown to have a positive effect on resilience in young adults. Based on these studies, we anticipate discovering a relationship between increased satisfaction in romantic relationships and family communication patterns. We also anticipate a correlation between resilience and family communication patterns, specifically, conversation orientation having a positive effect on resilience. Participants were recruited using email and Facebook to take a 30-minute survey. We predict that results will indicate that conversation orientation is positively associated with relationship satisfaction and resilience. Results show that conversation orientation is a positive predictor of resilience. Conformity orientation was not significantly associated with relationship satisfaction or resilience. One limitation of this study was that it was rather small in sample size. With a larger sample size results could vary significantly. Practical implications for family counselors will be discussed.

Keywords: Family, Resilience, Relationship satisfaction

Social Impact: Family Relations

Shaqyna Ross
Wayne State University

Exploration of Medical mistrust in the lives of African American and Arab American adolescents.

This research examines two large overlooked minority young adult groups in America who experience racial discrimination in healthcare. This research also argues that the effects of trust in a provider are associated with medication adherence, continuity of care, improvements in self-reported health, and decision making when seeking care. Racial discrimination in health care access and quality of care has resulted in a long standing and ongoing medical mistrust of healthcare providers and the health system for many racially demean groups. Adolescents and emerging adults are very important considering this is the stage where youth are beginning to become more independent and are taking on greater responsibility for their own health care. Medical mistrust studies have predominantly been studied in adult populations, but there has been a huge gap in the research studying medical mistrust in youth which is where early intervention can clearly be beneficial. Due to mutually dependent challenges that minority youth face such as racial discrimination, environments with social disadvantages, and medical mistrust they often have social complexes. With this being said minority youth often have a lot of involvement with health care systems from multiple different access sites, but this leads to them often failing to achieve positive health outcomes.

Keywords: Minority, young adults ,health care, medical mistrust, Racial discrimination,disadvantage, health
Social Impact: Healthcare

Hima Rawal
Michigan State University

Impacting Communities: Transferable Skills as Unexpected Benefits of Teaching Professional Development

The goal of most PhD programs is to develop graduate students as researchers to advance knowledge, ideas, and develop creative solutions. MSU thrives partly because of all global Spartans' varied contributions in research, teaching, mentoring and community engagement at local and global levels. Many of the essential skills that help translate the work to impact communities are not acquired by chance but are a result of intentional planning, preparation and training and can be acquired in instructional professional development opportunities. In this session, we will share the transferable skills international graduate students have cultivated by participating in the Graduate Teaching Assistant Preparation program. Not only have these skills been impactful in their immediate spheres of influence (labs, classrooms, tutoring and recitations sessions) but these also prepare them to empower and educate communities to find solutions.

Keywords: transferable skills, international graduate students
Social Impact: Higher Education

Angie Delgado
Roosevelt University

The Effects of Opioid Misuse and Adverse Childhood Experiences on Child and Adolescent Development

Traumatic events are inevitable. No matter the age or gender, trauma can occur at any given time. Unfortunately, "3 million children and adolescents experience some form of the traumatic event" (Schwarz & Perry, 1994). Children who suffer from trauma show deficits in learning and language development, which may lead to the necessity of academic support. The intention of this research is to determine how traumatic events affect adolescents' integration into society. Specifically, how opioid misuse and racial/ethnic differences contribute to trauma stressors from an ecological perspective. The methodology used to conduct this study is qualitative data from past research and peer-reviewed journals. The results demonstrated that Black and Latino children are more likely to suffer from substance abuse and racial trauma. The presence of a strong relationship with friends and family, in-depth psychological interventions, exposure-based therapy, cognitive behavioral therapy, and TF-CBT [trauma-focused cognitive behavior therapy] have been effective treatments for children and adolescents who suffer from trauma and substance abuse.

Keywords: Opioid misuse, racial stress, racial socialization strategy, and TF-CBT

Social Impact: Mental Health

Jasmin Banks
Michigan State University

Gaslighting in the Workplace: Exploring and unexplored microaggression

Microaggressions are a nuanced form of discrimination experienced by members of marginalized groups, including women, racial minorities, and members of the LGBTQ community. Primarily rooted in identity, microaggressions represent verbal, behavioral, and environmental humiliations that communicate negative, derogatory, or hostile sentiments toward a person or group. While such behavior can range on continua from subtle to overt and unintentional to intentional, research has identified micro-invalidation as a unique category of microaggressions, as it typically occurs in response to prior micro-aggressive behavior (Sue, 2010). It represents a reaction that invalidates or denies a target's experience of microaggressions and subsequently exacerbates the situation and the target's experienced harm. Gaslighting is a secondary form of microaggression and a specific type of micro-invalidation – specifically, behavior that conveys blaming people for their own hardships (Johnson, Nadal, Sissoko & King, 2021). Although research has highlighted a need to understand and address microaggressions in the workplace (Fattoracci & King, 2022), little attention has been given to the occurrence and impact of gaslighting. Accordingly, our primary research question is: What is gaslighting behavior at work, and what are its subsequent effects in and on organizations? In this project, we integrate the literature on psychology, communication, and health to develop a theoretical model of gaslighting that articulates its workplace conceptualization, the mechanisms through which it affects employees and organizations, and the subsequent impact on employee health and well-being.

Keywords: Gaslighting in the Workplace

Social Impact: Mental Health

Student Poster Presentation Abstracts

Virtual Location: Hopin

Abbey Vallance
Aquinas College

Will Changing Your Daily Self-Talk Influence Your Perception of the World Around You?

Previous research findings have found that positive self-talk in conversations about academics, have contributed to better testing results (Flor et al., 2016). Negative self-talk correlated with athletic performance was found to result in more cognitive anxiety among athletes (Antonis et al., 2009). Self-talk was also found to be the key factor in one's self-confidence (Antonis et al., 2009). The hypothesis constructed by an initial literature review is that positive self-talk will correlate with a positive perspective of the world, in comparison with negative self-talk and a negative perspective of the world. The initial methods of this study will be in college students in Michigan, through an online questionnaire. The importance of this study is to focus on adolescents who were in school during the COVID-19 pandemic. Since this pandemic, overall mental health and suicide rates have drastically increased in this adolescent population. It is vital to find simple alternatives people can implement in their daily lives to improve their mental health.

Keywords: academics, sports, and overall mental health.

Social Impact: Healthcare

Agnas Augustine
Madras Christian College

Important of Panchayat Development Index and LSDG in community development

The nations around the globe are working hard to achieve united Nations Sustainable Development Goals. Countries have developed indigenous versions of SDG to fit their socio-economic and political conditions. Localisation of Sustainable Development Goals in india leads SDG aspirations of India. Panchayat Development Index, is a need assessment tool in development, in order to assess the growth and identify need. LSDG and PDI has lot to do with community development in India. PDI is prepared based on Local indicators framework. 577 indicators measures growth of villages in a holistic way. PDI cover all the aspects of integrated community development which includes social, economical, political, cultural, personal, environmental development.

Keywords: Panchayat Development Index, Indicators, Thematic development

Social Impact: Social Equity

Amber D'mello
Michigan State University

Validity of a Sleep Accelerometer for Assessing Physical Activity in Toddlers

In recent years, the importance of 24-hour movement has been highlighted. Accelerometers, used to assess movement, are separately used for both physical activity (PA) and sleep due to differences in monitor settings and placement. Given the newly recognized importance of capturing 24-hour behaviors, it would be optimal to use one device to assess PA and sleep. The Motionlogger is commonly used to assess sleep in pediatric populations; however, it is unknown if it could accurately measure PA, making it a potential device for 24-hour monitoring. Purpose: To evaluate the validity of the Motionlogger for assessing PA among toddlers. Methods: Toddlers, aged 12 to 36 months, were recruited from childcare centers at the University of Colorado and Michigan State University or through known contacts and listservs. Toddlers wore two accelerometers, one on each ankle, while free-play activities were video recorded for a minimum of 30-minutes, indoor and outdoor. Continuous direct observation (DO) was used to record PA level following the rules stated

in the Observational System for Recording Physical Activity in Children - Preschool (OSRAC-P). PA level is coded on a scale from 1 (stationary) to 5 (fast) and averaged over 60-seconds. Devices were initialized to collect data in 15-second epochs and were then aggregated to 60-seconds for analysis. A Spearman rank correlation was conducted to compare Motionlogger counts to DO ($p < 0.05$). Results: Thirty-two toddlers (16 girls; 24 7 months old) were recruited for the study. A weak correlation was found between the accelerometer counts and OSRAC-P activity levels ($r_s=0.389$; $p < 0.001$). Conclusion: A weak association was found between Motionlogger counts and DO. Previous literature assessing a wrist worn Actigraph GT1M ($r=0.52$; Van Cauwenberghe et al., 2011) and an ankle worn Actical ($r=0.75$; Hager et al., 2016) reported higher associations when compared to DO. Future research should assess this device using a smaller epoch to determine if this could improve the validity for toddler PA assessment.

Keywords: Toddlers, Validity, Motionlogger, Physical Activity.

Social Impact: Healthcare

Ami Brooks

University of New Orleans

Is Exposure to Second-Hand Smoke Associated with Gestational Age at Birth in a Michigan Prospective Pregnancy Cohort?

Preterm birth (< 37 weeks completed gestation) is an adverse birth outcome. Maternal smoking is associated with preterm birth, but less is known about the impact of second-hand smoke (SHS) on preterm birth. The objective of this study was to assess the association between SHS exposure and gestational age at birth (GAB). Materials and Methods: Participants ($n=848$) were from the Michigan Archive for Research on Child Health (MARCH), a prospective pregnancy cohort. Data were collected via survey and birth certificates. Participants were included in this analysis if they had data on SHS exposure and GAB. Descriptive statistics and simple linear regression analysis were used.

In this sample, most of the women were either White (59%) or Black (34%). Nearly half (44%) had < college education; 56% attended \geq some college. Nearly 25% had household income \leq \$25K; 30% $>$ \$75K; 26% missing income data. SHS exposure was reported by 14%. Overall, ($n=848$), the association between SHS and GAB was not significant ($\beta= -0.2786$, $p=0.213$), however results varied when stratified by race, approaching significance for White ($\beta= -0.4376$, $p=0.0594$), but not Black ($\beta= -0.0523$, $p=0.916$) women. In this sample, the relationship between SHS during pregnancy and GAB was not significant but approached significance for White mothers such that on average, for White mothers who were exposed to household SHS during pregnancy, the estimated weeks of gestation was 0.4376 shorter (or almost half a week). Future efforts will use multivariate regression to attempt to control for confounding variables.

Keywords: preterm birth, adverse birth outcome, maternal smoking, second-hand smoke, gestational age at birth, race, education, income, socioeconomic status, pregnancy cohort, survey, birth certificates, regression analysis, confounding.

Social Impact: Healthcare

Ana D. Castellon

California State University Northridge

Students Voice/Identity Through Writing

The debate of students' real voice in writing has been ongoing since it first came into discussion at the Dartmouth Conference in 1966 according to Walker Gibson (qtd. in Clark 286). The pioneers of students' voices in writing range from Peter Elbow, Robert Zoellner, Donald Stewart, Ken Macrorie, Darsie Bowden, and Kathleen Blake Yancey, however they do not discuss the influence of race/ethnicity at length in their works. Many marginalized students doubt their own voice in academic writing (Rodriguez 1082; Naomi 185 and Lee et al. 23). However, these perspectives have not adequately addressed the issue of marginalized student's real voice/identity through their writing. My objectives with this study are to find out to what degree marginalized students use their real voice in their writing, how their identity impacts their real voice, and what, if anything, stops them from using their real voice in their writing. While observing

first-year composition classes, I developed a hypothesis that marginalized students are not often able to share their voice/identity through their writing because of their lack of agency, cultural differences, language barriers, personal insecurities, family dynamics, the high school conditioning of student/teacher interaction, and socio-economic status (Lee et al 22; Butler 67 and Virtanen 9). This IRB-approved survey explores those variables using grounded theory analyses. I argue that when marginalized student's real voices are allowed to come through in their writing it creates a sense of belonging for the students. This study will help improve pedagogical practices in the discipline of Writing Studies in order to help marginalized students.

Keywords: CRT, Voice, Identity, Writing, Marginalized, Dominant Discourse and college students

Social Impact: Higher Education

Anna Diaz Farias

Idaho National Laboratory

Increase of Cyber regulation

Cyber security regulations are a necessary part of protecting firms from cyber-attacks, as well as the customers of these firms. Many companies are currently underinvesting in cyber defense due to negative externalities, positive externalities, free riding, and public goods problems. Cyber security regulations, due to the nature of how fast technology increases, by the time things become regulated, aspects of that regulation are at risk of being outdated. To increase cyber regulations, it is important to consider both public and private sector knowledge, as well as understanding the different levels of security for different organizations. To ensure the success of cyber regulations, companies should have strong commitment from senior management and should not rely on low-cost efforts to protect themselves. Additionally, there are several techniques that can be implemented in order to improve ICS security.

Keywords: Cybersecurity Regulations, low cost efforts, Coffee

Social Impact: Workforce Development

Ayanna Johnson

Siena Heights University

Experiences of African American Law Students and Lawyers

Through this study the experiences of both African American law students and lawyers will be examined, from the perspective of Black feminist thought. By acknowledging and combating gender, race, and class inequalities in schools and legal institutions, new data can be concluded from research in this study. Qualitative interviews will take place to gather an adequate understanding of admissions and interview processes, networking, and retention to add to the literature and knowledge in the field of legal research. Educating individuals on the issue of underrepresentation in legal systems is the overarching goal to meet for better outcomes. Results may conclude the factors listed above and many more to uncover lead to the presence of systematic practices in higher education and professional institutions. This study strives against colorblindness and all aspects that contribute to the social hierarchy that has taken hold of the legal system.

Keywords: Discrimination, Underrepresentation, Systematic Racism, Implicit/ Racial Bias

Social Impact: Criminal Justice Reform

Aysa Monae Collins
California State University

Prenatal Care and Beyond: Unraveling the Impact of Diabetes, Obesity, and Health Disparities on Non-Hispanic Black Women and Infant Mortality

In recent years, the United States has witnessed an increase in infant mortality rates, notably among marginalized communities. Maternal weight status before and during pregnancy plays a crucial role in influencing factors contributing to infant mortality rates. Previous research has identified that maternal black women are at a higher risk of infant mortality and diabetes complications during pregnancy. Recent studies have emphasized the importance of prenatal care in mitigating this risk. This study examined infant mortality risk factors: the trimester of prenatal care initiation, the number of prenatal care visits, maternal pre-pregnancy weight, the mother's delivery weight, the mother's total weight gain, the identification of pre-pregnancy diabetes, and gestational diabetes. Using the Centers for Disease Control and Prevention, National Vital Statistics System, and CDC WONDER Online Database, 8,066 infant mortality reports in California for 2017-2021 were analyzed for women aged 20-39. Findings unveiled a total of 819 infant mortality reports for non-Hispanic black women. Additionally, there were 600 infant mortality reports for non-Hispanic black women who initiated prenatal care within the initial three months of pregnancy. Furthermore, 43% of non-Hispanic black women exhibited maternal risk factors for diabetes (pre-pregnancy or gestational) and obesity. Statistical data analysis of pre-pregnancy weight and mothers' delivery weight indicated that maternal obesity increases the risk of infant mortality. This study found that early and adequate prenatal care, while important, does not significantly reduce the risk of infant mortality among non-Hispanic Black women or significantly address the impact of maternal risks of diabetes and obesity.

Keywords: Healthcare, Infant mortality rates, Maternal black women, Marginalized communities, Adequate Prenatal care, Diabetes, Obesity, Complications during pregnancy

Social Impact: Healthcare

Briana Moncayo
John Jay College

An Analysis Concerning the Factors to Obtain a level of Education for Black Males and Females

Education is a gateway through which individuals tap into knowledge, expand their thinking, and create curiosity. However, education is a privilege not many have, especially the chance to pursue a higher education. Although Black men and women are able to pursue a higher education, Black men and women face discrimination early on in their childhood up to their adolescent years which has shaped their ability to pursue their education in college and beyond. Using the feminist and gender theory of disability and quantitative research, my study found that Black men are less likely to obtain a higher degree due to their low self esteem and fear of overcoming society's hate towards their race. Through the quantitative research conducted through the SPSS database and General Social Survey Codebook, 2018, we were able to examine the different variables affecting education from a pool of 2,348 participants. A statistical analysis showed that both the Black male and female population are less likely to pursue a college degree once they have a high school diploma. However, Black men were even less likely than Black women to continue their education after high school. The research is important because it can help us answer the question: How can academia empower students of color to obtain a higher education? Through my research, I present innovative ways schools can impact a student's academics by creating a path that not only builds advocacy within themselves but involves the support of people in their community.

Keywords: Black Mental Health, Self-esteem, Student Success, Attitudes towards education, and Mentorship.

Social Impact: Higher Education

Carlos Fitch
California State University, Long Beach

"De una frontera a otra:" The experiences of Queer Transborder Students in Rural Higher Education Institutions along the US-México Borderlands

In the Mexicali – Imperial County border region, thousands of students cross the border in a daily basis to pursue educational degrees in the United States; these students are known as transborder students. Existing research on transborder education centers in identity development, attainment and retention, and navigational experiences. As revealed, the educational trajectories of transborder students involve multiple layers of structural oppression and racism, which affects the social and cultural identity of Latinx transborder students. This study looks at the intersectionality of race, transborderism, and sexual orientation in the educational trajectories of higher education students to explore 1) the social and educational experiences of these students and 2) the agency articulated through their identity. Utilizing Latinx Critical Race Theory (LatCrit) and the conceptual frameworks of racist nativism and Queer of Color critique, this thesis aims to reveal the agency and resilience developed through the navigational and educational journeys of LGBTQIA2+ Latinx transborder students in higher education institutions from the Imperial Valley. LatCrit methodologies inform the thesis' data collection through testimonios and pláticas, as a form to provide participants with a space of liberation and legitimacy as they share their stories. The thesis aims to provide experiential knowledge on the contexts of rurality, queerness in the borderlands, and transborderism as resistance amid the rise of racist rhetoric and queerphobia in the recent decade.

Keywords: Transborder Students, LGBTQ+, Rural Education

Social Impact: Higher Education

Corties Draper
Roosevelt university

The Replication and Personalization of Financial Research: Improving Time-Series Momentum Strategies

The project's approach involves selecting a quantitative financial research paper with promising results, followed by rigorous data collection and analysis to replicate the original study. Subsequently, the findings will be personalized by incorporating the preferences, risk profiles, and financial goals of short-term traders. The chosen research for replication is "Improving Time-Series Momentum Strategies: The Role of Trading Signals and Volatility Estimators" by Balta and Kosowski (2012). The original study explores enhancements to time-series momentum strategies, examining the impact of different trading signals and volatility estimators on performance in various asset classes. Similar to the original findings from Baltas and Kosowski, momentum trading signals generated by fitting a linear trend on the asset price path maximize the out-of-sample performance while minimizing portfolio turnover, thus dominating the ordinary momentum trading signal in the literature—the sign of past return. Regarding the volatility-adjusted aggregation of univariate strategies, the Yang-Zhang range estimator constitutes the optimal choice for volatility estimation in terms of maximizing efficiency and minimizing bias and ex-post portfolio turnover.

Keywords: Short-term trading, Quantitative Finance,

Social Impact: Workforce Development

Diallo Patterson
Tuskegee University

Assessing the Physical-Chemical Properties of Purple Hull Peas cookies

This study aims to evaluate the chemical differences in the cookies developed with purple hull pea flour after baking. Inclusion of purple hull peas, as a cousin of black-eyed peas, increases the protein and fiber content of the cookies. The Maillard reaction occurs between a reducing sugar and amino acid group, while cooking and is responsible for non-enzymatic browning (285°F or above). We hypothesize that various compounds present, after the Maillard reaction, will contribute to overall flavor and appeal. The purple hull pea flour (PHP) was developed by soaking a 1:2 ratio of peas in distilled water overnight. After soaking, the excess water was drained, and the peas were wrapped with cheesecloth and allowed to sprout at room temperature for 72 hours. After germination, the peas were placed on racks in the dehydrator for 12 hours. Once dried, the peas were milled into a fine powder by a flour miller. Three cookie samples mixtures were prepared. The control group (011) had 100% all-purpose flour, sample (006) had 60% (PHP) flour and 40% all-purpose flour, while sample (007) had 100% (PHP) flour. A preliminary sensory evaluation was conducted where six panelists evaluated each sample mixture using the 9-point hedonic scale. Due to the results of the evaluation a sample mixture of interest was determined.

Keywords: Serving underserved farmers in the Black-Belt region of AL through this project.

Social Impact: Workforce Development

Emma Tooley
Siena Heights University

Effects of Menstrual Cycles on Female Athletes' Performance

The purpose of this research is to widen the knowledge of female athletes and the effects of menstruation on their performances. Female athlete research must continue to grow so coaches, players, trainers, etc. have better knowledge and experience when assessing them. Gaps in literature are found in the performance tests done and determining which day of the cycle these tests are carried out. The correlation between cyclic days and performance still needs to be researched and determined. This paper will study the effects of particular days within the menstrual cycle by comparing times of an endurance test around the track. The current research is dominant in the fields of strength and resistance training. Hopefully, the results of this study can give better insight into female athletes and their health needs. This work will add knowledge to understanding the female athlete's body and the menstrual cycles. Some practical considerations include accuracy when the days of phases actually are and some ethical concerns pertaining to comfortability.

Keywords: Menstrual Cycles, Female Athletes, Phases: follicular, luteal, ovulation, Performance rates

Social Impact: Healthcare

Everett Baxter
Michigan State University

Progress Towards Establishing OATP1B3's Enzyme Kinetics on the Direct Transport of Harmine

1.3 million Americans suffer from Type 1 Diabetes (T1D) that is a result from unstable glycemic control from the loss of pancreatic beta cell function and mass. Loss in both Pancreatic beta cell mass and function leads to insufficient regulation of glucose in the bloodstream. To abate this issue, there are current technologies on the market used to maintain an insulin balance such as insulin pump therapy. However, these technologies do not sustain insulin independence. Transplanted islets usage is needed for a <10% of Type 1 Diabetics and occurs only so often. To support the viability of these islets, harmine, a chemical from the indigenous plant located in South American Amazon, has been shown to promote cell division in mouse pancreatic beta cells. Inhibition of dual-specificity tyrosine phosphorylation-regulated kinase 1a (DYRK1a) led to the promotion of cell division in mouse pancreatic beta cells. However, harmine has

limited uptake into pancreatic beta cells. We hypothesize that pig Organic Anion Transporting Protein 1B3 (OATP1B3) can mediate the cellular uptake of harmine. OATPs are known for being promiscuous transporter proteins to a variety of exogenous and endogenous substrates, bile, and statins. However, there is no information on if OATP1B3 can transport harmine. To further elucidate these Transport kinetics on to harmine, stably expressed HEK293-1B3 cells were used to compare against control cells. From our results, we were able to find that Harmine is capable of being transported by OATP1B3 and further investigation for the Km and Vmax values are still underway. Our goal for this project is to advocate for Type 1 Diabetic Patients through validating transport kinetics of OATPs that will lead to a greater impact for the broader community.

Keywords: Type 1 Diabetes, OATPs, and Harmine

Social Impact: Healthcare

Faisal Sherif
Michigan State University

How Effective Is Soil Spectroscopy for Replacing Traditional Soil Analyses?

Researchers worldwide are employing soil spectroscopy as a tool to predict important soil properties more quickly and cost-effectively than many traditional soil testing methods. Efficiencies in generating data on soil characteristics may aid in making more informed management decisions that support soil health, but a lack of familiarity with spectroscopy may limit more widespread adoption by agronomists or other land managers. To demonstrate potential for spectroscopy-based predictions to replace traditional soil analysis methods, we evaluated quantitative and qualitative differences between predicted and measured soil properties, for a suite of soil properties important for soil health. We also explored end-user interest and concerns about replacing traditionally measured soil testing data with data predicted from spectroscopy using market analysis techniques. By addressing data quality concerns and making spectroscopic measurements more accessible to end-users, the soil science community can help expand the spatial and temporal resolution of soil datasets at local to global scales. Improved resolution in soil datasets will improve soil management decisions, supporting soil health, agronomic productivity, and climate stability.

Keywords: Soil Health, Global Good

Social Impact: Workforce Development

Jasmine Brenner
Michigan State University

"Substance Use Patterns in the Shadow of COVID-19: A Comparative Analysis of Alcohol and Drug Consumption Amidst a Global Pandemic"

Since the COVID-19 pandemic, alcohol and drug use has increased (Chacon et al., 2021). Moreover, individuals in recovery had an increased chance of relapse during the pandemic (Melamed et al., 2022). Currently, in some North Carolina cities, fentanyl overdoses are higher in African Americans than in other ethnic groups, whereas opioid usage is lower. In 2021, 106,699 in the US died of an overdose (CDC, 2023), and 75.4% of those deaths were opioid-related (CDC, 2023). Given increased rates of use and overdose, data suggest a need to understand the influence of COVID-19 on alcohol and drug use and to understand the difference in knowledge of overdose between or among individuals who reported drug and alcohol use and those who did not. Employing a pre-post test group design, 39 participants participated in an ethno-drama experience. To understand these differences, an independent sample t-test will be used to investigate knowledge of overdose and differences between those who use substances and those who do not.

Keywords: COVID-19, substance use

Social Impact: Healthcare

Jemel Fanfan
Michigan State University

Isothermal Inactivation Parameters of Salmonella in Red Chili Flakes

Spices are considered as Ready-to-Eat foods with low moisture content and are commonplace in meals to add or improve flavors. Although red chili flakes have natural antimicrobial properties, they have been linked to multiple salmonella outbreaks. Recent Food and Drug Administration reports have also found that oregano and rosemary are also at higher risks for salmonella contamination. Processing techniques for ready-to-eat food products are recommended to have at least a 5-log reduction in the target pathogen. A large knowledge gap exists in the investigation of isothermal techniques required to reduce salmonella contamination in red chili flakes. This study aims to investigate (1) isothermal inactivation of Salmonella Montevideo in red chili flakes and (2) modeling of the D - and Z - values of salmonella of this spice. The red chili flakes investigated were inoculated with Salmonella enterica serovar Montevideo (S. Montevideo). Inoculated spices were then subjected to heat treatments at 60, 65, 70, and 75 degrees celsius for up to 75 minutes. Survival of the bacteria was assessed via plating on a selective and differential media. The water activity of the chili flakes along with the antimicrobial properties were measured during the experiment. Overall, this investigation will determine the isothermal inactivation parameters for these chili flakes as well as the creation of a mathematical model to reach the Food and Drug Administration recommended 5-log reduction of salmonella within them.

Keywords: Food Processing, Microbiology, Isothermal Inactivation, Statistical Modeling

Social Impact: Healthcare

Jordan Boyer
North Carolina Central University

When A Child Becomes The Parent: Parentification in Children with A Chronically-Ill Parent

There are roughly 40,199,341 reported households that have a parent who has a chronic illness, which accounts for 12% of our population (Kaasbøll et al., 2021). Chronic-Illness is defined as any condition that persists for at least a year, requires ongoing medical attention, or limits activities of one's day to day functioning (Centers for Disease Control and Prevention, 2022). Previously, Landi et al. (2022) found that young adults caring for sick parents had poorer mental health outcomes than same-aged peers who were not caring for chronically-ill parents (in relation to the COVID-19 virus). The term parentification was developed by Ivan Boszormenyi-Nagy to describe deviations in generational boundaries with a child assuming roles and responsibilities that aren't age-appropriate. Research shows that the younger the child is when the parental illness occurs, paired with a longer timespan of parentification were significantly associated with depression into adulthood (Cho & Lee, 2019). The current study will investigate whether there are differences in parentification across age in individuals who cared for a chronically-ill parent during childhood. To understand these differences in parentification, 200 HBCU undergraduate students will be sampled. An independent-sample t-test will assess differences in parentification between individuals who cared for a chronically-ill parent during the earlier portion of their childhood, ages 5-13 and those who reared a chronically-ill parent during the later portion of their childhood, ages 13-21. Given the increase in health disparities and COVID-19's impact, understanding the role of children who care for a chronically ill parent and the psychosocial implications of such care on the child across their lifespan are imperative.

Keywords: parentification, youth caregiving, parental illness

Social Impact: Healthcare

Jordan Harris
Siena Heights University

Professor Perceptions of Letter Grading and Its Effects on Students

This study will examine how professors in collegiate schools view the letter grading system. Letter grading is the most popular form of evaluation for students in the U.S. The letter grading system in America is represented by the letters A through F. Letter grading will be analyzed looking at its perceived effectiveness and its effects on students. This method of evaluating students is being investigated due to data from previous studies showing the amount of stress letter grading causes students. Students under letter grading systems have put learning to the side and focus on achieving either an A or F. Other studies of letter grading have shown that this method of evaluating students can be damaging to students' psychological well-being. Professors will be surveyed for this study to fill the gaps previous research has left. Prior studies focused on the student's view of letter grading while excluding professors' opinions. The survey will consist of Likert scale questions and data will be analyzed using statistical analysis. Other questions explored in this study will be: What other evaluation methods are used by instructors, what are the preferred evaluation methods of professors, and do professors observe a difference in levels of student engagement, learning, and psychological well-being while using other evaluation methods?

Keywords: letter grading, well-being, students, teachers, effects

Social Impact: Higher Education

Jordan Parker
Michigan State University

Understanding the Victimization of Young Adults in Detroit, Michigan: Where do we go from here?

Neighborhood characteristics, such as poverty and disorganization, have been shown to increase an individual's risk of victimization. To date, a considerable portion of research focusing on youth victimization includes adults (i.e., those 18 years of age and older) and does not differentiate between young children and teenagers, who are more likely to be both victims and perpetrators of violence. Understanding the neighborhood context of youth's victimization across development groups is important given the high rates of violence exposure and negative consequences associated with victimization (e.g., substance use, and mental and behavioral problems). Framed by social disorganization, the current study examines violent victimization in Detroit, Michigan. Study data were obtained from law enforcement records from 2007-2022. Findings provide an overview of victim demographics and the role of neighborhood context as it relates to violent victimization across development groups. Results are discussed in the context of how to better understand youth victimization in the U.S. and intervention strategies aimed at reducing violence.

Keywords: Juvenile Victimization, Community Interventions, Social Disorganization

Social Impact: Family Relations

Levi Mahler
California State University, Monterey Bay

Gods and Bases: U.S. Military Presence and Its Impacts on Japanese Spiritual Customs

Japan continues to be impacted by World War II, perhaps most clearly in the continued presence of U.S. military bases. Our historical research analyzes how the occupation of Japanese spaces by the U.S. military has impacted Japanese spiritual customs in these areas over time. We interviewed various groups of Japanese to learn about how bases affect spiritual practices, looking at Shintō and Buddhism religions, including the ability to visit ancestral tombs, and how traditions have changed since 1945. We also visited base towns to understand broader memories and feelings around the continued base presence.

Keywords: spiritual customs, U.S. military occupation of Japanese spaces, spiritual practices, Shintō, Buddhism, ancestral tombs

Social Impact: Family Relations

Margret E
Madras Christian College

Field Action Programme (FAP) - a vantage point for practicing Advocacy

A field action program can serve as a valuable vantage point for advocacy, as it facilitates a comprehensive understanding of the ground realities and specific challenges faced by the community. By working closely with the target population (Particularly Vulnerable Tribal Groups- Irular Tribe), it becomes possible to understand their needs and concerns, thereby advocating for their rights and promoting necessary changes. This hands-on approach can significantly amplify the impact of advocacy efforts and foster a deeper connection with the communities being served. The use of reflective practice in FAP paves the way to train people for self- Advocacy. This presentation unpacks the different advocacy models practiced in the Field Action Programme of Department of Social Work (Aided) , Madras Christian College.

Keywords: Advocacy, particularly Vulnerable Tribal Groups (PVTGs), Community Engagement.

Social Impact: Social Equity

Mia Moore
Roosevelt University

Broadcasting A Revolution: Fannie Lou Hamer's Use of Media in the Civil Rights Movement

The 1960s were characterized by many social and political movements, especially the Civil Rights Movement (CRM). Figures like Dr. Martin Luther King Jr. are revered for their leadership of the movement and use of nonviolent direct action to gain liberation. While their names may not be as well-known as Dr. King's, there are a variety of Black women that also helped to further the movement's progress, like Fannie Lou Hamer. This project examines how Fannie Lou Hamer used media – sonic and visual – to advance the mission of the CRM. Using a rhetorical analysis, the project focuses on two of Hamer's speeches (from the 1964 Democratic National Convention and a 1969 Vietnam War Moratorium Rally) that reveal the ways that she took advantage of the evolution of television and the efficacy of freedom songs to share her story, educate people on the CRM and systemic issues, and inform the masses on the ways in which they could mobilize themselves to mitigate structural harm (namely through registering to vote). This project is informed by Black Feminist Thought, a framework developed by sociologist Patricia Hill Collins. In centering the knowledge and experiences of black women when approaching scholarship and analysis, this project is deliberately crafted to facilitate maximum comprehension while also adding to recent historiographical developments that reexamine the roles of Black women within the CRM.

Keywords: Civil Rights Movement; Fannie Lou Hamer; media; activism

Social Impact: Social Equity

Nayeli Karla G. Trujillo
University of Colorado Boulder

Tangibly Embedded- A profound obligation, to self and others, during and beyond stressful times

This project focuses on linking individuals to larger constructed social landscapes; specifically, how various kinds of community-university interactions can employ innovative strategies for engagement. The Covid19 pandemic further inflamed inequities that had been in place prior to it. Intensifying unparalleled levels of stress due to broadening social inequality and diminished access to resources, such as equitable Wi-Fi as well as educational, emotional and social programs. In response, I participated in a partnership program between University of California, San Diego, and the nonprofit La Colonia de Eden Gardens Inc. (LCEG, Inc.) to sustain and grow mentors, parents, and youth that include members from various San Diego County communities. I have attended to inequities by implementing social programs that provide support in learning digital literacies, mentoring and service projects. The frameworks that drive my work are interdisciplinary, intersecting between anthropology, the learning sciences, and ecological concepts to further the notion that humans jointly and tangibly co-produce embodied connections. I focus on how members of this university-community collective defined and experienced well-being and the role that service played in promoting individual and group resilience. Research was driven by community identified concerns of rising anxiety, depression, shortfalls with remote learning and limited knowledge of digital literacies. Data sources include surveys, interviews, field notes, and visual art, which were analyzed using mixed methods. Data was collected from members of the LCEG, Inc. landscape. This research helps fill gaps in scholarship by showcasing how assisting one another, through stress, can help individual and group well-being. Initial findings point to resilience and sustainability being balanced when valued engagement, growth by way of new learning and service opportunities are combined to empower the affective worlds we occupy.

Keywords: Affect Theory, Resilience, Sustainability, Well-Being, Social Landscapes, Stress, Service

Social Impact: Mental Health

Oscar Juvera
California State University Northridge

Comparative Postnatal Development of Purkinje Dendritic Arborizations in the Cerebellum of Spastic and Wildtype Rattus norvegicus

Purkinje cells are highly specialized neurons located in the cerebellum that play a crucial role in regulating motor coordination and learning. By releasing an inhibitory neurotransmitter called gamma-aminobutyric acid (GABA), Purkinje cells exert precise inhibitory control over the activity of deep cerebellar nuclei, fine-tuning motor output to achieve accurate movement. Disruptions in Purkinje cell activity can lead to motor dysfunction such as ataxia, characterized by impaired balance or coordination in an organism. Minor alterations in the number or function of Purkinje cells can result in significant motor deficits, underscoring the crucial nature of their precise regulation. The California State University, Northridge (CSUN) possesses a lineage of Han-Wistar rats afflicted with an incapacitating form of ataxia, which ultimately leads to their demise prior to reaching 60 days of age. Inquiries into these rats have identified a homozygous recessive gene that triggers an unequal loss of Purkinje cells, ultimately resulting in ataxia. To augment our comprehension of the underlying mechanisms behind ataxia pathology, we have opted to employ these spastic rats as a model organism. Despite our cognizance of the fact that a certain percentage of Purkinje neurons are lost by postnatal day 60 (PND60), the precise onset of this neuronal degradation remains shrouded in obscurity. Accordingly, the primary aim of this research endeavor is to ascertain the precise temporal point at which Purkinje neuron loss commences in these rats. Immunohistochemistry staining, cell shape tracing, and quantification of neuronal density in spastic rats vis-à-vis normal animals will comprise the methodological framework employed to determine the existence or degeneration of Purkinje neurons.

Keywords: Purkinje cells, ataxia, motor coordination, spasticity.

Social Impact: Healthcare

Petvy Li
Hunter College

Disassembly of ECM-Mimicking Collagen Networks by Magnetic Brownian Motion of Iron Oxide Nanocages to Create a Drug Delivery Pathway

A significant problem in effective drug delivery stems from the extracellular matrix (ECM) around cancer cells in the tumor microenvironment (TME). During tumorigenesis, the interaction between cancer cells and the TME increases density of the ECM and prevents the penetration of drugs and immunological cells for reaching to targeted tumor cells. Previously, enzymes were used to permanently loosen the density of the ECM networks, but their chemical, functional, and environmental specificities for the network backbones restrict their efficacy. We aim to study how applying magnetic Brownian motion of non-toxic cage-shaped superparamagnetic iron oxide nanoparticles (IO-nanocages) under alternating magnetic fields (AMFs) can relax the collagen networks with IO-nanocages embedded into them. Relaxation of ECMs by the magnetic motion of nanoparticles is advantageous for their reversibility of ECM density, non-invasiveness of ECM relaxation, and biocompatibility of IO-nanocages. To examine our hypothesis that magnetic Brownian motion will disrupt collagen crosslinks to increase IO-nanocages release, we self-assembled collagen I in a range of density mimicking the ECMs in Eppendorf tubes. We expect that when IO-nanocages are incubated into the collagen layer on top of water under AMFs, IO-nanocages should diffuse from the collagen phase to the water phase due to density relaxation of collagen networks from Brownian forces. Preliminary results show that the concentration of IO-nanocages in the water phase increased after five minutes of the AMF application. Collagen disassemblies were also confirmed by using optical birefringence imaging which showed that the collagen bundles lost both one dimensional fibril shape as well as the molecular self-assembly alignment. Our findings support our hypothesis that the Brownian force created by IO-nanocages in AMFs leads to disassembled collagen fibers, relaxation of the collagen network which decreased its density, and increased the diffusion of IO-nanocages in the ECM mimics to the water layer. This technique will have a high impact on improving the efficiency of drug/gene delivery through the TME as IO-nanocages open up the route for their penetration through the complex and dense ECM. In the future, we will optimize the experimental design to relax ECMs by changing the concentration, size, and composition of IO-nanocages to maximize their diffusion from the collagen to the water phase. After this optimization, we will embed cells in the ECM mimics and quantify the concentration of IO-nanocages delivered to these cells in the magnetic fields. We will also deliver siRNAs to the luciferase-expressing cells to quantify the number of siRNAs in the above condition.

Keywords: increased efficacy of drug delivery in tumor microenvironment (TME), protein disassembly in extracellular matrix (ECM), Brownian motion of iron oxide nanocages (IO-nanocages)

Social Impact: Healthcare

Rahul Jain
Michigan State University

Space Radiation (X-rays)

X-rays in space were first discovered in 1949 by radiation detectors aboard V-2 Rocket launched by the US Naval Research Laboratory. This is fairly recent compared to the rich history of practicing astronomy for thousands of years. This is because earth's atmosphere acts as a shield against X-rays. Nowadays, space based satellites monitor many sources of X-ray with very sensitive detectors. Major sources of X-rays are when either neutron stars or black holes rip apart another star in a violent explosion. These explosions create many exotic radioactive isotopes that decay and power the explosions. To predict the complete profile of emitted X-rays, we need to know all the properties of radioactive isotopes. I will present the different isotopes we study experimentally in the laboratory, the techniques we use, and how it helps predict X-ray profiles from such explosions. This will help us better understand and monitor the background of X-ray radiation in space.

Keywords: Space missions, radiation background

Social Impact: Workforce Development

Victor Milanes

University of Central Florida & Michigan State University

Methods Review: What are People Saying about GMOs on Twitter?

The landscape of attitudes toward genetically modified foods (GMOs) has polarized the public in recent years. Contrasting news sources citing various empirical scientific studies contribute to the complexity of the landscape, and public opinion appears to be highly scattered. To better inform, educate and guide individuals and policymakers on how to better navigate their relationship with GMOs, this study seeks to understand and establish an empirical analysis of individuals' attitudes, and their diffusion on Twitter. This will be accomplished by answering the research question: How are semantic characteristics/temporal patterns related to the popularity of tweets (Defined by the number of retweets, likes, and replies they receive)? To answer this question, a sentiment and network analysis will be conducted in order to: Identify whether a tweet expresses a positive, negative, or neutral sentiment, as well as to quantify the intensity of that sentiment, and explore the structural properties and patterns within communication networks. Our data set consists of approximately 50,000 Tweets that mention keywords related to GMOs on Twitter from 2018. These computational models of Twitter interactions are conducted in R/RStudio. This study expects to coincide with previous research and produce results suggesting that semantic characteristics play a significant role in Twitter engagement. Lastly, this study aims to establish and solidify qualitative data scraping techniques related to character content to provide context for further research in data mining on social media.

Keywords: GMO, Twitter, Attitudes, data mining

Social Impact: Social Equity

Zaria Jackson

North Carolina Central University

Determining effectiveness of a catalyst on the depolymerization of polyethylene terephthalate using kinetics

Kinetics research is essential for expanding the field of polymer recycling as well as restoring sustainable methods for the conversion of waste plastics into valuable chemical resources. The depolymerization of the biobased polyester polyethylene terephthalate (PET) using a zinc-oxide catalyst has shown to be a functional and efficient approach in recycling and reusing PET waste. The catalyst was composed of zinc-oxide and picolinic acid to form a zinc-picolinate. The efficiency and effectiveness of the catalyst was characterized and evaluated by conducting a kinetics study on the depolymerization of PET in order to determine the rate of reaction. These research methods are vital for advancing the economy and decreasing the negative effects of plastic waste on the environment.

Keywords: recycling, kinetics, plastic, catalyst, polymers

Social Impact: Environment

What is AGEP?

The Alliances for Graduate Education and the Professoriate (**AGEP**) is a National Science Foundation program that supports recruitment, retention, and graduation of underrepresented U. S. minorities in doctoral programs of the natural and social sciences, mathematics, and engineering. Undergraduates, graduate students, post-docs, and faculty who participate in building the AGEP Community at MSU rise to meet the challenge of Diversity, Equity & Inclusion at U. S. colleges and universities, by nurturing and developing world-class STEM and Social, Behavioral and Economic sciences faculty members who fully reflect the diversity in race, gender, culture and intellectual talent of the U. S. population.

National Need

The United States faces a growing demand for a highly educated science and engineering workforce. The annual number of Black, Hispanic, and American Indian citizens earning a PhD must quadruple in order to contribute the science and engineering talent necessary for the U.S. to become self-reliant.

AGEP at Michigan State University – Impact

The AGEP Community represents 75% of doctoral students at MSU who are Black, Hispanic or American Indian citizens that in NSF sponsored departments. Ninety percent of the AGEP Community graduate student participants complete an advanced degree. Over the past 10 years, the AGEP Community has grown from six graduate students in 2006 and faculty to over **250** participants annually with over **400** alumni nation-wide.

The Community began with support from NSF, and AGEP has become a self-sustaining component of the matrix of graduate student support provided by the MSU Graduate School. A cross-disciplinary AGEP Learning Community of graduate students and faculty meets monthly; discusses active research by participants using everyday language; and considers current topics of regional and national importance for public policy. AGEP is a proven strategy for diverse recruitment, retention, and persistence in graduate education. The AGEP Student Success Conference hosted by MSU is cross-disciplinary experience, full of scientists, engineers, social scientists, policy makers and community leaders and students.

For more information, visit us at:

MSU AGEP website: <https://grad.msu.edu/agep>

MSU AGEP Program Director: Steven Thomas, deshawn@msu.edu

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the individual presenters and do not necessarily reflect the views of the National Science Foundation.

